1947.

VICTORIA.

COUNTRY ROADS BOARD.

THIRTY-FOURTH ANNUAL REPORT

FOR YEAR ENDED 30TH JUNE, 1947.

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

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COUNTRY ROADS BOARD.

THIRTY-FOURTH ANNUAL REPORT.

Exhibition Building,
Carlton, N.3.,
20th November, 1947.

The Honorable J. A. Kennedy, 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, 1947.

FINANCE.

During the year the receipts from motor registration fees and fines paid into the Country Roads Board Fund amounted to £1,908,848 compared with £1,678,550 during the preceding year, an increase of £230,298. The cost of collection and refunds totalled £146,052, leaving a net revenue of £1,762,795.

Under the terms of the Federal aid roads agreement the sum of £813,024 was received as against £548,934 during the previous year, representing an increase of £264,090.

The total gross amount received from both sources was, therefore, £2,721,872, an increase of £494,388 over the total for the financial year 1945–46.

From the loan authorization of £500,000, for the construction and reconstruction of metropolitan roads and bridges, passed by Parliament under Acts 4188, 4414, and 4498, £9,979 was expended during the year. A balance of £236,763 remained at 30th June, 1947.

COUNTRY ROADS BOARD FUND.

At the beginning of the financial year 1946–47, the Board was faced with an extensive programme of reconditioning works on State highways and main roads due to the inability to carry out the normal programme of works during the war years. In the latter part of the previous year provision had been made for some large works as indicated in the last annual report, but generally it was not possible to proceed with the work beyond the preliminary stages.

The total amount allocated for reconditioning and maintenance work on main roads, State highways, tourists' roads, forest roads, and Murray River bridges during the year 1946–47 was £2,390,195, which was the highest allocation made from the Country Roads Board Fund since the inception of the Board. The allocation for the financial year 1945–46 was only £1,486,191.

The credit balance shown in the Country Roads Board Fund at the 30th June, 1947, was £644,626, which will be required for deferred works and to meet commitments amounting to £172,469 in respect of contracts and direct labour works in hand at the end of the financial year.

Section 34 of the Country Roads Act No. 3662 provided for the half cost of permanent works on main roads apportioned to municipalities to be paid at the rate of 6 per cent. per annum over a period of 31½ years to cover interest and sinking fund. The Act also provided for payment of 1 per cent. to 3 per cent. towards interest on loan moneys expended on the construction of developmental roads. The Councils' contributions in

respect of expenditure in the years 1913–14 and 1914–15 are now subject to reduction as shown by the individual redemption schedules. As the payment of Councils' contributions is now covered by relief as a charge against the Country Roads Board Fund that relief is reduced by an amount of £4,625 in the year 1946–47, the total amount for the year being £220,682.

Act No. 3944 provides that consolidated revenue shall be recouped from the Country Roads Board Fund all interest and sinking fund payments in respect of loan expenditure under the Country Roads Act. At the date of the financial agreement with the Commonwealth (30th June, 1927) the total liability was netted and will not be redeemed until approximately 58 years from that date. The total amount charged to the Fund during the financial year was £501,480, of which £181,918 represents the amount of relief granted to municipalities on account of their proportion of interest and sinking fund payments.

Federal Aid Roads Account.

The following amounts were expended during the year from Federal aid funds:—

	£
Construction of developmental and main roads	191,784
Isolated settlers' roads	19,028
Provision towards maintenance of roads previously constructed from moneys provided by the State and the Commonwealth	242,482
Restoration and re-building of bridges	54,890
Removal of drift sand, bush-fire restoration works, &c.	4,666
Flood damage repair	29,458
Construction and reconstruction on school-bus routes	12,374
Total	554,682

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 £9,880 was made available under the terms of the Federal aid roads and works agreement, which, together with the amount of £4,205 committed from the previous year, made a total amount available of £14,085. The expenditure was £4,888, and £9,197 was carried forward to the ensuing financial year.

At the 30th June, 1947, a credit balance of £1,359,242 was 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 £1,007,123.

STATE HIGHWAYS.

The State-highway system now comprises a length of 2,921 miles over which maintenance works were carried out during the year. These consisted principally of patrol maintenance, resealing, and reconditioning works. In addition, extensive works were undertaken in restoring pavements which had failed owing to heavy traffic and to the limited nature of the work carried out during the war years. The principal works of this description were the following:—

Princes Highway West between Killarney and Rosebrook.—Reconstruction with scoria, and sealing three miles.

Midland Highway between Lethbridge and Meredith.—Reconstruction in fine-crushed rock and sealing 5½ miles.

Western Highway between Horsham and Dimboola.—Strengthening and re-sheeting 6¼ miles.

Western Highway near Ballan.—Widening, reconstruction and resheeting prior to sealing of 1½ miles.

Calder Highway between Sea Lake and Nandaly.—Major reconditioning and sealing 11½ miles.

The Board is faced with a large number of works on State highways which involve widening, re-alignment, strengthening, and shouldering. Generally, pavement renewals of an extensive nature were held over in recent years where it was considered necessary to rebuild the road on a new alignment in the interests of safety, in which cases the Board had acquired the necessary land in anticipation of the work being ultimately undertaken. In giving priority to these works the Board has paid particular attention to localities in which accidents have occurred. An important project of this description is the deviation of the Calder Highway north of Malmsbury. The work consisted of clearing, forming, and surfacing a length of 11,300 feet, the formation width being 33 feet and the pavement width 22 feet, together with a reinforced concrete box culvert over Kangaroo Creek.

The Board has not yet been able to embark on an extensive programme of new bitumen sealing work, as it has been necessary to concentrate on reseals in order to preserve existing assets. The length of resealing on State highways completed during the year was 135·8 miles, compared with 202·67 miles during the previous year. The length of new seals on sections previously sealed but which required reconstruction was 28·9 miles, whilst new seals being extensions of the bituminous surface treated system totalled 35 miles.

The total expenditure on maintenance and repairs was £597,181, including the cost of improvements required to meet urgent needs; £15,820 was expended on the erection of new bridges and the restoration of dilapidated structures. The total amount was provided from the Country Roads Board Fund.

The Board has had under consideration the declaration of important main roads as State highways, particularly those which constitute the natural extensions of certain existing highways or form important connecting links in the highway system. Recommendations for the declaration of these additional highways will be made to the Governor in Council at an early date.

MAIN ROADS.

An amount of £1,688,437 was allocated during the year for the maintenance, improvement, and reconditioning of 8,491 miles of declared roads, but, in view of difficulties experienced by the Board in common with other Instrumentalities in having works performed, the amount expended was only £886,026, being approximately 53 per cent. of the total allocation. Provision of £1,205,296 was made from the Country Roads Board Fund and £483,141 from moneys available under the Federal aid roads and works agreement.

The length of reseals for the twelve months extended over 328 miles, whilst new seals on sections previously sealed, but which required reconstruction, were restricted to 26·63 miles. New seals being extensions of the bituminous surface treated system, totalled 66·67 miles. The total of the lengths dealt with was 421·3 miles, being a decrease of 40·3 miles on the previous year.

New bridge projects initiated totalled 32 and an existing bridge was strengthened, the total cost of the projects being £45,000.

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. Assistance given in this way amounted to £41,628 for the year, which resulted in the total municipal contributions being reduced to one-quarter of the total cost.

Under Act No. 4415, relief to the extent of £220,704 was granted to country municipalities on account of interest and sinking fund payments in respect of main roads and developmental roads for the year.

Among the more important works completed under the Board's direct supervision were the following:—

Main Healesville Road.—

This road has been subjected to particularly heavy log and sawn-timber traffic during recent years resulting in the surface showing signs of deterioration in many places, where extensive reconditioning works will be necessary in the near future. On a section of the road at and near the junction of the Warburton Road at which a number of serious

accidents had occurred, regrading of the hill on the Lilydale side of the junction and the improvement of the curve were completed. Plate No. 1 shows the new road and the old alignment.

Point Nepean Road.—

This road is one of the most heavily trafficked on the outskirts of Melbourne, especially during weekend and holiday periods. A section to which particular attention was given is at the junction at Mentone at which traffic on the Point Nepean Road, Warrigal Road, Balcombe Road, and Lower Dandenong Road meet. In conjunction with the Mordialloc City Council, the Board has adopted a scheme for improving this junction involving the acquisition of land to provide increased visibility and to facilitate the flow of traffic.

Fig. 1 shows the proposals.

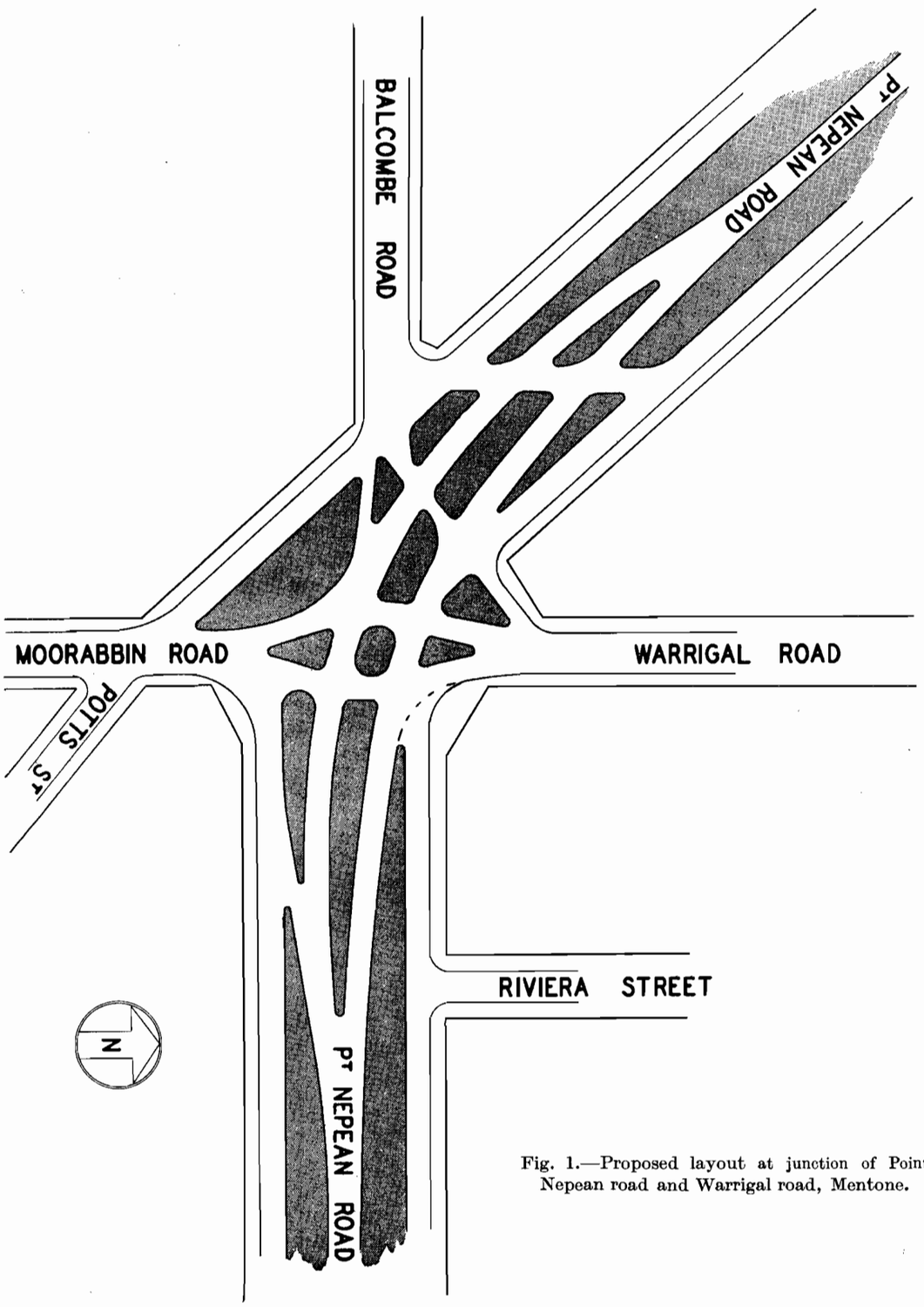

Fig. 1.—Proposed layout at junction of Point Nepean road and Warrigal road, Mentone.

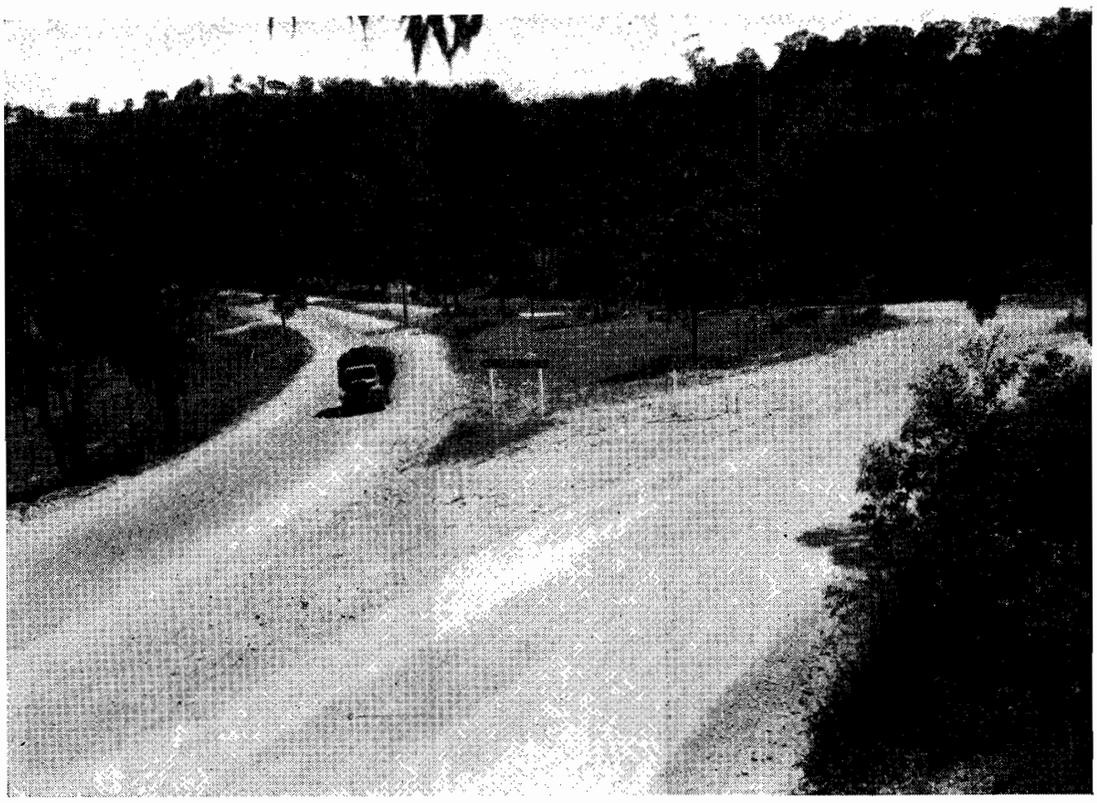

Plate No. 1.—New junction of Main Healesville and Warburton Roads near Lilydale (old junction on right).

Main Coast Road.—

This road, which forms the main route to Wonthaggi and Inverloch, also takes traffic to Phillip Island across the bridge between San Remo and Newhaven. The road surface had consisted of a thin layer of sand which required constant maintenance to avoid corrugation, and, in addition, the alignment in numerous places was bad. In view of the heavy traffic now using the road, and the excessive cost of maintenance, the Board decided to undertake a comprehensive scheme of realignment and construction, and, during last year, a length of twelve miles was dealt with between the South Gippsland Highway and the Corinella Road. It is proposed to seal this section during the present financial year.

Little Yarra Road.—

In view of the nature of the traffic consisting of heavy timber vehicles hauling timber from forest areas using the road which extends from Yarra Junction to Powelltown, and the difficulties in maintaining the pavement, extensive reconstruction, consisting of realignment and resheeting over a length of 3½ miles was completed during the year. It is proposed to seal this section during the present year.

Whilst the principal work carried out on main roads consisted of maintenance and reconditioning, it was found necessary to embark on certain extensive work to cater for special classes of traffic. Particulars of the principal works are given hereunder.

Benalla–Tatong Road.—

Following investigation by the State Development Committee into the question of closing the railway line between Benalla and Tatong, at which evidence on behalf of the Board was given by the Chairman, the Committee decided that it would recommend the closing of the railway line on the Board undertaking that the road between the towns mentioned would be placed in a satisfactory condition by the 30th June, 1947. Thereupon the road was declared a main road, and the necessary reconstruction works were put in hand and completed before the date mentioned.

Winchelsea–Dean Marsh Road.—

Since the development of the brown coal mine at Wensleydale, the Winchelsea–Dean Marsh Road has been subjected to heavy coal traffic to the Winchelsea railway station, with the result that considerable wear and tear has been caused to the road. With the object

of affording improved facilities for the transport of the coal, the Board provided for the complete reconstruction and sealing of the road, and the necessary action has been taken for the replacement of two bridges over the Barwon River. Provision has also been made for the reconstruction of the bridge over the Wormbete Creek on the Cape Otway Road, as well as the strengthening of that road, which is to be used as an alternative route pending the erection of the two bridges on the main road.

Plate No. 2.—Alpine Road near Mount Hotham—unwidened section.

Plate No. 3.—Alpine Road—widened section.

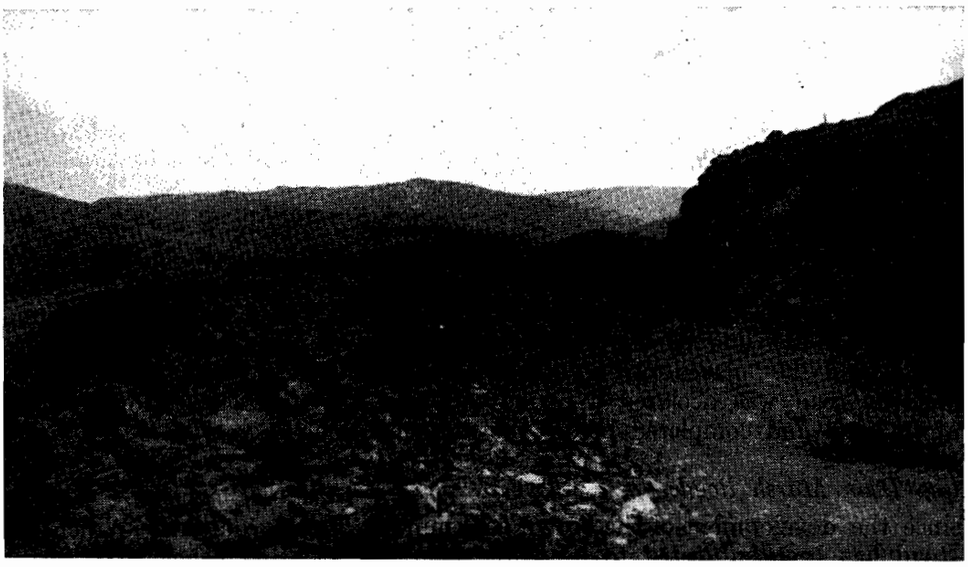

Plate No. 4.—Alpine Road—section in course of widening at curve.

Main Roads—Declaration of.

In the 33rd Annual Report it was indicated that the Board had listed a large number of applications received from municipal councils for the declaration of additional main roads, which would be considered at an opportune time. Early in 1947, the Board made a comprehensive investigation, and, as a result, decided that the most important of the roads should be declared. The number of additional roads which it was decided to declare was 72, having a length of approximately 1,105 miles, and involving 116 municipalities. In future, the Board will be responsible for payment of two-thirds of the cost of maintenance, and the municipalities one-third. The total length of main roads at 30th June, 1947, was 9,596 miles.

DEVELOPMENTAL ROADS.

In accordance with the usual procedure, Municipal Councils were invited to submit applications for the provision of funds for the construction of roads of a developmental character to be financed from funds available under the Federal aid roads and works agreement.

In previous years the allocation of funds was mainly confined to new construction works, but it was decided that in addition provision in future should be made, as far as possible, for (1) resealing roads which had originally been sealed with funds provided by the Board ; and (2) for the restoration of old, worn-out macadam roads.

At the commencement of the financial year provision of £532,573 was made to cover new works and commitments in respect of works commenced in the previous year. The amount expended during the year was £197,506 supplemented by £44,455 contributed by the councils from their own funds.

An amount of £55,635 was allocated to councils to assist in the maintenance of roads of a developmental character on which Federal aid or other funds provided by the State had previously been expended on construction ; £36,412 was expended, in addition to which municipal contributions totalled £12,511.

TOURISTS' ROADS.

Alpine Road.—

During the year renewed attention was given to the Alpine Road, which serves the chalet at Mount Hotham operated by the Railways Department. The work of widening this narrow mountain road between Harrietville and Mount Hotham had been commenced some time ago but was suspended during the war. During the year a further length of 1·85 miles between Mount St. Bernard and Mount Hotham was widened, the amount expended being £5,000. Owing to the steepness of the mountain side, negotiation of the narrow sections is somewhat hazardous for those not accustomed to the route. The section between Omeo and Mount Hotham was maintained and improved by patrolmen under the direction of the Omeo Shire Engineer.

Plates No. 2, 3, and 4 show a typical narrow section of the road and sections which have been widened.

Acheron Way.—

The Acheron Way, which is an attractive tourists' road, within comparatively easy reach of the metropolis, is now largely used by timber traffic, and at weekends by tourists and passenger buses. In recent years it has been possible to undertake little more than ordinary maintenance, but, as soon as labour and plant conditions improve, it is intended to undertake the widening of the narrowest and most tortuous sections where traffic is congested.

Ocean Road.—

On the Ocean Road extensive works were carried out, particularly on the section between Lorne and Apollo Bay, which is at present used to a great extent for the cartage of timber. The principal work consisted of repairing slips, building retaining walls to combat sea erosion, and resheeting with fine-crushed rock about 9 miles between Apollo Bay and the Lighthouse Road. In addition, resheeting, re-aligning, and sealing unsealed sections between Torquay and Bellbrae were completed.

Grampians Road.—

The principal work carried out on the above road, which is extensively used for the cartage of timber, consisted of 2·10 miles of resheeting with sand, and reforming, grading, and surfacing with fine-crushed rock beyond Hall's Gap.

Phillip Island Road.—

For the reconditioning of the Phillip Island Road, from the Main Coast Road near the Anderson railway station to San Remo on the mainland, and across the bridge to Newhaven and Cowes on the island, provision was made during the year and a contract was let for the supply of 6,000 cubic yards of fine-crushed rock with a view to proceeding with the work during the next financial year.

FOREST ROADS.

During the year, the following additional roads were proclaimed forest roads under the provisions of the Country Roads (*Forest Roads and Stock Routes Act* 1943), bringing the total mileage to 205 miles :—

Avon Shire	Dargo Road from the Maffra Shire boundary to its junction with the Bairnsdale–Dargo Road.
Ballan and Kyneton Shires	Greendale–Trentham Road from the Myrniong–Greendale Road to Trentham.

The total amount expended on the maintenance of forest roads during the year was £19,770 which was charged against the Country Roads Board Fund without any contribution by councils.

At the request of the Government a large programme of urgent road construction and strengthening commenced in the previous year was continued on behalf of the Forests Commission to facilitate transport of timber extracted from forest areas. The following roads were included in the programme :—

Reefton Spur (*Warburton–Woods Point Road*).—The work on this road, consisting of clearing, forming, and surfacing 13 miles from Reefton on the Woods Point Road to the junction with the Marysville–Woods Point Road at Big River saddle, has now been completed, the cost totalling £78,000 which is being borne by the Melbourne and Metropolitan Board of Works and the Forests Commission. As indicated in the last annual report, this road will form portion of the route to Woods Point, when the existing road is inundated by the McVeighs dam, which is to be constructed by the Melbourne and Metropolitan Board of Works, and direct immediate access is also provided to Warburton from the various areas tapped by the Forests Commission in the Big River area. The Board proposes to recommend the proclamation of the road as a forest road in order that provision may be made for its maintenance as a charge against the Country Roads Board Fund.

Licola (*Crescent Creek*) *Road.*—The length of the work to be carried out is 12·1 miles, of which the formation of 5¼ miles is 95 per cent. completed, in addition to a further 2 miles of clearing. The new road will give access from State forests on the slopes of the Great Dividing Range to the Heyfield–Licola main road in the Shire of Maffra. The strengthening of the main road, the cost of which is being shared with the Forests Commission, was continued during the year.

Raglan–Mount Cole Area.—Construction of new road leading into the Mount Cole State forest from Raglan over a length of 7·9 miles was commenced, and a length of 3·2 miles of formation was completed. The road will be formed and surfaced throughout during next financial year.

Benwerrin–Mount Sabine Road.—During the year clearing and forming was extended by 3 miles, completing this work from Benwerrin as far as Mount Cowley, and the surfacing was completed to Todd's Corner, within 3 miles of the same point, thus facilitating logging from the vicinity towards sawmills at Dean Marsh.

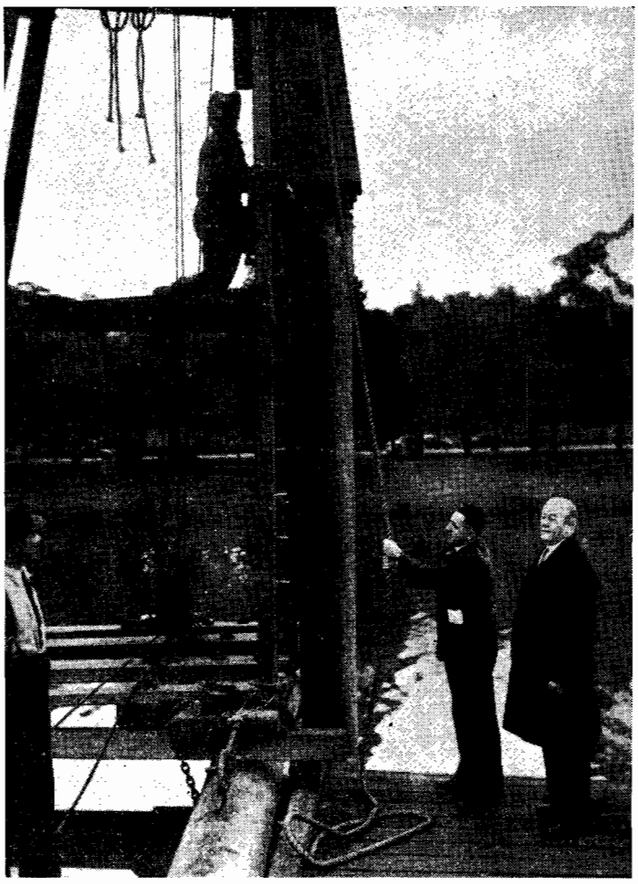

Plate No. 5.—Driving of first pile of bridge over River Yarra at Swan Street, Melbourne, by the Hon. P. J. Kennelly, M.L.C., Minister of Public Works, on 24th September, 1946.

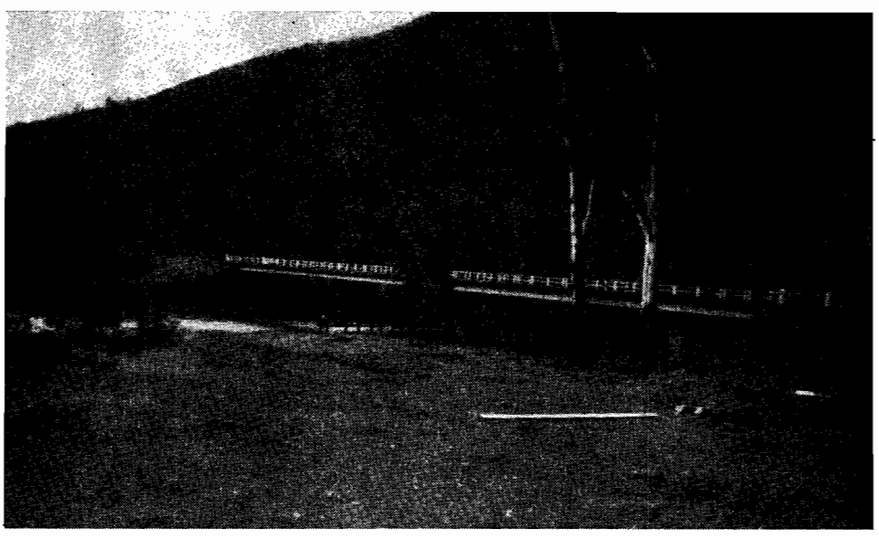

Plate No. 6.—New bridge (Cheyne's Bridge) over Macalister River on Licola Road, Maffra Shire.

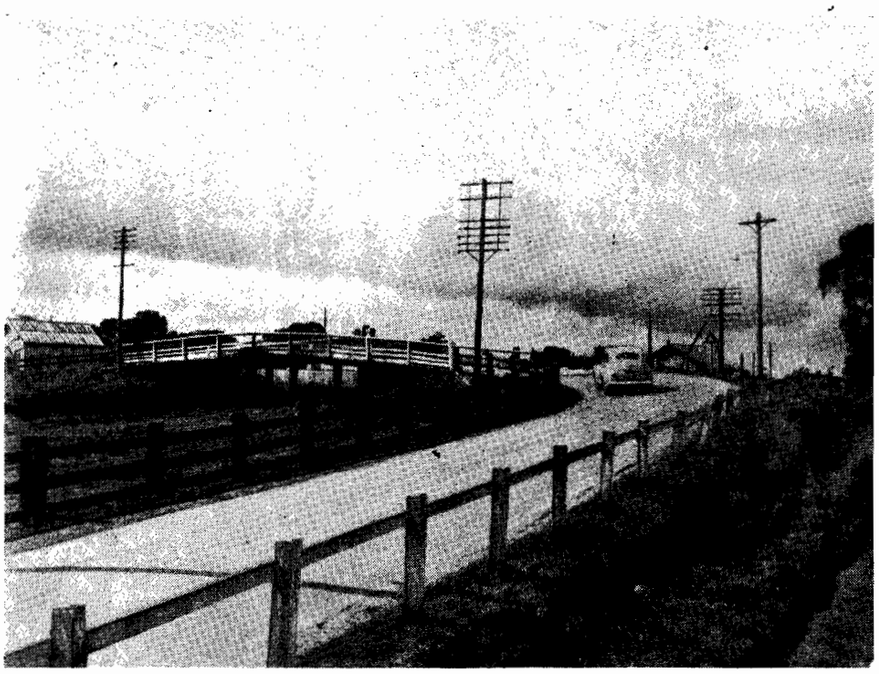

Plate No. 7.—Bridge over railway at Moe.

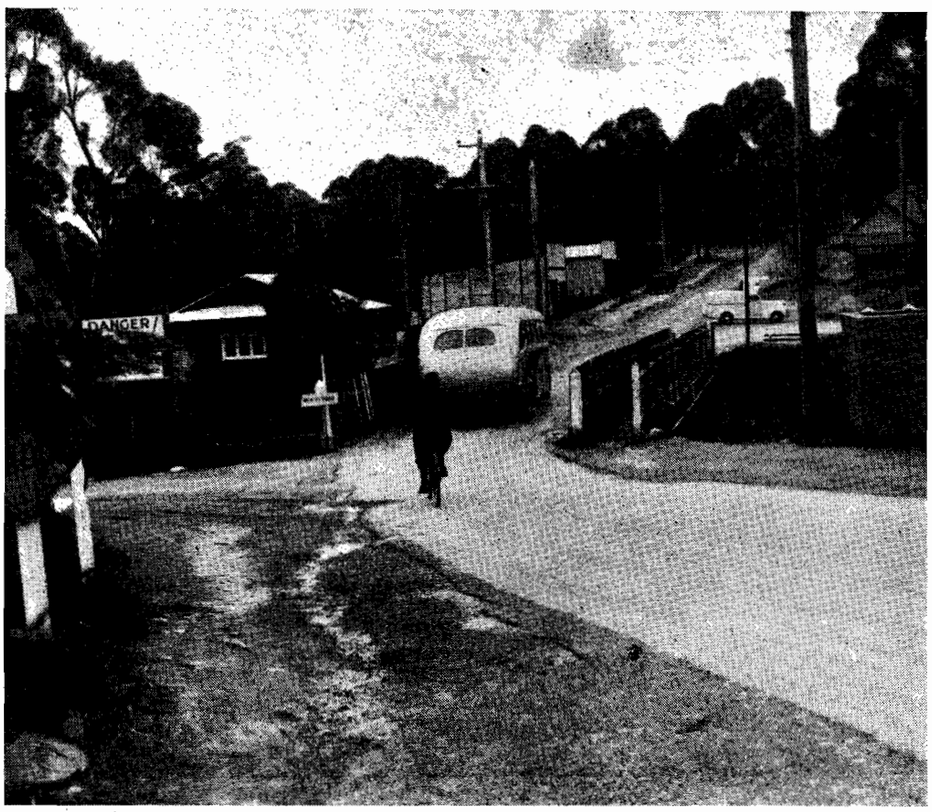

Plate No. 8.—Bridge over railway at Belgrave.

Nunniong Access Road.—Surveys covering a length of 10 miles have been prepared, and plans are in course of preparation.

Thomson Valley Road.—The work to be carried out will entail widening the existing track to 20 feet, realigning and surfacing over a distance of 5 miles, and the construction, widening, and surfacing of 8 miles of new road. At the end of the year approximately 2 miles had been cleared and 1 mile formed.

Tyers–Walhalla Road.—Survey of a section of 2·8 miles of this road in the Shire of Narracan approximately 7 miles north of Tyers, which involves relocation, has been completed, and the work of clearing and forming commenced. Owing to the wet conditions, the work was suspended at the end of the financial year.

Widening and regrading a length of 3·2 miles in the Traralgon Shire near the sawmill at Tyers is being carried out by the Traralgon Shire Council, and further provision was made for the Council to undertake the clearing, forming, and grading of the remaining section to the Shire boundary.

Noojee–Powelltown Road.—Due to the operations of the timber industry in the adjoining Noojee forest area, the strengthening of the pavement of this road to carry heavier loads was undertaken during the year, and consisted of resheeting with sand the length between " The Bump " and Powelltown, at a cost of £3,194. It is proposed to strengthen this section with fine-crushed rock during the financial year 1947–48.

Brookville Road.—Clearing, forming, and gravelling of this road near the old Brookville township site was completed by contract during the year, enabling cartage of logs to proceed to the sawmill at Swift's Creek.

BRIDGES.

During the year, apart from minor maintenance and repair, 123 bridge projects of a total value of £116,000 were initiated, bringing the total number of structures erected or in course of erection by the Board and municipal councils to 3,165. Of the 123 new projects, 25 of a total value of £46,000 were supervised by the Board, and 98, at a total cost of £70,000 were supervised by municipalities.

In the last annual report, special reference was made to three important projects in Melbourne and the metropolitan area, viz: the new bridge over the Yarra River at Swan-street, new bridge over the Darebin Creek in Bell street, on the boundary of the Cities of Heidelberg and Preston, and the renewal and widening of the bridge over Merri Creek in Bell-street, on the boundary of the Cities of Preston and Coburg.

Swan-street Bridge.—A contract was entered into for the construction of the piers as the first stage of construction. The contractor commenced operations, but difficulties regarding supplies, both of materials and labour, eventually forced him to ask to be relieved of his contract.

After consideration of thc circumstances the Board determined the contract and proceeded to carry out the work by direct labour. Men and materials were assembled and the work of casting the piles, driving the necessary staging, and all preparatory work was pushed ahead. Towards the end of January, the shortage of steel became acute, followed by still greater reduction in the amount of cement available.

In view of the fact that the Board considered it essential not to hamper river traffic more than was absolutely necessary, and in view of the shortage of materials, it was decided to close the job down temporarily.

Plate No. 5 shows the driving of the first pile by the Honorable P. J. Kennelly, M.L.C., Minister of Public Works.

McAlister River Bridge.—The structure known as " Cheynes " bridge on the Licola main road, having become decrepit and unable to carry the heavy log traffic to which this road will shortly be subjected, was replaced by a new bridge on a new alignment. The new structure, which is 338 feet long consists of 6 spans, varying from 45 to 55 feet in length and has a width of 22 feet between kerbs, with timber piers decked with rolled steel joist stringers.

Plate No. 6 shows an elevation of the new structure.

Plate No. 9.—Bridge over railway at Leongatha.

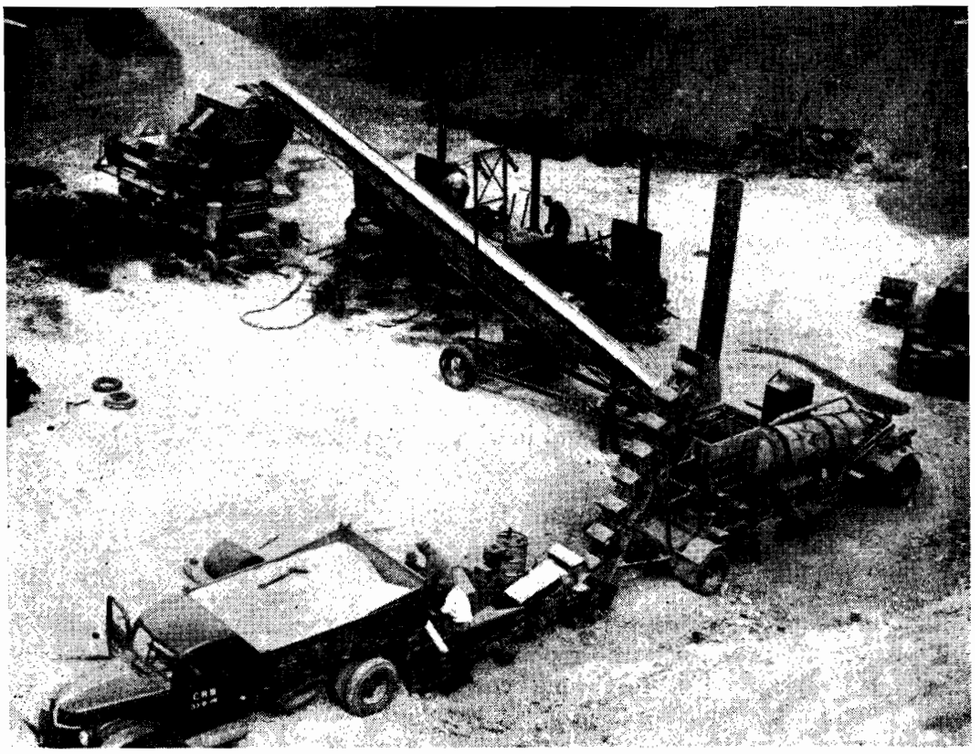

Plate No. 10.—" Barber-Greene " pug mill mixer with auxiliary plant set up at Ferntree Gully.

Moe Railway Bridge.—In view of the increasing traffic it has been found that a number of narrow bridges with sharp curves on the approaches, which were erected some years ago over railway lines, are now a source of danger, these dangerous conditions being accentuated by the fact that in many cases the structures are in close proximity to important towns on heavily trafficked roads.

For some time the bridge on the Prince's Highway over the railway line at Moe has given the Board a great deal of concern, in view of the number of serious accidents which have occurred. Proposals for the erection of a new bridge on an improved alignment have been investigated from time to time, but, owing to circumstances beyond the control of the Board, the erection of a new structure had to be delayed. Pending developments in connexion with the extension of the State Electricity Commission's brown coal area, it has been decided to widen the existing structure and improve the approaches, and plans for a roadway width of 30 feet, with two footways, each 6 feet wide have been prepared with a view to the carrying out of the work during the present financial year.

Plates No. 7, 8, and 9 show the existing bridges over railway lines at Moe, Belgrave, and Leongatha respectively, the widening of which is contemplated.

Bridge Maintenance.

In 1941, consideration was given by the Board to the question of carrying out a comprehensive inspection of bridge structures with the object of ascertaining the extent of renewals, &c., necessary. An examination of many bridges on State highways and main roads was made by a bridge inspector, but, owing to urgent defence works required to be undertaken by the Board, his services had to be utilized on those projects. Since the end of 1946, a bridge inspecting engineer has continued this work, and a classification of structures has been partly prepared with particular reference to their load-carrying capacity, to enable a programme of bridge maintenance and replacement on a standardized basis being established throughout the State.

ESSENDON AERODROME.

At the request of the Commonwealth, the Board undertook the construction of certain runways and taxiways at the Essendon aerodrome.

The first work undertaken was the construction in cement concrete of the north-south runway 4,800 feet in length by 150 feet wide. The pavement consisted of a 9-in. slab of plain cement concrete thickened to 11 inches over a width of 5 feet along the outside edges, and laid on a sandstone base of 9 inches consolidated depth. In addition, considerable extensions were made to the old apron area in front of the main hangars and two connecting taxiways were constructed in similar type pavement.

On completion of the above runway, the east-west runway, 6,100 feet in length and 200 feet wide was constructed. Owing to non-availability of cement this runway was constructed in flexible type pavement, comprising a base of 15 inches of sandstone with 11 inches consolidated depth of fine-crushed rock, which, after consolidation, was primed and sealed with a cutback bitumen and covered with clean, coarse sand. Concurrently with the construction of the east-west runway the south-west portion of the 34-degree runway 2,600 feet in length and 150 feet wide was similarly constructed.

An extensive drainage scheme was required to provide for the disposal of the runoff from the paved areas constructed and approximately 8 miles of concrete pipes ranging in size from 6 inches to 48 inches were laid.

FEDERAL AID ROADS AGREEMENT.

The new Act of the Federal Parliament, known as the *Commonwealth Aid Roads and Works Act* 1947, which was enacted following the expiration of the Federal aid roads and works agreement on the 30 June last, came into operation on the 1st July, 1947. This continues the principle of distributing funds for road works, and embodies certain new features. The amounts to be distributed to the States under the new Act are to be made available by way of grants over a period of 3 years only, and provides for the amounts to be expended by the States to be in accordance with a policy agreed to by the Commonwealth Minister.

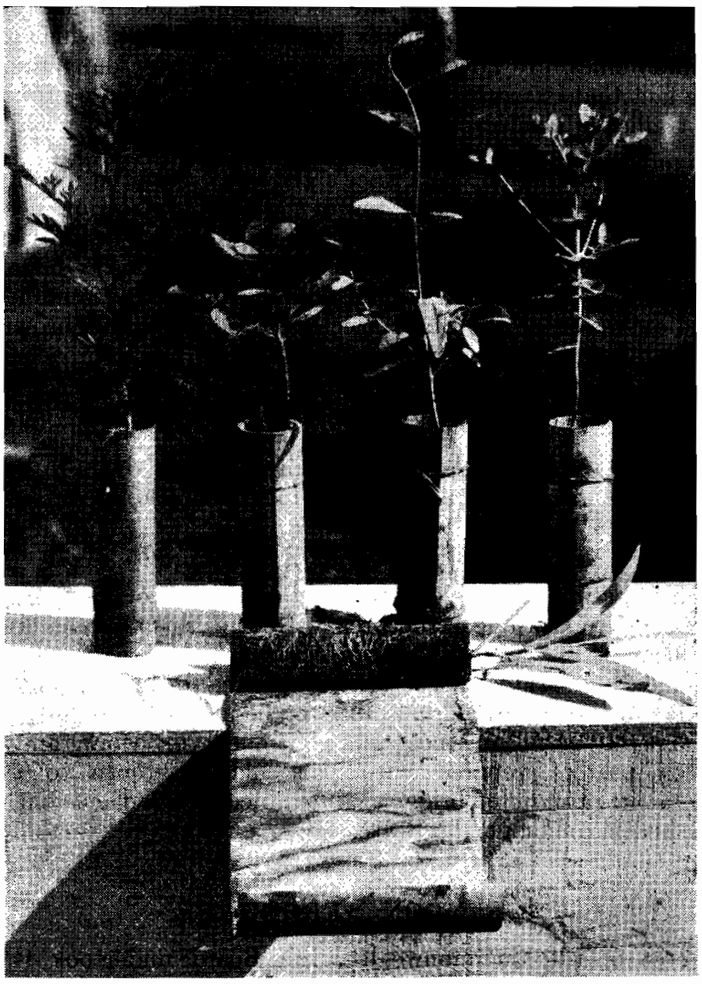

Plate No. 11.—Seedlings grown in ply-wood tubes.

Plate No. 12.—Three-year old tree (spotted gum) in Woodburn Memorial Avenue—Goulburn Valley Highway near Arcadia.

The proceeds of 3d. per gallon of customs duty on motor spirit imported into Australia, and a total of 2d. per gallon excise duty on motor spirit refined in Australia is to be distributed to the States on the basis of three-fifths population and two-fifths area, as in the past, but excluding collections in respect of spirit used in civil aircraft or for the purposes of civil aviation, and provision is made for the amount to be paid to the State to be expended upon the construction, reconstruction, maintenance, and repair of roads, provided that a sum not exceeding one-sixth may be expended upon such other works connected with transport as the State thinks fit.

In addition, it is enacted that, for the purpose of financial assistance to the States, a sum of £1,000,000 annually shall be apportioned to the States on the population-area basis mentioned, and that such amount shall be expended upon the construction, reconstruction, maintenance, and repair of roads through sparsely-populated areas, timber country, and rural areas, or, if the State thinks fit, upon the purchase of roadmaking plant for use in areas where the purchase of such plant is beyond the resources of the local authorities.

A further sum of £500,000 is to be provided annually for expenditure by the Commonwealth in the construction and maintenance of stragetic roads and roads of access to Commonwealth property.

BITUMINOUS SURFACE TREATMENT.

For several years considerable difficulty has been experienced by the Board in obtaining the necessary screenings or other aggregate to provide for the satisfactory maintenance of existing bitumen surfaced roads, apart from the covering material needed for the extension of initial sealing. This factor, in addition to the shortage of spraying plant and the high cost of bitumen, has militated against the carrying out of many very necessary resealing works and the programme of new works which the Board was anxious to put in hand.

With a view to obtaining the maximum quantity of aggregate for the coming season municipal councils have been requested to make every effort to ensure that all existing plant capable of crushing and screening stone suitable for use as aggregate for bituminous surface treatment work or of screening gravel for the same purpose is kept to its full capacity. New crushing units are as yet unobtainable from manufacturers, but the Board has undertaken to assist as far as possible in obtaining spare parts or replacements for plant, and requests have been made that the Board be advised of any idle crushing or screening plant in order that means may be devised for putting it into operation. The Board hopes that by these efforts a considerably augmented supply of aggregate might be obtained in order that delays may not occur in the carrying out of urgent work in the spraying season.

Whilst during the war bituminous work was restricted to the lightest possible re-treatments required to maintain existing " black " surfaces throughout the State, it is now possible on a limited mileage of these surfaces to adopt slightly heavier forms of re-treatment, such as pre-mixed drag-spread types. Those types enable a degree of improvement in riding qualities to be incorporated in necessary re-treatments applied to old sealed sections constructed many years ago and now in rough condition. As suitable mixing plant for this work had been imported for the Board's operations in the Northern Territory, one of the units has been purchased for work in this State, and is shown in Plate No. 10.

TREE PLANTING.

General.

The Board was hopeful that it would have been possible to embark on new schemes of tree planting and the extension of existing plantations throughout the State, but the labour shortage and difficulty of obtaining materials for tree-guards have prevented this. However, following a request from the Honorable C. E. Isaac, M.L.C., Honorary Campaign Director of the " Save the Forests " Campaign, new plantations were prepared and planted on the Western Highway, east and west of Melton township, mainly for the purpose of experimenting in an area in which tree planting has not been successful in the past, the actual work being carried out by the Board's officers and employees under the advice of the " Campaign " officers.

The seed was planted in November and December, 1946, and the seedlings transplanted into ply-wood tubes in January and February, 1947. It is claimed that this method has the advantage of allowing the unrestricted growth of the roots in a downward direction thereby preventing their disturbance when the young tree is planted in its permanent position.

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When planted, the trees are watered, but no further artificial water is given, as it is contended that the young plant root will reach down for further supplies of moisture. The experiment will be watched with interest in view of the difficulties experienced in the past with plantations in similar areas. Plate No. 11 shows seedlings before planting.

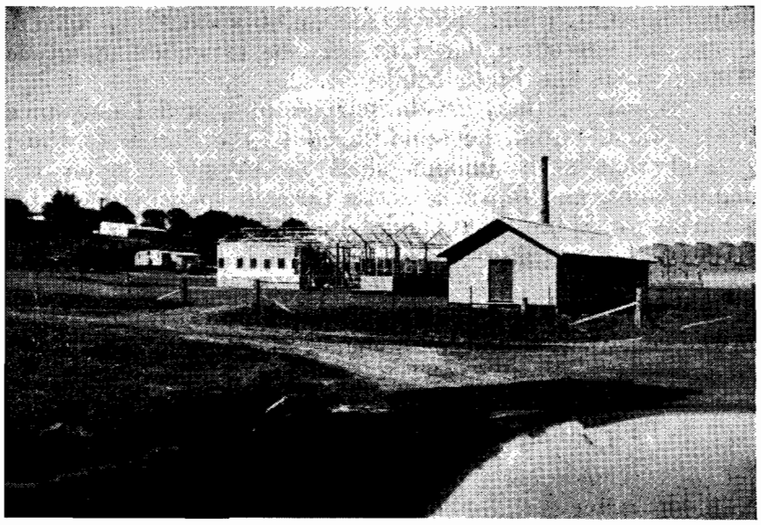

Plate No. 13.—Geelong Depot—Workshop and Store building in course of erection.

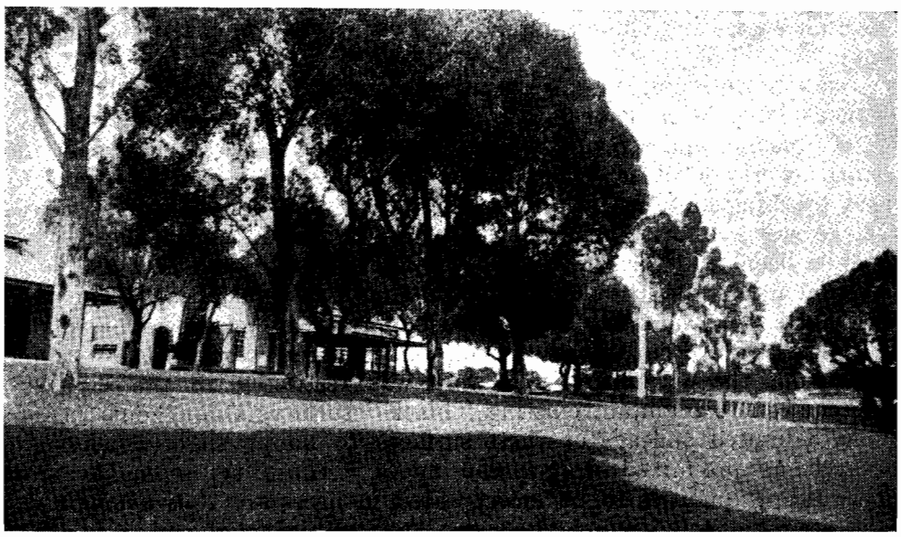

Plate No. 14.—Bendigo Depot grounds.

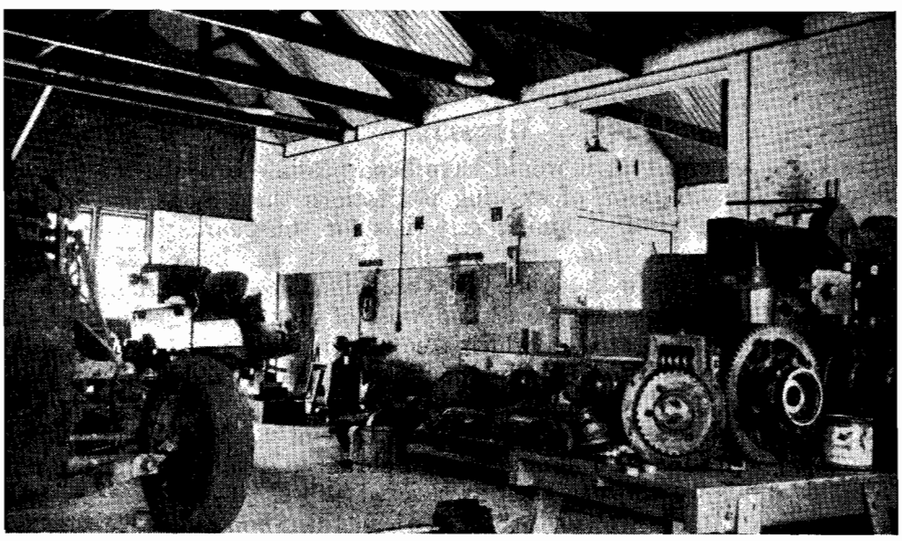

Plate No. 15.—Bendigo Depot—portion of workshop.

Woodburn Memorial Avenue.

Mr. J. E. Woodburn of Arcadia, approached the Board with a request that an avenue of trees be planted at his expense on the Goulburn Valley Highway in the vicinity of Arcadia as a memorial to his son, who lost his life in the recent war while serving with the R.A.A.F. abroad.

The Board agreed to co-operate in the proposal, and, since work commenced in July, 1945, 1,406 trees have been planted and tree guards erected; 839 guards, which were no longer required in other localities, were made available and erected in the avenue.

The total cost of the scheme to date, excluding the value of the salvaged guards, was £1,250. It is the desire of Mr. Woodburn that the planting be extended next planting season. Plate No. 12 shows a sample of a three year old tree in the avenue.

COAL WINNING AT YALLOURN.

At the request of the State Electricity Commission that the Board render urgent assistance as a temporary measure in the employment of labour and plant for the removal of over-burden and winning of coal at the old brown-coal mine at Yallourn in order to increase the rate of output operations were commenced on the 6th January, 1947, by the working of three shifts. For the first three months the quantity of overburden removed was 240,534 cubic yards, and the coal production 40,591 tons which was the maximum quantity which could be railed away.

The plant used consisted of steam and electric shovels, bulldozers, tractors, loaders, graders, scoops, motor trucks, &c.

Sufficient camp accommodation is available to enable the employment of labour for the winning of 10,000 tons of coal per week.

DECENTRALIZATION.

The Board's proposals for extending the decentralization of its administrative activities are being proceeded with as rapidly as possible having regard to the difficulties experienced in securing staff and in the erection of the necessary buildings at divisional headquarters. Some progress has been made, particularly at the centres where offices had not previously been established. This applies to Ballarat, where three houses are in course of erection for the Divisional Engineer, Assistant Divisional Engineer, and Clerical Officer respectively.

At Geelong five houses are being erected under the supervision of the Public Works Department for the accommodation of the Divisional Engineer and his staff. Buildings have also been erected on the storeyard site leased from the Lands Department, and a prefabricated house has been acquired from the Housing Commission for the storeman.

Additional buildings have been completed at the Bendigo depot consisting of testing laboratory, carpenters' and painters' shops, and fittings in the store and workshop have been installed. During the year major repairs and general overhaul of tractors, power graders, and utility trucks were carried out at the Bendigo workshop and extensive field repairs were undertaken on heavy plant by the workshop personnel.

At Benalla depot preliminary work in constructing the floors of a new divisional workshop and store has been undertaken.

Land for a divisional office and staff residences has been purchased at Horsham with a view to the erection of buildings as soon as conditions are favourable. House sites at Warrnambool and Bairnsdale have been purchased for additional staff which will be necessary when the operations at those centres are extended.

Plates Nos. 13, 14, 15 and 16 show progress with storeyard and workshop accommodation at Geelong and Bendigo respectively.

SNOW REMOVAL.

Whilst the blockage of traffic by snow on roads in the State is generally of little significance, the Board is faced with this problem in certain areas, particularly on the road to Mount Buffalo, the Alpine Road to Mount Hotham from both Omeo and Bright, and the Omeo Highway north of Omeo. Up to the present, owing to pressure of more urgent work, the Board has not incurred any expenditure in the acquisition of special

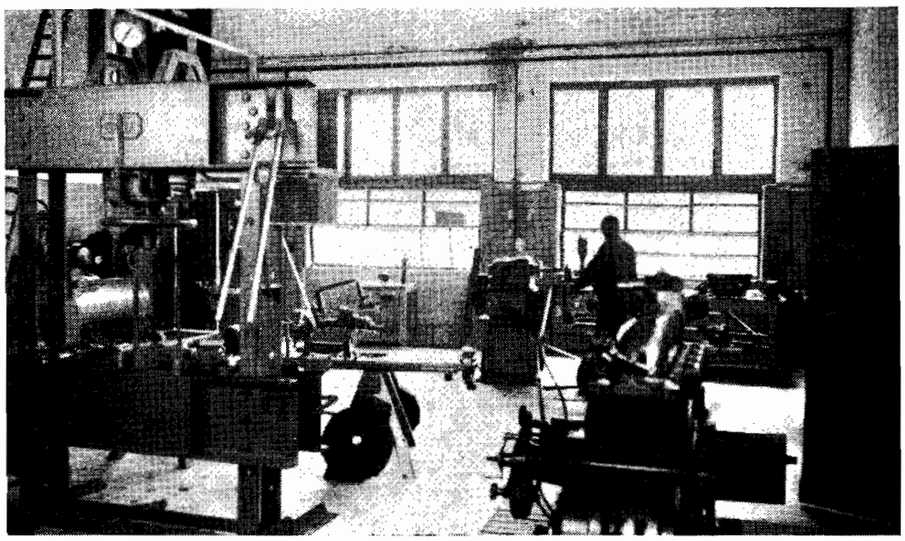

Plate No. 16.—Bendigo Depot—portion of machine shop.

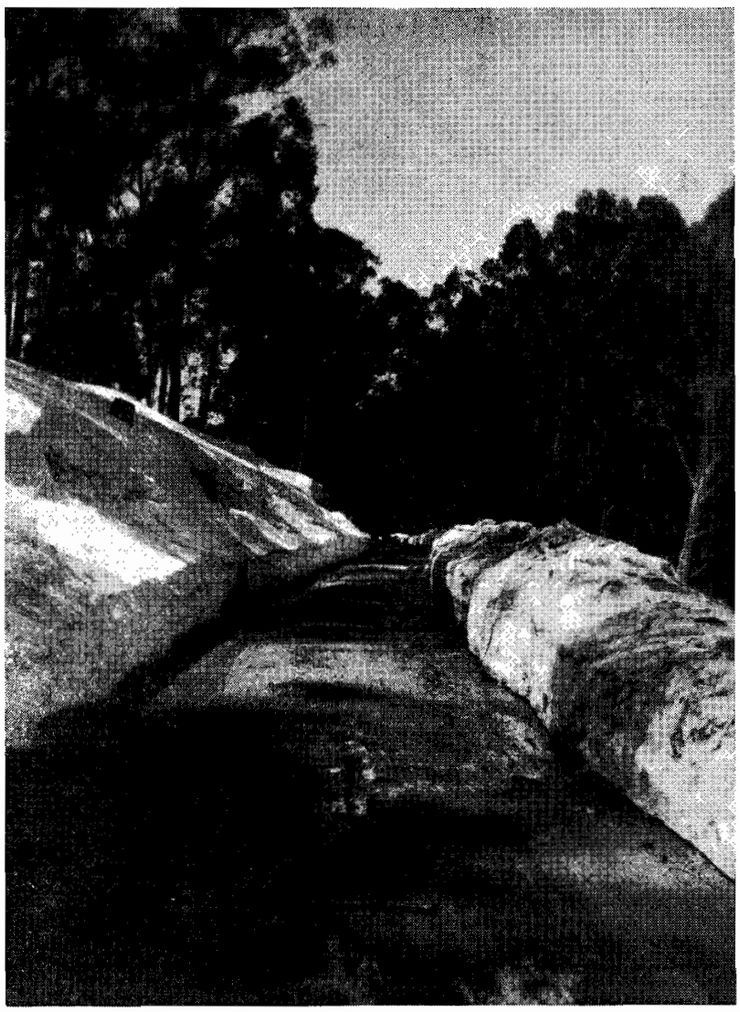

Plate No. 17.—Cutting through snow drift on Omeo Highway—work done with pick and shovel.

plant and in employment of labour to undertake the work of snow removal. As soon as the time is opportune the Board proposes to acquire modern plant for the removal of snow with a view to maintaining communication on "through" routes and also giving easy access to Victoria's snowfields during the winter months.

Plate No. 17 shows snow clearing on Omeo Highway.

ROADS IN SOLDIER SETTLEMENT ESTATES.

During the year the Board received a number of requests from the Soldier Settlement Commission for assistance in the construction of roads to serve allotments in estates acquired for settlement of discharged servicemen.

Following conferences with the Commission, it has been agreed that the Board should make provision for constructing the principal road in each estate, subject to the municipal council, under whose supervision the work will be carried out, contributing to the cost.

TRAFFIC LINE MARKING.

The valuable work of marking traffic lines commenced over fifteen years ago, has been continued. The difficulty experienced during the previous year in obtaining suitable supplies of white paint continued during 1946–47, and as an expedient the Board was compelled to use yellow paint, the only colour available.

The work done by the Board's machine during the year 1946–47 comprised the painting and re-painting of 794·5 miles of State highways, main roads, and tourists' roads, and 27·15 miles on behalf of municipalities and other bodies. The total expenditure was £7,652, of which £263 was charged to municipal councils. The total quantity of paint used was 6,190 gallons, or an average of 7·53 gallons per mile. The total cost per mile, including labour, materials, and plant hire, was £9 6s.

With the object of effecting saving in cost and economising in the use of paint, broken lines have been painted since 1941. Following recommendations reported from American trials, a length of painted sections of 15 feet, with a space of 25 feet has been adopted. Local experiments are being made with the object of determining whether the length of painted line might be further reduced, and the spaces increased without militating against the effectiveness of the line.

ROAD SIGNS AND DIRECTION BOARDS.

During the war years many of the road signs and direction boards suffered from the general difficulty experienced in carrying out maintenance works, and it was necessary for the provision of additional signs to be severely restricted. In addition, owing to prohibition of direction signs in certain circumstances under National Security Regulations, many of these signs had to be removed. Due to the shortage of labour and materials, the restoration of the road signs and direction boards has been seriously delayed, but every effort is being made to reinstate them.

Considerable difficulty is still being experienced in obtaining white paint for direction boards, guide posts, &c. The shortage of this material influenced the Board in experimenting with the use of aluminium paint, which has proved to be a reasonably good substitute. It has therefore been decided to continue its use for the present.

PLANT.

In recent years the development of mechanical plant for road construction and maintenance has considerably increased, with the result that hand methods which had previously been adopted have now been superseded. To a great extent the skilled plant operator has taken the place of the unskilled labourer in the personnel of the works organization, and works can be more efficiently and expeditiously carried through.

It was anticipated that sufficient plant would have become available to meet immediate requirements at the termination of the war, but this hope has not been realized. Some plant, not all in good order, has become available from Commonwealth Disposal sources, but, owing to the increased demands throughout Australia, and the difficulties of manufacturers in meeting the shortages little headway has been made in securing serviceable plant for immediate use. The difficulties experienced by the Board in obtaining the services of sufficient skilled tradesmen and adequate workshop accommodation have retarded repair work, and it has therefore been necessary to utilize the resources of other organizations and private workshops. The co-operation of certain metropolitan municipal councils in this way has been especially helpful.

At the end of the financial year it was found that of 70 power graders owned by the Board, only 20 were in good condition, 30 required overhaul, and 20 were not fit for further use.

In view of the urgency of special works which were put in hand to facilitate the transport of timber from forest areas, it was necessary for the Board to concentrate its plant on this work, with the result that many important reconstruction and restoration works on other roads throughout the State could not be commenced.

The unsatisfactory position with regard to plant generally has seriously retarded the Board in its own operations, and, in addition, prevented effective operation of its proposal for assisting municipalities in obtaining the use of plant for carrying out works under their control.

The Board has in view the building up of a " pool " of plant, such as power graders, tractors, compressors, &c., at divisional centres, so that eventually, as part of the decentralization policy, units may be available for hire to municipalities which are not in a position to acquire their own plant. The value of this system will be enhanced by the establishment of fully-equipped workshops at divisional centres to ensure the adequate maintenance of the plant.

WORKSHOP ACCOMMODATION.

In August, 1938, the Board obtained under lease from the Lands Department an additional area of land at South Melbourne in the vicinity of its workshops and stores. On this area additional stores and buildings used for the housing of plant were erected. As portion of the area was not required at the time, it was leased to a private company for a period, on the understanding that the Board would have the right to take over any buildings at a valuation. The Board has exercised its option, and has arranged to carry out certain works, and to instal the necessary machinery to extend its greatly overtaxed workshops. The necessity for this extra accommodation has been felt for some time, and had become increasingly necessary owing to the plant acquired from the Commonwealth Disposals Commission requiring considerable overhaul. The establishment of the divisional workshop at Bendigo has also resulted in greatly improved repair output besides saving much of the time and effort previously required in moving units stationed in the division to and fro when overhauls become necessary.

CONFERENCE OF MUNICIPAL ENGINEERS.

In 1940, the Board convened a conference of municipal engineers to discuss technical matters of importance in relation to the Board's work. This conference proved of inestimable value to the Board as well as the engineers, as it enabled many engineering problems to be discussed in detail, and views to be freely exchanged.

Although it was intended that these conference be held annually, they were suspended during the war years owing to the absence of many of the engineers on war service.

During last year it was decided to resume the conference, and it was opened by the Minister of Public Works (The Honorable P. J. Kennelly, M.L.C.), in November. The result of the discussions, it was agreed by those present, were of considerable advantage to all concerned, by ensuring fuller co-operation between Municipal engineers and the engineers of the Board.

A complete record of the proceedings was forwarded to each municipal engineer throughout the State.

CONFERENCE OF STATE ROAD AUTHORITIES.

The ninth conference of State Road Authorities of Australia, which was held in Perth in September, 1946, was attended by the Chairman of the Board. At this conference, matters of a varied nature, affecting all States, were discussed. These comprised such subjects as the supply of bitumen, future co-ordination of research and testing, bridge design, dimensions and loadings of vehicles, traffic signs and markings, traffic census, standardization of plant, compilation of statistics, &c. In addition, the delegates to the conference were given the opportunity, by courtesy of the Government of Western Australia and the Commissioner for Main Roads, to inspect a number of road works completed and in hand.

Conferences of Senior Technical Officers and Testing Officers were held in Sydney in June, 1947. It has been the practice for these conferences to be held, as far as possible, annually in order that technical matters might be discussed and recommendations made for consideration by the Conference of the State Road Authorities to be held subsequently.

In view of the Commonwealth-wide movement through the Australian Transport Advisory Council towards the promotion of road safety, increased importance attaches to the work of the Conference of State Road Authorities, which, over the years, has brought into effect a large measure of uniformity of road engineering practices, as well as introducing many road-safety measures and co-ordinating road and traffic research.

SAFETY MEASURES.

With the extension of road traffic following the easing of petrol restrictions, attention is being focussed on the necessity for the maximum effort in the direction of increasing the safety factor. A careful analysis of road accidents reveals that the majority are caused by such human factors as careless and faulty driving, or high speed, coupled with mechanical defects of vehicles. In the construction of roads and bridges and the designing of new works, the safety aspect is constantly being kept in mind, special attention being paid to such factors as alignment, grade, width of formation and pavement, and particular care is taken to ensure that the curves are laid out with sufficient radius and super-elevation to provide the maximum of safety and to conform as far as possible to the general speed value of the section of road, thus avoiding unduly sudden changes in driving conditions.

Where it has not been possible to undertake works of improvement, the erection of warning signs, the painting of traffic lines, or provision of other safety devices have been adopted as a temporary measure.

Elsewhere in this report, reference is made to certain works which have been commenced or completed. As the works involved are in the nature of improvement of existing conditions, generally with the object of providing safer alignment, it is necessary in some cases to abandon existing sections, and, where it is considered that realignment may be necessary in the future, only essential maintenance is carried out pending completion of the reconstruction.

Whilst overseas reports by highway authorities in countries where traffic densities are generally much greater than in Australia indicate an increasing use of elaborate methods of " building safety into the road ", such as " clover-leaf intersections ", multi-lane divided highways, elimination of private access along arterial and sub-arterial roads, or lighting rural roads for their full length, it is not always realised that such projects are very costly and only warranted in densely-populated areas. In general, the available funds and resources in this State are sufficient to deal only with urgently-needed road facilities of a less spectacular type. However, all such procedures are kept under close review, and those new features which can be appropriately used without extravagance are introduced into the lay-out of roads as occasion warrants. As has been indicated in previous reports portions of narrow road reserves are from time to time being widened to ensure that the space required for future developments is retained free of obstruction.

Owing to the danger caused to road users by the practice of operators of large transport vehicles stopping on the side of highways for long periods, particularly at night time, arrangements were made for a conference of officers of the Board, the Police Department, and the Victorian Road Transport Association. It was indicated that, generally, it is the practice of drivers to stop for the purpose of rest, and, in some cases, to adjust their loads, the position usually chosen being just beyond the crest of a hill, in order that they may not require to use the self-starter when continuing the journey. Following the conference it was decided that, in order to obtain practical experience of the conditions, a parking bay should be constructed on the south side of the Prince's Highway on the hill leading from the direction of the " Robin Hood " junction to Picnic Point, and that a notice " Parking Bay—$\frac{1}{4}$ mile " should be erected facing east on the south side of the highway, to indicate its location to drivers in ample time. The effect of this provision will be kept under observation.

Whilst it is recognized that in the class of work carried out by the Board, accidents to employees are unavoidable, the Board is naturally anxious that these should be reduced to the absolute minimum. A careful analysis of such accidents is made from time to time with a view to effecting improvements in conditions if necessary. As it is apparent, however, that many are preventable by the use of care and knowledge the Board has enlisted the aid of the National Safety Council which is supplying posters and literature for display and distribution in workshops and on construction projects.

ASSISTANCE TO MUNCIPALITIES.

For some years, no loan money has been expended on road construction works by the Board, except a limited amount in the metropolitan area. The Board looks to the Federal aid funds to provide the necessary finance for construction works for which grants are made to municipalities for such works on a contributory basis. The total amount allotted in the financial year 1946–47 for construction works including works on roads to properties of isolated settlers, was £832,000, the contributions from municipalities being £202,000, or approximately 19 per cent. of the total cost. In view of the fact that the provision of funds by the Commonwealth has been extended, as previously mentioned, the Board proposes to make the grants for the 1947–48 financial year on more liberal terms.

In the administration of the Country Roads Act relating to the reduction of councils' contributions in respect of maintenance of main roads, the Board is required to take into consideration whether the road is being used by traffic not of local origin, or is subjected to timber or firewood traffic, and on that account municipal contributions have been reduced on the average from $33\frac{1}{3}$ per cent. to $25\frac{1}{2}$ per cent. The rates of contribution will be reviewed in the coming year, and it is anticipated that the amount to be contributed by municipalities in respect of the 1946–47 expenditure will be further reduced.

Additional assistance in the maintenance of main roads has been rendered by making supplementary grants from Federal aid funds, without further contribution by the municipalities. It is not the practice to provide these funds for ordinary maintenance works, as the Board feels that assistance can be granted in respect of these works when the conditions mentioned above justify it by the reduction of contributions. The supplementary grants are made generally for specific works which are considered to be of special importance or magnitude or are the result of deferred maintenance due to the holding over of works during the war years. The amount allotted under this heading in the financial year 1946–47 was £477,157, thus reducing the effective percentage contribution by municipalities towards maintenance. The Board has made a still larger sum available during the current year, in order to render additional financial assistance to the councils in overcoming the arrears of work.

The granting of funds to assist in the maintenance of certain undeclared roads, which have been constructed in the past with funds provided by the State, is of considerable further help to the municipalities. It has been the general practice for these funds to be made available on the basis of £2 to £1. The amount provided for the financial year 1946–47 was £88,127. The Board intends to make additional funds available for the following year, and to review the amount of municipal contributions. This grant is intended to assist municipalities in carrying out their responsibilities for the maintenance of the roads, and their contributions represent the minimum amounts which they should expend from their own funds.

The proposed declaration of additional State highways (see page 5) and of over 1,000 miles of new main roads (see page 9) will also afford considerable financial relief to municipalities throughout the State.

AUSTRALIAN TRANSPORT ADVISORY COUNCIL.

The first meeting of the Australian Transport Advisory Council, which consists of the Commonwealth Minister for Transport and appropriate State Ministers, was held in Melbourne on the 7th January. At this meeting it was resolved that the Commonwealth and State Ministers should appoint representatives to meet in conference with interested bodies to be nominated by the States and approved by the Commonwealth to prepare recommendations in regard to road safety and road and vehicle standards for submission to the Australian Transport Advisory Council.

The conference (which was attended by representatives of the Board) was held on the 31st March, 1947, when it was resolved to recommend that an Australian Road Safety Council be formed, and that road-safety activities be co-ordinated by that Council, which should comprise representatives from each State of the Commonwealth. It was also resolved that a Commonwealth-wide standard for motor vehicles is desirable in the interests of road safety, and a special sub-committee was established to deal with this. Recommendations for vehicle standards, as set out by the Federal Chamber of Automotive Industries, are now being examined in detail by this sub-committee with the assistance of technical sub-committees in each State. The Board's Chief Engineer, Mr. C. G. Roberts, B.Sc.(Eng.), A.M.I.E.(Aust.), A.M.I.C.E., is a member of the special sub-committee. The conference also recommended the establishment of two other sub-committees, one to consider methods for obtaining uniformity in road standards, in so far as they relate to transport policy and with regard to safety, and one to prepare a uniform traffic code.

A further meeting of the Australian Transport Advisory Council was held on the 26th and 27th May, 1947, at which the resolutions of the conference were approved.

In response to a subsequent request that a representative of the Board be nominated as a member of the Australian Road Safety Council, also of the Roads Standards Sub-committee, and of the Uniform National Road Traffic Code Sub-committee, Mr. J. Mathieson, M.C.E., A.M.I.E.(Aust.), M.S.E., the Board's Deputy Chief Engineer was nominated in each case.

TRAFFIC CONTROL.

In the Thirty-third Annual Report, particulars of the comprehensive revised scale adopted for the granting of permits to exceed the weights of vehicles and loads laid down in the Motor Car Act were given. Despite the Board's action in the granting of permits on a liberal basis according to tyre equipment and class of vehicle, it is found that there are still numerous offenders carrying excessive loads which are causing extensive damage to many main roads and State highways. In the public interest, and to protect road users as a whole, special attention is paid by the Board's Divisional Traffic Officers to offences for excessive loading. Many operators also adopt speeds far beyond their legal limits, thus accentuating the damage to roads, as well as endangering other traffic. During the year, 181 convictions for overloading were obtained, and 97 for speeding, the fines totalling £1,235 and £497 respectively.

Action was taken in the case of 65 offences against the Country Roads (Impounding of Cattle) Act in respect of unattended stock on State highways, and fines amounting to £123 were imposed. Proceedings were instituted in eight cases for the offence of removing timber from roads, and fines were imposed amounting to £33.

To assist in informing commercial vehicle manufacturers concerning the necessity for limiting vehicle loadings as a means of keeping road construction and maintenance costs within reasonable bounds, the Board's chief engineer addressed members of the Federal Chamber of Automotive Industries on the subject. Co-operation between road authorities and vehicle manufacturers is also being secured through the committees of the Australian Transport Advisory Council, as mentioned in a separate paragraph. The control of individual vehicle operators remains, however, a very serious problem as indicated above.

MOTOR REGISTRATION.

During the year 302,079 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 23,250 in the figures of the financial year 1946–47 :—

Vehicles.	Financial Year 1945–46.		Financial Year 1946–47.		Increase.	Decrease.
Private—						
New	1,205		6,122		4,917	
Secondhand—Re-registered ..	12,417		9,874			2,543
Renewals	129,734		137,859		8,125	
		143,356		153,855		
Commercial—						
New	2,038		3,221		1,183	
Secondhand—Re-registered ..	6,586		6,247			339
Renewals	35,376		41,426		6,050	
		44,000		50,894		
Primary Producers—						
New	310		1,412		1,102	
Secondhand—Re-registered ..	2,924		2,982		58	
Renewals	52,747		53,548		801	
		55,981		57,942		
Hire		2,933		3,263	330	
Licensed under Omnibus Act		716		780	64	
Trailers		8,546		9,100	554	
Traction Engines, &c.		69		73	4	
Motor Cycles		23,228		26,172	2,944	
Total		278,829		302,079	26,132	2,882

ACCOUNTS.

Statement of accounts for the year ended 30th June, 1947, 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		571,117 2 5	26,063 9 2	597,180 11 7
2. Main Roads—				
Permanent Works (Swan-street Bridge) ..		9,979 5 5	..	9,979 5 5
Construction and restoration ..	95,168 1 1	179,495 16 6	821,016 1 10	1,000,511 18 4
Maintenance and reconditioning	905,343 17 3			
3. Developmental Roads—				
Construction and Maintenance	233,917 19 10	28,678 11 5	224,267 2 4	252,945 13 9
Roads for Isolated Settlers ..	19,027 13 11			
4. Tourists' Roads—				
Construction	497 18 1	92,066 15 1	4,235 3 6	96,301 18 7
Maintenance	95,804 0 6			
5. Forest Roads Maintenance		6,143 18 4	13,626 3 1	19,770 1 5
6. Murray River bridges and punts—				
Maintenance		4,517 5 9	112 9 7	4,629 15 4
7. Roads adjoining Commonwealth properties—				
Maintenance		3,912 1 2	976 7 8	4,888 8 10
Total		£895,910 16 1	£1,090,296 17 2	£1,986,207 13 3

In addition to the amounts shown in the above statement an expenditure of £337,241 1s. 7d. was incurred from the Country Roads Board Fund on works carried out by th6 Board on behalf of the Commonwealth Government under the National Security Regulations. The cost is recouped by the Commonwealth as the works progress. The amount outstanding on account of these works at 30th June was £24,698 18s. 4d.

CHIEF ENGINEER—MISSION ABROAD.

In 1924, the first Chairman of the Board, Mr. W. Calder, M.Inst.C.E., M.I.E.(Aust.) C.E., visited the United Kingdom and United States of America, and, in 1936, the second Chairman, Mr. W. T. B. McCormack, M.Inst.C.E., M.I.E.(Aust.) C.E., visited the United States of America.

As a result of the information gained by those gentlemen during their missions, the State and the Board derived considerable benefit. In addition, comprehensive reports on their observations were prepared, with the result that the lessons learned were widely distributed to municipal bodies and other organizations connected with road construction and maintenance as well as road transport generally.

In view of the great recent advance in these matters overseas, particularly in the use of modern plant and the problems connected with road transport and highway safety, the Board considered that it would be of great value to obtain personal information which could be applied to the many questions which arise in the post-war years. It was, therefore, recommended to the Government that the Board's Chief Engineer, Mr. C. G. Roberts, M.C., B.Sc.(Eng.)London, A.M.I.C.E., A.M.I.E.(Aust.), C.E., who is eminently

suited to such a task by his civil and military experience, should visit the United Kingdom and United States of America. The Government readily acquiesced in the proposal, and Mr. Roberts left for U.S.A. on 22nd June, 1947. It is expected that he will be absent for approximately six months.

The Board wishes to express appreciation of the great assistance rendered by leaders in overseas organizations to its representatives in the past, and the willingness they have shown to facilitate the mission of Mr. Roberts.

STAFF.

At the 1st July, 1946, the number of permanent officers was 85 and temporary officers 192. During the year approval was given by the Government for the transfer of 43 officers to the permanent staff, mainly those who had been on the staff at the 3rd September, 1939. At the 30th June, 1947, there were still 190 temporary officers as compared with 126 permanent officers. The Board is hopeful that the position will be further improved at an early date, as it is very short-staffed, and feels that many officers who have passed a period of probation and have the necessary qualifications should enjoy the privileges of permanency. In addition, the Board is handicapped if it is able to offer only temporary appointments to persons recruited to fill important positions.

In common with other Government, semi-Government, and private organizations, the Board is faced with difficulty in obtaining the services of sufficient officers to enable ordinary works as well as those which form part of the post-war programme to be fully planned and effectively supervised. This applies firstly to qualified and experienced engineers, surveyors, and draughtsmen, and secondly to qualified accountancy and costing officers.

Whilst there were 92 new appointments to the Board's staff in all classifications, these were offset by the resignation of 49 officers most of whom left the Board's service to take up positions at higher salaries.

The responsibilities entrusted to the Board have continuously increased due to such factors as—

(*a*) the declaration of additional main roads, State highways, forest roads, and tourists' roads ;

(*b*) the provision of additional construction and maintenance funds over an extending system of roads of a developmental character, and those required for special transport such as timber traffic ;

(*c*) the increasing specialization required in highway engineering so as to ensure that full advantage is taken of advances in uses of materials and in construction processes. (The increasing importance of asphalt technology, of soil mechanics, of traffic engineering, and of structural and bridge analysis may be especially cited.)

(*d*) the rapid mechanization of all processes, thus requiring a phenomenal increase in plant and in workshop organization ;

(*e*) the necessity for further decentralization of administration and engineering supervision.

To meet this situation it is vital for economic administration of the road enterprises of the State that an adequate staff of well-qualified and efficient officers should be secured and maintained. Having suffered the loss of several senior members of its somewhat small pre-war staff of experienced engineers, the Board is endeavouring to attract additional officers as required from time to time, and to afford adequate recognition to those remaining senior officers whose retention is essential for proper training of junior officers—in order to give effect to the decentralization programme and necessary extensions of specialized sections of the organization.

STAFF ACTIVITIES.

During September, 1945, an appeal was made by the Country Roads Board Patriotic Auxiliary, in conjunction with Vice-Admiral and Mrs Drew, of Flinders Naval Depot, with a view to sending food parcels to widows and orphans of the Royal Navy personnel in the United Kingdom. As a result of the generous support of country municipalities and citizens an amount of £1,020 was donated, and over 2,000 parcels were consigned to the Royal Naval Benevolent Trust for distribution. Unfortunately, the bulk of the consignment went astray at the London docks, but ultimately all parcels were traced and distributed. The officers of the Board administering the Auxiliary have received numerous letters which indicate the gratitude with which the parcels have been received and the satisfaction which has been given to the large number of donors.

During the war years an arrangment was made whereby contributions were collected fortnightly from members of the staff, generally according to salary rates, and the proceeds were donated to patriotic and charitable purposes. The total amount collected was £3,000. Subsequently, the staff decided to continue the collections in order to establish a fund for the purpose of assisting charities. From the fund an amount of £241 has been paid to various hospitals and as contributions to appeals made from time to time.

OFFICERS AND EMPLOYEES.

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

ACKNOWLEDGMENTS.

The thanks of the Board are tendered to the Honorable P. J. Kennelly, 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,

W. L. DALE, Chairman.

F. M. CORRIGAN, Member.

D. V. DARWIN, Member.

R. JANSEN, Secretary.

CHIEF ENGINEER'S REPORT.

Country Roads Board,
Melbourne,
6th November, 1947.

THE CHAIRMAN,

SIR,

I have the honour to submit the following particulars of matters of engineering interest included in the Board's work during the year 1946–47.

PLANT.

During the year an amount of over £210,000 was expended on the purchase of additional plant, half the amount being spent on new units and the remainder on second-hand equipment purchased mainly from Commonwealth Disposals. The major items are shown on the following list.

Item.	New.	Second-hand.
Power Graders; Light	6	..
Power Graders; heavy	8	7
600-gallon Bitumen Heaters	9	..
Aggregate Loaders	6	..
Front End Loaders	..	5
Tractors—		
Class 1	2	14
Class 2	..	11
Class 3 and 4	..	13

It will be noted that many of the more important items of plant, particularly Class 1 tractors were second-hand, and, although they have now been in the Board's possession for a considerable time, a number have not been used as it was found essential to take the units down completely for a thorough check over before being sent into the field for use.

The desperate position regarding plant is shown by the fact that it was recently estimated that about 110 Class 1 and 2 tractors would be required during the coming construction season to complete the work for which funds have been provided. The total number of these machines owned by the Board is 62, of which only about 30 will be available for use.

The position with regard to other items is unfortunately very similar.

PAVEMENT DESIGN.

The design of non-rigid pavement is proceeding generally on the basis indicated in the Chief Engineer's report for the year ending the 30th June, 1945, but experience with the use of the California Bearing Ratio test, while justifying its adoption as a tentative basis of pavement design, has shown that the test requires careful supervision, particularly where inexperienced operators are employed. It is found, for instance, that engineering assistants recruited at Leaving Certificate standard do not produce reliable test results until they have had at least nine months' experience. The acute shortage of qualified personnel has, therefore, made it necessary to limit the use of the California Bearing Ratio test to the more important works.

In order to overcome this difficulty, an attempt has been made to establish correlations between the California Bearing Ratio Test and the simpler soil tests, such as mechanical analysis, Atterberg limits, and the linear shrinkage test. This has met with a certain amount of success, and it is proposed in future to carry out California Bearing Ratio Tests only where simple tests on a number of small samples from the same work have proved that the sample selected for the California Bearing Ratio Test is in fact typical of the material encountered. The linear shrinkage test has been correlated with the plasticity index and provides a field method for estimating the latter, which will prove very useful in preliminary soils investigations and in the control of gravel supplies, particularly as a chemical balance is not required for the linear shrinkage test.

The danger involved in basing a pavement design on single isolated tests or on tests at widely separated points is again emphasized.

STANDARD SPECIFICATIONS.

During the year a standard specification was issued for supply and delivery of roadmaking gravel under number Sp.21–1, September, 1946. The principal clauses are as follows:—

Roadmaking Gravel.—Gravel shall consist of natural or artificially-mixed aggregate or granular material of hard durable particles and soil or other binder, such that the mixture complies with the requirements for grading and physical properties set out in Tables 1 and 2.

Oversize material encountered in deposits from which gravel is produced shall be removed by screening or shall be crushed to the required size, whichever the contractor may elect. The composite material shall be free from vegetable matter and lumps or balls of clay.

TABLE 1.—TOLERANCE ON SIZING.

Type of Material.	Percentages by Weight Passing Sieves Designated.										
	1½".	¾".	⅜".	¼".	No. 7.	No. 14.	No. 25.	No. 36.	No. 52.	No. 100.	No. 200.

TABLE 2.—TOLERANCE ON PHYSICAL PROPERTIES.

Type of Material.	California Bearing Value, Percentage.	Properties of Material Passing No. 36 Sieve.						Los Angeles Abrasion, Loss.
		Liquid Limit.	Plasticity Index.		Tensile Strength, lb./sq. in.	Linear Shrinkage.		
	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.		Maximum.

Tests.—The methods of test shall be the standard methods used in the laboratory of the Country Roads Board.

Sample—The whole of the material to be supplied shall be approved by the Engineer, and shall be equal in quality to an approved 20-lb. sample, which shall be submitted by tenderers at the time of tendering. Where required by the Engineer, further samples, of such weight as the Engineer may require, may be taken from the pit or other source, in the presence of the tenderer, and tested prior to the acceptance of the tender.

It will be noted that the specification provides for insertion of limits for grading and other physical properties. Generally, the limits for grading will be based on previous experience with local material, but, where this is not available, reference will be made to laboratory tests of similar materials, combined with a study of their behavior in service.

The usual tolerances for other physical properties which are specified, are as follows :—

(*a*) *California Bearing Ratio.*—For pavements which are to be sealed a minimum of 50 is required in all cases. Where the traffic is heavy, or where better material is available, 80 should be specified.

(*b*) *Liquid Limit.*—For pavements which will be sealed 25. For pavements which will not be sealed 35.

(*c*) *Plasticity Index.*—For pavements which will be sealed, the range of plasticity index for gravels should be from 0 to 6 except in dry areas where a maximum of 9 may be allowed.

For pavements which will not be sealed, the range of plasticity index should be from 4 to 9, but may be increased to a maximum of 12 in dry areas.

Where the tensile strength exceeds 40 lb. per square inch, a lower plasticity index may be allowed.

(*d*) *Tensile Strength.*—For gravels a minimum of 40 lb. per square inch is desirable.

(*e*) *Lineal Shrinkage.*—For gravels to be sealed, 2 to 3 per cent. For gravels not to be sealed, 3 to 4 per cent.

(*f*) *Los Angeles Abrasion Loss.*—Space has been left in the specification for insertion of limits for this, but, up to date, it has not usually been specified.

ROUGHOMETER.

About 1928, a locally-made instrument was fitted to a car to measure the relative movement between the front axle and engine block in an endeavour to measure riding qualities of road surfaces.

Results indicated that the characteristics of the car affected the observations of the instrument, and over long periods readings could not be compared with confidence.

Following a design published by the Division of Tests, Public Roads Administration, U.S.A., a single wheel trailer-type roughometer was constructed in 1946 (see Plate No. 18). This instrument consists of a heavy frame which is carried on two, single-leaf springs, which carry the axle of a standard motor-car wheel. Dash pots are provided as a damping system to control spring oscillation, and vertical movement of the axle, relative to the frame, is integrated by a mechanism consisting of two opposing ball clutches. For each inch of integrated vertical movement, an electrical impulse is sent to an electrical counter, which thus records the vertical movement in inches. Difficulty was experienced in obtaining a suitable counter, and finally a telephone counter was re-wound to suit the voltage of the car battery.

The design is such that the apparatus is capable of duplication in all its parts, and if tests show that it is capable of rating the amount of re-treatment the surface requires, a unit for the use of each Division would probably be justified.

It is hoped that readings of this instrument may give an indication of the quantity of material required to rectify riding qualities of a surface, and observations have been made "before" and "after" bituminous treatment of some typical surfaces in order to obtain, if possible, quantitive relationship between roughness figures and cubic yards of material actually used.

BITUMINOUS SURFACING.

GENERAL.

The season's bituminous surfacing operations were limited by the supply of mineral aggregate and the restrictions on railway transportation. Inability to obtain additional equipment limited the Board's ability to obtain much aggregate by direct labour.

The Crushed Stone Industry showed little sign of increasing its output. Railway transportation was severely restricted by recurring industrial disturbances, seriously interfering with the distribution of crushed-stone products from fixed quarries. The industrial demand for liquid fuel made the supply of primer tars and petroleum flux oils most difficult. The accumulation of orders, shortage of steel, and a six month's strike in the iron and steel industry made the acquisition of new, locally-built plant out of the question; the lag in delivery being about two years.

TYPES OF WORK.

Initial treatments were increased from 22 miles in 1945–46 to 160 miles. Of this total, 104 miles were extensions to the existing treated system, and 56 miles on reconstructed lengths of previously-treated pavements.

Retreatments were largely reseals, totalling 460 out of the 500 miles carried out. Reseals using a rate of application of binder at 0·15 gallon per sq. yard predominated. This rate of application was chosen in order to cover as great an area as possible with the mineral aggregate available. A start was made with

the urgently needed surface corrective retreatments, by the laying of 40 miles of plant-mixed drag-spread work, but unfortunately, extension of this type of work is dependent on a large increase in the supply of mineral aggregate and the availability of new equipment.

Total Length of Treated Surface.

The total length of "black" surface in the Board's system at the 30th June, 1947, was :—

	Miles.
State Highways	1,931
Main Roads	3,747
Tourists' and Forest Roads ..	95
Total	5,773

Work Carried Out.

Table 3 shows details of the work carried out on roads under the Board's control. In addition, 43 miles of road were treated for municipalities and 234,200 square yards of bituminous surfacing (equivalent to about 25 miles of pavement) laid for the Commonwealth of Australia.

	Miles
Work carried out by C.R.B. on C.R.B. roads ..	653
Work carried out by municipalities on C.R.B. roads	7
	660
Work carried out by C.R.B. on municipal roads	43
Work carried out by C.R.B. for Commonwealth	25
Total	728

Cost of Work.

Table 4 sets out detailed costs of the work carried out during the season.

Table 5 shows the trend of costs of this type of work since 1940–41. From 1945–46 to this season, materials rose approximately 5½ per cent. and labour 6½ per cent. The rise in price of materials was due largely to the increasing price of bitumen and the rise in labour costs to the introduction of the 40-hour week. Cost of stores and plant hire remained much the same.

Table 3.—Mileage of Work Carried Out Under the Board's Control.

Type of Road, &c.		Length in Miles.							
		Nature of the Work.						State Highways.	Other Roads.
		Initial Treatments (Prime and Seal).	Retreatments.						
			Reseals. Binder in gallon per Square Yard.				P.M.S.		
Roads.	Control.		0·10	0·15	0·20	0·25			
State Highways ..	C.R.B.	63·93	2·68	98·54	16·27	..	18·34	199·76	..
Other Roads	C.R.B.	11·47	2·60	5·63	12·51	..	0·26	..	32·47
Other Roads	Municipalities ..	84·74	2·06	252·03	65·14	2·97	21·06	..	428·00
Totals ..	.. .. ..	160·14	7·34	356·20	93·92	2·97	39·66	199·76	460·47
,, ..	.. .. ..	160·14	500·09					660·23	

Table 4.—Average Cost in Pence per Square Yard of the Work Carried Out in 1946–47.

Subdivision.	Nature of the Work.				
	Initial Treatments.	Retreatments.			
		(Reseals.)			Plantmix Seals.
	Prime and Seal (Primer 0·2) (Binder, 0·25).	Nominal Rate of Application to Binder in Gallon per Square Yard.			All Types.
		0·10.	0·15.	0·20.	0·25.	
Square Yards Costed.	1,413,309.	75,313.	3,186,581.	845,261.	31,120.	399,045.
Materials	11·97	4·14	5·71	8·02	7·14	..
Labour	2·28	0·96	1·14	1·43	1·43	..
Stores	0·40	0·11	0·16	0·23	0·22	..
Plant Hire	1·87	0·77	0·94	1·16	1·31	..
Totals	16·52	5·98	7·95	10·84	10·10	..

TABLE 5.—AVERAGE COST OF RETREATMENT BY RESEALING. (MEDIUM RESEALS, BINDER 0·15 GALLON PER SQUARE YARD) FOR THE YEARS 1940–41 TO 1946–47.

Year.	Average Cost in Pence per Square Yard.
1940–41	4·76
1941–42	6·06
1942–43	7·50
1943–44	8·16
1944–45	7·36
1945–46	7·59
1946–47	7·95

BITUMEN.

The supply of bitumen was adequate, but the price rose to an average of £17 12s. per ton net f.o.w., an increase of £2 13s. per ton net over 1945–46.

The sources of supply were again restricted by the Commonwealth Government to the Sterling or Sterling Bloc areas. Price control under the averaging conditions of the Prices Regulations continued.

MINERAL AGGREGATE.

The total quantity of mineral aggregate used was 70,911 cubic yards. The average price per cubic yard stacked by the roadside was 22s. 2d., the same as during 1945–46.

During the year, the amended gradings adopted in 1945–46 were as set out in Table 6, were again used.

TABLE 6.—MINERAL AGGREGATE.

Size designations, sizing, and maximum permissible ranges in mechanical analyses.

(*a*1) *Crushed stone products and gravel; graded aggregates.*

Size Designation.	Trade Name.	Sizing.			TOLERANCE ON SIZING. Limits of Ranges of Percentages by Weight Passing British Standard Square Mesh Sieves. Sieve Size.																
Graded.	Nominal Size or Gauge.	All Passing.	Range of Sizes.																		
GRADED AGGREGATE.		Oversize Maximum.	All Passing.	All Retained On.	4″.	3½″.	3″.	2½″.	2″.	1½″.	1″.	¾″.	½″.	⅜″.	½″.	⅛″.	¼″.	No. 7.	No. 10.	No. 14.	No. 25.	No. 100.
1	3½″ Metal ..	4″	3½″	1½″	100	90–100	..	25–60	..	0–15	..	0–5	..	..	..	..	..	..	..	..	..	..
2	2½″ Metal ..	3″	2½″	1½″	..	..	100	90–100	35–70	0–15	..	0–5	..	..	..	..	..	..	..	..	..	..
3	2″ Metal ..	2½″	2″	1″	..	..	..	100	90–100	35–70	0–15	..	0–5	..	..	..	..	..	..	..	..	..
4	1½″ Metal ..	2″	1½″	¾″	..	..	..	..	100	90–100	20–55	0–15	..	0–5	..	..	..	..	..	..	..	..
5	1″ Metal ..	1½″	1″	⅜″	..	..	..	..	..	100	90–100	40–75	15–35	0–15	..	0–5	..	..	..	..	..	..
6	¾″ Screenings ..	1″	¾″	⅜″	..	..	..	..	..	..	100	90–100	20–55	0–5	..	0–5	..	..	..	..	0–0·5	..
7	½″ Screenings ..	¾″	½″	No. 7	..	..	..	..	..	..	..	100	90–100	40–70	..	0–15	..	0–5	..	..	0–0·5	..
8	⅜″ Screenings ..	½″	⅜″	No. 7	..	..	..	..	..	..	..	..	100	85–100	..	10–30	..	0–10	..	..	0–0·5	..
9	⅛″ Screenings	⅜″	⅛″	No. 14	..	..	..	..	..	..	..	..	..	100	..	85–100	..	10–40	..	0–10	..	0–0·5
10	⅛″ Toppings ..	⅜″	⅛″	0	..	..	..	..	..	..	..	..	..	100	..	85–100	..	40–70	..	..	..	0–30
11	Commercial grit	⅛″	⅜″	0	..	..	..	..	..	..	..	..	..	..	..	100	85–100	40–75	..	..	..	0–30
12	Stone dust ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	100	..	85–100	..	..	..	15–45

(*a*2) *Crushed-stone products and gravel. Supplementary gradings for graded aggregates.*

67	¾″ Screenings ..	1″	¾″	⅛″	..	..	..	..	..	..	100	90–100	..	20–55	..	0–10	..	0–5	..	..	0–0·5	..
68	¾″ Screenings ..	1″	¾″	No. 7	..	..	..	..	..	..	100	90–100	..	30–65	..	5–25	..	0 5	..	..	0–0·5	..
78	½″ Screenings ..	¾″	½″	No. 7	..	..	..	..	..	..	..	100	90–100	40–75	..	5–25	..	0 5	..	..	0–0·5	..
89	⅜″ Screenings ..	½″	⅜″	No. 14	..	..	..	..	..	..	..	..	100	90–100	..	20–55	..	5–30	..	0–10	0–0·5	..

(*b*) *Crushed-stone products and gravel. One size aggregates.*

Size Designation.	Trade Name.	Sizing.			TOLERANCE OF SIZING. Percentages by Weight Passing British Standard Square Mesh Sieves. Sieve Size.																		
One Sized.	Nominal Size or Gauge.	All Passing.	Range of Sizes.																				
ONE SIZED AGGREGATE.		Oversize Maximum.	All Passing.	All Retained On.	3″.	2½″.	2″.	1½″.	1″.	¾″.	½″.	⅜″.	¼″.	⅛″.	⅛″.	No. 7.	No. 10.	No. 14.	No. 25.	No. 100.	*X*.	*Y*.	*Z*.
A	2½″ One Size ..	3″	2½″	2″	100	85–100	0–35	0–5	..	..	..	..	..	..	..	0–2	..	..	..	..	65	2½″	2″
B	2″ One Size ..	2½″	2″	1½″	..	100	85–100	0–30	0–5	..	..	..	..	..	..	0–2	..	..	..	..	70	2″	1½
C	1½″ One Size ..	2″	1½″	1″	..	..	100	85–100	0–25	0–5	..	..	..	..	..	0–2	..	..	..	..	75	1½″	1″
D	1″ One Size ..	1½″	1″	¾″	..	..	..	100	85–100	0–45	0–7	..	..	..	..	0–2	..	..	..	..	55	1″	¾″
E	¾″ One Size ..	1″	¾″	½″	..	..	..	..	100	85–100	0–35	0–7	..	..	..	0–2	..	..	0–0·5	..	65	¾″	½″
F	⅜″ One Size ..	¾″	⅜″	¼″	..	..	..	..	100	95–100	40–80	0–25	0–7	..	..	0–2	..	..	0–0·5	..	75	¾″	⅜″
G	½″ One Size ..	¾″	½″	⅜″	..	..	..	..	..	100	85–100	0–45	0–7	..	..	0–2	..	..	0–0·5	..	55	½″	⅜″
H	⅜″ One Size ..	½″	⅜″	¼″	..	..	..	..	..	..	100	85–100	0–40	0–10	..	0–2	..	..	0–0·5	..	60	⅜″	¼″
I	¼″ One Size ..	⅜″	¼″	⅛″	..	..	..	..	..	..	..	100	85–100	..	0–30	0–10	..	..	0–2	0–0·5	70	¼″	⅛″
J	⅛″ One Size ..	¼″	⅛″	No. 10	..	..	..	..	..	..	..	..	100	..	85–100	..	0–35	0–10	0–2	0–0·5	65	⅛″	No. 10
K	Air blown grit	⅛″	No. 7	No. 14	..	..	..	..	..	..	..	..	..	..	100	85–100	..	0–30	0–2	0–0·5	70	No. 7	No. 14

Provided that not less than *X* per cent. by weight of the total material shall pass a sieve of *Y* opening and be retained on a sieve of *Z* opening.
N.B.—To assure one sized characteristics it is essential that the tolerance provided for the quantity passing a sieve of *Y* opening and retained on a sieve of *Z* be complied with.

TABLE 6.—MINERAL AGGREGATE—*(continued)*

(c) Special Aggregates.

Scoria and Sand.				3".	2½".	2".	1½".	1".	¾".	½".	⅜".	¼".	3/16".	⅛".	No. 7.	No. 10.	No. 14.	No. 25.	No. 52.	No. 100.	No. 200.
Scoria	½"	½"	No. 14	..	..	..	..	..	100	85–100	70–95	..	25–65	..	0–30	..	0–15	0–6	..	..	..
Coarse Sand	⅜"	3/16"	No. 25	..	..	..	..	..	..	..	100	..	95–100	..	75–95	50–80	25–60	0–25	..	0–3	..
Fine Sand	3/16"	No. 14	..	..	..	..	..	..	..	..	..	..	100	..	98–100	..	95–100	80–95	45–70	10–20	0–5

PLANT OPERATION.

A total of eight sprayers was operated, four being 400-gallon units, one large 600-gallon unit, and two 1,000-gallon units. Owing to the shortage of heaters, the 1,000-gallon plants were operated as 600-gallon units.

For plantmix work, a Barber-Greene continuous pugmill-type mixer was operated.

An analysis of the season's operations based on a daily output of ten loads per day is set out in Table 7.

TABLE 7.—ANALYSIS OF THE OPERATION OF THE BOARD'S SPRAYERS.

Operation.	Percentage of Total Time (Average for all Units).
Spraying	34·3
Moving	12·2
Weather	15·3
Holidays	9·0
Mechanical delays	5·1
Other delays	24·1
	100·0
Details of "other delays":—	
Poor organization	4·4
Long leads	4·9
Short lengths	9·2
Road not ready	2·4
No aggregate	1·4
No bituminous materials	Nil
Insufficient labour	Nil
Cleaning plant	1·8
Total	24·1

BRIDGES.

GENERAL.

There is still a very big serious lag in the construction of new bridges to replace old and weak structures, while maintenance of existing structures has seriously fallen behind. The position is further aggravated by the phenomenal increase in heavy truck traffic in practically all parts of the State due to developmental projects of water, power, open-cut coal mining, and forestry which all increase the volume of this heavy cartage, while in addition, decentralization of industry adds its quota.

The lack of materials, plant, and manpower hampers the work of replacement and too much stress cannot be laid on maintenance of old structures at present until the arrears of reconstruction work can be overtaken. It will, unfortunately, be necessary to continue the policy of imposing load limits on inadequate and weak structures.

The Board recently appointed a Bridge Inspecting Engineer, but it will be some little time before he will be able to cover all Main Roads, and he is at present engaged in testing and assessing the capacity and life of bridges on routes which serve areas to which heavy concentrated loads are frequently carried or can shortly be expected. The bridges are classified, and on this information replacements can be logically planned.

DESIGN LOADINGS AND DESIGN.

Reference was made in the last Annual Report to the adoption of the A.A.S.H.O. H.20 : S.16 loading for the design of bridges on Highways and Main Roads, but its adoption does not solve the problem of existing bridges, and many old concrete structures lacking adequate shear reinforcement are being affected by the heavy loads now using them. The Board's standard designs for culverts and flat-slab bridges are being modified for this new loading, and as soon as these have been completed it is proposed to circularize them to Municipal Engineers. The lateral distribution of a load has always been determined by somewhat empirical formulae and tests recently carried out in the U.S.A. indicate that these formulae are somewhat conservative. The practical impossibility of obtaining timber crossbeams the full width of a bridge, considerably reduces this distribution, and in all Rolled Steel Joist spans of over 40 feet, stiffening or distributing frames are being welded to the stringers.

HEAVY LOADING AND TARE OF VEHICLES.

Reference has been made to the general tendency towards heavier loading, and Table 8 sets out nine recent applications which have been received for permits to carry heavy loads. Before granting any permit, the load distribution is carefully considered in relation to the actual structures which may be called upon to take it.

Numbers 5–9 are for legal-width vehicles and represent approximately 95 per cent. of the loadings for which permits are requested. In these cases the very high percentage of "tare" to "pay" load indicates that consideration should be given to the use of special alloy steels in the construction of these vehicles.

Numbers 1–4 are vehicles whose width varies from 10 feet to 18 feet, providing greater distribution over the structures than is usual, and for such cases as these special consideration must be given to routes and to any strengthening of bridges. Despite this greater distribution the calculated stresses for some proposed loads are often above those normally permitted for "isolated loads", and in such cases permits are refused.

TABLE 8.—RECENT APPLICATIONS FOR PERMITS.

Number.	Pay Load. Tons.	Tare. Tons.	Gross. Tons.	Axles.	Remarks.
1 ..	63	19	82	5	Float type—less tractor
2 ..	58	17	75	4	Float type—less tractor
3 ..	45	18	63	4	Float type—less tractor
4 ..	35	16	51	4	Float type—less tractor
5 ..	23	12	35	5	Float type—including tractor
6 ..	21	14	35	5	Float type—including tractor
7 ..	18	12	30	4	Float type—including tractor
8 ..	11	7	18	3	Semi-trailer type (three axles)
9 ..	6	4	10	2	Truck type (two axles)

Construction and Maintenance.

Few contractors are tendering for other than minor bridge work at present, and then only for jobs which are situated close to their normal place of residence. This is primarily due to the position regarding labour and materials. Steady progress is being made with the establishment of construction and maintenance gangs in each Division, and, as plant becomes available, they are being equipped with mechanical plant with the object of reducing man-hours to a minimum. It is intended that each construction gang will be equipped with a 100 cubic feet a minute compressor with tools for the sawing and drilling of timber and for the vibration of concrete.

Previous annual reports have stressed the need for attention to timber bridges, and some aspects of this were discussed in that of 1944, but to ensure satisfactory results the principles enumerated there must be followed and applied thoroughly and periodically. Too often the deck of a timber bridge is covered with a thick layer of gravel placed to cover irregularities or to make up the grade when a road is resheeted, while in other cases the surface of a longitudinally-decked timber bridge is allowed to split and splinter because of the lack of a sealing coat. If necessary, such sealing coats can be placed on the bridge deck by hand when the deck has dried out a little, approximately two to three years after construction.

Experience has shown that preliminary air seasoning of timber for use in bridges is very valuable in prolonging its life, and it is noted that of the 64,000 super feet of 2-in. thick decking used in the San Remo bridge all is in very good condition after seven years' very heavy service. This timber was laid without spikes, was sealed carefully after about twelve months of service, and particular attention has been paid to draining all water away. Elsewhere, decking placed green and covered with 6 inches of gravel has completely failed after ten years of light service.

With this experience in mind an endeavour is being made to build up stocks of timber which can be air seasoned before use or made available for use if any emergency arises.

Reinforced Concrete Bridges.

During the year, the difficulties previously experienced in obtaining timber in sufficient quantity and of a satisfactory quality for use in bridge works, were again very evident. Improvement in the amount of timber available can be expected in future, but, due to the great inroads made into the State's resources of better-class timber, the quality available will, in general, be poor.

Because of the difficulties with regard to timber it is obvious that the proportion of bridges constructed in reinforced concrete will greatly increase. During the past year, however, whilst most of the materials required for reinforced concrete construction have been available in sufficient quantities, supplies of reinforcing steel have been very bad. As an indication of the shortage, the amount of reinforced steel actually delivered to the Board was 160 tons only, against orders placed totalling 1,200 tons. This meagre supply was augmented by the use of considerable quantities of second-hand material. Supplies of reinforcing steel may be expected to improve during 1947–48.

With the greater use of concrete structures, proper control of the materials used and of the methods of construction followed in concrete work become of increasing importance. It usually costs little more to construct a first-class job, and the value of such extra cost as is incurred will be amply repaid over the years by decreased maintenance charges and a more permanent structure. The difference between first-class and careless work lies mainly in close attention to details, as, in general, it requires the same bulk of material and number of man-hours to construct one as the other.

The additional cost involved in obtaining suitable aggregates and ensuring that these are mixed in the correct proportions and properly placed is only a few shillings per cubic yard of finished concrete, but the difference in the strength and durability of the finished work may be very great. The C.R.B. standard specification for concrete provides that concrete containing six bags of cement per cubic yard of finished concrete shall have a comprehensive strength when aged seven days of 2,500 lb. per inch. This figure, however, should be considered as only a minimum basis for acceptance purposes, as, with proper control, concrete having far greater strength is readily obtained. Test cylinders from jobs carried out under the direct supervision of the Board have consistently given results of 4,000 lb. per inch and over at seven days. Concrete having such a strength may not be necessary to cope with the actual design stresses in the structure, but this strength is a measure of the soundness of the concrete, a high value indicating that a long trouble-free life can be anticipated.

It might be contended that if such strengths can be obtained then higher working stresses should be permitted and, on jobs where the Board is satisfied that supervision and control is such that consistently high results are assured, this is normal practice.

The principles involved in the selection of aggregates having suitable physical characteristics and freedom from deleterious substances are well known. Not so well known is the danger of disintegration of concrete through chemical reaction between certain aggregates and cement. The great bulk of Victorian aggregates are satisfactory in this respect, but a few cases of trouble due to this cause have been found. The deterioration is due to softening of the concrete, together with an expansive reaction between the cement and the constituents of the aggregate, and is generally evidenced by "blowing" of pockets of concrete, cracking, and spalling, and, in addition, by the formation of so-called stalactites. The problem has been investigated by the C.S.I.R. whose report on the subject states "the presence of opal in aggregates must be regarded as dangerous, and the use of acid and intermediate volcanic rocks must be regarded with suspicion". In one case examined in Victoria, the causes of the trouble were chlorite and serpentine.

One of the most costly and difficult jobs in maintaining concrete structures is the repair of cracked and spalled sections. Apart from the difficulties in making a satisfactory job structurally the appearance of the structure is usually marred by the differences in texture between the surface of the old work and the patch. One of the most fruitful causes of cracking and spalling is inadequate cover to the reinforcement. It is not sufficient to place the reinforcement in its correct position with a few light ties to maintain it correctly during placing of the concrete. The forces exerted on the reinforcement by the placing operations and the weight of settling concrete are considerable and must be provided for by solidly blocking and tying from the forms, and careful inspection should be made during pouring to ensure that clearances are maintained. The Board's Standard Specification for Concrete provides that, before any concrete is deposited, the placing and fastening of reinforcement shall be approved by the Superintending Engineer or his representative, but examination of bridges throughout the State shows innumerable instances where the specified cover to the reinforcement has not been maintained, many structures having nothing but a thin skin of mortar covering the bars. The

deterioration due to penetration of water and rusting of the steel with consequent splitting and spalling of the concrete is only too evident. The importance of sufficient cover for the steel cannot be over emphasized. It might be noted that the minimum cover required by the Standard Specifications for Highway Bridges of the A.A.S.H.O. is as follows :—

> " The minimum covering, measured from the surface of the concrete to the face of any reinforcing bar, shall be not less than 2 inches except in slabs where the minimum covering shall be 1 inch. In footings of abutments and retaining walls and in piers, the minimum covering shall be 3 inches. In work exposed to the action of sea water the minimum covering shall be 4 inches except in precast concrete piles, where a minimum of 3 inches may be used."

These requirements are considerably in excess of those of Australian specifications, and whilst some allowance must be made for the more severe weather conditions of the U.S.A., it may be desirable in the interests of structural durability to increase the Australian figures.

Costs.

Conditions, during the year, make it difficult to give costs which can be regarded as standard. These include :—

(*a*) inexperience and shortage of labour, particularly in the carpenter class ;

(*b*) shortage of materials and consequent delays due to non or late delivery, with the need for improvisation and alteration of details ;

(*c*) rising costs of wages and materials, together with the reduction of hours of work.

Table 9 gives costs on bridges which have been carried out without undue delays :—

Table 9.—Recent Bridge Costs.

Type.	Length.	Cost per Square Foot.	Remarks.
	feet	£ *s.* *d.*	
Timber and Steel	45	1 10 0	High abutments. Difficult foundations
Timber and Steel	360	1 1 0	Conditions fair. Site isolated
Timber and Steel	105	1 2 0	Conditions fair
Flat slabs concrete	64	1 10 0	Foundations difficult
Large Culvert	32	2 0 0	Conditions bad

Approximately 35 per cent. of job costs come from " unproductive " items such as camp establishment and maintenance, payroll tax, leave, &c.

With the present shortage of contractors it is evident that more projects will need to be carried out by direct labour, and lowering of costs will be dependent on the use of mechanical means on the works, together with standardization of formwork and falsework.

TESTING LABORATORY.

For accurate routine viscosity measurements on lubricating oils and flux oils, the modified Ostwald (Fenske) viscosimeter, as described in the A.S.T.M. tentative method of test D445–46T, is now being employed.

It is also proposed to put into use Lee's modification of the Ostwald viscosimeter, as described in British Standard Method No. 188–1937. This instrument is of itself the reversed-flow type, and is intended for use with opaque or very viscous materials, such as tars and cut-backs. It enables repeated determinations to be carried out on the one sample without the necessity for cleaning and refilling, and its use is therefore indicated when it is required to determine the viscosity of a sample of tar or cut-back at several different temperatures.

A constant temperature bath, with built-in auxiliary equipment, has been constructed, for the accommodation of the Fenske and the Lee viscosimeters, and is shown in Plate No. 19 with viscosimeters in position. The bath itself is a 5-litre Pyrex beaker, and may be filled with diethylene glycol instead of water to enable viscosities to be determined at 210°F. and other elevated temperatures. A four-blade propeller-type stirrer, driven at 600 r.p.m. by a 30-volt synchronous motor, stirs the bath adequately.

Sensitive temperature control is obtained by a xylol-mercury thermo-regulator mounted in the bath and connected to an electronic relay contained in the cabinet forming the base of the instrument. Low-voltage, bare-wire heaters are employed to avoid the thermal lag associated with heaters of the high-voltage jacketed type. Two heating elements are employed, each consisting of a self-supporting helix of heavy-gauge nichrome wire. Current for the heaters is supplied by a transformer having a 32-volt tapped secondary, and housed in the cabinet of the instrument. By means of two voltage selectors mounted on the panel of the instrument, the voltages applied to each heater can be independently varied by 4-volt steps. One heater is in operation continuously, at a voltage not quite sufficient to maintain the desired temperature, while the other heater is automatically switched on and off by the relay, the voltage applied to this heater being just sufficient to obtain thermo-static control.

With water as the bath liquid, the following degrees of temperature control were obtained :—

Operating Temperature.	Observed Temperature Differential.
25° C. (77° F.)	±0·001° C
37·8° C. (100° F.)	±0·007° C.
50° C. (122° F.)	±0·009° C.

It is proposed to improve the apparatus by surrounding the beaker with a transparent shield in order to minimize heat loss, and also to fit a rheostat for fine adjustment of heater voltages.

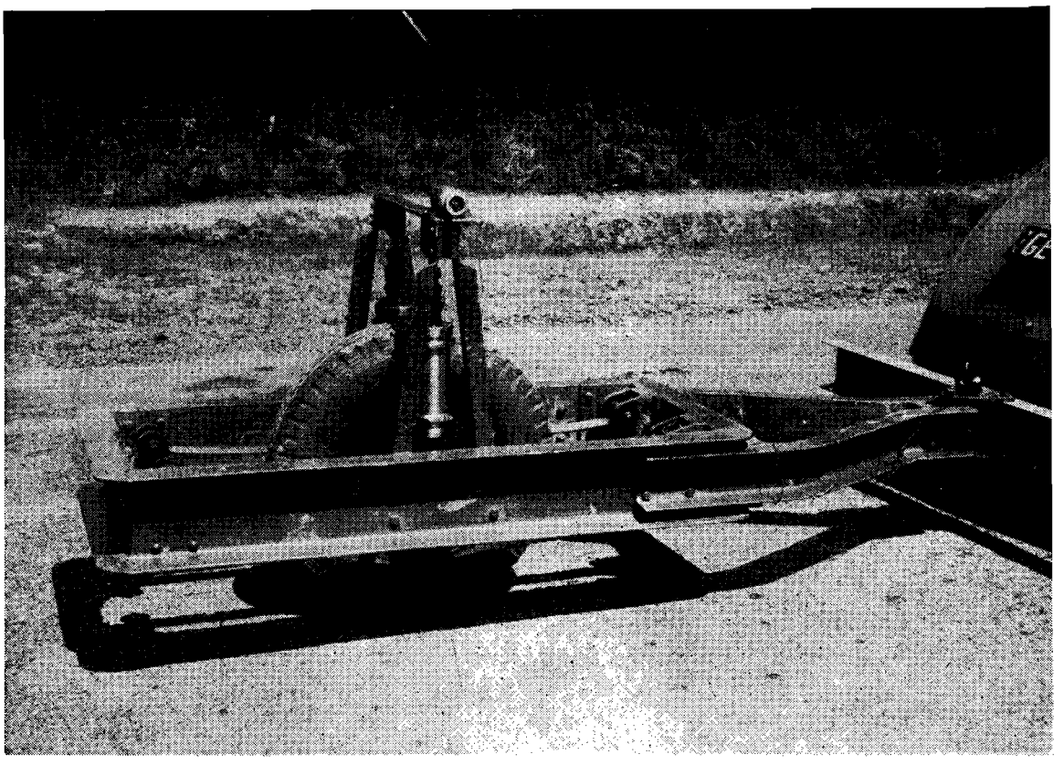

Plate No. 18.—Trailer-type Roughometer.

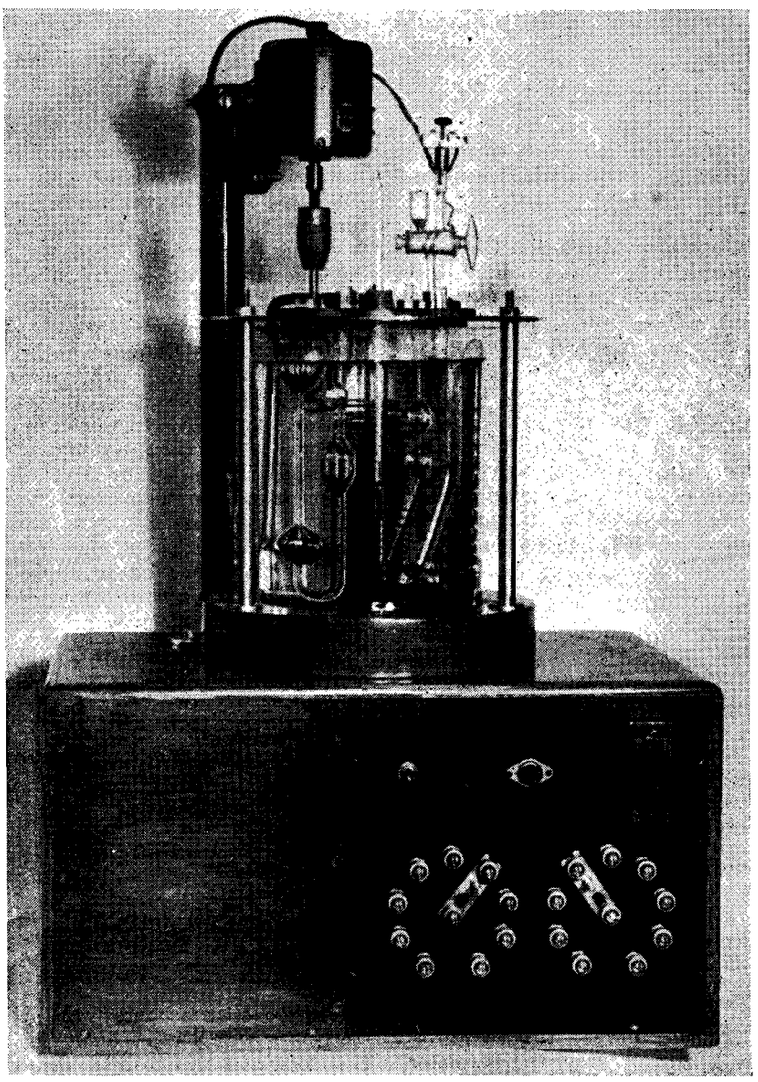

Plate No. 19.—Constant Temperature Bath with Viscosimeter in place.

LIBRARY.

Over a period of years the Board accumulated a number of technical books and pamphlets, and, during the last financial year, it became necessary to establish this library on a proper basis.

A technical librarian has been appointed and is responsible for the indexing and care of books and the circulation of technical periodicals among members of the staff. The librarian is the holder of a University degree in Arts and is competent to make searches in the literature for information required by the Board's senior officers, which they would not themselves have time to find.

In addition, contact is maintained with technical libraries of the Council for Scientific and Industrial Research, State Rivers and Water Supply Commission, and others, and books and periodicals are borrowed from, and loaned to, these libraries.

Much valuable information is received from overseas sources, such as the Road Research Laboratory in Great Britain, the Highway Research Board, and the Public Roads Administration in U.S.A., as well as organizations in South Africa, India, and elsewhere, and a properly-organized library and information service will enable the Board and the engineering staff to apply to its work the results of most recent overseas research.

CHIEF ENGINEER.

On the 20th June, the Chief Engineer left Melbourne on an official mission to the United States of America and to the United Kingdom. From reports and personal letters received to date it is evident that he will bring back not only a vast amount of technical information, but, by personal contact with administrative and technical authorities on the highest level in both countries, will acquire a wealth of background which should be of inestimable value to the Board, and indeed to all road authorities of Australia.

He is expected to return to Victoria late in January next year.

Yours obediently,

J. MATHIESON,

Acting Chief Engineer.

APPENDIX.

COUNTRY ROADS BOARD FUND.

RECEIPTS.

		£ s. d.	£ s. d.	£ s. d.	£ s. d.
1946. July 1.	To Balance				961,105 12 0
1947. June 30.	„ Motor Car Act No. 3741—				
	Registration Fees		1,887,280 4 5		
	Less Refunds		12,361 10 4		
			1,874,918 14 1		
	Fines ..	21,567 6 4			
	Less Refunds ..	76 5 0			
			21,491 1 4		
			1,896,409 15 5		
	Less Cost of Collection ..		133,614 7 3		
				1,762,795 8 2	
	„ Country Roads Acts Nos. 3662, 3741/13, 4332—				
	Fees and Fines		381 14 0		
	Registration of Traction Engines		94 17 0		
				476 11 0	
	„ Acts Nos. 3662, 3741, 4332, 4585—				
	Costs			74 16 6	
	„ Municipalities' Repayments—				
	Permanent Works—				
	Outer Metropolitan Roads	4,603 7 2			
	Relief Acts Nos. 4140, 4415 ..	143,332 7 8			
			147,935 14 10		
	„ Main Roads—Maintenance ..		128,541 5 5		
				276,477 0 3	
	„ Hire of Plant		181,935 13 5		
	„ Stores and Materials		411,750 7 3		
	„ Sundries		205,452 16 0		
				799,138 16 8	
	„ Special Works—Outstanding 30th June, 1946—Recoup			109,201 15 7	
					2,948,164 8 2
					3,909,270 0 2

PAYMENTS.

		£ s. d.	£ s. d.	£ s. d.
1947. June 30.	By Maintenance			1,412,029 8 1
	„ Murray River Bridges and Punts			4,629 15 4
	Interest and Sinking Fund Municipalities' Repayments			104,546 13 3
	„ Interest and Sinking Fund—Great Ocean Road			1,000 0 0
	Recoup to Revenue Act 3944—			
	Interest—Main Roads		96,965 2 8	
	Developmental Roads		164,559 14 10	
	Sinking Fund Contributions		24,243 15 7	
	Exchange		32,456 18 9	
	Loan Conversion Expenses		488 17 8	
	Special Payment to National Debt Sinking Fund		846 14 9	
				319,561 4 3
	„ Relief to Municipalities—Acts. Nos. 4140, 4415 ..		.. ..	220,704 11 6
	„ Stores and Materials		449,407 18 0	
	„ Plant Purchase and Repairs		368,388 19 6	
	„ Storeyards 1, 2, and 3		96,208 13 9	
	„ Sundry Debtors		74,167 8 5	
	„ Traffic Administration—			
	„ Motor Car Acts		3,902 1 5	
	„ Country Roads Acts		1,672 6 4	
	„ Bridge Inspections		742 14 8	
	„ Act No. 4332—Impounding of Cattle		930 19 11	
	„ Act No. 4609—Tourists' Resorts Fund		9,079 12 5	
	„ Act No. 4585—Traffic Line Marking		7,803 8 8	
	„ Act No. 5015—Cremorne Bridge ..	7,776 0 0		
	„ Alexandra Avenue	1,849 5 4		
			9,625 5 4	
	„ Recoup to Revenue Act 3782—Superannuation Charges		1,700 19 2	
	„ General Expenses—			
	Salaries, &c.	191,036 9 1		
	Less Recoup	26,940 1 3		
			164,096 7 10	
				1,187,726 15 5
	„ Special Works—Outstanding			14,444 13 9
	„ Balance			644,626 18 7
				£3,909,270 0 2

RECONCILIATION.

	£ s. d.	£ s. d.
Balance as per Treasury Books	595,645 8 6	
Add Transfers Outstanding	98,632 5 1	
		694,277 13 7
Deduct Accounts in Transit		49,650 15 0
Balance as per Country Roads Board Account		644,626 18 7

APPENDIX—*continued.*—REVENUE ACCOUNT, 30TH JUNE, 1947.

1947.		£ s. d.	£ s. d.	£ s. d.
June 30.	To Maintenance Works General		694,147 11 10	
,,	Mansfield–Woods Point Road ..	3,124 6 3		
,,	Woods Point Road	2,351 6 0		
,,	Walhalla Road	2,231 4 5		
,,	State Highways	596,547 18 5		
,,	Tourists' Roads	93,856 19 9		
,,	Forests Roads	19,770 1 5		
			717,881 16 3	
				1,412,029 8 1
,,	Murray River Bridges and Punts		.. ..	4,629 15 4
,,	Contribution to Sinking Fund		26,136 13 4	
,,	Interest on Loans		78,409 19 11	
				104,546 13 3
	Recoup to Revenue—Act. No. 3944—			
	Interest—Main Roads	96,965 2 8		
	Developmental Roads ..	164,559 14 10		
			261,524 17 6	
,,	Sinking Fund Contributions		24,243 15 7	
,,	Exchange		32,456 18 9	
,,	Loan Conversion Expenses		488 17 8	
,,	Special Payment to National Debt Sinking Fund ..		846 14 9	
				319,561 4 3
,,	Act No. 4395—Great Ocean Road—			
	Interest		495 12 0	
	Sinking Fund		504 8 0	
				1,000 0 0
,,	Tourists' Resorts Fund—Act No. 4609		.. ..	9,079 12 5
,,	Recoup to Revenue—Act No. 3782—Superannuation Charges			1,700 19 2
,,	Relief to Municipalities		.. ..	220,704 11 6
,,	Audit Fee		646 13 9	
,,	Bridge Equipment		1,811 19 1	
,,	Bridge Inspections		742 14 8	
,,	Defence Leave—Employees		213 15 9	
,,	Direction Boards and Warning Signs		2,404 6 8	
,,	Divisional Offices		2,720 19 8	
,,	Divisional Storeyards		14,757 16 4	
,,	Gravel Sites and Metal Investigation		474 10 0	
,,	Instruments and Survey Equipment		790 16 2	
,,	Insurance of Staff		192 17 8	
,,	Motor Expenses		15,136 15 10	
,,	Offices—Exhibition Building		1,181 4 8	
,,	Office Expenses		6,669 0 11	
,,	Office Furniture		5,468 11 2	
,,	Patrol Garages		6 18 1	
,,	Patrolmen's Cottages and Roadmaster's Residence ..		3,516 9 10	
,,	Residences and Housing Sites		4,993 14 6	
,,	Storage Sites		463 6 3	
,,	Storeyard Equipment Repairs		7 8 7	
,,	Plans Purchase		1,091 0 10	
,,	Plant Purchase		238,546 15 11	
,,	Postage and Telegrams		1,808 12 8	
,,	Printing and Stationery		2,210 3 3	
,,	Salaries		95,306 19 11	
,,	Pay Roll Tax (Staff)		2,355 6 3	
,,	Storeyard Cartage Expenditure		11,949 10 9	
,,	Telephones		2,096 1 4	

1946.		£ s. d.	£ s. d.	£ s. d.
July 1.	By Balance			1,452,785 17
1947.				
June 30.	,, Motor Car Act No. 3741—			
	Registration Fees	1,887,280 4 5		
	Less Refunds	12,361 10 4		
		1,874,918 14 1		
	Fines .. 21,567 6 4			
	Less Refunds .. 76 5 0			
		21,491 1 4		
		1,896,409 15 5		
	Less Cost of Collection ..	133,614 7 3		
			1,762,795 8 2	
,,	Country Roads Act No. 3662—			
	Registration of Traction Engines		94 17 0	
	Fees and Fines		381 14 0	
	Costs—Acts Nos. 3662, 3741, 4332, 4585.. ..		74 16 6	
,,	Plant Earnings	182,461 12 9		
,,	*Deduct* Working Costs	129,842 3 7		
			52,619 9 2	
,,	Sundry Earnings		808 19 2	
,,	Rents		1,605 7 7	
,,	Royalty on Gravel and Metal		218 18 0	
,,	Storeyard Cartage Earnings		14,370 6 7	
,,	Timber, &c.—Revenue		138 1 8	
,,	Old Roads, Sale of		177 2 4	
,,	Materials, Sale of		27 10 0	
,,	Plans, Sale of		14 18 4	
,,	Storeyards 1, 2, and 3		4,709 7 10	
,,	Great Ocean Road—Interest and Principal ..		1,752 15 0	
,,	Maintenance Works—			
	Contributions Payable by Municipalities	160,076 4 2		
	Adjustment	0 12 8		
			160,075 11 6	
,,	Permanent Works—			
	Contributions Payable by Municipalities—			
	Outer Metropolitan Roads ..	4,603 7 2		
	Other Main Roads ..	138,707 3 4		
			143,310 10 6	
				2,143,175 13 4

,,	Testing Materials			3,413 16 11	
,,	Divisional Testing Materials			384 0 1	
,,	Travelling Expenses			2,081 6 4	
,,	Motor Car Acts Nos. 3741, sections 11–13, and 3901, section 24–36			3,902 1 5	
,,	Country Roads Board Acts			1,672 6 4	
,,	Act No. 4332—Impounding of Cattle			930 19 11	
,,	Act No. 4585—Linemarking (Traffic)			7,803 8 8	
,,	Act No. 5015—				
	Cremorne Bridge	7,776 0 0			
	Alexandra Avenue	1,849 5 4			
				9,625 5 4	
,,	Chief Engineer's Mission Abroad			2,172 15 10	
,,	Advertising—Government Printer			1,191 2 9	
,,	Transportation Survey			39 16 8	
,,	Photography			411 18 8	
,,	Legal Costs			300 0 0	
,,	Cost Clerk Training			600 6 1	
,,	Traffic Census			270 4 7	
,,	Engineers' Conference			52 16 10	
,,	Technical School Fees			6 8 0	
,,	Wireless Licences			37 0 0	
,,	Recoup—				
	S. R. B. Packer			149 4 7	
	J. and A. M. Bell			9 15 1	
,,	Bush Fire Fighting			17 11 5	
,,	Investigation Survey			221 14 5	
				452,858 10 5	
	Less Recoup			26,940 1 3	
					425,918 9 2
	Balance				1,096,790 17 5
					£3,595,961 10 7

£3,595,961 10 7

BALANCE-SHEET AT 30TH JUNE, 1947.

LIABILITIES	£	s.	d.
Contractors' Deposits	22,885	10	2
Sundry Liabilities	23,923	6	0
Revenue Account	1,096,790	17	5
	£1,143,599	13	7

ASSETS.	£	s.	d.	£	s.	d.
Country Roads Board Fund				644,626	18	7
Maintenance Expenditure—						
Contributions Payable by Municipalities				160,076	4	2
Permanent Works—						
Contributions Payable by Municipalities (Subject to Relief)—						
Outer Metropolitan Roads	4,603	7	2			
Other Main Roads	138,707	3	4			
				143,310	10	6
Outstanding Accounts	22,651	4	9			
„ Special Works	14,444	13	9			
				37,095	18	6
Materials Stock—						
Storeyard	115,876	16	3			
Branches	19,727	15	5			
				135,604	11	8
Trust Fund				22,885	10	2
				£1,143,599	13	7

SUMMARY SHOWING VALUE AS AT 30TH JUNE, 1947, OF BOARD'S ASSETS CHARGED TO FUND (not included in Balance-sheet).

	£	s.	d.
Divisional Engineer's Residences	11,407	9	2
Divisional Storeyards and Offices	8,375	0	0
New Divisional Premises	21,217	4	4
Divisional Workshop Plant, Tools, and Equipment	5,770	0	0
Patrol Cottages, Huts and Garages	14,885	10	0
Storeyard No. 1	8,917	0	0
„ „ 2	13,088	0	0
Storage Sites	463	0	0
Workshop Plant Tools and Equipment	10,947	4	0
Furniture and Fittings	17,436	6	7
Testing Laboratory Equipment	4,835	12	8
	117,342	6	9

	£	s.	d.
Brought Forward	117,342	6	9
Bridge Equipment	5,779	3	9
Survey Instruments	2,473	14	0
Loadometers	1,192	16	10
Concrete Pipe Tester	4	0	0
Motor Registration Branch	6,284	4	0
Motor Testing Branch	457	18	0
Police Motor Cycles	4,490	0	0
Police Motor Cars	13,613	13	0
Motor Cars	17,948	0	0
	169,585	16	4
Working Plant at Valuation	488,241	11	9
	£657,827	8	1

COUNTRY ROADS BOARD LOAN ACCOUNT—ACT No. 3662.

1947.	RECEIPTS.	£	s.	d.
June 30.	To State Loans Repayment Fund	10,006	18	6
		£10,006	18	6

1947.	PAYMENTS.	£	s.	d.	£	s.	d.
June 30.	By Permanent Works	10,324	2	11			
	Less Refunds	344	17	6			
					9,979	5	5
	„ Balance—Outstanding Transfers	36	7	2			
	Less Account in Transit	8	14	1			
					27	13	1
					£10,006	18	6

BALANCE SHEET AT 30TH JUNE, 1947.

LIABILITIES.	£	s.	d.	£	s.	d.	£	s.	d.
Interest on Permanent Works				..		..	18,834	6	6
Loan Securities Issued	4,893,233	17	1						
Add Increase in Expenses Renewal Loans ..	541	4	5						
				4,893,775	1	6			
Less Amount Repaid				80,000	0	0			
				4.813,775	1	6			
Deduct Discount and Expenses				104,907	5	8			
				4,708,867	15	10			
Less Securities Repurchased and Cancelled from National Debt Sinking Fund				509,474	4	7			
				4,199,393	11	3			
Less—									
Redemption Funds	85,219	1	1						
Main Roads Sinking Funds	285,688	7	7						
Repaid to State Loans Repayment Fund ..	626,034	3	5						
				996,941	12	1			
							3,202,451	19	2
State Loans Repayment Fund				..		..	348,265	4	7
Contribution to National Debt Sinking Fund				556,022	0	4			
Less Net Loss on Repurchase of Securities (Including Exchange) ..				17,812	12	7			
							538,209	7	9
Loan Redemption as Itemized Above				..		..	996,941	12	1
							£5,104,702	10	1

ASSETS.	£	s.	d.
Permanent Works	5,057,105	7	4
Interest Capitalized on Permanent Works (Act 3662)	18,834	6	6
Country Roads Board Loan Account	27	13	1
National Debt Sinking Fund (Cash in Hand)	28,735	3	2
	£5,104,702	10	1

DEVELOPMENTAL ROADS LOAN ACCOUNT—ACT No. 3662.

BALANCE-SHEET AT 30TH JUNE, 1947.

LIABILITIES.	£ s. d.	£ s. d.	£ s. d.
Loan Securities Issued	6,343,806 7 9		
Add Increase in Expenses Renewal Loans	752 0 2		
		6,344,558 7 11	
Deduct Discount and Expenses		158,697 3 1	
		6,185,861 4 10	
Less Securities Repurchased and Cancelled from National Debt Sinking Fund		784,885 9 4	
		5,400,975 15 6	
Less—			
Redemption Funds	646,386 7 4		
Developmental Roads Sinking Fund	55,083 0 2		
		701,469 7 6	
			4,699,506 8 0
State Loans Repayment Fund			239,896 6 1
Contribution to National Debt Sinking Fund		856,596 0 6	
Less Net Loss on Repurchase of Securities (including Exchange)		27,441 15 4	
			829,154 5 2
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
			£6,564,055 4 2

ASSETS.	£ s. d.	£ s. d.
Permanent Works Expenditure	6,425,757 10 11	
National Debt Sinking Fund (Cash in Hand)	44,268 15 10	
Contributions Payable by Municipalities, Act No. 3662, Sec. 86 (Subject to Relief)	94,028 17 5	
		£6,564,055 4 2

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

RECEIPTS.	£ s. d.
1947.	
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.
1947.	
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, 1947.

E. A. PEVERILL,
Auditor-General,
17th December, 1947.

E. J. HICKS,
Accountant,
27th October, 1947.

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