1955

VICTORIA

COUNTRY ROADS BOARD

FORTY-SECOND ANNUAL REPORT

FOR YEAR ENDED 30TH JUNE, 1955

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

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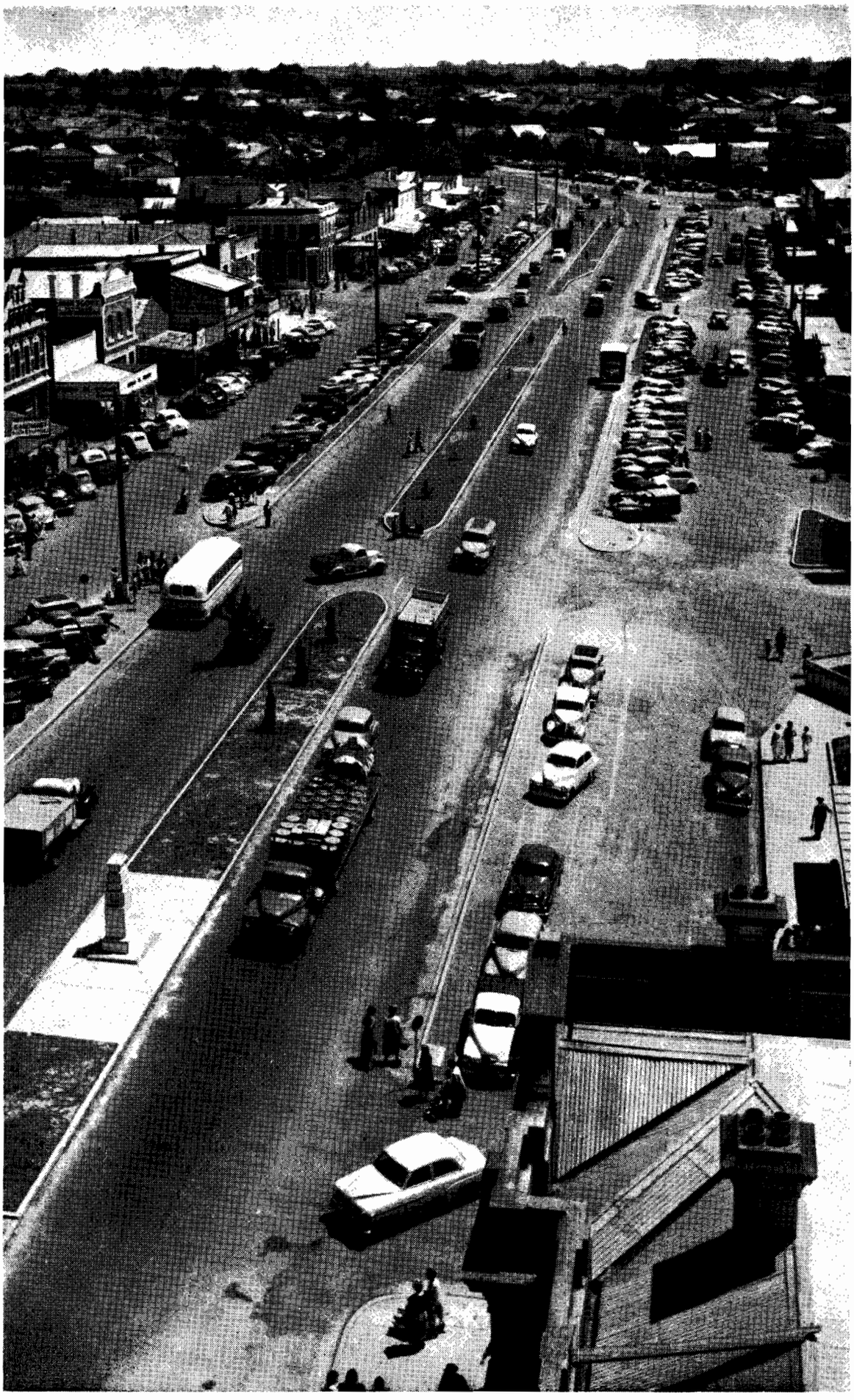

Dual carriageway and channelization of Princes Highway through township of Dandenong.

Cover.—A recently constructed pre-cast concrete bridge over Lightning Creek on the Omeo Highway.

COUNTRY ROADS BOARD

FORTY-SECOND ANNUAL REPORT, 1955

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COUNTRY ROADS BOARD

FORTY-SECOND ANNUAL REPORT

Exhibition Building,
Carlton, N.3,
1st December, 1955.

The Honorable Sir Thomas Maltby, M.L.A.,
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* 1928 (No. 3662) the Board has the honour to submit to you for presentation to Parliament, a report of its proceedings for the year ended 30th June, 1955.

FINANCE.

Naturally, an increased amount was received from motor registration fees, due to the increasing number of vehicles using the roads in this State. Apart from this, the Board's funds were augmented from three other sources, providing about 25 per cent. additional increase in revenue, viz. :—

(1) The increased share of the moneys derived from the petrol tax consequent upon the decision of the Commonwealth Government to distribute to the States an equivalent of 7d. per gallon on petrol (both excise and customs) as from the 1st July, 1954, instead of 3½d. per gallon excise and 6d. per gallon customs as had operated immediately prior to that date.

(2) The payment into the Country Roads Board Fund as from the 1st July, 1954, of two-thirds of the additional registration fees payable under Section 8 of the *Motor Car Act* 1951, No. 5616.

(3) The payment into the Country Roads Board Fund of the balance standing to the credit of the Transport Regulation Fund at the 30th June, 1955.

Despite the additional amounts available to the Board from the above sources, the total sum at the Board's disposal was still quite inadequate to cover the cost of urgent and necessary works, and the Board was again obliged to limit the allocations for works, both under municipal supervision and under its own direct supervision. After providing for the minimum requirements for the maintenance of existing assets, the amount remaining was sufficient only for a small programme of reconstruction far short of requirements. While road traffic and heavy road transport are increasing rapidly without much restriction, road finance is not increasing commensurably.

The net amount received by the Board from motor registration fees and fines and half the drivers' licence fees for the financial year, after allowing for costs of collection, refunds, &c., was £4,829,100, an increase of £858,572 over the amount of £3,970,528 received from the same source during the financial year 1953–54. The receipts from petrol tax were £3,802,370, an increase of £1,060,762 over the previous year's receipts of £2,741,608.

An amount of £34,009 8s. 11d. was received from fees charged for the use, by vehicles engaged in Interstate trade of roads in this State; but this amount was held pending the outcome of legal proceedings as to the validity of the legislation.

DEFICIENCIES

Plate No. 1.—Badly-failed section of Warracknabeal–Dimboola Road.

Plate No. 2.—Broken edges of seal on South Gippsland Highway.

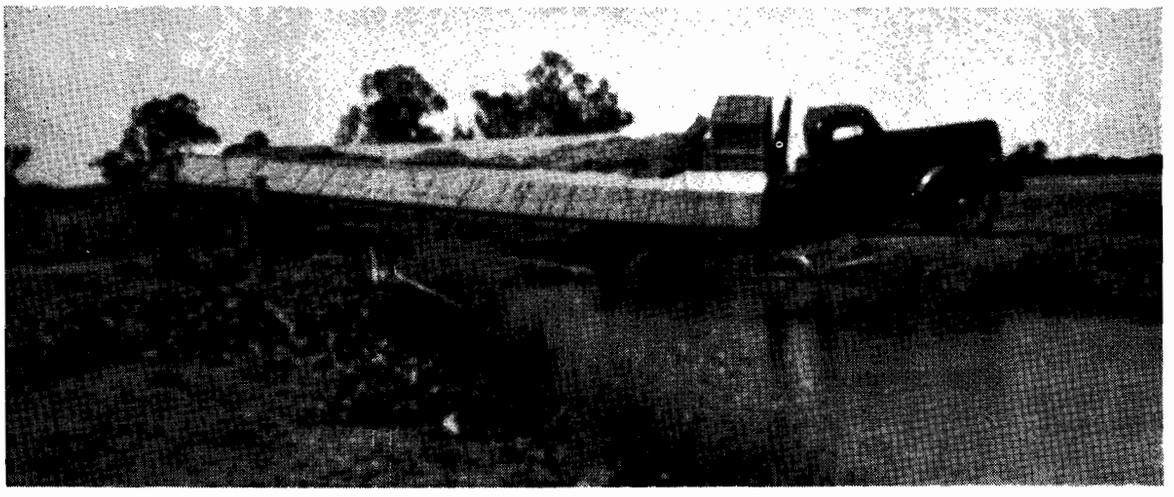


Plate No. 3.—Transport on collapsed State Rivers and Water Supply Commission bridge in Kerang Shire.

Plate No. 4.—Heavy transports on narrow bridge on Hume Highway at Kilmore, showing limited clearance.

While, however, there has been some increase in the receipts, the costs of road construction and maintenance are increasing much more rapidly, due to increase in costs coupled with increase in the volume and weight of heavy traffic using the State's road system. The total number of motor vehicles (i.e., cars, motor cycles, and trucks) registered on the 1st July, 1954, was 567,204. On the 30th June, 1955, this number had increased to 637,662. The increase in commercial vehicles in the same period was from 81,483 to 88,689. The increasing wear and tear on the roads is placing on the Board and the Municipal Councils a heavier financial burden, which is not by any means being met by the relatively small increase in the available funds. As has been stressed in earlier reports, the position is not likely to improve unless there is a very substantial increase in the Board's funds. In the circumstances, the Board is forced to continue with the uneconomical policy of patching and re-patching both roads and bridges in an endeavour to make them last a few years longer. (Plates Nos. 1, 2, 3, and 4.)

The Board's restricted financial position is unfortunate from another aspect, namely, that whilst more contractors are coming into the field for both road and bridge works the funds to finance extensive new works are not available. No bold or progressive policy can be formulated whilst so great a proportion of the available money must be devoted to the maintenance of existing assets. Something of the order 75 per cent. to 80 per cent. of the money is required for maintenance, so that progress with improvements is deplorably slow.

During the financial year 1954–55 a total sum of £19,772,000 was applied for by the Municipal Councils and the Board's engineers for expenditure on both classified and unclassified roads, but notwithstanding the fact that the Board was satisfied that the applications were generally for urgent and necessary works, the full amount which could be allotted was £13,416,066 only, equivalent to 59 per cent. of the total applications. The actual road expenditure for the year, viz., £8,887,806, equalled 69 per cent. of the allocation, and the Board is satisfied that the potential of both the Municipal Councils and the Board is such that a considerably higher rate of annual expenditure could be achieved if additional funds were available. This position has remained unsatisfactory for some years, as the following table shows :—

Financial Year.	Applications before C.R.B.	Receipts of C.R.B.
	£	£
1950–51	11,568,000	6,055,000
1951–52	15,544,000	7,690,000
1952–53	13,008,000	7,419,000
1953–54	17,682,000	8,313,000
1954–55	19,772,000	10,364,000

Patrol and general maintenance requirements were again given a very high priority in the allocation of funds, but the many applications received during the course of the financial year for additional grants for both types of work were an indication of the need for works of a more permanent nature to cut down maintenance costs. A certain minimum allocation is, of course, essential to enable Councils which have set up an efficient patrol organization to finance the cost, and the Board is guided in this by the nature and extent of the Council's applications. In many instances, however, requests by Councils for grants for reconstruction could not be complied with, and in lieu of grants for this type of work the Board was obliged to make very limited grants to permit of light resheeting being carried out to hold the roads in the meantime. On dilapidated old bridges, load restrictions remain year after year.

Country Roads Board Fund.

The gross receipts from motor registration fees and fines, together with half the amount received from drivers' licence fees, amounted to £5,339,008 or £955,601 more than the amount received from the same source in the previous financial year. After taking into consideration refunds, costs of collection, &c., the net revenue for the year was £4,829,100

This increase has, however, been more than offset by the increasing costs of road construction and maintenance, the marginal increases provided under certain industrial awards, operative from December last, having greatly added to the Board's wages bill. Section after section of lightly constructed roads now inadequate requires complete reconstruction to far heavier standards.

Commonwealth Aid Road Funds.

The *Commonwealth Aid Roads Act* 1954 which repealed the 1950 Act and which came into operation from 1st July, 1954, provides for the payment into the Commonwealth Aid Roads Trust Account of the proceeds of 7d. per gallon Customs duty on motor spirit imported into Australia and a similar amount per gallon Excise duty on motor spirit refined in Australia in lieu of 6d. per gallon Customs duty and 3½d. per gallon Excise duty provided under the 1950 Act.

Under the new legislation the Commonwealth retains £900,000 per annum, £800,000 of which is to be expended on the construction, maintenance and repair of strategic roads, roads of access to Commonwealth property and other roads serving or likely to serve Commonwealth properties, and £100,000 to be expended on the promotion of road safety practices throughout the Commonwealth. The balance is distributed to the States on the basis of three-fifths as to population and two-fifths as to area, and provision is made that the moneys paid to the States shall be expended on the construction, reconstruction, maintenance and repair of roads or on the purchase of road-making plant with the proviso that not less than two-fifths of the amount shall be expended for similar purposes in connection with rural roads which do not include highways, trunk roads, and main roads. It is also provided that an amount equivalent to £1,000,000 apportioned each year among the States on the population-area basis may be expended on other works connected with transport by road or water.

For the population as published by the Commonwealth Statistician from the returns of the census taken during the month of June, 1954, the amount payable to the State of Victoria under the Act represents £175,700 out of each £1,000,000 distributed to the States.

During the financial year 1954–55 the total sum received by the Board from the proceeds of petrol tax was £3,802,370, making the total sum available to the Board from motor registration fees and fines, drivers' licence fees, additional transfer fees, municipal repayments, &c., as well as from Commonwealth sources, £9,408,332, as compared with receipts totalling £7,045,582 from the same sources in the preceding financial year. (As the additional transfer fees were not made available to the Board until the 1st July, 1954, they are not included in the last-mentioned amount.)

The amounts expended on roads and bridges during the year from moneys derived under the provisions of the Commonwealth Aid Roads Acts were as under:—

	£
Construction and maintenance of classified roads	2,445,138
Construction of unclassified roads and restoration and rebuilding of bridges on unclassified roads	838,205
Assistance on construction of Soldier Settlement Roads	52,558
Construction, reconstruction, and maintenance of school bus routes	5,109
Repair of flood damage on unclassified roads	10,490
Provision towards maintenance of unclassified roads	450,756
Purchase of roadmaking plant	114
Total	3,802,370

Loan Moneys.

The total amount of loan moneys made available to the Board during 1954–55 was £956,000, as compared with £1,290,500 in the preceding financial year. The provision of this loan money enabled the Board to finance a number of urgent and necessary works, but, on the other hand, the Board's interest and sinking fund bill has been increased from £611,154 to £676,011 and still remains a heavy burden on the Board's resources.

Finance—General.

At the 30th June, 1955, the total amount from all sources standing to the credit of the Board was £173,812. In finalizing its accounts the Board relied on the estimated balance in the Transport Regulation Fund, which at the date mentioned was paid into the Country Roads Board Fund to meet the very heavy claims made upon it in the closing stages of the financial year.

Allocations for Works.

The total allocation for road and bridge works from all funds for the financial year 1954–55, not including revotes and amounts already committed in respect of works authorized was £10,165,740, as compared with £7,605,369 in 1953–54. The allocation of £10,165,740 comprised £4,479,556 from the Country Roads Board Fund, £4,730,184 from Commonwealth Aid Road Fund, and £956,000 from loan moneys.

Taking into account revotes and commitments, the comparable figures for the financial years 1953–54 and 1954–55 respectively were £8,783,864 and £12,483,702.

MAIN ROADS.

Allocation of Funds.

The total amounts applied for, both by Municipal Councils and by the Board's Divisional Engineers (for works under the direct supervision of the Board) in respect of the maintenance and improvement of main roads which on the 30th June, 1955, totalled 9,789 miles, was £7,584,211, and the total sum allocated was £4,828,145, or 64 per cent. of the total allocations. This last-mentioned sum was made up of £3,474,919 from the Country Roads Board Fund and £1,353,226 from Commonwealth Aid Road Funds.

One hundred and eighty-nine municipalities participated in the allocation, whilst provision was also made for the maintenance and improvement of a number of main roads directly supervised by the Board. The total amount allotted for the latter group of roads was £380,153. This amount is included in the total allocation figures mentioned in the previous paragraph.

In making its allocation the Board endeavoured firstly to provide from the limited funds at its disposal the amounts essential for patrol and general maintenance, bridge maintenance, resheeting, and resealing, and next included a limited number of initial bituminous surface treatments, generally in short sections only. In order to reduce maintenance costs, especially in areas where there is a scarcity of maintenance materials, it has been the aim of the Board to carry out as much extension of bituminous surfacing as possible. The increase in this type of improvement year by year is far too slow. The allocation also included some reconstruction of worn-out sections of pavement and weak bridges, although again not to the extent which the Board would have wished. In fact, the necessity for costly and repeated patching rather than completely reconstructing, forced upon the Board by reason of its limited purse, was again the predominant factor in determining the types of work for which funds could be provided, and it is quite apparent that this wasteful procedure will continue until there is a substantial increase in the Board's funds.

The expenditure for the year on main roads was £3,200,161, equivalent to 66 per cent. of the allocations, as compared with 67 per cent. in 1953–54 and 73 per cent. in 1952–53. Commitments amounting to £1,018,291 were outstanding at the 30th June, 1955.

Apportionment of Costs.

The Country Roads Act provides that not more than one-third of the amount expended from the Country Roads Board Fund on the maintenance of main roads during the preceding year shall be apportioned to the municipalities, whose contributions are due

and payable on the 1st January in the financial year next following that in which the expenditure was incurred. The Act further provides for the municipal contribution to be reduced below one-third where the cost of maintenance of a road is deemed to be excessive and where such cost is due to motor traffic not of local origin, or to timber traffic. In dealing with the apportionment of the cost of works the Board is also required to take into account the revenue, valuation, and rating of the municipality concerned.

Consequent upon the great development in motor traffic, contributions have, in many cases, been reduced over a number of years below one-third, and as a further measure of assistance to the municipalities the Board has also been reducing their contributions by supplementing its allocations from the Country Roads Board Fund with grants from Commonwealth Aid Road Funds, free from additional contributions by the Councils. Generally, these supplementary grants relate to larger items such as reconstruction projects, and the amounts to be contributed by the municipalities concerned for such items are substantially reduced by the allocation of these grants of " free " money.

The percentage of contribution by Councils to the total expenditure for 1953–54 was 15·65 per cent. as compared with 15·15 per cent. in the previous year. The following are the details :—

	£
Expenditure from Country Roads Board Fund	1,850,079
Expenditure from Commonwealth Aid Road Funds	591,532
Total Expenditure	2,441,611
Amount apportioned to Councils based on expenditure from Country Roads Board Fund only	£382,039
Percentage of apportionment of amounts provided from the Country Roads Board Fund	20·65%
Percentage of apportionment of total expenditure (including Commonwealth Aid Road Fund grants)	15·65%

Had the whole of the expenditure been financed from the Country Roads Board Fund and apportioned strictly on a one-third basis the Councils would have been required to contribute one-third of £2,441,611, i.e., £813,870. By reason of the reduced contributions and the " free " grants from Commonwealth funds, however, their contributions amounted to £382,039 only, a saving of £431,831.

Major Works.

Particulars of some of the major works carried out during the year are set out hereunder :—

Bairnsdale Division.

Avon Shire.—(1) Dargo Road—1½ miles of resheeting near Cobbannah ; 1 mile of resheeting and sealing and construction of two timber bridges and approaches. (2) Bengworden Road—1 mile of resheeting and sealing.

Bairnsdale Shire.—Resheeting and sealing of 1 mile of the Bairnsdale–Dargo Road, 1 mile of the Bengworden Road, 1·5 miles of the Bairnsdale–Bullumwaal Road, and 1·5 miles of the Glenaladale–Lindenow Road.

Tambo Shire.—Reconstruction and sealing of 1 mile of the Metung Road and 1 mile of the Tambo Upper Road and extensive repairs to truss bridge over Tambo River near Bruthen.

Ballarat Division.

Ararat Shire.—Willaura–Wickliffe Road—2 miles of reconstruction and sealing 1 mile south of Willaura. *Avoca Shire.*—(1) Maryborough–Natte Yallock Road—2·6 miles of reconstruction and sealing ; (2) Moonambel Road—1 mile of resheeting and sealing. *Ballan Shire.*—Myrniong-Greendale Road—1·4 miles of sealing. *Buninyong Shire.*—(1) Buninyong–Mt. Mercer Road—1 mile of reconstruction ; (2) Elaine–Mt. Mercer Road —1·15 miles of reconstruction and sealing westerly from Elaine. *Glenlyon Shire.*—

Hepburn–Newstead Road—1·4 miles of reconstruction and sealing. *Grenville Shire.*—Sebastopol–Smythesdale Road—1 mile of sealing. *Lexton Shire.*—Beaufort–Lexton Road—1·75 miles of reconstruction and sealing. *Newstead Shire.*—Reconstruction and sealing of 1·3 miles of the Hepburn–Newstead Road, and 1 mile of the Newstead–Guildford Road. *Ripon Shire.*—(1) Ballarat–Carngham Road—1 mile of sealing; (2) Beaufort–Lexton Road—1 mile of sealing; (3) Skipton Road—1 mile of reconstruction. *Talbot Shire.*—Maryborough–Ballarat Road—construction of 1·6 miles and fencing of deviation to by-pass two railway crossings north-west of Clunes. *Tullaroop Shire.*—Reconstruction and sealing of 2·4 miles of the Natte Yallock Road and 1·05 miles of the Talbot–Eddington Road.

Benalla Division.

Reconstruction and sealing, the principal type of improvement in this Division, was effected on the following roads:—

Beechworth Shire.—1 mile of Beechworth Road and ·85 miles of section joint with Wangaratta Shire, thus completing the sealing of the road between Beechworth and Wangaratta. *Benalla Shire.*—1·8 miles of the Benalla–Tocumwal Road near Devenish, 3 miles of the Benalla–Yarrawonga Road, 1·2 miles of the Dookie–Devenish Road, and 1·7 miles of the Swanpool Road. *Bright Shire.*—1·5 miles of the Buckland Valley Road, 1·2 miles of the Buffalo River Road, 1·1 miles of the Harrietville Road, and 1·1 miles of the Myrtleford–Yackandandah Road. *Cobram Shire.*—1·2 miles of the Benalla–Tocumwal Road north of Katamatite and 1·9 miles south of Katamatite. *Euroa Shire.*—3·1 miles of the Euroa–Mansfield Road. *Mansfield Shire.*—1·5 miles of the Benalla–Mansfield Road, 1 mile of the Mansfield–Woods Point Road, and 1·59 miles of the Mansfield Road. *Numurkah Shire.*—2·55 miles of the Nathalia–Katamatite Road. *Orley Shire.*—1 mile of the Wangaratta–Kilfeera Road, 1·8 miles of the Wangaratta–Whitfield Road, and 2 miles of the Bright Road. *Rutherglen Shire.*—1·75 miles of the Chiltern–Howlong Road. *Seymour Shire.*—1·1 miles of the Highlands Road and 1·1 miles of the Avenel–Nagambie Road. *Shepparton Shire.*—1·25 miles of the Katandra Road and 2 miles of the Shepparton–Barmah Road. *Towong Shire.*—2·75 miles of the Murray Valley Road and 1·6 miles of the Tallangatta Creek Road. *Tungamah Shire.*—1·5 miles of the Benalla–Tocumwal Road, 2 miles of the Benalla–Yarrawonga Road and 1·25 miles of the St. James Road. *Wangaratta Shire.*—3·5 miles of the Beechworth Road. *Yackandandah Shire.*—1·5 miles of the Kiewa Valley Road at Wodonga Shire boundary and 3·1 miles near Yackandandah Creek. *Yarrawonga Shire.*—1 mile of the Yarrawonga–Katamatite Road, 2·35 miles of the Benalla–Yarrawonga Road, and 3·7 miles of the Wangaratta–Yarrawonga Road.

Bendigo Division.

Birchip Shire.—Reconstruction of 4·7 miles of the Beulah–Birchip–Wycheproof Road, 1·3 miles of the Birchip–Sea Lake Road, and 2·3 miles of the Birchip–Warracknabeal Road. *Charlton Shire.*—St. Arnaud–Wycheproof Road—1·66 miles of sealing. *Cohuna Shire.*—Cohuna–Koondrook Road—1·1 miles of strengthening and sealing. *Deakin Shire.*—(1) Rochester–Kyabram Road—1·25 miles of reconstruction and sealing; (2) Kyabram–Tongala Road—1·13 miles of strengthening and sealing. *East Loddon Shire.*—Bendigo–Pyramid Road—2·9 miles of strengthening and sealing and 4 miles of resheeting. *Gordon Shire.*—Charlton–Durham Ox Road—2·2 miles of resheeting and sealing (thus completing the sealed road between the Loddon Valley Highway at Durham Ox and Boort). *Huntly Shire.*—Bendigo–Tennyson Road—2·75 miles of strengthening and sealing. *Kerang Shire.*—(1) Cohuna–Koondrook Road—·5 miles of reconstruction and 1 mile of sealing; (2) Koroop Road—3·6 miles of reconstruction, realignment, and sealing. *Korong Shire.*—Wedderburn–Boort Road—2·5 miles of reconstruction, realignment, regrading and sealing. *Maldon Shire.*—Baringhup Road—1·1 miles of reconstruction and sealing. *Marong Shire.*—(1) Bendigo–Eddington Road—1·85 miles of realignment, reconstruction and sealing; (2) Bendigo–Pyramid Road—2·7 miles of strengthening and sealing; (3) Bendigo–St. Arnaud Road—1·9 miles of strengthening and sealing; (4) Ravenswood–Marong Road—1·99 miles of realignment, regrading, and construction, including new culverts. *Metcalfe Shire.*—Resheeting and sealing of 2·05 miles of the Kyneton–Redesdale Road and 1·1 miles of the Vaughan–Chewton Road. *McIvor Shire.*—(1) Heathcote–Bendigo Road—2·1 miles of realignment, reconstruction, and sealing (completion of sealing of road in this Shire); (2) Heathcote–Redesdale Road—1·6 miles of reconstruction and sealing. *Rochester Shire.*—(1) Bendigo–Tennyson Road—2 miles of resheeting and sealing; (2) Echuca–Mitiamo Road—1·12 miles of sealing; (3) Rochester–Bamawm–Prairie Road—2 miles of strengthening and sealing. *Rodney Shire.*—

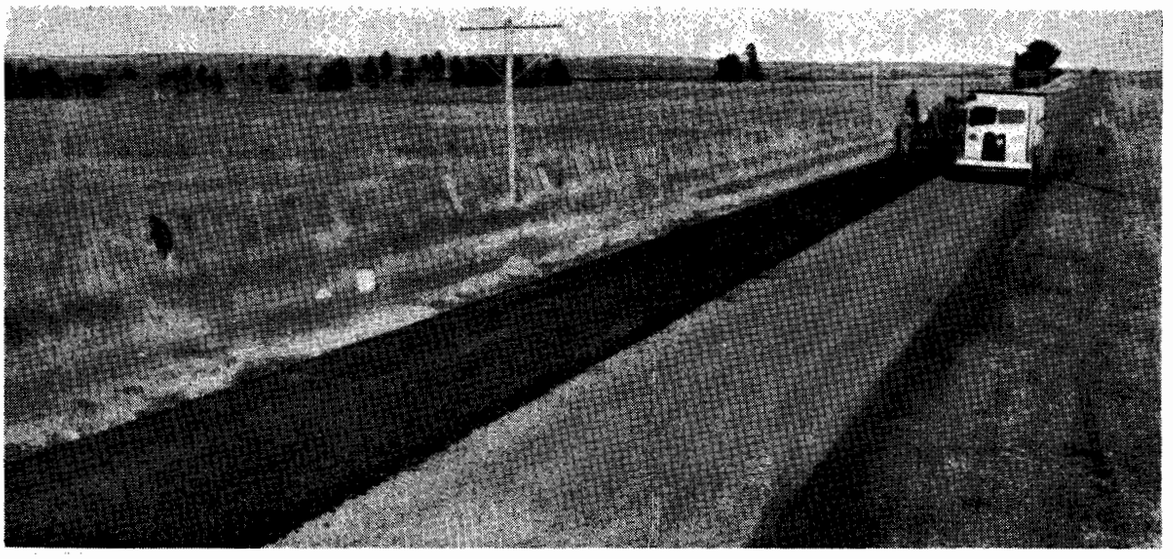


Plate No. 5.—Hot-mix seal on Winchelsea–Dean's Marsh Road.

Plate No. 6.—Reconstruction in progress, Beech Forest–Apollo Bay Road.

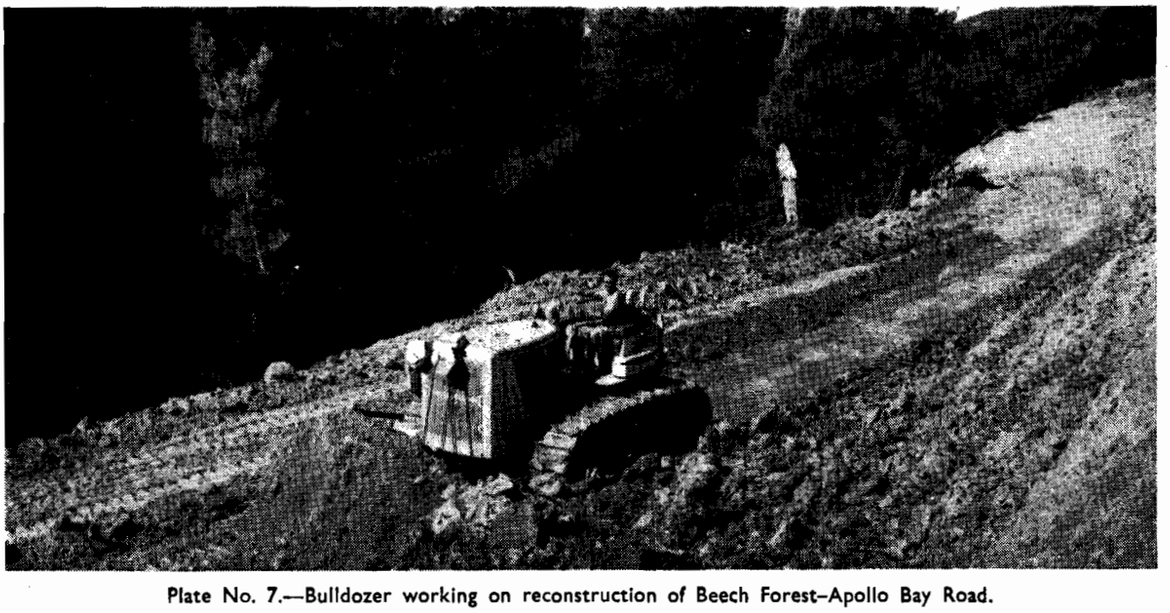


Plate No. 7.—Bulldozer working on reconstruction of Beech Forest–Apollo Bay Road.

Reconstruction and sealing of 1·5 miles of the Tatura–Murchison Road and 1 mile of the Undera–Wyuna Road. *Swan Hill Shire.*—Sealing of 3·5 miles of the Nyah–Ouyen Road, 1·1 miles of the Robinvale Road, 1·55 miles of the Sea Lake–Robinvale Road, and 2·43 miles of the Ultima Road. *Wycheproof Shire.*—(1) Birchip–Sea Lake Road—1 mile of sealing; (2) Birchip–Wycheproof Road—1·57 miles of sealing and 1·02 miles of reconstruction; (3) Sea Lake–Ultima Road—1·25 miles of sealing.

Dandenong Division.

Bass Shire.—Dalyston–Glen Forbes Road—6,200 feet of reconstruction, widening, and sealing. *Cranbourne Shire.*—Koo-wee-rup–Pakenham Road—1 mile of reconstruction and widening; Manks Road—2·14 miles of resheeting and widening. *Dandenong Shire.*—Wells Road—1·25 miles of reconstruction and widening from Springvale Road to Chelsea Road. *Healesville Shire.*—Buxton–Marysville Road—3·3 miles of reconstruction and realignment; Healesville–Kinglake Road—2 miles of reconstruction and sealing. *Lillydale Shire.*—Canterbury Road—·75 miles of reconstruction and sealing at Bayswater and 1 mile of reconstruction at Montrose. *Mornington Shire.*—Mooroduc Road—2·06 miles of reconstruction and realignment. *Phillip Island Shire.*—Ventnor Road—3 miles of priming and sealing. *Ringwood Borough.*—Canterbury Road—1·6 miles of reconstruction and widening. *Upper Yarra Shire.*—Launching Place–Gembrook Road—1 mile of realignment, reconstruction, and sealing.

Geelong Division.

Winchelsea Shire.—Winchelsea–Dean Marsh Road. Special attention has been given to this road over the last few years to enable it to carry heavy coal traffic between Winchelsea and the Coal Mine at Yan Yan Gurt. £56,000 was made available from loan money during the financial year 1954–55 and tenders were invited for the work of premixing and laying a 2½-in. consolidated bituminous macadam top, arrangements having previously been made for the supply of the aggregates. As, however, no tenders were received, it was decided to utilize the Board's "Barber-Greene" hot mix plant and spreader and tamper by using a direct labour gang. (Plate No. 5.)

The bituminous macadam was of 1½-in. gauge maximum size and in accordance with the British Standard Specification. This necessitated quite extensive alterations to the plant to enable this size of material to be handled through the various stages of gauging, drying, and mixing, the plant generally being only designed to take material up to the nominal ¾ in. size. The plant was not ready for use until well into the summer, and it has since been in constant use apart from wet weather. About half the length of 7 miles was covered by 30th June, 1955, and the expenditure was approximately £28,000.

Otway Shire.—Beech Forest–Apollo Bay Road. The section of this road south from the Aire River Bridge has never been constructed to a reasonable standard, and in recent years was not of much importance. The Forests Commission, however, desired to commence the utilization of the pine plantations in the Aire Valley and to extend logging operations to feed a mill to be installed at Gellibrand, and asked the Board to reconstruct this road between Aire River Bridge and the saddle known as Binns' Corner about 3 miles south, where the Cape Horn Road, constructed by the Commission as an internal road, takes off.

Construction commenced early in the new year and continued until wet weather stopped the work, during which time the formation was approximately 90 per cent. completed. Extremely heavy earthworks were involved to achieve a reasonable alignment and satisfactory grades for extraction of timber. On completion a base course of local shale will be provided in 1955–56 to be completed with the top course of fine crushed rock or suitable gravel in the succeeding financial year. This work is being carried out under the direct supervision of the Board. (Plates Nos. 6 and 7.)

The works carried out in the Division under municipal supervision included the following:—

Bellarine Shire.—(1) Geelong–Portarlington Road—1·73 miles of reconstruction and sealing between Drysdale and Portarlington; (2) Portarlington–St. Leonards Road—2 miles of widening, realignment, surfacing, and sealing north of the railway crossing at Bellarine Highway. *Colac Shire.*—Colac–Beech Forest Road—realignment, regrading, and surfacing between Burtons Lookout and the new Boundary Creek bridge. *Otway*

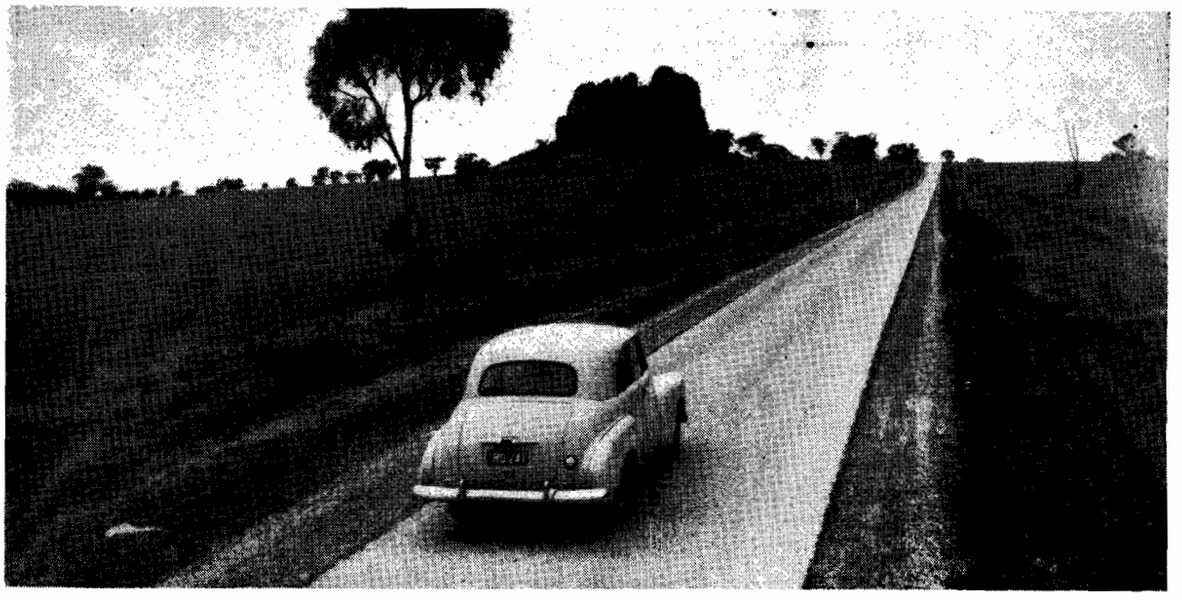


Plate No. 8.—Apsley–Natimuk Road at Mitre Rock showing reconstruction and sealing.

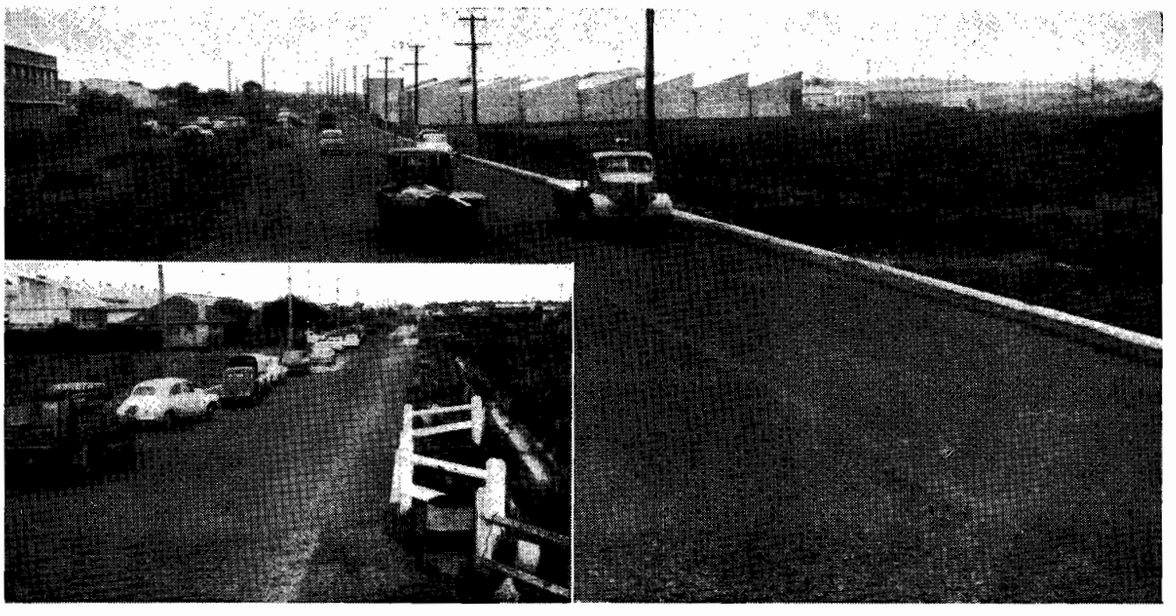


Plate No. 9.—Bell Street, Preston, after widening and reconstruction near Albert Street.
Insert shows heavy traffic while work is in progress.

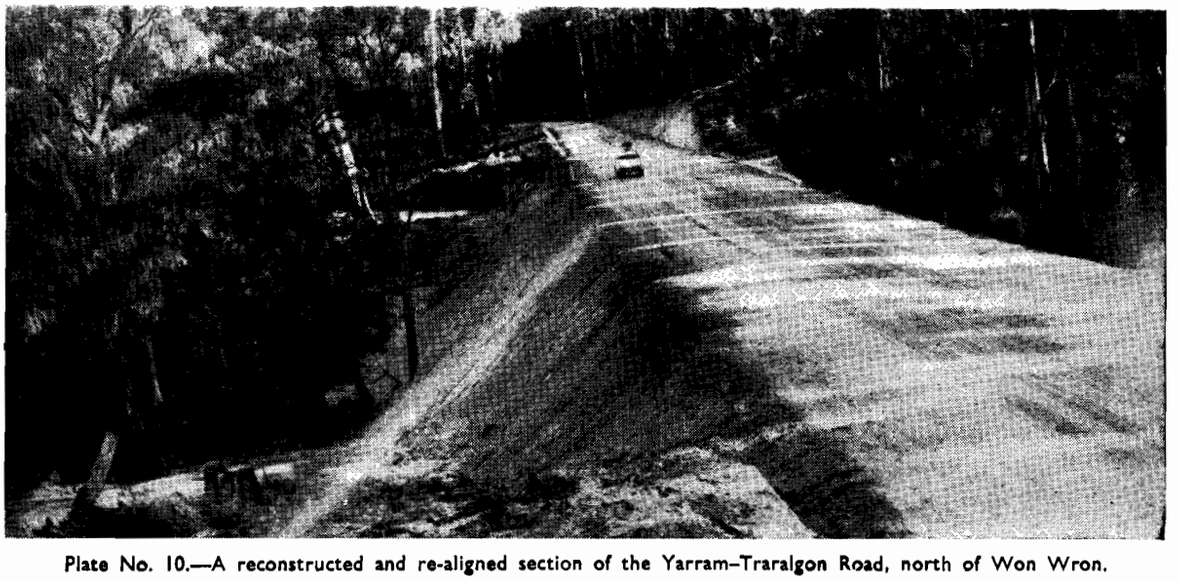


Plate No. 10.—A reconstructed and re-aligned section of the Yarram–Traralgon Road, north of Won Wron.

Shire.—Forrest–Apollo Bay Road—1·6 miles of realignment, regrading, and surfacing south of Benwerrin–Mt. Sabine Road junction. *Werribee Shire.*—Millers Road—2 miles of reconstruction and widening between the Sunshine City boundary and Kororoit Creek Road.

Horsham Division.

Arapiles Shire.—(1) Apsley–Natimuk Road—3·5 miles of reconstruction and sealing near Mitre Rock; (2) Edenhope–Horsham Road—4·1 miles of reconstruction near Miga Lake. *Dimboola Shire.*—Horsham–Rainbow Road (joint work with Shire of Karkarooc)—construction of deviation 2 miles in length north of Rainbow, thus eliminating two railway level crossings on the main road. *Donald Shire.*—Reconstruction and sealing of 1·4 miles of the Donald–Minyip Road and 1 mile of the Marnoo–Donald Road. *Dunmunkle Shire.*—Reconstruction and sealing of 1·15 miles of the Murtoa–Minyip Road south-westerly from Minyip and 4·4 miles of the Stawell–Warracknabeal Road over old failed sections. Reconstruction and sealing as follows:—*Kaniva Shire.*—1·4 miles of the Broughton Road and 1·4 miles of the Kaniva–Edenhope Road. *Kara Kara Shire.*—1·2 miles of the Marnoo Road and 3 miles of the Marnoo–St. Arnaud Road. *Karkarooc Shire.*—1·5 miles of the Rainbow–Beulah–Birchip Road. *Kowree Shire.*—3 miles of the Apsley–Natimuk Road, 1·3 miles of the Booroopki–Frances Road, 2 miles of the Edenhope–Goroke Road, 4 miles of the Edenhope–Horsham Road, 3·3 miles of the Kaniva–Edenhope Road, and 1 mile of the Natimuk–Hamilton Road. *Lowan Shire.*—1·3 miles of the Lorquon West Road and 1 mile of the Nhill–Jeparit Road. *Stawell Shire.*—2 miles of the Landsborough Road, 1·5 miles of the Marnoo Road, and 1·25 miles of the Marnoo–St. Arnaud Road. *Warracknabeal Shire.*—1 mile of the Warracknabeal–Rainbow Road. *Wimmera Shire.*—1 mile of the Horsham–Murtoa Road and 3 miles of the Dimboola–Warracknabeal Road. (Plate No. 8.)

Metropolitan Division.

Camberwell City.—(1) Doncaster Road—laying of hot mix bituminous macadam wearing surface between Balwyn Road and Koonung Creek; (2) similar work on Warrigal Road between Rowan Street and Highbury Road. *Coburg City.*—(1) Bell Street—widening pavement between Cramer Road and Cumberland Road; (2) Bell Street Extension—construction of embankment between Magdalen Street and Broadmeadows railway line. *Essendon City.*—Sunbury Road—construction of western roadway between Kirton Road and Orange Grove. *Footscray City.*—Princes Highway—reconstruction of pavement on south-east side between Ballarat Road and Barkly Street as part of the divided roadway. *Malvern City.*—Warrigal Road—plant mix seal on western lane between Batesford Road and Middle Road. *Moorabbin City.*—South Road—strengthening pavement with bituminous macadam between Jasper Road and Tucker Road, and construction of northern lane of divided roadway between Tucker Road and East Boundary Road. *Mordialloc City.*—South Road—widening and reconstruction of roadway between Nepean Highway and railway line. *Preston City.*—Bell Street—construction of southern roadway of divided roadway section between Darebin Creek and Victoria Street. *Sandringham City.*—Beach Road—removal and re-erection of fencing, and clearing to widen road reserve between Sandringham and Beaumaris. *Williamstown City.*—Kororoit Creek Road—widening pavement between Champion Street and Churchill Street. (Plate No. 9.)

Traralgon Division.

Alberton Shire.—Yarram–Traralgon Road (Board's supervision)—1·4 miles of clearing, earthworks, and gravelling near Bodman's Creek; Woodside Beach Road (Council's supervision)—1·1 miles of reconstruction and sealing at Woodside. *Maffra Shire.*—Licola Road (Board's supervision)—8·4 miles of resheeting and sealing between Green's Gully and Cheyne's Bridge; Maffra–Sale Road (Council's supervision)—2 miles of widening and sealing. *Morwell Shire.*—Morwell–Mirboo Road (Board's supervision)—3 miles of resheeting and sealing between Boolarra and Mirboo Shire boundary. *Narracan Shire.*—(1) Mirboo North–Thorpdale Road—1 mile of resheeting and sealing near Thorpdale; (2) Moe–Willowgrove Road—3·5 miles of reconstruction near Walhalla Road; (3) Willowgrove Road—2 miles of reconstruction near Willowgrove and 2 miles of resheeting and sealing between Trafalgar and Willowgrove. *Rosedale Shire.*—Reconstruction and sealing of 1 mile of the Rosedale–Heyfield Road, 2·4 miles of the Seaspray Road, and 3 miles of the Traralgon–Maffra Road. One mile of sealing

on the Willung Road. *South Gippsland Shire.*—Port Franklin Road—1 mile of resheeting and sealing. *Woorayl Shire.*—Kongwak–Inverloch Road—2·16 miles of reconstruction. (Plate No. 10.)

Warrnambool Division.

Dundas Shire.—Resheeting and sealing of 1 mile of the Cavendish–Coleraine Road, 3·5 miles of the Dartmoor–Hamilton Road, 1 mile of the Macarthur–Hawkesdale Road, 1 mile of the Macarthur–Penshurst Road, 2·5 miles of the McIntyre's Crossing Road, and 2 miles of the Victoria Valley Road. Sealing 3 miles of the Mt. Napier Road. *Glenelg Shire.*—(1) Casterton–Apsley Road—1·87 miles of reconstruction and realignment at Nangeela; (2) Casterton–Edenhope Road—3·25 miles of sealing at Brimboal; (3) Casterton–Penola Road—4·2 miles of resheeting with crushed limestone at Lake Mundi. *Heytesbury Shire.*—Sealing 1·2 miles of the Cobden–Port Campbell Road, 1·3 miles of the Timboon–Nirranda Road, and 1 mile of the Timboon-Terang Road. *Portland Shire.*—Reconstruction and sealing of 2 miles of the Bridgewater Road, 4·5 miles of the Portland–Casterton Road, and 2 miles of the Portland–Nelson Road. *Wannon Shire.*—Sealing 1·7 miles of the Cavendish–Coleraine Road, 3·5 miles of the Coleraine–Balmoral Road, and 3·4 miles of the Natimuk–Hamilton Road.

STATE HIGHWAYS.

Financial considerations, already referred to in relation to main roads expenditure, apply equally to State highways, where the allocation was again on a restricted basis, and works of high priority could not be provided for, so that arrears of work on the highways mentioned in earlier reports were not by any means overtaken. In short, the year's work represented mainly reconstruction of some of the old assets and the maintenance of others beyond their economic life. (Plate No. 19.)

The Board has long foreseen that the time would come when the provision of additional traffic lanes would be required on some of our principal highways, especially those leading into the metropolis and provincial cities and carrying increasing concentration of traffic. Beginning as long ago as 1937, some preliminary work, such as the acquisition of land, has already been carried out in certain cases, and a short section of divided highway was constructed in 1938 for 1·2 miles of the Western Highway in Sunshine, whilst 3-lane sections were provided on portions of the Princes, Maroondah, and Nepean Highways. During the year on the Princes Highway West between Melbourne and Geelong, some road and bridge work has been commenced in Brooklyn and at Kororoit Creek towards provision of a 4-lane road. Under existing conditions the completion of long lengths of 4-lane divided road will be a slow process.

Practically the whole of the work on State highways is carried out under the Board's direct supervision. In preparing their applications for the Board's consideration, the Divisional Engineers submitted programmes of works within the bounds of practicability. They applied for a total sum of £4,791,335 for a total length of 3,849 miles, but only £3,351,136 or 70 per cent. was initially allotted. The total amount expended was, in fact, restricted to £3,033,653, including £979,900 from the Country Roads Board Fund and £690,588 from loan moneys. The Board's organization could manage a far greater programme of construction and maintenance than the available funds would permit.

Major Works.

The more important works carried out during the year included the following:—

Bairnsdale Division.

Princes Highway East.—4·35 miles of reconstruction and sealing of weak pavement between Lakes Entrance and Orbost. 3 miles of reconstruction and sealing of weak pavement and narrow formation between Orbost and Brodribb River. 1·4 miles of reconstruction and sealing near Bellbird. 5 miles of resheeting near McKenzie River. 6·7 miles of reconstruction and sealing near Genoa. 14 miles of resheeting near Genoa. *Omeo Highway.*—2 miles of resheeting and sealing near Monkey Creek. 1·55 miles of reconstruction and sealing between Ramrod Creek and Red Knob. 4 miles of resheeting near Tambo Crossing. 6 miles of resheeting near Omeo. 3·5 miles of resheeting and sealing near Tambo Crossing. 1·5 miles of reconditioning and sealing near Swifts Creek. 1·5 miles of resheeting near Benambra turn-off. 2 miles of resheeting near Glen Wills.

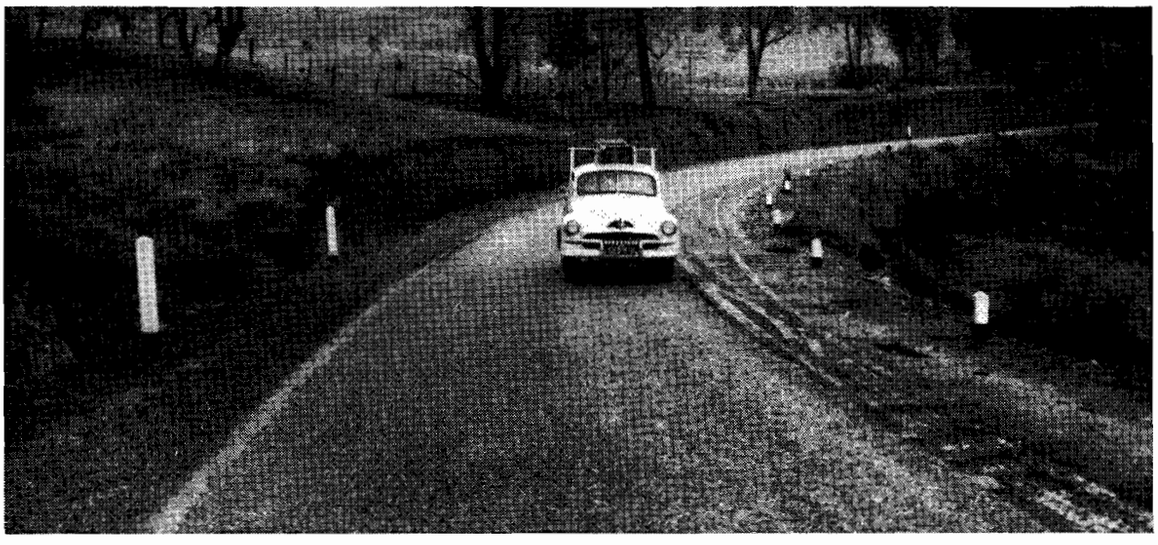


Plate No. 11.—Reconditioned and sealed section of the Omeo Highway near Swift's Creek.

Plate No. 12.—North-Western Highway, near junction with Creswick Road, Ballarat, showing reconstruction in progress.

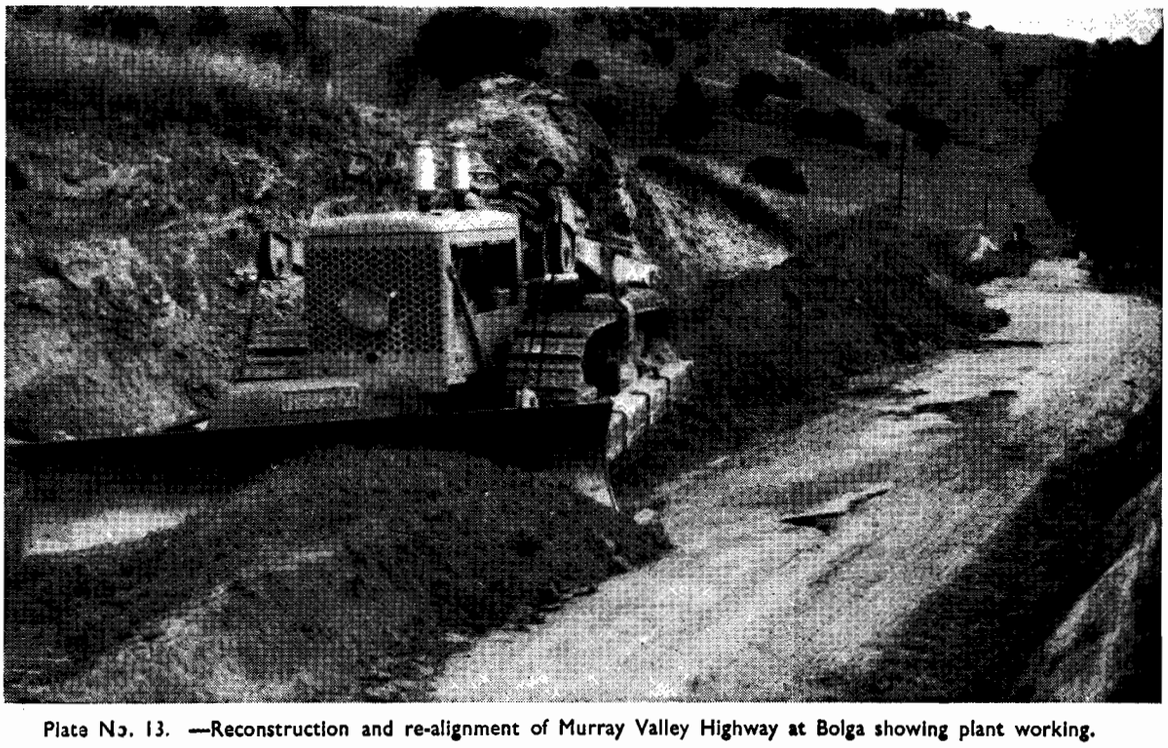
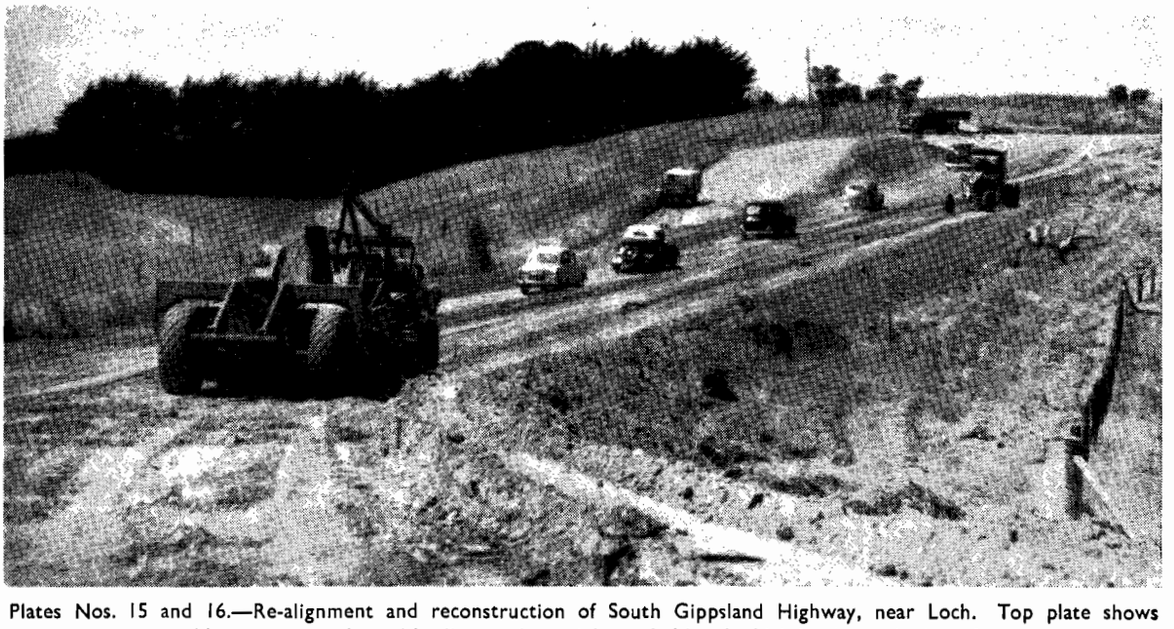


Plate No. 13. —Reconstruction and re-alignment of Murray Valley Highway at Bolga showing plant working.

Plate No. 14.—Sealing in progress with 800-gallon sprayer on Murray Valley Highway at Nathalia.



Plates Nos. 15 and 16.—Re-alignment and reconstruction of South Gippsland Highway, near Loch. Top plate shows old, narrow, rough road leading to sharp right-angled bend which has been eliminated.

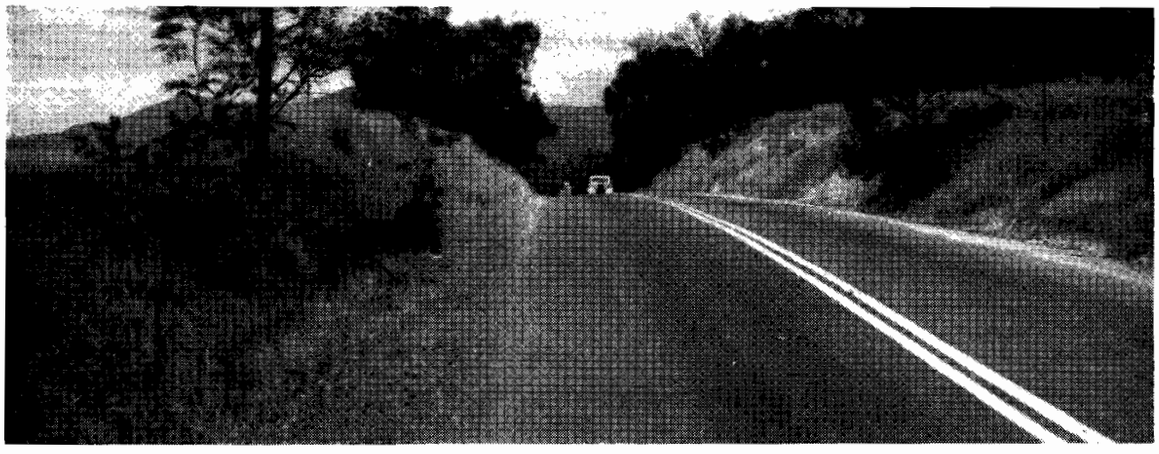


Plate No. 17.—Maroondah Highway, approximately 35 miles, showing section before reconstruction at a sharp vertical curve.

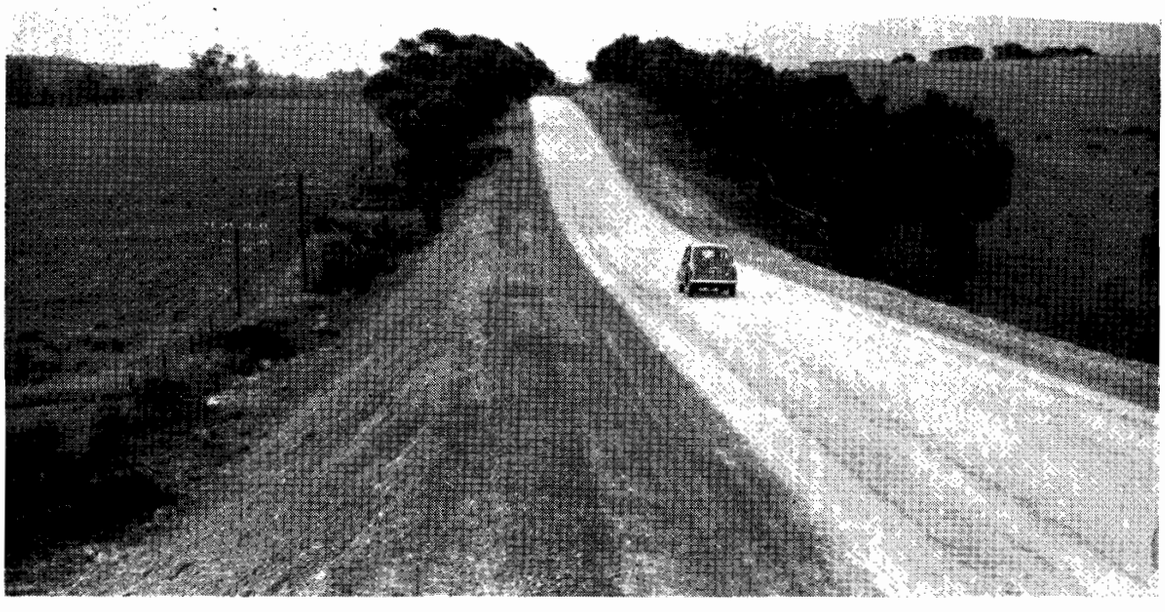


Plate No. 18.—Maroondah Highway, showing same section after reconstruction.

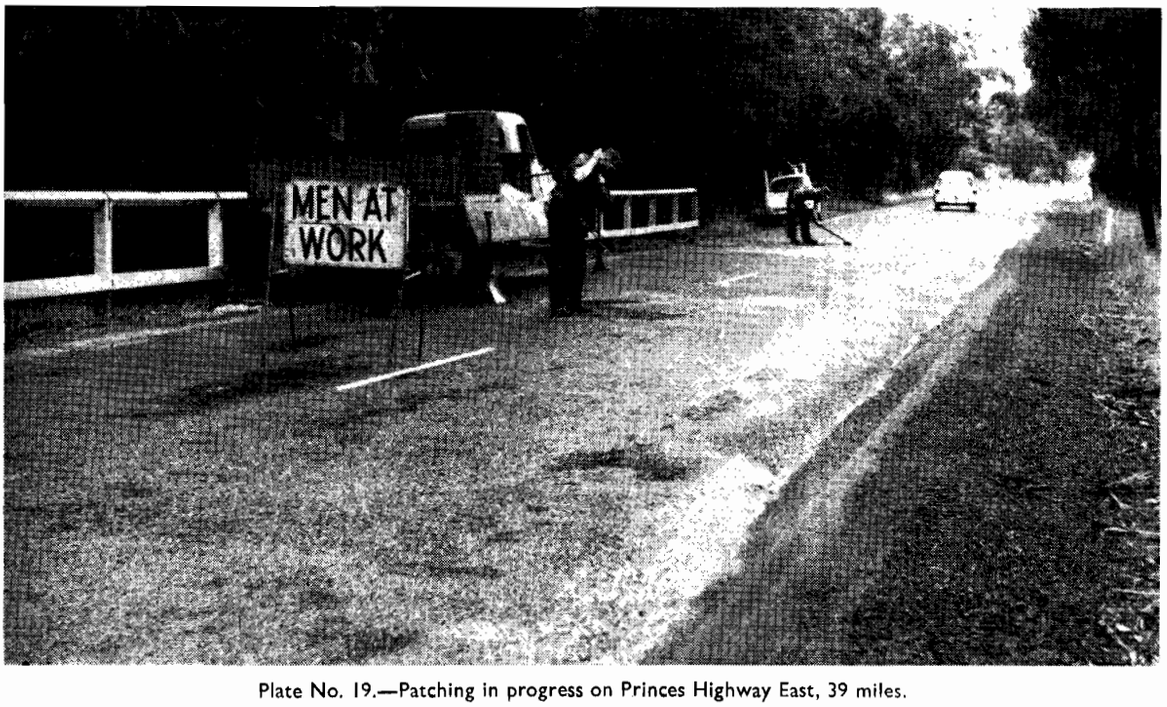


Plate No. 19.—Patching in progress on Princes Highway East, 39 miles.

Plate No. 20.—Princes Highway East, approximately 25 miles, showing widening and regrading of vertical curve during reconstruction.

Plate No. 21.—Widening of Hume Highway in progress at approximately 18½ miles.

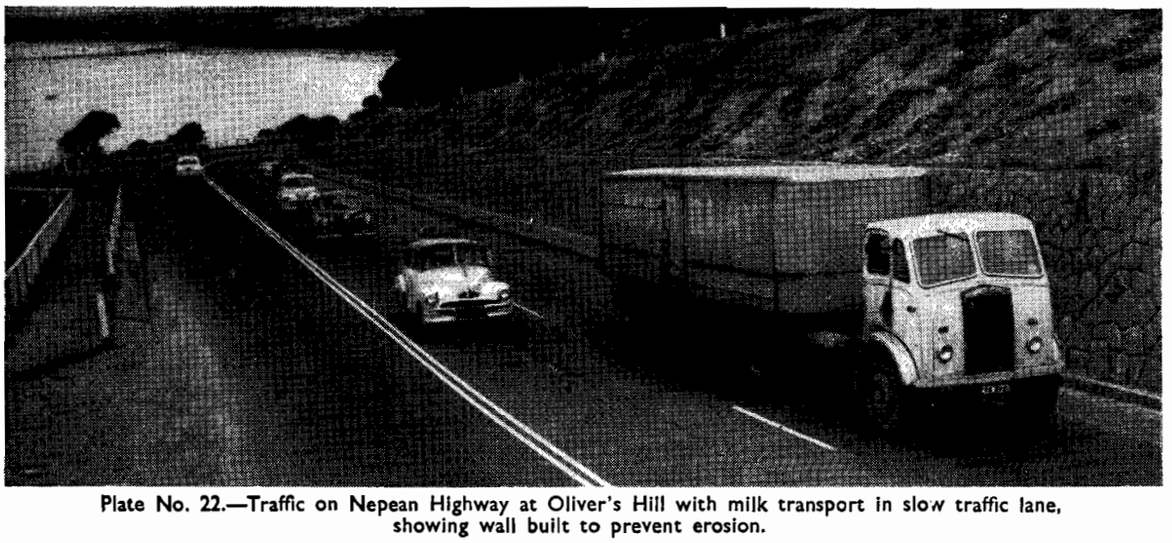


Plate No. 22.—Traffic on Nepean Highway at Oliver's Hill with milk transport in slow traffic lane, showing wall built to prevent erosion.

Bonang Highway.—1 mile of resheeting and sealing in Orbost. Widening and improving curves between Orbost and Sardine Creek. 14 miles of resheeting near Sardine Creek. (Plate No. 11.)

Ballarat Division.

Western Highway.—Completion of raising of Paddock Creek Bridge between Ballan and Gordon and construction and sealing of approaches. *Midland Highway.*—1·4 miles of reconstruction of weak pavement south of Elaine. *Glenelg Highway.*—7·25 miles of reconstruction and sealing of narrow and weak sections between Pittong and Lake Bolac. *North-Western Highway.*—1·5 miles of widening and resheeting in Howitt Street, Wendouree. Construction of a channelized intersection at the junction of the highway and Gillies Street, Wendouree. *Pyrenees Highway.*—Completion of raising and widening of Joyces Creek Bridge, construction and sealing of approaches, and erection of safety guard fence. 1·5 miles of reconstruction and sealing near Dunnesworthy. (Plate No. 12.)

Benalla Division.

Hume Highway.—1·25 miles of reconstruction, widening, and sealing between Glenrowan and Wangaratta. *Omeo Highway.*—1·4 miles of widening and relocation of a narrow steeply-graded section south of Mitta Mitta. 2·5 miles of reconstruction and widening west of Eskdale. 1·65 miles of reconstruction and sealing near Noorongong. *Murray Valley Highway.*—1·6 miles of reconstruction and realignment west of Bolga. 2·5 miles of reconstruction and sealing between Towong and Thowgla Creek. 8·7 miles of reconstruction and sealing between Cobram and Yarrawonga (thus completing the sealing of the highway from the Hume Highway to Strathmerton). 3·4 miles of reconstruction and sealing north of Nathalia. Completion of the major part of the reconstruction of 3·11 miles south of Nathalia which was subject to periodic closure due to flooding. 1·97 miles of reconstruction and sealing northerly from McCoys Bridge. *Midland Highway.*—4·3 miles of reconstruction and sealing between Reef Hills and Swanpool, and 1 mile south of Swanpool. (Plates Nos. 13 and 14.)

Bendigo Division.

Calder Highway.—3·2 miles of resheeting and sealing (using sand aggregate) easterly from the Henty Highway junction at Nunga. 3 miles of regrading and realignment, construction, and sand sealing between Kiamil and Trinita. 1·5 miles of regrading, reconstruction and sealing south of Red Cliffs. *Northern Highway.*—·95 miles of resheeting, widening, and sealing through the Township of Heathcote. *Murray Valley Highway.*—4·1 miles of sealing between Turrumberry and Patho. 2·05 miles of reconstruction, including widening and sealing, westerly from Lake Charm. 4·93 miles of construction and sealing between the Tooleybuc Turn-off and Hayesdale. 7·94 miles of maintenance resheeting between Hayesdale and Bannerton. 1·75 miles of raising formation and sheeting to above flood level between Boundary Bend and Lake Powell, and 3·21 miles of forming and reforming between Bannerton and the Calder Highway. *Midland Highway.*—5·16 miles of construction and sealing between Stanhope and Byrneside, including widening of four narrow State Rivers and Water Supply Commission bridges. *Henty Highway.*—6·45 miles of resheeting in five sections. Widening of four narrow State Rivers and Water Supply Commission culverts between Lascelles and Gama. *Loddon Valley Highway.*—3·3 miles of reconstruction, including widening and sealing near Hawkinston. *Ouyen Highway.*—5·75 miles of reconstruction, including widening; reconditioning 5·9 miles previously reconstructed and sealing full length of 11·5 miles westerly from Ouyen. 10 miles of resheeting in several sections.

Dandenong Division.

Bass Highway.—Completion of reconstruction and sealing of 4 miles between Kilcunda and Dalyston. *South Gippsland Highway.*—Improvement of alignment, widening, and reconstruction of 2·5 miles between Bass River and Loch Township. 1·25 miles of realignment and reconstruction westerly from Bena. *Maroondah Highway.*—1·5 miles of realignment, reconstruction and widening from Green Point to The Grange. Realignment, reconstruction, &c., from Don Road to "The Wattles" corner. *Princes Highway East.*—5·8 miles of widening and sealing between Dandenong and Berwick. Reconstruction, realignment, and sealing failing lengths totalling 1·5 miles near Narre Warren. *Hume Highway.*—4 miles of widening in waterbound and penetration macadam near Craigieburn. *Nepean Highway.*—Completion of 600 feet of retaining wall to prevent erosion at Olivers Hill. (Plates Nos. 15 to 22.)

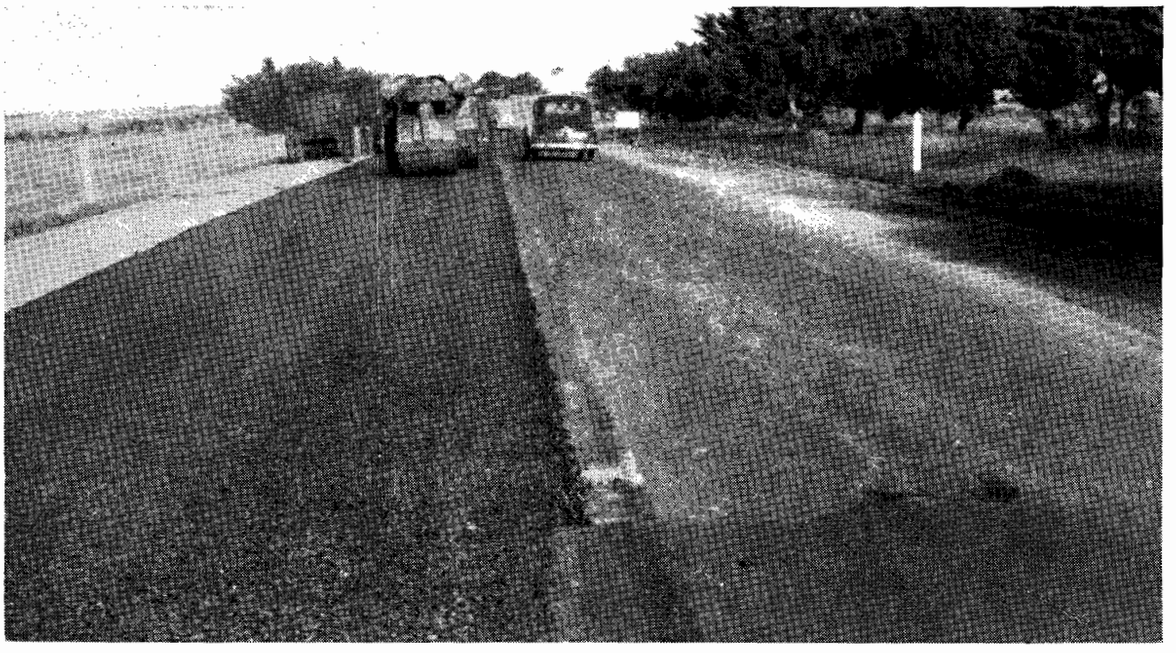


Plate No. 23.—Cold-plant mix seal being spread on Princes Highway West near Little River.

Plate No. 24.—Calder Highway, south of Woodend, showing removal of old corduroy base during reconstruction.

Plate No. 25.—Henty Highway at approximately 222 miles. Section reconstructed and sealed north of Hopetown.

Plate No. 26.—Reconstruction and seal extension on the North-Western Highway, north of Litchfield.

Plate No. 27.—A reconstructed section of the Princes Highway East, east of Morwell.

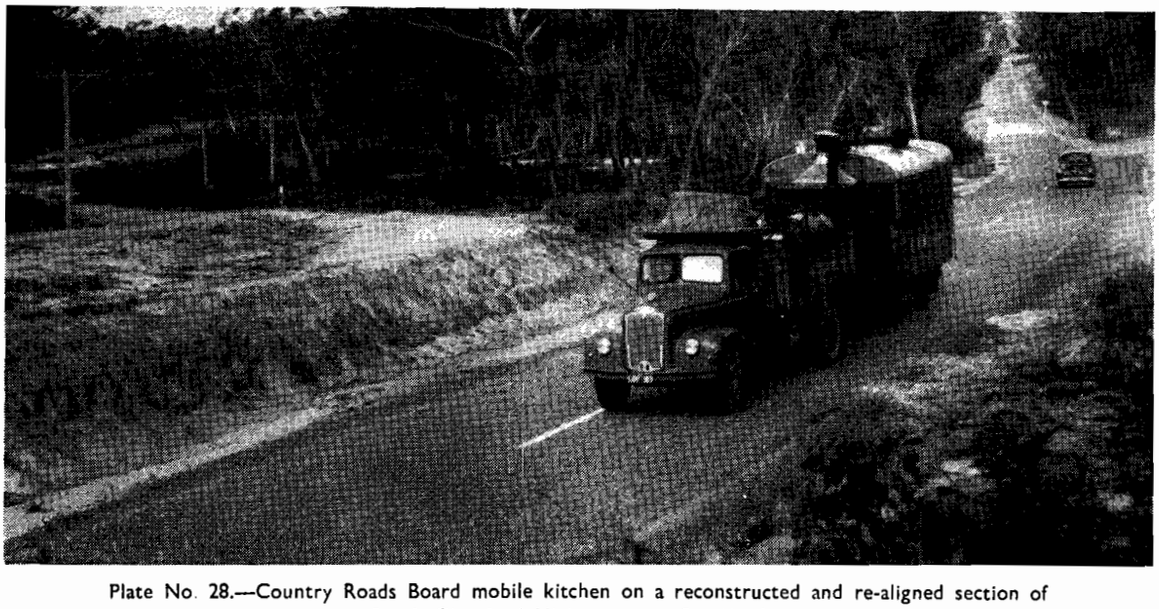


Plate No. 28.—Country Roads Board mobile kitchen on a reconstructed and re-aligned section of South Gippsland Highway, near Stradbroke.

Plate No. 29.—Bulldozer at work on widening of the Alpine Road near Blowhard, Mt. Hotham.

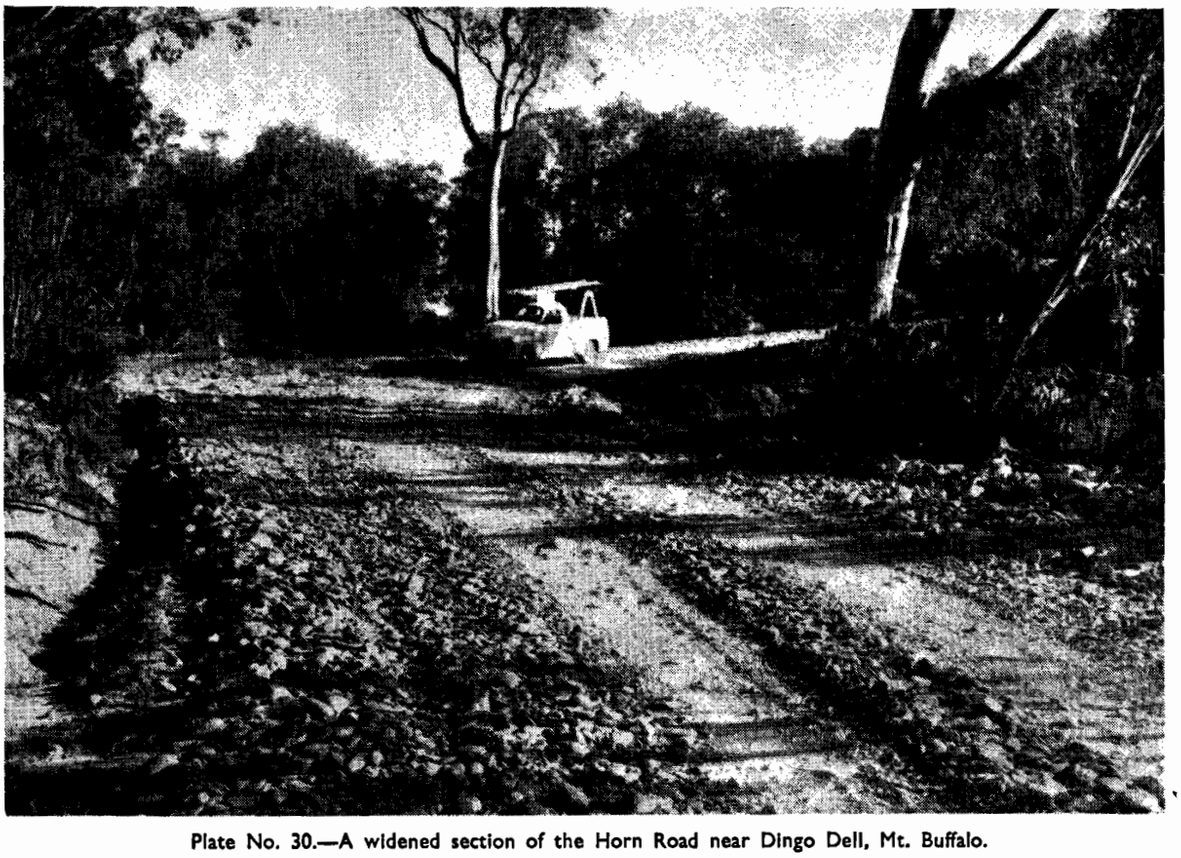


Plate No. 30.—A widened section of the Horn Road near Dingo Dell, Mt. Buffalo.

Geelong Division.

Princes Highway West.—Commencement of the duplication of the highway between Footscray and Geelong, including two new bridges at Kororoit Creek. 3 miles of premix regulation and bituminous macadam wearing course near Little River. *Western Highway.*—1 mile of resheeting and widening, together with improvement of drainage, in the Avenue of Honor at Bacchus Marsh. Extension of realignment, regrading, and widening in the Pentland Hills. Bituminous macadam wearing course on two sections between Rockbank and Melton. *Calder Highway.*—Reconstruction through the Black Forest south of Woodend. *Bellarine Highway.*—1·5 miles of widening at West Moolap. Widening and regrading of crests between Leopold and Wallington. (Plates Nos. 23 and 24.)

Horsham Division.

Western Highway.—1 mile of reconstruction and sealing at Nhill. 6 miles of sealing near Nhill. *Henty Highway.*—1·5 miles of reconstruction and sealing at Cherrypool. 4 miles of widening pavement between Lah and Beulah. 7·8 miles of reconstruction and sealing north of Hopetoun. *North-Western Highway.*—6·15 miles of reconstruction and sealing between Litchfield and Massey. (Plates Nos. 25 and 26.)

Metropolitan Division.

Western Highway.—Strengthening of pavement (north lane) between Duke Street and Westmoreland Road, Sunshine. *Maroondah Highway.*—Laying of hot mix bituminous macadam wearing surface between Kangerong Road and Middleborough Road, Box Hill. *Nepean Highway.*—Widening and reconstruction between Patterson Street and Tatong Road, Moorabbin. Laying of hot mix bituminous macadam wearing surface between Oak Avenue and Mentone Junction, Mordialloc.

Traralgon Division.

Princes Highway.—2·7 miles of widening pavement between Nilma and Darnum. 1·8 miles of reconstruction and sealing between Morwell and Traralgon. *South Gippsland Highway.*—3·1 miles of reconstruction and sealing between Merrimans Creek and Monkey Creek. (Plates Nos. 27 and 28.)

Warrnambool Division.

Princes Highway West.—2 miles of widening, strengthening, and sealing at Garvoc. *Henty Highway.*—5·5 miles of reconstruction and sealing between Mooralla and Glenisla.

TOURISTS' ROADS.

A total sum of £371,398 was allotted for the 415 miles of road which have been proclaimed tourists' roads, this sum covering general maintenance for the most part with a limited expenditure on improvements. In this case also, it was necessary to reduce the amounts applied for.

The total expenditure was £294,595, of which £285,655 was expended under the Board's direct supervision.

Among the more important projects carried out were the following :—

Bairnsdale Division.

Alpine Road.—5 miles of resheeting and draining of poor formation near Mt. Hotham.

Benalla Division.

Mount Buller Road.—For the first time snow ploughing was undertaken, the ploughing being carried out to the highest point on the proclaimed road, a parking strip at the highest point of the road was lengthened by 400 feet and some narrow sections of the road near Mirrimbah were widened. *Alpine Road.*—Work was commenced on the widening of a very narrow section ·75 miles long at Mt. Blowhard. *Mt. Buffalo Road.*—1 mile of widening and realignment on the Horn Road, from Lake Catani to near Dingo Dell. (Plates Nos. 29 and 30.)

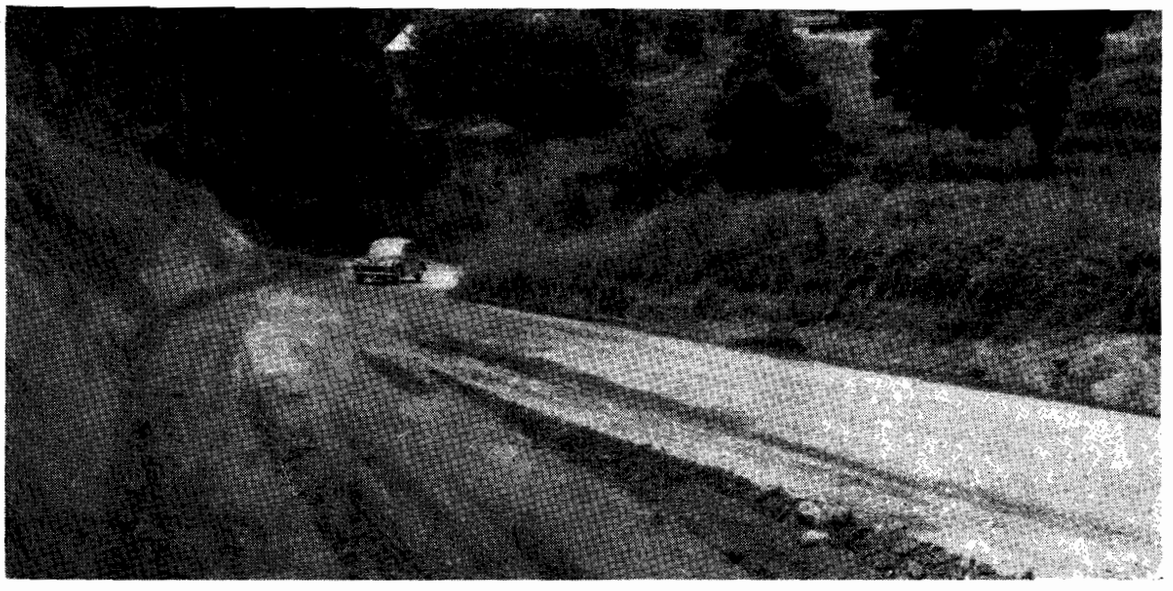


Plate No. 31.—Widening in progress on Acheron Way, approximately one mile north of Warburton.

Plate No. 32.—Widening and reconstruction of the narrow Silverband Road, Grampians.

Plate No. 33.—Sprayer camp on move on sealed section of Ocean Road, two miles west of Port Campbell.

Dandenong Division.

Acheron Way.—·75 miles of realignment, widening, and surfacing northerly from the junction with the Woods Point Road. *Phillip Island Road.*—1·5 miles of reconstruction and sealing between Anderson and San Remo. (Plate No. 31.)

Geelong Division.

Ocean Road.—Widening and realigning between Jamieson River and Separation Creek. Widening and realigning at Mt. Defiance and Andersons Creek. Widening of sealed pavement in Anglesea and between Jan Juc and Anglesea.

Horsham Division.

Mt. Victory and Silverband Roads.—Widening to 20 feet of 8 miles of narrow, rocky, side-cuttings on both of these roads between Grampians Road and Halls Gap and the junction of Mt. Victory and Silverband Road approximately 4 miles from Halls Gap. *Grampians Road.*—1 mile of realignment 12 miles south of Halls Gap. (Plate No. 32.)

Warrnambool Division.

Ocean Road.—4·75 miles of strengthening and sealing between Peterborough and Port Campbell. (Plate No. 33.)

FOREST ROADS.

A total sum of £191,789 was made available for expenditure on the 375 miles of proclaimed forest roads for the financial year 1954–55. This did not provide for any substantial work of improvement, but covered mainly patrol maintenance and maintenance resheeting. The total amount expended was £137,896.

The more important works included the following :—

Bairnsdale Division.

Bruthen–Buchan Road.—4 miles of reconditioning and sealing near Bruthen. 8 miles of resheeting near Red Knob Road junction. *Dargo Road.*—4 miles of resheeting near Cobbannah. *Bairnsdale–Dargo Road.*—4 miles of resheeting near Cobbannah.

Geelong Division.

Winchelsea Shire.—Dean Marsh–Lorne Road—1·25 miles of reconstruction south from the Benwerrin–Mt. Sabine Road junction.

UNCLASSIFIED ROADS.

The Board again made provision for works on unclassified roads under two general headings, (1) construction and reconstruction of roads serving settlements, including short roads to serve properties of isolated settlers, and (2) the maintenance of unclassified roads generally.

For the first group, applications amounting to £4,793,364 were received by the Board, and £3,301,535 was allotted. For general maintenance £935,563 was applied for, and £683,891 allotted. The grants in both cases were on a contributory basis with the Councils' contributions varying according to the circumstances of each particular case, although for maintenance the grants were mainly on a basis of £2 Board to £1 Council, as in the past.

Several additional requests were made to the Board during the year for the declaration of certain unclassified roads as main roads, but in view of the additional statutory responsibilities which would devolve upon the Board by such action, it was unable to grant these requests. The Board has, however, endeavoured to assist the Councils, as far as its finances will permit, with the maintenance of these roads.

Details of some of the major works carried out during the year on unclassified roads are set out hereunder :—

Bairnsdale Division.

Omeo Shire.—Old Tongio Gap Road—3·5 miles of reforming and gravelling. *Orbost and Tambo Shires.*—Bonang–Gelantipy Road—improvement of curves. *Sale City.*—Desailly Street—1 mile of reconstruction and sealing. *Tambo Shire.*—Bonang–Gelantipy Road—1 mile of realignment at Yellow Boy Hill.

Ballarat Division.

Ararat City.—(1) Minimera–Buangor Road—2 miles of reconstruction and surfacing to provide access from Yalla-Y-Poora Soldier Settlement Estate to the Western Highway at Middle Creek; (2) Westmere–Tatyoon Road—1·5 miles of resheeting. *Ballarat Shire.*—(1) Burrumbeet–Learmonth Road—1·25 miles of reconstruction and sealing; (2) Addington–Coghills Creek Road—1·9 miles of resheeting; (3) Haddon–Windermere Road—1·5 miles of resheeting north from Ballarat–Carngham Road. *Clunes Borough.*—Learmonth Road—1·7 miles of resheeting south from Clunes. *Creswick Shire.*—(1) Daylesford–Clunes Road—1·55 miles of resheeting and sealing; (2) Dean–Mollongghip Road—1·5 miles of resheeting and sealing; (3) Werona–Kingston Road—1·2 miles of resheeting and sealing; (4) Creswick–Lawrence Road—2·25 miles of widening and resheeting. *Grenville Shire.*—Geelong–Portland Road—1·1 miles of reconstruction and sealing. *Lexton Shire.*—Waubra–Talbot Road—1 mile of reconstruction and sealing north from Waubra.

Benalla Division.

Benalla Shire.—Devenish–St. James Road—1·6 miles of reconstruction and sealing. *Cobram Shire.*—7·8 miles of reforming and gravelling in soldier settlement areas. Reconstruction and sealing as follows:—*Euroa Shire.*—Longwood–Ruffy Road—3·5 miles; *Numurkah Shire.*—Centre Road—3·2 miles, Spencers Road—2·5 miles, Collies Road—1·1 miles; *Shepparton Shire.*—Fruitgrowers' Outlet Road—3 miles, Pine Lodge North Road—1 mile; *Towong Shire.*—Mitta North Road—1 mile; *Violet Town Shire.*—Bridge Road—1·2 miles; *Yackandandah Shire.*—Sandy Creek Road—2 miles; *Yarrawonga Shire.*—Boomahnoomoonah Road—2 miles and Yarrawonga–Wilby Road—2·6 miles. (Plate No. 34.)

Bendigo Division.

Bendigo City.—(1) Oak Street, McKenzie Street, and Specimen Hill Road—1 mile of construction and sealing to link the Calder Highway at Golden Square with Specimen Hill; (2) Holdsworth Road—3 miles of reconstruction and sealing of this by-pass road between the Loddon Valley Highway and the Midland Highway at White Hills. *Charlton Shire.*—(1) Yeungroon Road—1 mile of sealing; (2) Charlton–Jeffcott Road—1 mile of sealing; (3) Borung–Charlton Road—1 mile of sealing. *Eaglehawk Borough.*—Simpsons Road—1·2 miles of reconstruction and sealing. *East Loddon Shire.*—Calivil Mail Road—5 miles of reconstruction. *Mildura Shire.*—Sealing 2 miles of Koorlong Avenue, 1·6 miles of Ranfurlie Way, 1·2 miles of Millewa Avenue, 1·9 miles of Walnut Avenue, 2·7 miles of Brownport Avenue, 2·7 miles of Belar Avenue, 3 miles of Sixteenth Street, 1·1 miles of Fourteenth Street, and 2·6 miles of Pawson Avenue. Werrimul North Road—2·5 miles of construction, (Plate No. 35.)

Dandenong Division.

Cranbourne Shire.—Lang Lang Estate Road—9,500 feet of forming, grading, and surfacing. *Healesville Shire.*—Myers Creek Road—2 miles of reconstruction and sealing. *Lillydale Shire.*—3 miles of resheeting on various roads. *Phillip Island Shire.*—Coast Road—3 miles of formation and ·4 miles of surfacing.

Horsham Division.

Arapiles Shire.—Various roads—13 miles of forming, reforming, and surfacing. *Dimboola Shire.*—Various roads—7·6 miles of heavy resheeting, reforming, and surfacing. *Donald Shire.*—Various roads—10·8 miles of forming and gravelling. *Dunmunkle Shire.*—Various roads—4·6 miles of construction. *Horsham City.*—Various roads—2 miles of reconstruction and sealing. *Kaniva Shire.*—Various roads—10·2 miles of forming and gravelling. *Kara Kara Shire.*—Various roads—8·3 miles of forming and gravelling. *Karkarooc Shire.*—Various roads—9 miles of construction and surfacing. *Kowree Shire.*—(1) Various roads—15 miles of forming, reforming, surfacing, and heavy resheeting; (2) *Apsley Elderslie Road.*—2 miles of construction and sealing. *Lowan Shire.*—Various roads—6·7 miles of forming and surfacing. *Stawell Shire.*—Various roads—4·8 miles of forming and surfacing. *Warracknabeal Shire.*—(1) Various roads—2·4 miles of construction; (2) Peppers Plains Road—1·2 miles of strengthening and sealing. *Wimmera Shire.*—Various roads—8 miles of forming and surfacing.

Traralgon Division.

Rosedale Shire.—(1) Nambrok–Denison Soldier Settlement area—8 miles of reconstruction, draining, and gravelling on various roads; (2) Kilmany Settlement Road—2·3 miles of reconstruction and gravelling; (3) Rosedale–Longford Road—6 miles of

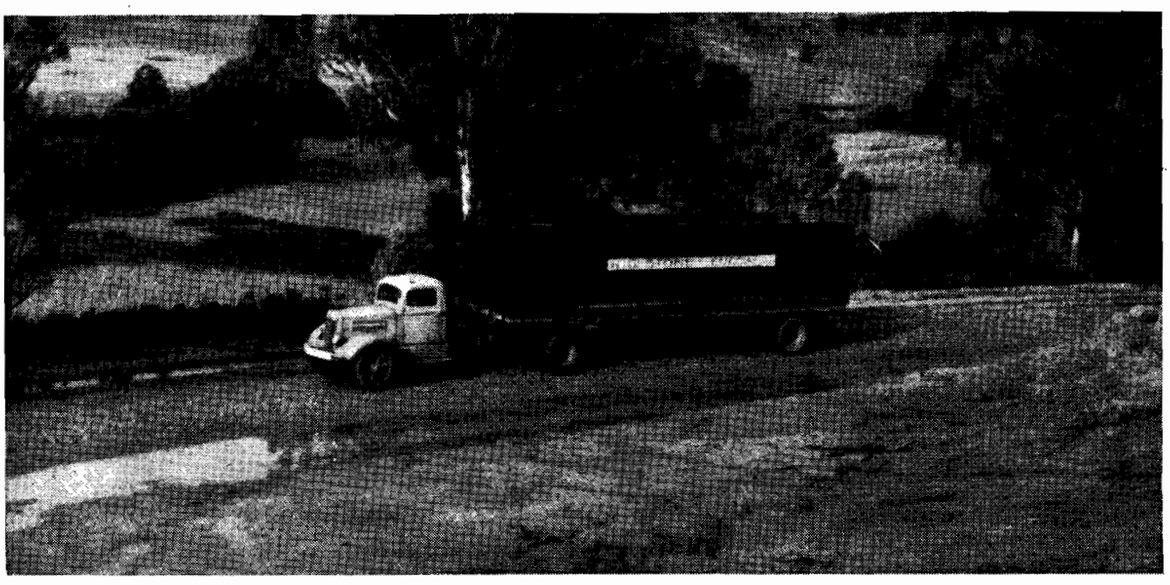


Plate No. 34.—Cattle transport on section of Longwood-Ruffy Road, reconstructed and sealed.

Plate No. 35.—Seal in 14th Street, Mildura, which carries the bulk of traffic to the High School.

Plate No. 36.—Scour prevention drop structure on Caramut-Glenthompson Road.

resheeting and draining; (4) Riggall's Road—1 mile of reconstruction and gravelling; (5) O'Meara's Road—1 mile of reconstruction and gravelling; (6) Waites Road—1 mile of reconstruction and gravelling. *Traralgon Shire.*—(1) Hazelwood Road—1 mile of resheeting and sealing and 1 mile of reconstruction; (2) Liddiard Road, Traralgon—1 mile of resheeting and sealing. *Woorayl Shire.*—(1) Fish Creek–Waratah Road—1 mile of forming, grading, and gravelling; (2) Hull's Road—1 mile of forming, grading, and gravelling; (3) McBurnie's and Boag's Road—1 mile of forming, grading, and gravelling.

In addition to the above, a commencement was made with the construction of the Wellington River Road in the Shire of Maffra from the Licola Bridge to the Wellington River.

Warrnambool Division.

Belfast Shire.—Sealing 1·5 miles of the St. Helens Road and 1·5 miles of the Toolong North Road. *Dundas Shire.*—Sealing 2·5 miles of the Strathkellar Road, 2 miles of the Murndal Road, and 2 miles of the Chatsworth Road. *Glenelg Shire.*—Dorcdong Road—5 miles of kerbing and 1 mile of forming and gravelling. *Mount Rouse Shire.*—Caramut–Glenthompson Road—construction of concrete erosion prevention structure to arrest a 30 feet deep scour threatening the roadway. (Plate No. 36.)

BRIDGES.

The volume of bridge construction and maintenance requiring urgent attention is still far beyond the Board's financial resources. The prevailing scale of salaries is too low to attract and retain young designing engineers and draftsmen, so that works are also hampered by frequent changes in engineering personnel. From 1st July, 1954, to 30th June, 1955, 20 qualified officers of the Bridge Division resigned and only 17 new appointments were made.

On the credit side, several new bridge contractors have entered the field, making for more competition, although contract prices are still at a high level. This is, perhaps, inevitable, but the Board is hopeful that the position will improve when some of the newer contractors gain experience.

The Board's own bridge building organization has been fully taxed throughout the year, and in several instances bridge work has been carried out directly by the Board on declared roads which are normally maintained under the supervision of Municipal Councils. In these cases the Councils' own resources have not been adequate for the work required, and efforts to have the work done by contract have been unavailing.

Once again, damage by floods to various structures has added to the Board's problems, and on many bridges it has been necessary to fix gross load limits as the only means of retaining the structures for the use of the general public pending repair or reconstruction.

In addition to replacement of certain old bridges in the metropolitan area, which works were in hand at the 1st July, 1954, the Board has been entrusted with the design and construction of a new bridge over Moonee Ponds Creek to link Dean Street, Moonee Ponds, with Dawson Street, Brunswick. Designs of this project were well advanced during the year.

Reference was made in the previous report to the inadequate space available at the Board's Head Office to accommodate the whole of the personnel of its Bridge Division, and to the necessity for renting a portion of the State Electricity Commission's offices in Church Street, Richmond, to house some of the officers. This latter arrangement, which was very helpful to the Board, and for which it is most grateful to the Commission, terminated in May, 1955, by which time portion of the Board's building at Drummond Street, Carlton, had been remodelled and became available for occupation by some of the officers of the division.

During the year a commencement was made with the construction of 196 bridges, of a total value of £1,502,347, bringing the total number of bridges either erected or in course of erection with funds provided by the Board since its inception to 4,296.

Of the new bridges, 148 of a total value of £390,000 were commenced under municipal supervision, and the remaining 48 of a total value of £1,112,347 were under the direct supervision of the Board. In the previous financial year, 134 bridges of a total value of £351,409 had been commenced under the supervision of the Councils, and 30, of a total value of £295,395 under the Board's direct supervision.

Brief details of some of the major structures in progress during the year are given hereunder :—

METROPOLITAN BRIDGES.

Bell Street, Cities of Coburg and Preston (Merri Creek).

The remaining work to be done on this bridge by direct labour was completed during the year, and the full width of 43 feet was made available to traffic in July, 1954. The new structure 160 feet long replaces a weak narrow bridge which had been in service for over 80 years. The total cost of contract and direct labour work on the bridge and approaches was £98,450.

Albion Street, Cities of Essendon and Brunswick (Moonee Ponds Creek).

Some minor final details were completed during the year, and the full width, 28 feet, of the new bridge which is 120 feet long was made available to traffic in July, 1954. This is the first completed replacement of the series of five (5) bridges on the boundaries of Brunswick City authorized in 1951 to be undertaken by the Board. The cost of bridge and approaches was £32,600.

Moreland Road, Cities of Coburg, Essendon, and Brunswick (Moonee Ponds Creek).

The progress of the contract for this bridge did not come up to expectations. The foundations were completed during the year and a start made on the superstructure.

Arthurton Road, Cities of Brunswick and Northcote (Merri Creek).

Owing to difficulties with foundations in very confined spaces, progress on the contract for this bridge has been slow. All foundation work has, however, been completed and a start made in placing the superstructure. The new bridge has had to be built in half-widths to cater for traffic.

Dean Street, Cities of Essendon and Brunswick (Moonee Ponds Creek).

Plans and specifications have been prepared for a reinforced concrete bridge at this site to link Dean Street, Moonee Ponds, with Dawson Street, Brunswick. The bridge will be 120 feet long, with a roadway 28 feet wide with two 9-ft. footways. It is intended that the bulk of the work be carried out by contract. This bridge will provide a new traffic link on the route of a secondary road shown in the Master Plan for Melbourne, a small footbridge being the only existing structure. The work has been included in the programme in preference to renewal of the bridge half-a-mile downstream at Brunswick Road which is being repaired by the Councils to serve for some years.

Johnston Street, Cities of Collingwood and Kew (Yarra River).

Good progress was made during the year and, by 20th June, 1955, all piers and abutments which could be completed prior to the demolition of the old bridge were completed. Considerable progress was made on the falsework construction across the river, and it is anticipated that one half-width of the bridge will be open to traffic in January, 1956. (Plate No. 37.)

Chandler Bridge, Cities of Heidelberg and Kew (Yarra River).

The work of renewing the deck and strengthening this steel truss bridge was commenced in December, 1954, and good progress has been made. The corrosion of the steel which was revealed when the job was opened up was much greater than expected. The work has been carried out without undue interference with traffic. (Plate No. 38.)

COUNTRY BRIDGES.

Bairnsdale Division.

State Highways.

Princes Highway East.—A start was made on the construction of the new reinforced concrete bridge over the Mitchell River at Bairnsdale. (Plate No. 39.)

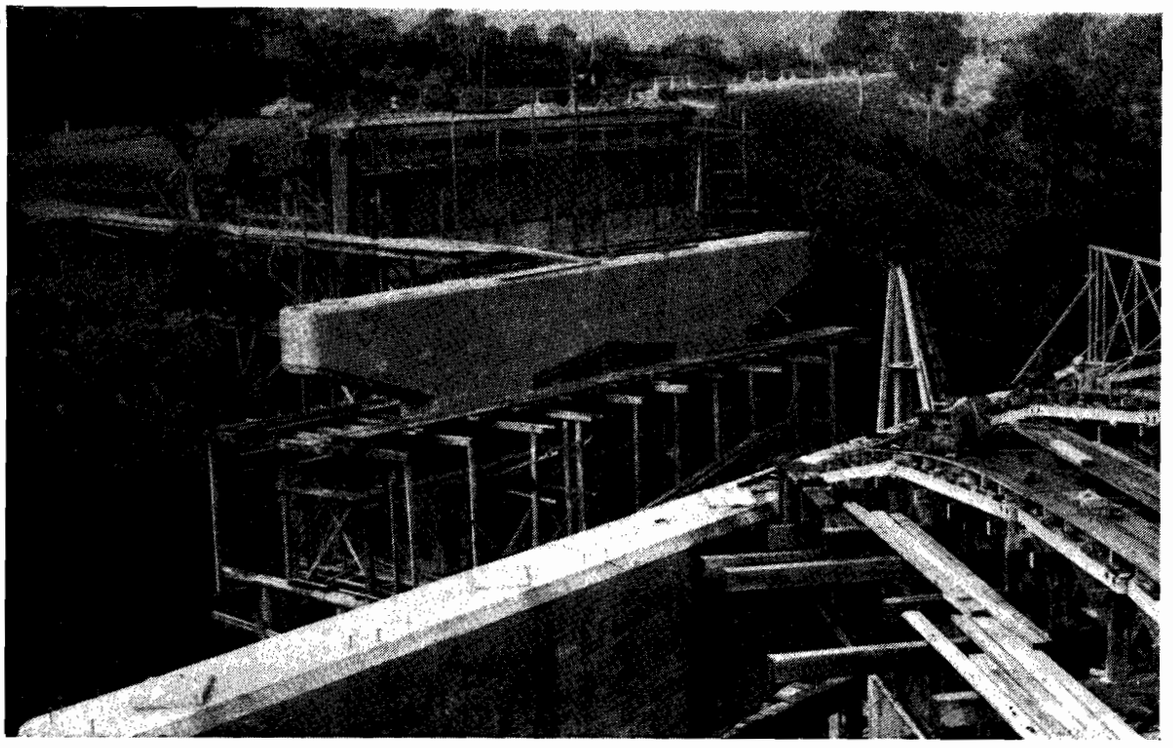


Plate No. 37.—Bridge under construction, Johnston Street, over Yarra River.

Plate No. 38.—Reconditioning old bridge on Chandler Highway over Yarra River.

Plate No. 39.—Ceremony at driving of first pile of new bridge on Princes Highway East over Mitchell River at Bairnsdale.

Unclassified Roads.

Avon Shire.—(1) Talbotville Road—erection of foot suspension bridge over Wonnangatta River and improvement of drainage: (2) Stockdale Road—installation of twin 8 ft. x 5 ft. reinforced concrete box culvert. *Bairnsdale Shire.*—Romawi Road—construction of bridge and approaches over Forge Creek.

Ballarat Division.

State Highways.

North-Western Highway.—Reconstruction of seven culverts between Linton and Avoca. *Pyrenees Highway.*—Redecking of eleven culverts between Castlemaine and Newstead. Construction of footbridge alongside the existing bridge over Deep Creek at Carisbrook. Replacement of timber culvert west of Avoca. Construction of new bridge west of Amphitheatre. Widening and redecking bridge near Dunneworthy.

The raising of the bridge over Joyce's Creek, on the Pyrenees Highway, and that over Paddock Creek on the Western Highway, referred to in some detail in the 41st Annual Report, was completed during the year.

The 7-span 190 feet long deck of the Joyce's Creek bridge, weighing in all 220 tons, was raised 10 ft. 6 in. in three sections to provide for the backing up of water from the Cairn Curran Reservoir, and the deck was widened to 24 feet between kerbs.

The 60-ft. span deck of the Paddock Creek bridge, weighing 160 tons, was raised by 6 feet to allow for the backing up of water from the Bostock Dam recently completed by the Geelong Waterworks and Sewerage Trust.

Main Roads.

Avoca Shire.—Ararat–St. Arnaud Road—reconstruction of bridge over Native Youth Creek. *Ballan Shire.*—Geelong–Ballan Road—construction of Reilly's Creek Bridge.

Benalla Division.

State Highways.

Murray Valley Highway.—Construction of a new alignment of a precast concrete bridge 180 feet long over Sheepwash Creek, and a similar type of bridge 120 feet long over Deep Creek. *Midland Highway.*—Between Shepparton and Mooroopna, there are seven (7) bridges, six of which are too narrow for the intensity of traffic, while two of them are old timber structures. During the year, contracts were let for the replacement of these two bridges by reinforced concrete structures, with lengths of 496 feet and 386 feet respectively. The new structures provide for a road width of 28 feet with a 6-ft. cycle track on each side and a 6-ft. footway on one side. It is anticipated that contracts for the widening of the other four bridges will be let during the financial year 1955–56. *Hume Highway.*—As a start on the widening of the bridges and causeway between Wodonga and Albury, a contract has been let for the widening of the No. 3 bridge. The remodelled structure will provide a road width of 28 feet with a combined cycle and footway track 6 feet wide on each side.

Main Roads.

Oxley Shire.—Bright Road—(1) Completion of superstructure and manufacture of precast units for the new bridge over Maloney's Creek; (2) replacement of bridge at 5 miles by 60-in. diameter pipe culverts. *Shepparton Shire.*—Katandra Road—replacement of timber bridge by reinforced concrete box culverts. *Towong Shire.*—Yabba Road—construction of new timber and rolled steel joist bridge over Fairyknowe Creek. *Upper Murray Shire.*—Tallangatta–Corryong Road—replacement of timber bridge by reinforced concrete culverts.

Bendigo Division.

State Highways.

Calder Highway.—Construction of footbridges at Barkers Creek, Harcourt, and at Kangaroo Flat. *Northern Highway.*—Construction of reinforced concrete bridge over McIvor Creek near Tooborac. Widening narrow reinforced concrete bridge south of Argyle. (Plate No. 40.)

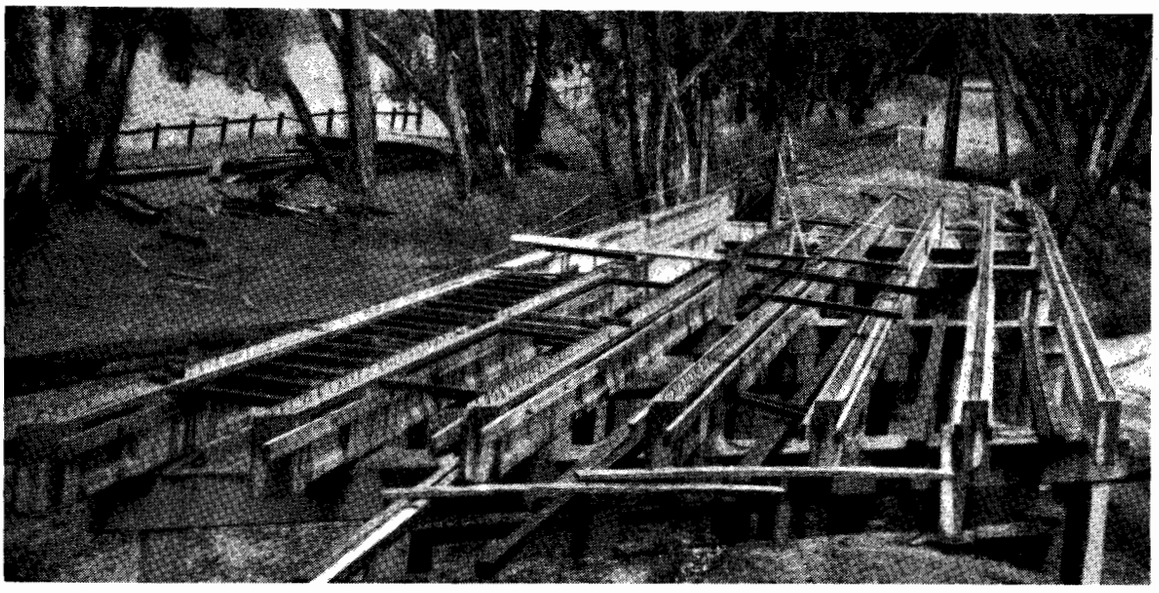


Plate No. 40.—Bridge under construction over McIvor Creek, on the Northern Highway, near Tooborac.

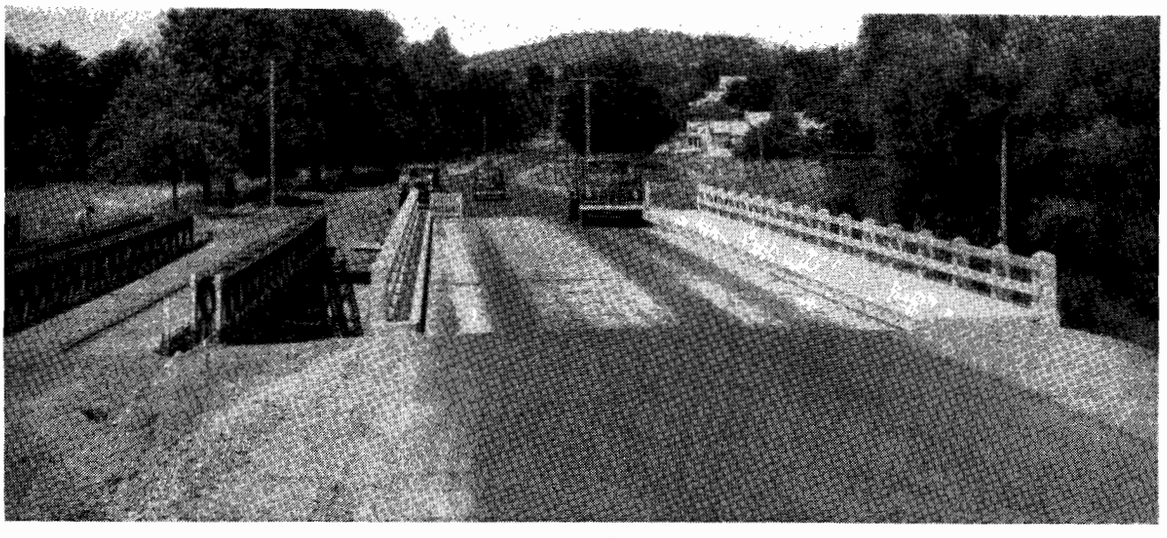


Plate No. 41.—New bridge over Jackson's Creek on Calder Highway at Gisborne.

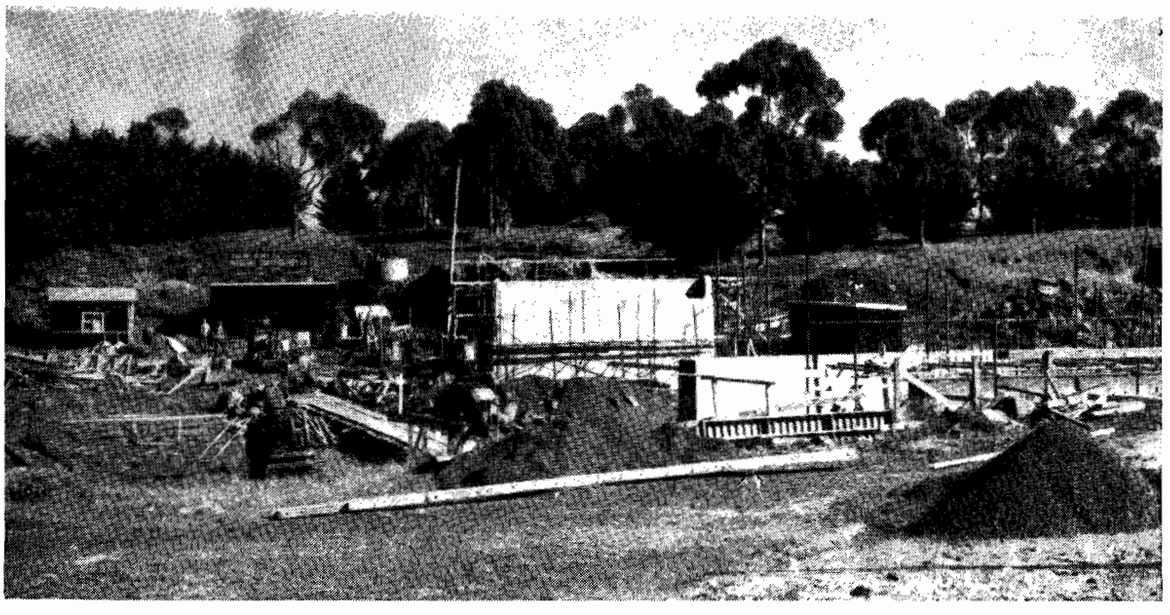


Plate No. 42.—Progress of new bridge on Princes Highway West, over Kororoit Creek

Main Roads.

Korong Shire.—Bendigo-St. Arnaud Road—construction of reinforced concrete bridge over Cochrane's Creek. *Marong Shire.*—Ravenswood-Marong Road—construction of new reinforced concrete bridge over Bullock Creek. *McIvor Shire.*—Heathcote-Bendigo Road—construction of new bridge near Derrimal. Heathcote-Nagambie Road—construction of new reinforced concrete bridge at 3·4 miles east of the northern highway and at Graytown.

Forest Roads.

Epsom-Fosterville Road—construction of 3-cell reinforced concrete box culvert to replace an old timber bridge near the Bendigo Golf Links.

Dandenong Division.

State Highways.

Princes Highway East.—The old timber bridge at Auld's corner at mileage 35·5 was replaced by a concrete cell culvert, and permitted of a realignment of the highway at this point. The existing concrete culvert at 32·3 miles near Officer was widened to provide a road width of 28 feet between kerbs. *South Gippsland Highway.*—Good progress was made with the replacement of two timber bridges just east of Bass River at mileage 61 to provide a better alignment over the highway.

Main Roads.

Bass Shire.—Archies Creek Road—construction of twin-cell reinforced concrete base culvert and realignment of stream; Grantville-Glen Alvie Road—construction of 3-span concrete and rolled steel joist bridge 150 feet long and construction of 1,400 feet of approaches. *Berwick Shire.*—Nar-Nar-Goon-Longwarry Road—construction of 5-span reinforced concrete bridge 220 feet long over the Bunyip River; Belgrave-Hallam Road—construction of timber and rolled steel joist bridge over Eumemmering Creek. *Eltham and Doncaster and Templestowe Shires.*—*Warrandyte Bridge.*—The supply and erection of the steel girders was completed during the year and a start made with the casting of the deck. It is anticipated that the bridge will be opened to traffic by December, 1955. *Ferntree Gully Shire.*—*Belgrave Bridge*—The construction of this bridge, which was a concrete structure 127 feet long, with a road width of 30 feet and two 9-ft. wide footways, replacing a very narrow old timber bridge over the railway line at Belgrave, was completed and opened for traffic in December, 1954. *Warragul Shire.*—Hazeldean Road—construction of timber bridge.

Unclassified Roads.

Bass Shire.—Pinkertons Road—construction of timber and rolled steel joist bridge. *Berwick Shire.*—Army Road—construction of triple cell reinforced concrete box culvert. *Healesville Shire.*—Castella Road—construction of bridge and deviation over Yea River. *Spring Vale and Noble Park Shire.*—Hammond Road—construction of concrete and rolled steel joist bridge over Dandenong Creek. *Warragul Shire.*—Mizpah Settlement Road—construction of timber bridge.

Tourists' Roads.

Upper Yarra Shire.—Acheron Way. During the year several old and narrow timber bridges in the Cement Creek area were replaced by concrete structures.

Geelong Division.

State Highways.

Calder Highway.—New concrete bridge over Jacksons Creek at Gisborne was completed and new approaches provided. *Princes Highway West.*—Kororoit Creek. Prior to the 1st July, 1954, a contract was let for the construction of the piers and abutments of one of the two bridges at this site, to provide for the duplication of the highway. Since that date, a contract was let for the piers and abutments of the second bridge. It is expected that a contract will be let at an early date for the construction of the superstructures on both bridges. Waurn Ponds Creek.—A scheme for the improvement of the alignment of the highway at this point involved the construction of a new bridge to replace an old stone arch bridge. A contract has been let for the work, and, despite foundation troubles, good progress has been made. (Plates Nos. 41 to 44.)

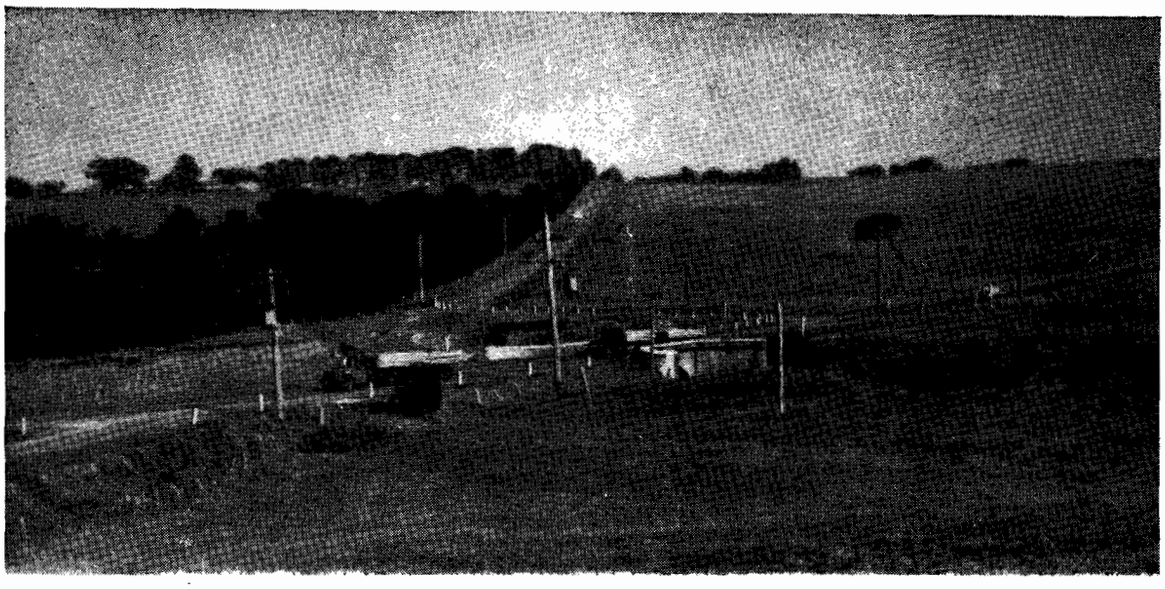


Plate No. 43.—Old bridge on sharp turn on Princes Highway West at Waurn Ponds.

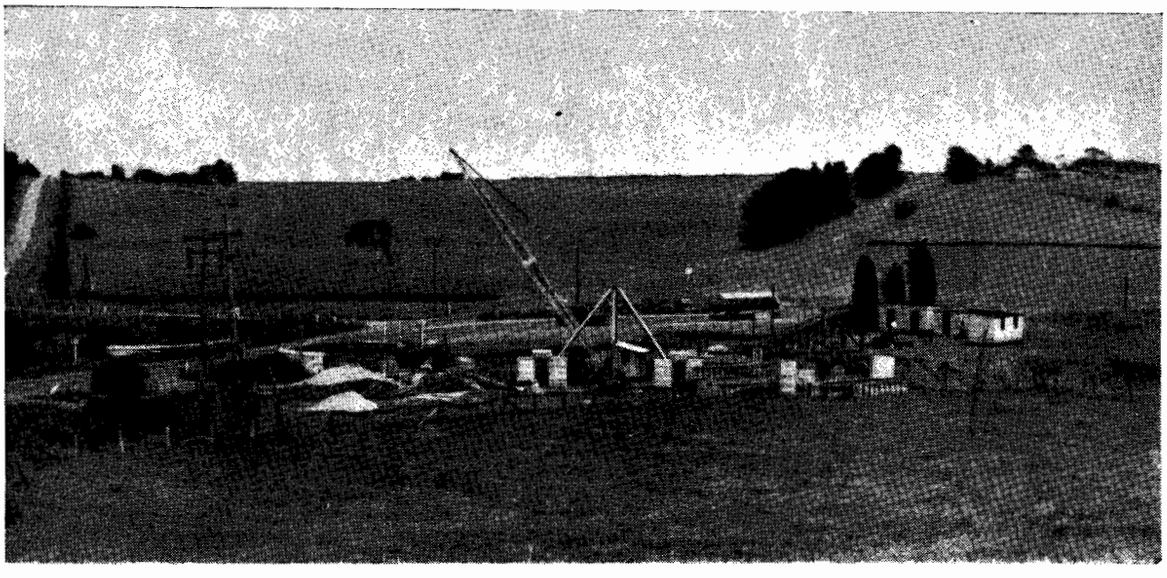


Plate No. 44.—New bridge under construction on Princes Highway West at Waurn Ponds.

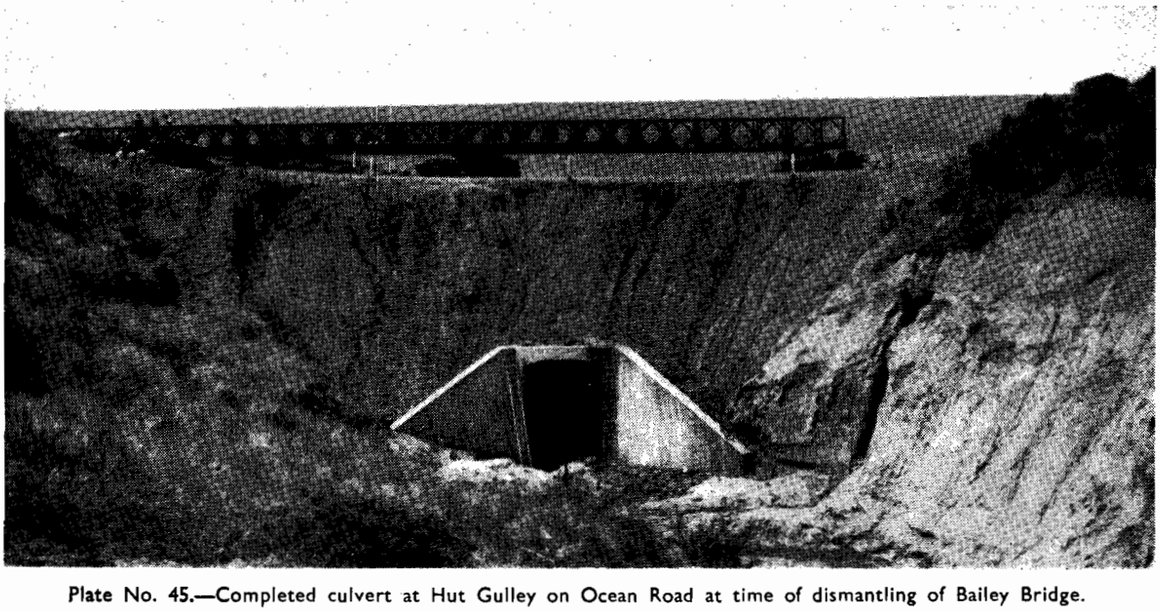


Plate No. 45.—Completed culvert at Hut Gulley on Ocean Road at time of dismantling of Bailey Bridge.

Tourists' Roads.

Ocean Road.—Hut Gully. Following the erection of the temporary Bailey bridge referred to in the 41st Annual Report, work on the construction of a permanent 15 ft. x 10 ft. reinforced concrete culvert under the Bailey Bridge was commenced. The new culvert was finished and the temporary bridge removed without interference to traffic, and the new structure was made available for traffic in December, 1954. Smythe's Creek.—In order to replace the low level timber bridge and to eliminate a bad bend at this site, work was commenced on the construction of a new bridge, and, despite foundation troubles, good progress was made. Spout Creek and Stoney Creek.—At these two sites, the low level concrete causeways were replaced by high level structures which provide for all-weather crossings. (Plate No. 45.)

Horsham Division.

State Highways.

Western Highway.—A narrow reinforced concrete bridge at Lochiel was widened from 16 feet to 24 feet between kerbs. *North-Western Highway.*—A commencement was made on a programme of widening five narrow concrete bridges between Redbank and Stuart Mill. Two of them were widened to 24 feet and the work is still in progress. Timber footbridges were constructed on two bridges over the Avon River at Donald. (Plate No. 46.)

Unclassified Roads.

Dunmunkle Shire.—Greenhills Road—replacement of old timber bridge by a multi-cell reinforced concrete pipe culvert over the Yarriambiac Creek at Greenhills. *Kara Kara Shire.*—John Bull Road—construction of timber and rolled steel joist bridge. Teddington Road—replacement of old timber structure by reinforced concrete box culverts. *Stawell Borough.*—Smith Street—replacement of old timber culvert by a reinforced concrete " U " type slab culvert.

Traralgon Division.

State Highways.

Princes Highway East.—Construction of double cell reinforced concrete box culvert at approaches at Middle Creek near Rosedale. *South Gippsland Highway.*—Construction of a 3-span composite reinforced concrete and steel bridge 122 feet long, together with 2,000 feet of approaches at Albert River. (Plate No. 47.)

Main Roads.

Woorayl Shire.—Lower Tarwin Road—construction of 3-span rolled steel joist and timber bridge 135 feet long at Tarwin River, together with ·3 miles of approaches.

Forest Roads.

Narracan Shire.—Walhalla Road—(1) construction of 3-span rolled steel joist bridge 122 feet long over Tyers River at Gould, together with approaches; (2) construction of a 35-ft. span rolled steel joist and timber bridge over Stringers Creek at Walhalla. (Plates Nos. 48 to 50.)

Unclassified Roads.

Maffra Shire.—Boisdale–Newry Road—construction of 2-span rolled steel joist and timber bridge over Carters Creek; Cobains Road—construction of single-span rolled steel joist and timber bridge; Heyfield–Upper Maffra Road—construction of extra span and general repairs to bridge over Macalister River; Tinamba–Seaton Road—construction of 2-span rolled steel joist and timber bridge. *Narracan Shire.*—Main Canal Road—construction of rolled steel joist and timber bridge over Wheelbarrow Drain; Trafalgar South Road—construction of timber bridge. *Traralgon Shire.*—Old Melbourne Road—construction of 6-cell reinforced concrete pipe culvert. *Woorayl Shire.*—Buffalo–Waratah Road—construction of timber bridge over Fish Creek Drain.

Warrnambool Division.

Main Roads.

Glenelg Shire.—Casterton–Apsley Road—(1) construction of 3-span reinforced concrete bridge 60 feet long over Deep Creek on improved alignment, using precast U-type slabs; (2) construction of triple-cell reinforced concrete pipe culvert 72 feet long

BRIDGES

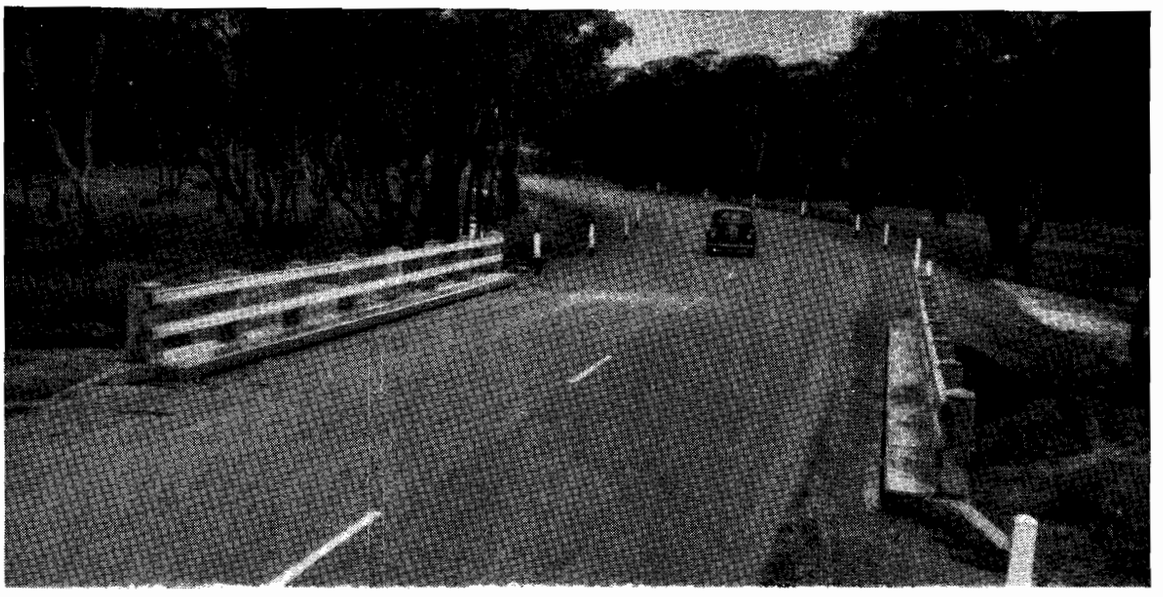


Plate No. 46.—Bridge on North-Western Highway, approximately 136 miles.

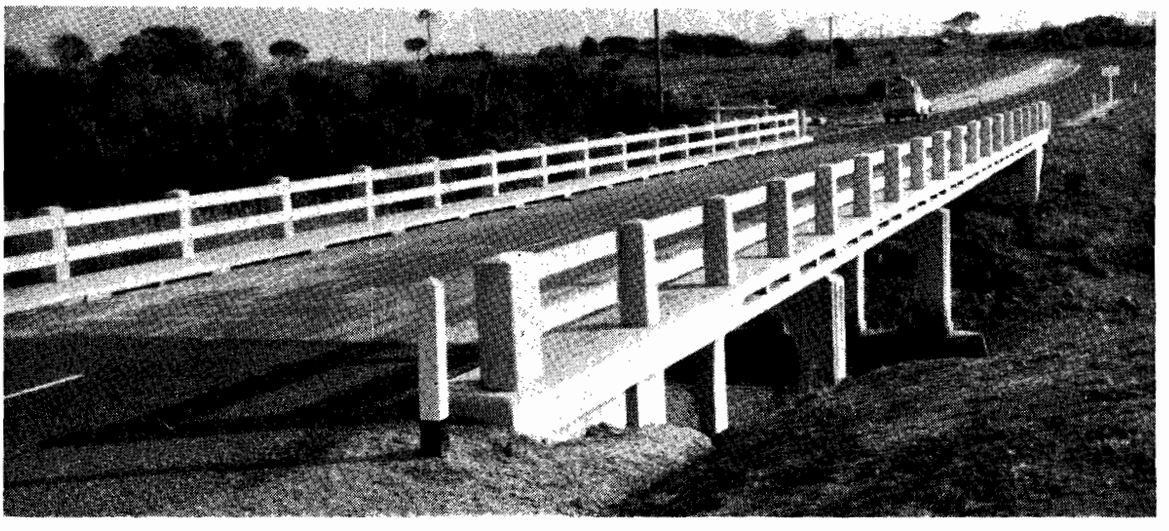


Plate No. 47.—Reconstructed bridge and approaches on South Gippsland Highway over Albert River.

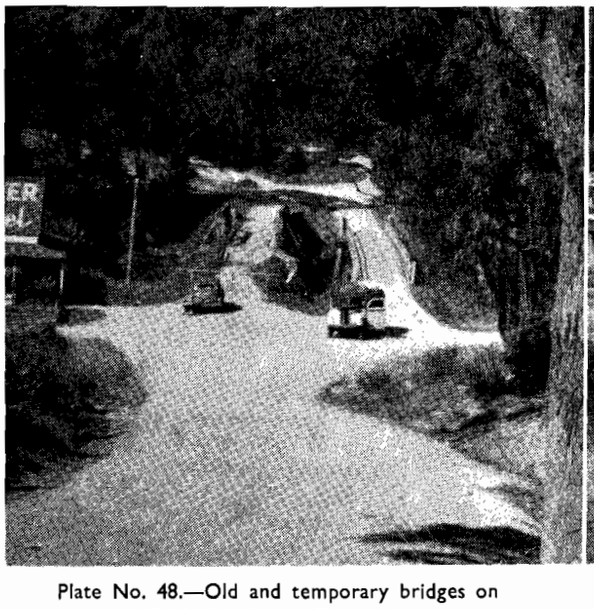


Plate No. 48.—Old and temporary bridges on Walhalla Road over Tyers River.

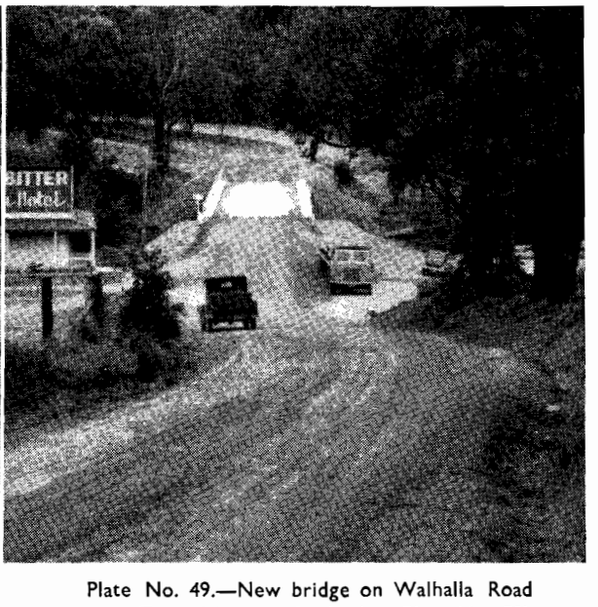


Plate No. 49.—New bridge on Walhalla Road over Tyers River at Gould (see Plate No. 50).

Plate No. 50.—New bridge on Walhalla Road over Tyers River at Gould.

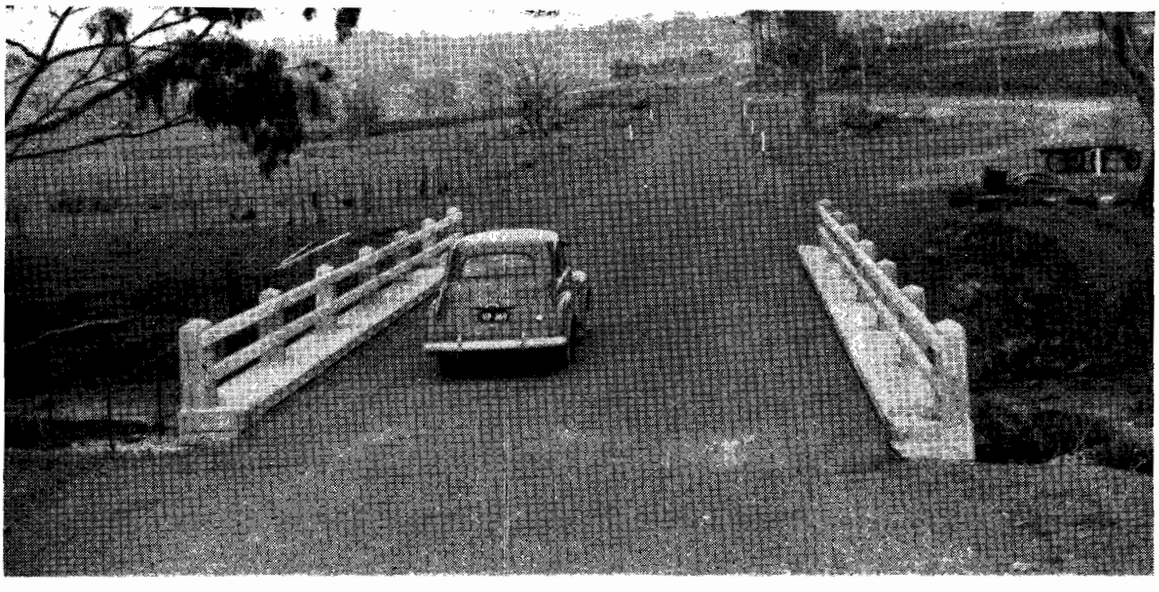


Plate No. 51.—Slab-type bridge over Deep Creek on Casterton–Apsley Road near Dunrobin, precast by the Glenelg Shire.

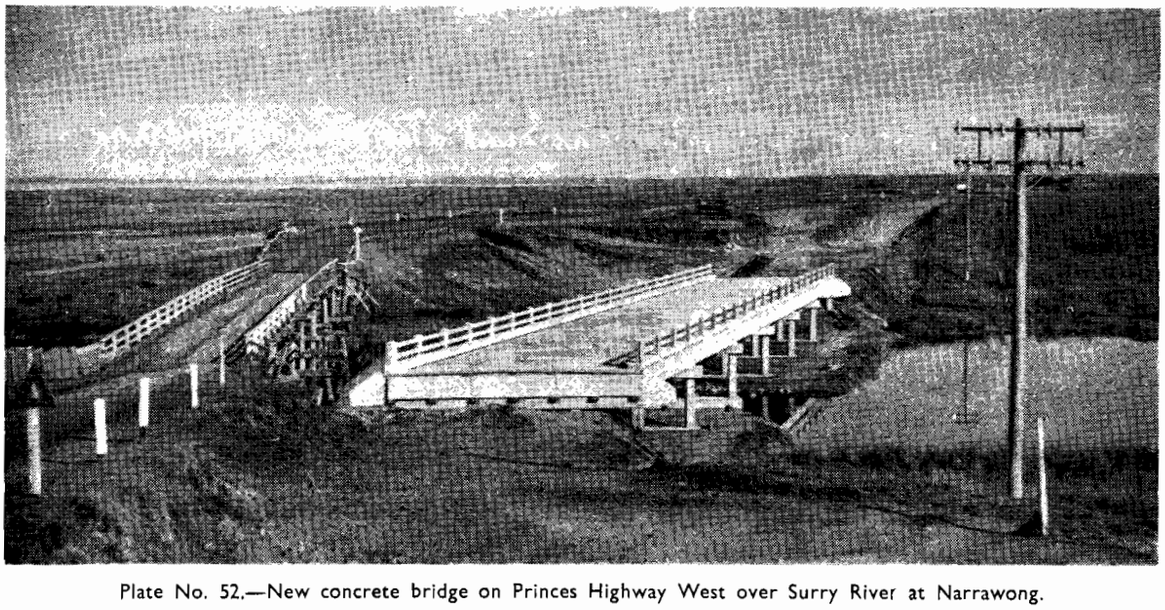


Plate No. 52.—New concrete bridge on Princes Highway West over Surry River at Narrawong.

FLOOD DAMAGE—FEBRUARY-MARCH, 1955

Plate No. 53.—Flooding of Tatura-Rushworth Road at Tatura.

Plate No. 54.—Shepparton-Tatura Road cut by 6-ft. drain to draw floodwaters away from Tatura township.

Plate No. 55.—Flooding of Tatura-Murchison Road.

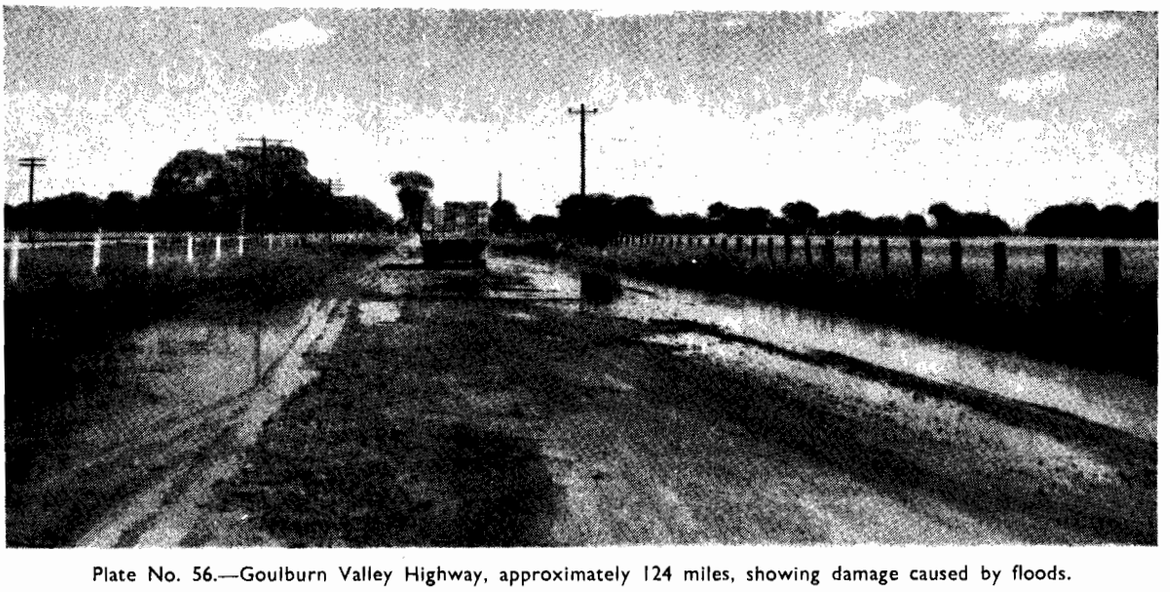


Plate No. 56.—Goulburn Valley Highway, approximately 124 miles, showing damage caused by floods.

at Fingerpost culvert. *Minhamite Shire.*—Woolsthorpe–Heywood Road—replacement of old timber bridge over overflow drain at Bessiebelle with reinforced concrete precast structure of 35-ft. span, 22 feet between kerbs. *Portland Shire.*—Dartmoor–Hamilton Road—erosion prevention work near Digby involving construction of two masonry drop structures. (Plate No. 51.)

State Highways.

Princes Highway West.—Construction of precast reinforced concrete bridge 180 feet long and 24 feet between kerbs over Surry River at Narrawong. (Plate No. 52.)

Unclassified Roads.

Wannon Shire.—Coleraine–Nareen–Moree Road—construction of 2-span timber and steel bridge, 50 feet long, on mass concrete abutments at Barrama.

FLOOD AND BUSH FIRE DAMAGE.

Between November, 1954, and February, 1955, serious damage was caused to roads and bridges in various parts of the State by severe storms and bush fires, the areas which suffered most being the Shires of Alberton, Avon, Bairnsdale, South Gippsland, and Tambo in Eastern Gippsland, the Shires of Benalla, Deakin, Rodney, Shepparton, and Waranga in the northern part of the State, and the Shires of Glenelg and Wannon in the western part.

Heavy rains occurred in the Bendigo Division on the 2nd, 3rd, and 4th December, 1954, and on the 11th and 13th of that month, particularly in the Shires of Rodney, Waranga, and Huntly, causing the flooding of local streams and watercourses, and resulting in minor damage to roads, bridges, and culverts.

Again, in February, 1955, heavy rain fell from the 11th to the 14th, being most severe in the Shires of Rodney, Deakin, Rochester, McIvor, and Korong. The rainfall was heaviest in the Rodney Shire, particularly at Tatura and Mooroopna, where approximately 11 inches was registered for 3 days. Damage was caused to many roads in the Shires mentioned, but, although widespread, was not generally of a spectacular or severe nature. Some provision was made by the Board towards the cost of effecting the necessary repairs. (Plates Nos. 53 to 56.)

Applications totalling £201,545 were received by the Board from 30 municipalities for grants for the repair of the damage, and grants totalling £148,600 (including the municipal contribution) were made from the Board's funds, no special assistance being given by the Government.

WORKS FOR OTHER AUTHORITIES.

As in previous years, the Board's organization and equipment were fully availed of during 1954–55 by other State and Commonwealth authorities for the carrying out of certain special projects at their cost, and although the total expenditure incurred on these works (£925,649) was less than the previous year's total of £1,028,379, it represents a very considerable effort in manpower and plant on the part of the Board. Of the total of £925,649, £782,044 was expended on behalf of State authorities and the balance of £143,605 on projects undertaken at the request of the Commonwealth Department of Works.

Brief particulars of the principal works undertaken, both State and Commonwealth, are given hereunder :—

Department of Public Works.—A total expenditure of £64,315 was incurred on the Chandler Highway (road and bridge), on the Big Desert Road at Kaniva to serve a large area of land being developed by the Australian Mutual Provident Society, and on the grounds and playing areas associated with State Schools and institutions throughout Victoria. *Forests Commission of Victoria.*—A total sum of £4,711 was expended on certain projects designed to facilitate the extraction of forest produce, including the Wellington Road in the Shire of Maffra, the Blue Range Road in the Shire of Mansfield, and the Benwerrin–Mt. Sabine and Sunnyside Roads in the Shire of Otway. In these cases, the Board also contributed amounts towards the works. *Geelong Waterworks and Sewerage*

Trust.—An amount of £2,674 was expended on works associated with the Bostock Dam adjacent to the Western Highway between Ballan and Gordon. *Housing Commission, Victoria.*—An expenditure of £79,623 was incurred on works associated with Housing Estates at Ballarat, Morwell, and Norlane. *Melbourne and Metropolitan Board of Works.*—A total sum of £2,443 was expended during the year on further works necessitated by the construction of the Upper Yarra Dam and on the resealing on the Blacks' Spur section of the Maroondah Highway. *Soldier Settlement Commission.*—An amount of £87,390 was expended, being the Commission's share, generally one-half the total cost of road works in various Soldier Settlement Estates throughout Victoria. Further details are given elsewhere in this report. *State Electricity Commission of Victoria.*—An expenditure of £39,050 was incurred chiefly on works on the Kiewa Valley Road to serve the Commission's interests at Mt. Beauty. These works included:—(*a*) 6·05 miles of reconstruction and sealing between Kiewa and Kergunyah; (*b*) 6·05 miles of forming and resheeting near Dederang Gap; (*c*) 1·2 miles of reconstruction and sealing near House Creek; (*d*) 1·3 miles of reconstruction near Running Creek; (*e*) completion of new reinforced concrete bridge over House Creek. *State Rivers and Water Supply Commission.*—A total sum of £500,361 was expended, principally on works connected with the Commission's projects at Eildon and Cairn Curran Reservoirs, and for the River Murray Commission at Hume Weir. Reference is made elsewhere to some of the special jobs carried out. *Victorian Inland Meat Authority.*—£1,372 was expended mainly on works connected with the Authority's activities at Ballarat. *Commonwealth Department of Works.*—An expenditure of £143,605 incurred on behalf of the Commonwealth Government included works on aerodromes, repeater stations, depots, and magazine areas throughout the State. *Portland Harbour Trust.*—An amount of £26,088 (not included in the foregoing figures) was expended on work for the Trust on the Cape Grant project. This project is being carried out somewhat differently from the other projects enumerated above. Although the labour and plant were made available to the Trust by the Board, the former provided the engineering supervision. The work done was a continuation of that commenced in previous years, comprising mainly the construction of access roads to a new quarry and the shifting of overburden from the quarry site, as well as levelling in the vicinity of the new breakwater. (Plates Nos. 57 and 58.)

Reservoir Projects.

The following works, made necessary by the construction of the new Eildon Dam were carried out by the Board during the year, on behalf of the State Rivers and Water Supply Commission:—(*a*) clearing, forming, grading, and fencing of 8,500 feet of Hutchinson Road near Bonnie Doon; (*b*) clearing, forming, grading, and fencing of 17,200 feet of the Maintongoon Road near Bonnie Doon; (*c*) the raising by 5 feet of a 5-span timber bridge over Glen Creek near Bonnie Doon; and (*d*) the raising of two timber bridges and 1,400 feet of reconstruction on the Ancona Road. In addition, work on the two major jobs, namely, the deviation of the Maroondah Highway at Bonnie Doon and the construction of the new bridge on this highway over Brankeet Creek was well advanced, and a commencement was made with the construction of a new bridge over the Howqua River on the new deviation of the Mansfield–Woods Point Road, the new bridge over Glen Creek on the Dry Creek Road, and deviations of the Mansfield–Woods Point Road near Howqua and between Jamieson and Corduroy Gap. Work on Campagnolo's Access Road near Mansfield, the Dry Creek and Glen Creek Roads near Bonnie Doon, and the deviation of the Burnt Creek Road in the vicinity of Mansfield was also put in hand. (Plates Nos. 59 to 61.)

Works as set out hereunder were also carried out during the year on behalf of the River Murray Commission in connection with the enlargement of the Hume Weir:—(*a*) Deviations at Ebden, First Bay Creek, and Tatonga, all west of Tallangatta, were put in hand, and the work at First Bay Creek is nearing completion; (*b*) work on the embankment across the Mitta Mitta Valley at Tallangatta is being carried out by contract to the State Rivers and Water Supply Commission and is nearing completion, and a contract was let by the Board for a new bridge approximately 750 feet long; (*c*) a contract was let for the bridge at Koetong Creek on the Murray arm of the reservoir, and the embankment has been constructed as far as could be done pending completion of the bridge; (*d*) the deviation at the junction of the Murray Valley and the Omeo Highways on the west side of the Mitta River at Tallangatta was completed; (*e*) the deviation of the Bethanga Road at Toorak to raise it above the new reservoir level was completed; and (*f*) a further deviation of the Bethanga Road west of Tallangatta was commenced. (Plates Nos. 62 and 63.)

WORK FOR OTHER AUTHORITIES

Plate No. 57.—Aster Street, one of the roads constructed for the Housing Commission, Ballarat West Estate.

Plate No. 58.—Sheeting with gravel from Kopke Quarry on Soldier Settlement Road in Ripon Shire.

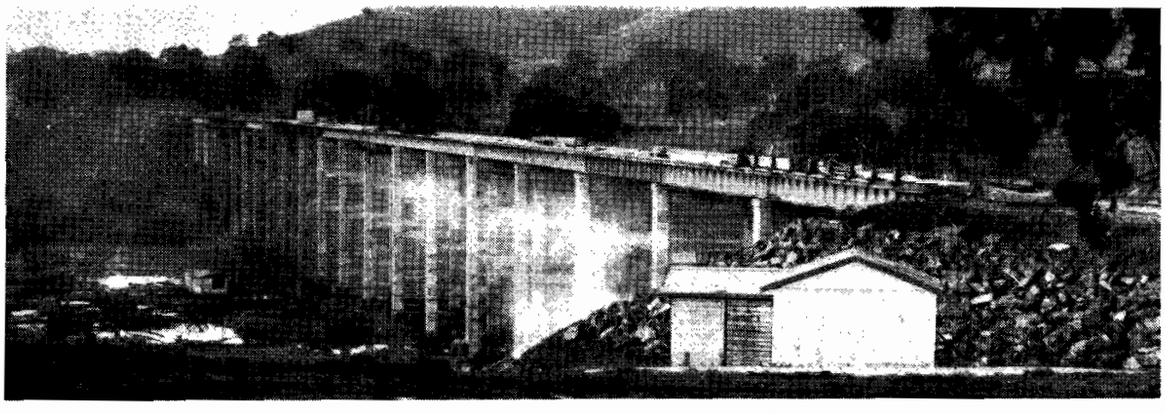


Plate No. 59.—Bridge in course of construction over Brankeet Creek, at Bonnie Doon.

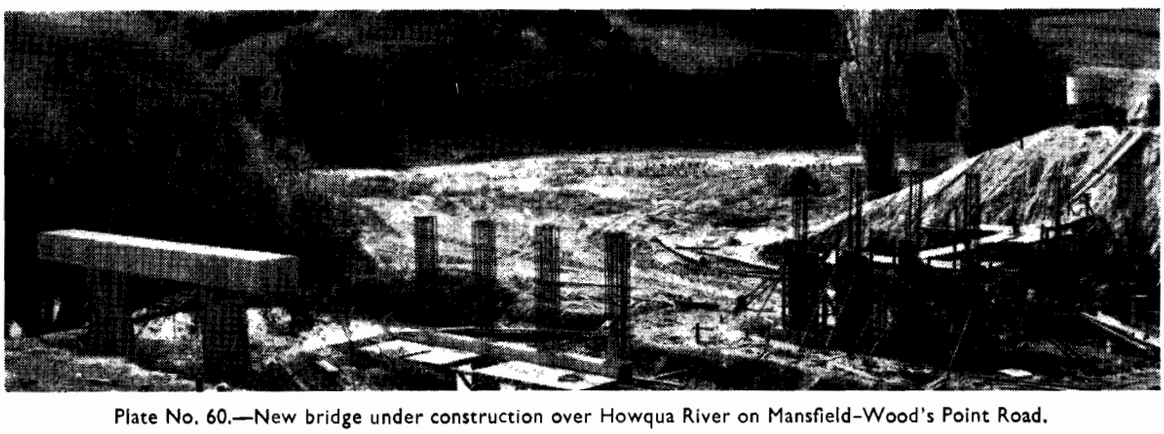


Plate No. 60.—New bridge under construction over Howqua River on Mansfield-Wood's Point Road.

WORK FOR OTHER AUTHORITIES

Plate No. 61.—Bulldozers working on reconstruction of Mansfield-Wood's Point Road north of Jamieson.

Plate No. 62.—New junction of Murray Valley and Omeo Highways at Tallangatta. The old junction will be submerged by the Hume Weir enlargement.

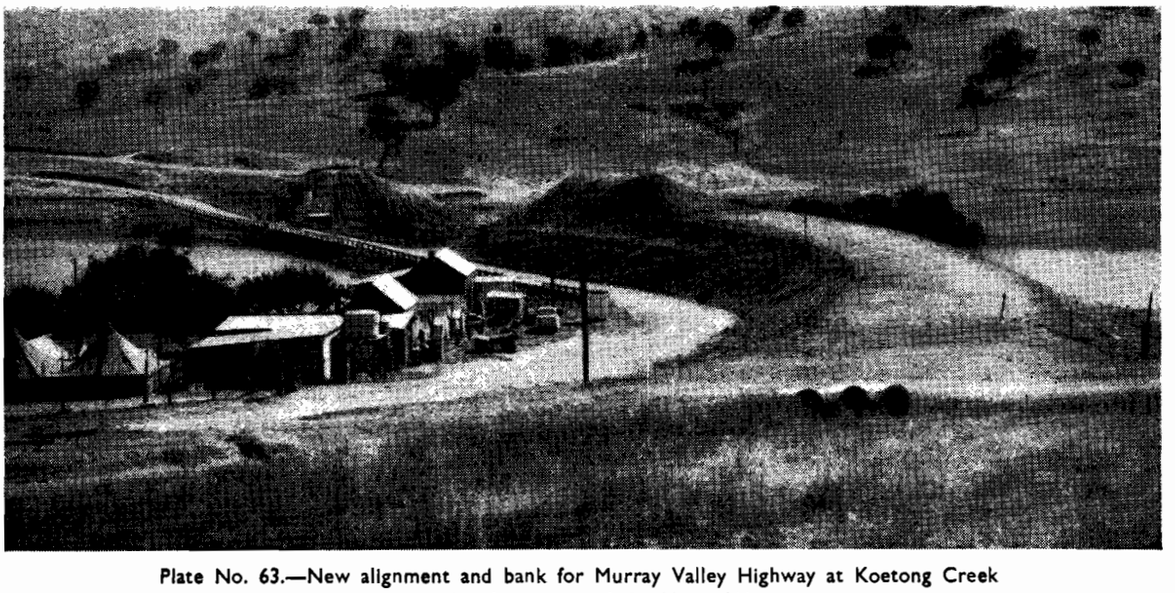


Plate No. 63.—New alignment and bank for Murray Valley Highway at Koetong Creek made necessary by the raising of the Hume Weir.

SOLDIER SETTLEMENT ESTATE ROADS.

A great deal of work was carried out during the year in connection with the construction of roads to serve Estates purchased by the Soldier Settlement Commission. Since the inception of the Commission in 1946–47 the Board has been responsible for the investigation, in conjunction with Municipal Councils, of the roading proposals for the various Estates, and has exercised a general supervision, through its Divisional Engineers, over the works undertaken, in addition to checking the plans and specifications for the respective projects.

Prior to 1953, the basis of contributions by the Commission, the Councils, and the Board was determnied on the recommendation of the Board itself, having regard to the availability of the Board's revenues and the circumstances of each particular case. With the approval of the Government of the day, however, a uniform basis of contribution was adopted during 1953, viz., 4 parts Commission, 3 parts Board, and 1 part Council. The total expenditure during 1954–55 on road and bridge works to serve Soldier Settlement Estates was £159,906, of which £87,390 was paid by the Commission, £52,558 by the Board, and £19,958 by the Councils. As this expenditure included works authorized prior to the 1953–54 financial year on varying rates of contribution by the three interested parties, the figures quoted are not strictly on the 4 : 3 : 1 basis.

The total expenditure on all road and bridge works associated with Soldier Settlement Estates since the inception of the scheme is £859,390, of which £565,568 was contributed by the Commission, £191,355 by the Board, and £102,467 by Municipal Councils. This expenditure indicates a very substantial effort in plant and manpower, and the various Councils, by whom the bulk of the work was undertaken, are to be commended for their co-operation and assistance and for the vigorous manner in which the great majority of the projects were carried out. This applies particularly to certain areas where numerous Estates were purchased by the Commission, involving heavy programmes of work for certain Councils in addition to their normal programmes of work in relation to funds provided by the Board.

Municipalities in which extensive soldier settlement road schemes have been undertaken, with the *total* expenditure in each, are quoted hereunder :—

	£
Dundas Shire	31,931
Glenelg Shire	33,732
Hampden Shire	77,020
Kowree Shire	37,112
Leigh Shire	41,718
Minhamite Shire	133,630
Mortlake Shire	56,198
Mount Rouse Shire	56,372
Numurkah Shire	76,722
Ripon Shire	46,653
Warrnambool Shire	31,681

DECENTRALIZATION.

Progress was made during the year in the development of certain of the Board's country divisional organizations, these developments being summarized hereunder :—

Bairnsdale Division.

The pre-casting yard at the Divisional depot was further developed, and a commencement was made with the manufacture of concrete piles and pre-cast beams for the new bridge over the Mitchell River at Bairnsdale. A large lean-to type of plant shelter was also erected and work has begun on the extension of the existing plant workshops. (Plate No. 64.)

Ballarat Division.

All constructed roads within the Depot and the approach roads thereto were sealed during the year, and a contract was let for the construction of a brick veneer utility block.

A pre-casting area has been established, and is in production. A timber floor 40 feet long and 10 feet wide, and a concrete floor 50 feet long and 12 feet wide have been laid, and a 60 ft. x 12 ft. shed for formwork manufacture and steel fabrication, together with a 12 ft. x 10 ft. cement shed have been erected.

DECENTRALIZATION

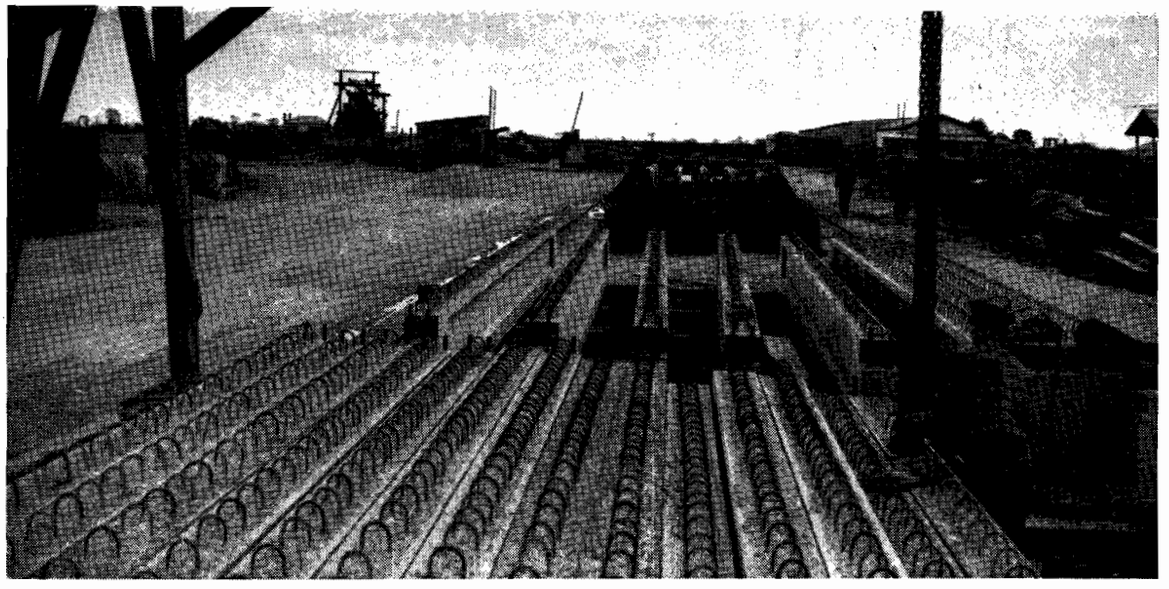


Plate No. 64.—Pre-cast beams in Bairnsdale Casting Yard, to be used on new bridge over Mitchell River.

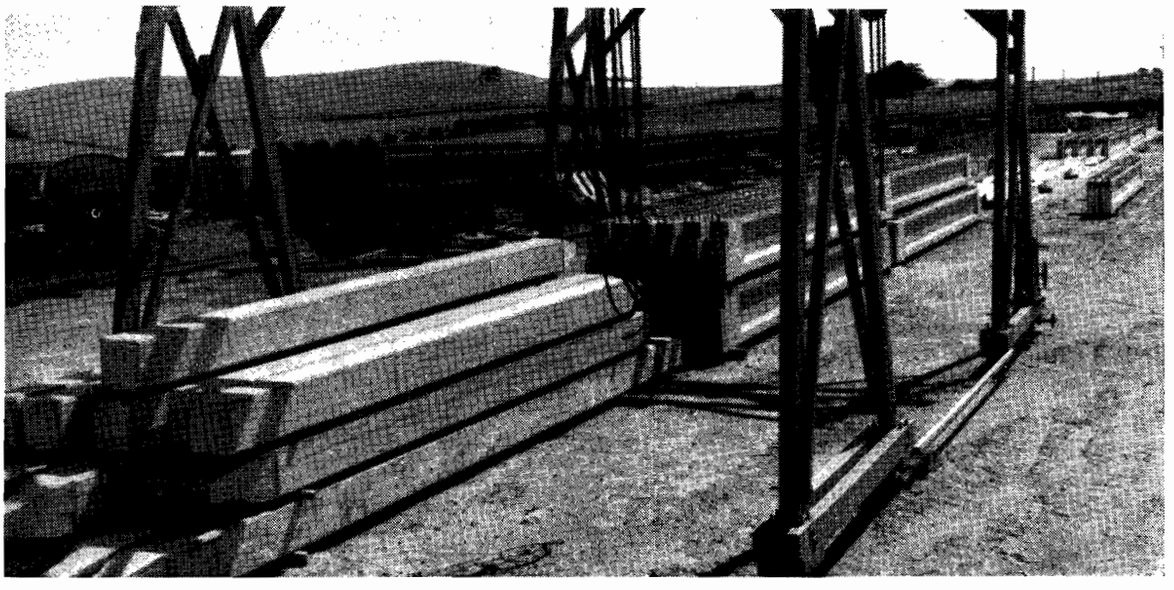


Plate No. 65.—Pre-cast bridge units in Warrnambool Storeyard.

ROAD MATERIAL

Plate No. 66.—" Goliath " crusher at Girgarre East in Bendigo Division.

A one-bag electric mixer and rotary weigh batcher with the necessary sloping aggregate bins arranged radially about the weigh batcher have been installed.

Particular attention was paid to the alignment of the forms for U-type slab construction with heavy gauge galvanized iron, so that they could be used many times in the repetition work, and these are proving very satisfactory.

Benalla Division.

The bridge pre-casting depot was further developed with the installation of two timber gantries, and concrete works platforms were constructed on two sides of the main workshop building.

A site was purchased for a new patrol depot in Wodonga.

Horsham Division.

A reinforced concrete floor 50 ft. x 40 ft. designed to provide for later expansion of the main workshop was constructed, and is being used in the meantime as a hard standing for plant under repair.

The work of developing the pre-casting yard was continued by the construction of aggregate bins and installation of electrical mixer and weigh batcher. A concrete casting bed was laid down and work was commenced on the construction of a gantry. Actual pre-casting work, manufacturing piles, beams and "U" type slabs has been carried out during the progress of the above works.

A patrol depot was established at Nhill, and land was obtained at St. Arnaud for the same purpose.

A tender was accepted by the Public Works Department for the erection of a reinforced concrete frame two-storey office building for the Board in Firebrace Street, Horsham, the Board's offices in the Public Library building being inadequate for its requirements.

Warrnambool Division.

At the Divisional depot two plant shelters providing 6,000 square feet of coverage, and a steel-framed stores building 80 ft. x 30 ft. were erected, and at the pre-casting yard, timber pre-casting platforms which had become unserviceable have been replaced by concrete platforms. (Plate No. 65.)

ROADMAKING MATERIALS.

Bendigo Division.

During the year, a section of the Midland Highway 5·16 miles in length, between Stanhope and Byrneside, was reconstructed and sealed. Over 35,000 cubic yards of pavement material were required for this job, and in the planning stage it became apparent that if gravel were obtained for this work from the usual sources of supply in the southern portion of the Shire of Waranga, the Council would be embarrassed by a shortage in future years of cheap material for minor road construction and maintenance. It was, therefore, decided to prospect for stone for the production of crushed rock, and a quarry was eventually opened in silurian sandstone in Allotment 22, Parish of Girgarre East in the Shire of Rodney, approximately 4 miles from the centre of the road work.

The stone is a relatively soft sandstone having a Los Angeles loss of approximately 43 to 58 per cent., and is unsuitable for the production of fine crushed rock having a maximum size of 1 in. to $1\frac{1}{2}$ in. square mesh. It was decided to put it through the Board's portable Goodwin-Barsby "Goliath" crusher which has crusher a size of 30 in. x 15 in. with a minimum jaw opening of $2\frac{3}{4}$ inches with new jaws fitted. The crushed rock produced has a maximum size of approximately $3\frac{1}{2}$ inches and reasonably graded down to fine material having 5 to 10 per cent. passing a No. 7 sieve. This relatively coarse crushed rock was spread with power graders, then broken down and consolidated with a heavy 3-wheel power roller weighing approximately 12 tons. This reduced the maximum size to $2\frac{1}{2}$ inches square opening and increased the percentage passing a No. 7 sieve from 20 per cent. to 30 per cent. In this condition it was capable of being graded and treated generally as fine crushed rock. The output achieved from this quarry and plant was an average of approximately 345 cubic yards per possible working day, with a maximum daily output of 525 cubic yards. The total quantity of crushed material produced was 37,500 cubic yards. (Plate No. 66.)

Horsham Division.

In an endeavour to step up the production of aggregate for bituminous surfacing. arrangements have been made to quarry and stock pile a quantity of 25,000 cubic yards of spalls in the old quartz porphyry quarry near Stawell, known as Rutter's quarry.

A large plant has been set up for this work, comprising the Boards "Cedar Rapids" 36 in. x 22 in. primary crusher, waggon drills, and heavy duty compressors. The plant is being designed to quarry and produce 300 cubic yards of spalls per day.

Warrnambool Division.

Increasing use has been made of limestone deposits as a source of roadmaking materials. In the Shire of Glenelg a deposit in the Parish of Kaladro has been opened up to provide crushed rock in the Strathdownie area, where no natural gravels exist.

A deposit in the Parish of Nangwarry has been worked to provide crushed rock for the Casterton–Penola Road near Lake Mundi. The deposit contained approximately 40 per cent. of sand which was extracted from the quarried material prior to crushing.

A deposit of soft limestone suitable for roadmaking has been opened up on the Dartmoor–Hamilton Road near Dartmoor, in the Shire of Portland.

COUNTRY ROADS BOARD FUND.

Motor Registration Fees.

The Board has, on many occasions in recent years, made representations for an increase in the basis of motor registration fees. The basis of 3s. per power-weight unit is still the same as in 1925. Costs generally have risen steeply since 1925, with the result that the cost of collection of motor registration fees has increased in much greater proportion than the receipts themselves.

In the financial year 1938–39 the total amount received from fees and fines under the Motor Car Act was £1,778,360 and the cost of collection was £87,398 or 4·9 per cent., whereas comparable figures for the financial year 1954–55 are £4,677,716, £483,284, and 10·3 per cent. Since the financial year 1949–50 the Board has received half the amount of drivers' licence fees collected, the other half going to the Municipalities Assistance Fund, which also bears half the cost of collection of these fees; and in 1954–55 the Board received for the first time two-thirds of the amount derived from the additional registration and transfer fees, the balance of one-third going to the Level Crossings Fund. If the receipts from additional registration and transfer fees and drivers' licence fees are added to the motor registration fees and fines, the cost of collection is reduced from 10·3 per cent. to 9·3 per cent. An increase in fees would be administratively economical as more revenue would at once become available without any increase in cost of collection.

The fact that the motor registration fees have not been increased over the past 30 years must be unique, as other charges for goods and services, including those which make up the cost of road and bridge construction and maintenance, have increased greatly. Fees should bear a relation to costs, and should, therefore, be on the same realistic basis. In four other States of the Commonwealth, some action has been taken to rectify a similar anomaly and to raise thereby a further substantial proportion of the increasing cost of providing and maintaining an effective system of roads and bridges. From the point of view of the vehicle owner, there is no doubt that efficient roads reduce operating costs and tend to lessen the cost of road accidents. However, a 1925 basis of charges cannot be expected to provide efficient services for 1955 traffic.

RAILWAY LEVEL CROSSINGS.

Reference has been made elsewhere in this Report to the creation of a Level Crossings Fund to be applied towards (*a*) the elimination of level crossings or the provision of alternative routes to enable road traffic to avoid level crossings, (*b*) the provision of lights, signs, and lighting at and to improve approaches to level crossings, and (*c*) generally to reduce danger at level crossings.

After passing of the enabling legislation immediate action was taken to improve conditions in certain cases where planning had already been undertaken, and the Board was authorized to undertake the following projects at the estimated costs shown:—

	£
Benalla and Oxley Shires.	
Hume Highway–Glenrowan deviation	53,750
Marong Shire.	
Bendigo–Pyramid Road–Woodvale deviation	21,500
Talbot Shire.	
Maryborough–Ballarat Road—deviation north-west of Clunes ..	10,750
Whittlesea Shire.	
Main Whittlesea Road—	
Deviation at Mernda	10,750
Deviation at Yan Yean	16,125
	112,875

In general, completion of these road works will not permit of the closing of adjacent level crossings, which will still be required for local traffic, but it will mean that the bulk of the traffic on these very important routes will be able to avoid the crossings, providing a much greater measure of safety. The possibility of entirely closing one level crossing on the Maryborough–Ballarat Road north-west of Clunes by constructing a short section of unclassified road is, however, being investigated, and similar action will probably be possible at one of the crossings on the existing route at Glenrowan.

Of the many major schemes which should be undertaken closer to the city and the metropolitan area, five are considered as having the highest priority, namely:—

Heidelberg Road, Clifton Hill;
Glenhuntly Road, Elsternwick;
Napier Street, Footscray;
Melbourne Road, Newport;
Nepean Highway, Moorabbin.

In view of the delay and inconvenience caused to the travelling public at the Clifton Hill railway crossing under existing conditions, that scheme has been selected by a special interdepartmental committee of engineers for immediate attention. The Clifton Hill railway gates are situated at the commencement of the Heidelberg–Eltham (main) road. The Collingwood Progressive Ratepayers' Association asked the Board to consider the construction of a subway or overhead crossing at this site, and the matter was subsequently investigated by the Parliamentary Public Works Committee which recommended that a road bridge be constructed over the railway line at an estimated cost of £27,258. No action was, however, taken at that stage. Early in 1953 fresh investigations were made by the Board at the request of the Government. Later the Ministers of Public Works and Transport, in conference, agreed that the Board as constructing authority should proceed to build a 4-lane overpass with two turning ramps between Heidelberg Road and Hoddle Street South, and with pedestrian subways, the estimated cost, with provision for widening the main bridge to six lanes at a later date, being £422,000. The Government announced the adoption of this proposal in May, 1955.

Progress has been made with the design of the new facility, and it is hoped that work will commence during the financial year 1955–56.

BUFFALO–WONNANGATTA EXPLORATION SURVEY.

There have, for many years, been proposals by Municipal Councils and various other bodies for the construction of a road along the Wonnangatta and Buffalo Rivers to connect south-eastern Victoria with Gippsland, local interest in these proposals resulting in the organization of a party which, between the 8th and 11th March, 1955, undertook a fresh exploration survey of the country, commencing at the Catherine River Station, 5½ miles south of Abbeyard, crossing the Barry Range, and following the Wonnangatta River to Crooked River township—a distance of over 60 miles by the route selected.

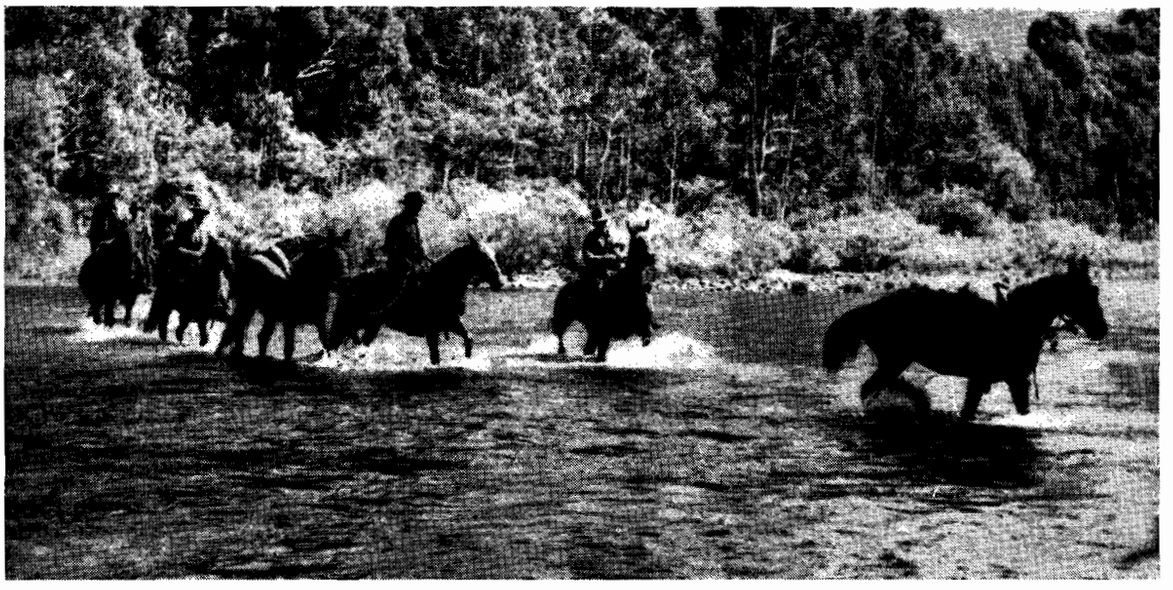


Plate No. 67.—Fording Wonnangatta River north of the Moroka River.

Plate No. 68.—Looking west up valley from Wonnangatta Homestead with F. M. Corrigan, Deputy Chairman, Country Roads Board, in the foreground.

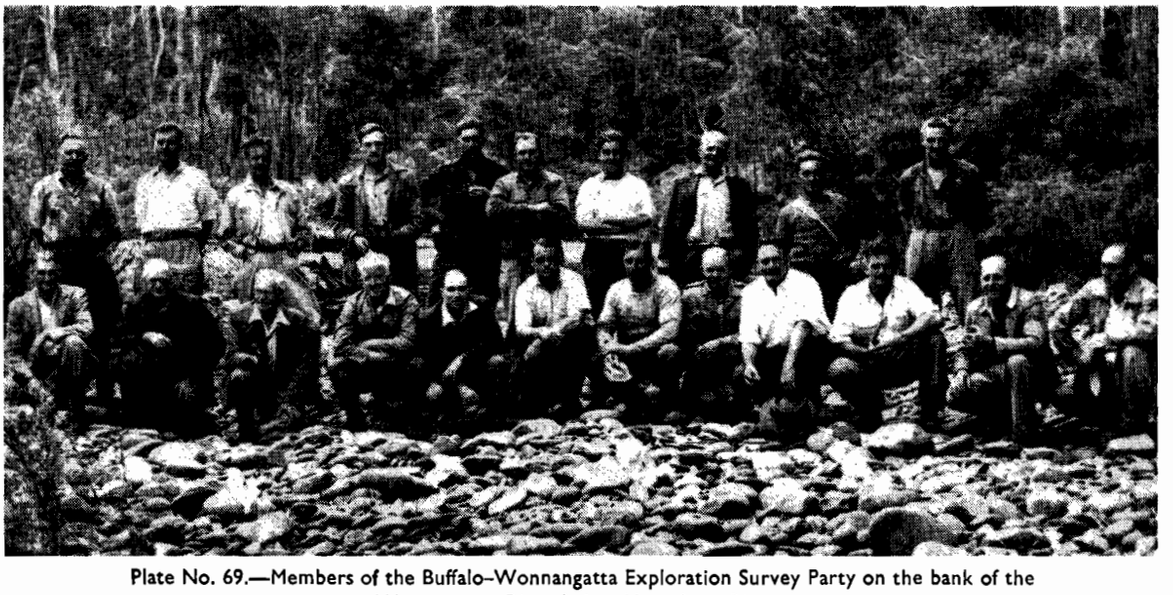


Plate No. 69.—Members of the Buffalo–Wonnangatta Exploration Survey Party on the bank of the Wonnangatta River below Humphrey River.

The party of 23 men who made the trip included the Deputy Chairman of the Board (Mr. F. M. Corrigan), members of the State Parliament, representatives of the Forests Commission, Lands Department, and Department of Agriculture, Municipal Councillors and officers, representatives of the press and radio, and local farmers.

Whilst the journey was a very strenuous one, members of the party were greatly impressed with the possibilities of the country through which they passed, and were unanimous in their opinion that the construction of this road to link the eastern and the north-eastern parts of the State would be justified. Apart from its value as a road connection it is claimed that the road has a high land settlement value with a good temperate climate. A comprehensive report on the survey has been submitted by Mr. Corrigan to the Government, with a recommendation that the construction of the road be commenced forthwith, and completed over a period of five years on a stage construction basis. (Plates Nos. 67 to 69.)

In April the Board inspected a section of the proposed route in the Wonnangatta Valley with the Avon Shire Council, and arranged to proceed with a survey with a view to constructing 2 miles of side cutting beyond the end of the present road to avoid two river crossings on the track now used by a resident settler. The Board also requested the Lands Department to carry out an aerial survey so as to facilitate investigation of the through route in some detail.

REMOVAL OF BRICK HOUSE.

History was made in this State early in 1955 when a brick house in Warrigal Road, Ashburton, was moved back a distance of 30 feet to conform to the general widening scheme for the section of the road from Gardiners Creek to High Street Road. Brick houses have been moved in overseas countries and this was also done successfully in Sydney in recent years, but so far as is known removal of a brick house had not previously been attempted in Victoria.

Generally the method adopted was to construct new concrete and brick foundations at the rear of the house in the new position, cut out three courses of brick along the longitudinal walls of the house and insert bogies made up of $\frac{3}{4}$-in. steel plates of 4-in. diameter x $\frac{3}{4}$-in. rollers with 2-in. timber axles, to roll along 12 in. x $\frac{1}{4}$ in. steel plates set on the lower brick work, and with timber blocks and wedges between the bogies and the building. Cross walls supported by piers of "I" beams were attached by U-bolts to the bogies at the wall intersections, the whole being picked up with "needles" and wedges set across the "I" beams. The rolling back of the house on to the new foundations was done by means of heavy German jacks operating from the front and a pair of winches attached to motor trucks pulling, through a series of blocks and wire rope slings, from the rear of the house.

The actual movement, which occupied three days, was carried out without any difficulty and without producing any cracking in the house either internally or externally. The chimneys were left standing during operations. The building was re-established on the new brick foundation by the reverse process of removing the bogies and replacing by brickwork.

A great deal of credit for the success of the removal was due to Mr. O. H. Griffiths, house remover, of Aspendale, who carried out the work with great care and precision and quite economically, considering the necessity for a certain amount of trial work in the early stages. (Plates Nos. 70 to 73.)

PHOTOGRAPHY.

The demand for screenings of the Board's 16 mm. documentary films continued throughout the year, 61 screenings having been given to schools and clubs and other organizations to audiences totalling approximately 5,800 people. In addition, 40 borrowers made use of the Board's films, and from their reports it is estimated that these films were exhibited to approximately 5,700 persons.

REMOVAL OF BRICK HOUSE

Plate No. 70.—Warrigal-road, Holmesglen, showing brick house before being moved.

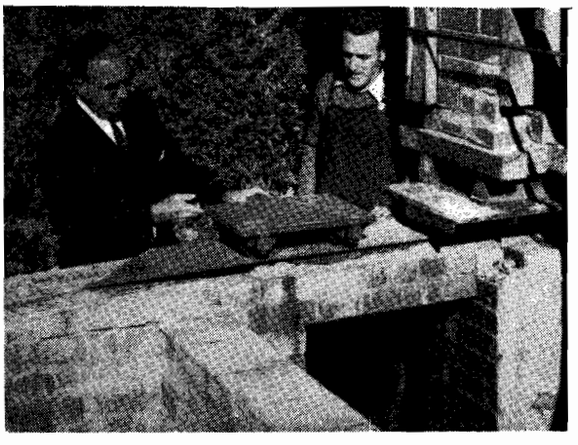


Plate No. 71.—Bogie and running plate used in moving brick house.

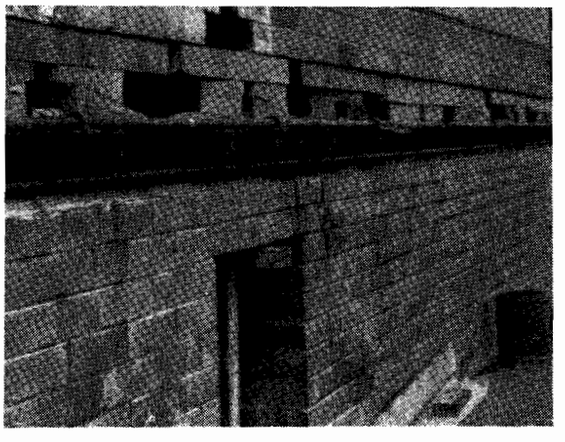


Plate No. 72.—Bogies, blocks, and wedges in position on running plate.

Plate No. 73.—House after removal.

The Board's mobile film unit screened films hired from commercial distributors and supplemented by the Board's own films before the Board's employees in camps remote from townships. There were 109 screenings at 41 locations, with audiences totalling 2,274.

During 1954–55 the film unit produced four new colour films—" Gazettes " Nos. 9 and 10, " Emergency Bridging," and " Power by Road ". The gazettes dealt with the ordinary activities of the Board and the traffic using the road system. " Emergency Bridging " is a pictorial record of the steps taken to assist traffic movements over a section of the Ocean Road at Hut Gully between Anglesea and Airey's Inlet, which was washed out by constant flooding, and shows how the " Bailey " bridge was placed to cover the gap and restore communication between the coastal townships. " Power by Road " shows vividly how the road system is called upon by another public authority to carry electrical equipment too heavy or too large to be moved by rail for installation in a large power station.

DISPLAYS AND EXHIBITIONS.

The value of models of contemplated major products as an educational medium has been well established, and models prepared by the Board's staff and placed on exhibition on various occasions have attracted considerable interest.

A model showing the proposed treatment of the intersection of the Princes Highway East and the Box Hill Road at Oakleigh was displayed at the exhibition arranged by the students of the Engineering School of the University of Melbourne in July, 1954, and at the Engineering Exhibition in the same month. Such channelization schemes as these are comparatively new developments in this State and the model showing the method of operation has already proved its worth.

A model of the proposed overpass in Heidelberg Road at the Clifton Hill railway crossing was exhibited at the Motor Show in March and April, 1955, and created great public interest. This scheme is also something quite new so far as Victoria is concerned, and the building of the model has enabled the general public to visualize what is contemplated.

CONTROL OF HEAVY TRAFFIC.

The number of special permits issued during the year 1954–55 for the carriage of loads in excess of the limits laid down in the Motor Car Act was 4,658, or 174 less than the total in the preceding financial year. This drop was entirely due to a reduction in the length of roads over which the 6-ton gross load limit had previously applied, as a result of which 280 permits issued in the year 1953–54 were no longer required. These figures indicate, however, a rise of 106 in the number of other types of permit.

The number of single trip permits rose from 3,625 to 3,731, an increase of 106, or 2·9 per cent., which involved 8,483 excess dimensions (height, width, length, &c.), an increase of 913 over the total for the previous year. Single trip " weight " permits increased by 145 to 1,602, this rise being divided between the 20–30 tons class and the 30–40 tons class. The " over 40 tons " class dropped from 31 to 27, of which 18 were issued to Government or semi-Government Departments.

Restriction of Loading on Roads.

There are still many sections of main roads and State highways which are too weak to meet the needs of the traffic using them, and it is thus necessary to limit the gross loads to be carried by these sections to 6 tons, under the appropriate provision in the Motor Car Act. This action enables the Board to exercise control over the traffic by the use of permits for the carriage of such weights as are considered reasonable for the particular vehicle, having regard to its type and tyre equipment. The usual practice of protecting certain weaker roads by prohibiting thereon, during the months of June to October, vehicles exceeding 6 tons gross weight was again adopted, and permits were issued in accordance with an approved schedule. The roads thus dealt with were identical with those similarly treated in the previous financial year.

Of the highways and main roads on which permanent 6-ton limits were in force, steps were taken during the year to lift the prohibition in respect of the Moe–Yallourn Road in the Shire of Narracan, Ayresford Road in the Shire of Hampden, and the Allansford–Nirranda Road in the Shire of Warrnambool.

TRAFFIC OFFENCES.

The financial year 1954–55 showed a marked change in road transport conditions due to the decision of the Privy Council in October, 1954, that the charging of fees for the movement of goods across State borders was contrary to the provisions of Section 92 of the Commonwealth Constitution. Not only has the number of trucks engaged on such work increased considerably, but due to the fact that the operations are not subject to State Government control and the consequent lowering of freight rates, the classes of goods carried and the types of vehicle used have also changed. The lighter trucks having almost entirely disappeared from the " long haul " field, liability to offend both by speeding and overloading appears to be increasing.

COURT CASES.

The total number of offences reported increased from 2,422 to 3,246, an increase of 824 or 34 per cent. over last year's figures. Of this total, 3,005 resulted in successful prosecutions, an increase of 36 per cent. over the previous year.

The fines resulting from prosecutions for the year totalled £31,744 1s. 0d., an increase of £11,427 16s. or 56 per cent. over the previous year, whilst the costs at £463 5s. 6d. were £113 11s. 7d. or 32 per cent. higher. The above increases resulted despite the falling off in cases covering offences under the Country Roads Acts, as will be seen from the following figures :—

Motor Car Act.

Fines amounting to £30,656 15s. resulting from 2,681 successful prosecutions, an increase of £11,727 16s. or 62 per cent. This increase is due to several factors, namely, (*a*) numerical increase in traffic, (*b*) increase in the size of trucks, and (*c*) proceedings instituted against both owner and driver for certain offences.

The appeal to the Supreme Court of Victoria of J. A. Cooper, of Trafalgar, against fines imposed on him at the Drouin Court of Petty Sessions for being the owner of a truck overloaded on one axle, and also on a group of axles including that axle was dismissed, it being held in the Board's favour that there was no duplication in the charges so preferred.

Appeals in seven cases were heard in General Sessions. These were in respect of five charges against the owners of overloaded vehicles, one against the driver of an overloaded vehicle, and one in respect of a speeding truck. In five of these appeals the Court found for the Board, in one case the charge went against the Board on facts, not on a point of law, and in the remaining case the matter has been set down for hearing in the Supreme Court.

The average fine per case under this Act rose from £9 3s. 6d. to £10 11s. 3d. due to an increase in the average fine imposed on owners of vehicles. Fines on drivers for the principal offence of exceeding the permissible axle load actually dropped from an average of £9 7s. per case to £8 6s.

The number of speeding charges rose from 236 to 292, and nine drivers had their licences cancelled for periods of from two to six months for second speeding offences.

Country Roads Act.

Of the 356 reports of offences against various provisions of the Country Roads Acts, 340 were in respect of unattended stock on State highways, of which 299 resulted in successful prosecutions.

This figure is 156 less than last year's figure, and in view of the fact that complaints as to unattended stock on highways have been very rare, it is evident that the work of the Board's stock inspectors is bearing good fruit. This is supported by the number of stock detected during the year, which shows a drop of 36 as compared with 1953–54 and 3,554 as compared with 1952–53 figures.

Of the 3,722 head detected, 650 were impounded, the remainder being released to owners who were subsequently warned or prosecuted.

It is of interest to note that the Board's records of accidents on State highways for the period of eleven months ended 31st May, 1955, show that only seven are attributable to unattended stock and that only one was fatal.

The records show that the menace of unattended stock is greatest in four main areas, namely Sale, Tallangatta, Ballarat, and Warrnambool, and special efforts are being made to cope with this situation.

Details of traffic offences reported, convictions obtained and fines imposed for the last 20 years are set out hereunder :—

TRAFFIC BRANCH.—COMPARATIVE FIGURES FOR YEARS 1933–34 TO 1954–55.

Year.	Number of Offences Reported.	Not Served, Noted, Dismissed, or Withdrawn.	Warned.	Convicted.	Fines.	Costs.	Total.
					£ s. d.	£ s. d.	£ s. d.
Brought Forward ..	1,364	109	304	951	4,203 11 0	515 8 7	4,718 19 7
1935–36 ..	736	17	154	565	2,271 0 0	194 4 3	2,465 4 3
1936–37 ..	750	18	127	605	2,180 10 0	226 4 4	2,406 14 4
1937–38 ..	1,209	30	184	995	2,797 0 0	326 12 0	3,123 12 0
1938–39 ..	871	14	83	774	2,035 5 0	213 10 7	2,248 15 7
1939–40 ..	1,089	19	101	969	2,618 10 0	225 15 9	2,844 5 9
1940–41 ..	1,271	19	198	1,054	3,008 7 6	209 8 0	3,217 15 6
1941–42 ..	860	12	137	711	1,882 10 0	150 11 9	2,033 1 9
1942–43 ..	488	13	196	279	897 0 0	62 5 6	959 5 6
1943–44 ..	494	5	270	219	770 15 0	49 9 5	820 4 5
1944–45 ..	407	4	279	124	405 0 0	45 19 0	450 19 0
1945–46 ..	498	2	310	186	653 7 0	54 1 6	707 8 6
1946–47 ..	660	9	291	360	1,908 15 0	67 5 0	1,976 1 0
1947–48 ..	989	29	241	718	4,631 1 0	119 2 0	4,750 3 0
1948–49 ..	1,749	43	687	1,019	9,236 5 0	150 15 3	9,387 0 3
1949–50 ..	1,683	57	124	1,503	12,812 12 6	206 8 8	13,019 1 2
1950–51 ..	1,821	72	46	1,703	15,382 5 0	238 15 9	15,621 0 9
1951–52 ..	2,048	72	34	1,942	18,908 5 0	276 5 11	19,184 10 11
1952–53 ..	1,922	64	80	1,778	16,406 2 6	265 18 7	16,672 1 1
1953–54 ..	2,422	115	93	2,214	20,316 5 0	349 13 11	20,665 18 11
1954–55 ..	3,246	156	85	3,005	31,744 1 0	463 5 6	32,207 6 6
..	26,577	879	4,024	21,674	155,068 8 6	4,411 1 3	159,479 9 9

LOCATION OF TRAFFIC OFFENCES, 1954–55.

State Highway.	Overload Offences.	Speeding Offences.	Other Offences.	Total.	Percentage.
					%
Bass	..	..	..	..	..
Bellarine	..	..	..	..	..
Bonang	1	..	1	2	..
Borung	..	..	..	..	..
Calder	158	48	24	230	9·2
Glenelg	7	1	1	9	..
Goulburn Valley	6	19	..	25	1
Henty	..	1	..	1	..
Hume	884	266	33	1,183	47·3
Loddon Valley	110	19	10	139	5·6
Maroondah	28	1	2	31	1·2
Midland	23	8	8	39	1·6
Murray Valley	30	6	..	36	1·4
Nepean	15	2	..	17	·7
Northern	..	5	1	6	..
North-Western	2	..	..	2	..
Omeo	1	1	..	2	..
Ouyen	..	..	..	..	..
Ovens	..	..	..	..	..
Princes East	214	17	17	248	10·0
Princes West	155	58	8	221	8·8
Pyrenees	1	..	3	4	..
South Gippsland	6	5	4	15	..
Sturt	..	..	..	..	..
Western	100	20	17	137	5·5
Main roads	122	15	2	139	5·5
Tourists' roads	3	2	2	7	..
Forest roads	..	..	..	..	..
Total	1,866	494	133	2,493	..
Percentage	75	20	5	..	..

An analysis of the locations of offences reported in the financial year 1954–55 is also given on page 34, emphasizing the fact that nearly half the offences were detected on the Hume Highway.

COLLECTION OF FINES.

The Board again had the assistance of a member of the Mobile Traffic Police in collecting outstanding unpaid fines, and an extremely satisfactory position has now been reached. The work carried out by this officer, including a visit to New South Wales and the Federal Capital Territory, on which he was accompanied by a member of the Board's staff, resulted in £5,295 12s. 6d. in cash being collected. Not all of this amount could properly be classed as " outstanding fines," but the greater part of it had remained unpaid after the hearing of the charges, and undoubtedly most of it would have remained unpaid without the Board's action and the co-operation of the police officer concerned.

The percentage of moneys unpaid since 1947 has been reduced from approximately 15–20 per cent. to 6·5 per cent., whilst the number of fines remaining unpaid is 477, representing only 4·4 per cent. of the cases heard. It is known that some of the offenders are now dead, some are in institutions, whilst others have left the country, so that, in the circumstances, it is unlikely that there will be any change in the figures for the period 1947–1954. The complete position from 1947 to the 31st December, 1954, is set out in the table hereunder :—

UNPAID FINES.

Year.	Fines Unpaid (in pounds).					Total Fines for Year.	Percentage Unpaid.	Percentage Unpaid Twelve Months ago.	Number of Fines.	Number Unpaid.	Percentage Unpaid.
	Victoria.	New South Wales.	South Australia.	Others.	Total.						
	£	£	£	£	£	£					
1947–48.. ..	42	230	18	..	290	4,631	6·3	6·4	718	34	4·7
1948–49.. ..	37	300	127	..	464	9,236	5·0	6·4	1,019	42	4·1
1949–50.. ..	82	616	122	15	835	12,813	6·5	6·9	1,503	49	3·3
1950–51.. ..	92	657	123	..	872	15,382	5·7	6·7	1,703	66	3·9
1951–52.. ..	247	672	338	20	1,277	18,908	6·7	9·1	1,942	108	5·5
1952–53.. ..	215	595	332	30	1,172	16,406	7·1	9·5	1,778	96	5·4
1953–54.. ..	180	649	139	50	1,018	20,316	5·0	10·0	2,214	182	3·7
1954–55.. .. (½ year only)	463	556	182	10	1,211	12,605	9·6	..	..	..	..
Total ..	1,358	4,275	1,381	125	7,139	110,297	6·5	..	10,877	447	4·4
Percentage	19·2	59·8	19·3	1·7	100·0	..	..	..	..	..	..

SUMMARY OF OFFENCES.

The offences against the provisions of the Motor Car Act during the financial year 1954–55 are summarized hereunder :—

Speeding (commercial vehicles)	292
Exceeding 17,000 lb. on one axle—	
Drivers	1,061
Owners	583
Exceeding weight on axle group—	
Drivers	240
Owners	113
Exceeding 6 tons load limit	97
Exceeding conditions of special permit	32
Exceeding load capacity—	
Drivers	39
Owners	54
Exceeding 8 feet in width—	
Drivers	32
Owners	8

Exceeding length limits—	
Drivers	73
Owners	10
Exceeding 12 feet in height—	
Drivers	37
Owners	8
Exceeding 5,000 lb. on one tyre	6
Refusing to be weighed	5
Giving false name	1
	2,681

TRAFFIC LINE MARKING.

The total mileage of roads maintained in a " striped " condition during the year 1954–55 was 2,187 miles, an increase of 174 miles over the previous year's figure. In order to maintain a line on this length of road it was necessary to paint 3,503 miles of standard stripe, i.e., a line consisting of 10-ft. dashes and 30-ft. gaps.

The total expenditure on this type of work during the financial year was £24,151, and the average cost per mile of standard line £6 18s. The total quantity of lacquer used was 12,354 gallons, with an average rate of application per mile of standard stripe of 3·55 gallons.

BITUMINOUS SURFACING.

This type of work is becoming increasingly important in the Board's programme, and is evidenced by the expenditure thereon over the last five financial years, viz. :—

	£
1950–51	770,640
1951–52	842,656
1952–53	1,017,716
1953–54	1,216,394
1954–55	1,664,209

Over the same period the mileages of road treated increased from 945 to 1,453, the totals for the respective years being :—

1950–51	945 miles
1951–52	958 ,,
1952–53	1,094 ,,
1953–54	1,282 ,,
1954–55	1,453 ,,

(These costs and mileages do not include roads treated by the Board for other authorities at the cost of the latter.)

Of the total length of " declared " roads under the Board's jurisdiction (14,430 miles at the 30th June, 1955), 8,111 miles have now been surfaced with bitumen. This type of surfacing has not extended in this State as rapidly as the Board would wish. By 1928 only about 1,400 miles out of a total " declared " length of 7,000 miles had been treated with bitumen, and by 1939, 5,000 miles had been treated out of a total " declared " length of 9,900 miles. The Second World War interfered with progress and by 1947, there were 5,700 miles of " black " road out of 13,200 miles declared. While work of this nature is, of course, governed by financial considerations as in the case of other aspects of the Board's work the average rate of extension of seal over 10 years of 234 miles per annum leaves much to be desired.

In an endeavour to spread the benefits of sealed roads as widely as possible the increased lengths in recent years have been mainly only 12 feet wide, in order to give the maximum benefit for traffic densities as high as 200 per 12-hour count, or even more. The pavements are usually made to the width and thickness appropriate to the traffic density so as to reduce edge maintenance, and in the hope that widening of the " strip seal " will soon become financially possible. To widen pavements by " widening trenches " is a costly and unsatisfactory procedure. Even with this policy the nett annual extension of bituminous surfacing has been less than 2 per cent. of the total declared length, so that, at that rate, there will still be miles of road each summer with no alternative to dust.

Records for the last 20 years indicate that from 5 per cent. to 13 per cent. of the length of bitumen surface has been resealed each year, while, generally, less than 2 per cent.—the weakest and very worst sections—have been reconstructed. Many sections of road are left in a weak and rough condition long after their due time, so as to devote at least portion of the available effort to extension of sealing. Maintenance and patching costs are considerably increased by this policy, and vehicles naturally suffer to some extent on the old, bumpy sections. It would be sound transport policy to adopt a much more rapid programme of both sealing extension and pavement reconstruction, but the Board has not been able to afford the effort and must, in fact, waste money in patching worn-out and obsolete assets.

LEGISLATION AFFECTING THE BOARD.

The following legislation affecting the Board was enacted during the financial year 1954–55 :—

Country Roads and Level Crossings Funds Act 1954, No. 5791.

This Act provides for the establishment at the Treasury of a "Level Crossings Fund," to the credit of which shall be paid one-third of all moneys received by way of additional registration fees, together with such other moneys as may be paid into that fund under any other Act. It further provides that moneys to the credit of that fund should be applied towards (*a*) the elimination of level crossings or the provision of alternative routes to enable road traffic to avoid level crossings, (*b*) the provision of lights, signs, and lighting at and of improved approaches to level crossings, and (*c*) generally reducing danger at level crossings.

The *Country Roads* (*Amendment*) *Act* 1934, No. 5831.

This Act authorizes the Board to expend a further sum of £6,000,000 from loan moneys on permanent works on main roads, State highways, tourists' roads, and forest roads, and also authorizes the Board to acquire land for road purposes without the proviso that previously applied that such acquisition was subject to money being immediately available for the *construction* of the new road or deviation.

The *Local Government* (*Amendment*) *Act* 1954, No. 5843.

This Act contains a provision that, where it appears from any plan of a proposed subdivision that any allotment abuts on or any new street connects directly with a State highway, main road or tourists' road, the Council of a municipality shall not seal the plan of subdivision without the consent of the Country Roads Board, or where the Board has failed or refused so to consent, of the Governor in Council. The Act also confers upon the Council certain powers to make by-laws declaring certain roads to be roads of limited access by restricting vehicular access between such roads and adjoining properties. It provides for some amendment to the *Local Government* (*Streets*) *Act* 1948 (No. 5289) which is incorporated in the *Country Roads Act* 1948, No. 5290.

Transport Regulation (*Amendment*) *Act* 1954, No. 5848.

This Act contains, *inter alia*, the provision that moneys standing to the credit of the Transport Regulation Fund at the 30th June in each year should be paid into the Country Roads Board Fund, together with charges payable for the use by vehicles engaged in interstate trade on roads in this State.

The *Public Works Loan Application Act* 1954, No. 5850.

This Act provides for the application from loan moneys of various amounts for the special purposes set out in the schedule to the Act, of which the following concerns the Board :—

> For meeting payments in connection with the construction of a new Napier Street bridge between Melbourne and Footscray—£65,000.

CONFERENCE OF STATE ROAD AUTHORITIES OF AUSTRALIA.

The Seventeenth Conference was held at the Public Works Committee Room, Parliament House, Hobart, from 8th to 12th November, 1954, and was attended by the representatives of the several State Road Authorities throughout the Commonwealth, together with the Director-General of the Commonwealth Department of Works.

The agenda was a comprehensive one of 52 items, including the invitation of tenders for bitumen supplies, the training of road engineers for Australian conditions, the question of financial assistance to the States by the Commonwealth, road construction and maintenance costs in relation to vehicle operation, traffic safety, certain standard specifications, road marking signs, highway bridge design specification, road design standards and route numbering.

The conference also arranged for papers to be prepared by engineers of the staffs of individual road authorities for submission to the Permanent International Association of Road Congresses to be held at Istanbul, Turkey, in September, 1955.

Arrangements were made for the next conference of State Road Authorities to be held in Brisbane in September, 1955, and for meetings of the various Committees to be held as follows:—Principal Technical Committee, Hobart, May, 1955; Materials Research Committee, Melbourne, February, 1955; Bridge Design Committee in Perth, February, 1955; and Traffic Engineering Committee in Sydney in March, 1955. Approval was also given for a Secretarial and/or Accountants' meeting to be held in Sydney in April, 1955.

CONFERENCE OF MUNICIPAL ENGINEERS.

The Eleventh Conference of Municipal Engineers, convened by the Board, was held in the Auditorium at the Police Headquarters Building, Melbourne, on the 25th and 26th May, 1955, and was very well attended by municipal engineers throughout the State.

The procedure adopted in previous years was again followed, municipal engineers being invited some time prior to the conference to submit items for inclusion in the agenda, and as in the case of the Tenth Conference, the comments of the Board's officers on the various points raised were prepared and sent to all municipal engineers beforehand in order to save time at the conference itself.

The Minister of Public Works (The Hon. S. Merrifield, M.L.A.), who opened the Conference, stressed its importance and value, and referred to the many difficulties—not only financial—which confronted road authorities and councils under present-day conditions. An interesting and informative paper was presented by Mr. K. C. Graham, Engineer to the Shire of Deakin, on problems involved in the crushing and screening of stone in a municipality, and one by Mr. S. B. Deany, the Board's Assistant Asphalt Engineer on the organization of bulk handling of bitumen. Both papers were supported by contributions by Mr. C. C. Perrin, the Board's Divisional Engineer at Horsham. Other items on the agenda, which was a comprehensive one, included traffic engineering in the country, widths of sealed pavements on main roads, recent developments in the design and construction of fine crushed rock pavements, efficient road pavement lay-out and minimum width of streets, and the powers of road authorities in relation to the erection of mail boxes, cream stands, tank stands, &c., on roads. (Plate No. 86.)

INSPECTION BY STUDENTS OF C.R.B. WORKS.

In recent years the practice has developed of arranging for inspections of the Board's works by students doing civil engineering courses at the various technical schools.

The Board is very much in accord with this policy, which should be of value to the students generally, and willingly co-operates in arranging inspections either in its head office or in the field. In addition to the inspections, it is usually possible to arrange for a short talk by a responsible officer of the Board's staff on the subject-matter of the inspection. Displays of the Board's films, aerial photographs and road and bridge plans have, on occasions, been incorporated with the visit. Parties of not more than sixteen students are found to be the most convenient for the purpose.

The opportunity also presents itself of interesting the students in the work of the Board and its attractions as a future career.

The Board has continued its policy of offering vacation employment to a limited number of students in engineering of the Melbourne University and of technical colleges in Melbourne and provincial cities.

LIBRARY SERVICE.

The Board's library at head office provides very valuable assistance to its staff, and is a real factor in the training of its officers, in keeping them appraised of the latest developments in highway and traffic engineering, bridge design, &c.

Publications are registered under the Universal decimal system, the catalogue containing about 13,000 entries, including references to articles of special interest. The library receives regularly 149 periodicals, as well as a number of trade journals. Incoming literature is assessed, classified, exhibited, and brought under the notice of those members of the staff who are interested in the particular subject covered. A considerable amount of the librarian's time is taken up by library research. The libraries at the Divisional Offices are supplied from head office library.

As an indication of the use made of the library, the following figures are furnished as relating to the last four financial years :—

—	1951–52.	1952–53.	1953–54.	1954–55.
Loans of books and pamphlets	1,868 (93)	2,066 (88)	1,929 (73)	1,694 (92)
Enquiries	503 (76)	362 (79)	322 (51)	371 (62)
Visitors	673 (32)	690 (41)	765 (63)	589 (21)
Totals	3,044 (194)	3,124 (208)	3,020 (199)	2,654 (175)

The figures in brackets indicate loans to other libraries and requests and visits from organizations and persons outside the Board. There has been close co-operation with other libraries to the benefit of all concerned.

MISSIONS ABROAD OF OFFICERS.

Mr. F. West.

Reference was made in the 40th and 41st Annual Reports to the visit of Mr. F. West, B.C.E., M.I.E. (Aust.) to the United States, Canada and the United Kingdom, for the purpose of observing development in the theory and practice of highway improvement and utilization, including soil stabilization, low cost bituminous surfacing and general aspects of tunnel design and operation, as well as recent trends in research and practice in road and traffic engineering.

Since his return to Melbourne in January, 1954, Mr. West has compiled a very valuable report embodying the information obtained by him during his mission. This report has been distributed to Municipal Councils and other authorities, and copies are still available.

Mr. H. H. Gray.

On the 25th March, 1955, Mr. H. H. Gray, one of the Board's Senior Divisional Engineers, who has for many years been in charge of the Board's Asphalt Section, and who specialized in bituminous treatment of roads as applied to Australian conditions, left Sydney en route for the United States and Europe.

The main purposes of his mission were to make a study of (*a*) the system and types of equipment used overseas for the handling, storage and distribution of bitumen in bulk, (*b*) procedures followed abroad for carrying out bituminous surfacing in poor weather, and (*c*) bituminous surfacing procedures suitable for temperate climates and traffic volumes ranging from 50 to 10,000 vehicles per day.

(Since this report was prepared, news has been received of Mr. Gray's death in London on the 26th September, 1955, as a result of injuries received in an accident. Further reference is made to this in the Chief Engineer's section of this report.)

EMPLOYMENT.

The total number of men employed directly by the Board for varying periods during the financial year 1954–55, i.e., field personnel as distinct from members of the staff, was 4,867, as compared with 4,574 in the previous financial year. The peak was reached in March, 1955, when the total number of men employed was 2,711, an advance of 189 over the previous year's "peak" figure. Of the total of 2,711, 139 were employed on work being carried out for other authorities, including 28 engaged on Commonwealth works.

The peak of employment in respect of works carried out for other authorities was reached in July, 1954, when the number was 296, including 85 on Commonwealth works.

These figures indicate that, apart from an increase in the Board's own direct labour effort, it is also doing a great deal of work for other authorities and for the Commonwealth Government. When consideration is given to the number of men employed by contractors to the Board and those engaged on works carried out by Municipal Councils with funds provided by the Board, it is estimated that the total labour force engaged at any one time on road and bridge works in which the Board is financially involved would exceed 5,000 men.

ACCIDENTS TO EMPLOYEES.

During the financial year 1954–55 employees of the Board were involved in 661 accidents, an increase of 78 over the figure for the previous year, and it is regrettable that the number of fatal accidents in the twelve months' period increased from 4 to 8.

The general nature of the accidents, many of which were of a minor character, is set out in the following statement:—

Fatal	8
Strains and sprains	75
Fractures	31
Eye injuries	97
Bruises and lacerations	124
Burns	20
Injuries to limbs	131
Poison	4
Head injuries	14
Infections	22
Miscellaneous	135
Total	661

The Board is in close co-operation with the National Safety Council, and makes full use of the Council's safety posters and literature.

MOTOR REGISTRATION.

Registrations effected during the year under the Motor Car Act totalled 637,662. This is an increase of 12½ per cent. on the registrations effected during the previous year and contrasts with the increase of 31⅓ per cent. in 1953–4 and 1¼ per cent. in 1952–3.

Details of registrations are set out hereunder :—

Vehicles.	Financial Year 1953–54.		Financial Year 1954–55.		Increase.	Decrease.
Private—						
New	36,258		51,894			
Secondhand—						
Re-registered	14,356		19,907			
Renewals	341,039		378,860			
		392,653		450,661	58,008	..
Commercial—						
New	7,697		9,638			
Secondhand—						
Re-registered	3,914		5,030			
Renewals	69,872		74,021			
		81,483		88,689	7,206	..
Primary Producers—						
New	3,801		4,505			
Secondhand—						
Re-registered	2,358		3,630			
Renewals	39,339		43,331			
		45,498		51,466	5,968	..
Hire		4,561		4,893	332	..
Licences under Motor Omnibus Act ..		812		768	..	44
Trailers		11,342		12,032	690	..
Traction Engines, &c.		15		3	..	12
Motor Cycles		30,840		29,150	..	1,690
Total		567,204		637,662	72,204	1,746

An examination of the above figures indicates that, for the first time in three years, there has been an increase in the total number of commercial vehicles registered over and above the number for the previous year. In 1950–51 the total number of this type of vehicle registered was 73,902, and in 1951–52, 86,153, an increase of 12,251.

The total for 1952–53 was 82,613, a decrease of 3,540, and the total for 1953–54, 81,483, a decrease of 1,130. The decreases were due to a temporary recession, which also affected the numbers of private cars. On the other hand the introduction of legislation withdrawing certain concessions which had been enjoyed by primary producers in relation to private cars meant that the cars concerned were then included with the ordinary private vehicles, the numbers of which showed a reasonable increase over the total for the previous year.

ACCOUNTS.

Statement of accounts for the year ended 30th June, 1955, 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. Other expenditure was, of course, incurred for purchase of machinery and buildings, for interest and sinking fund payments, and for administration.

	Under Board's Supervision.			Under Council's Supervision.			Total.		
	£	*s.*	*d.*	£	*s.*	*d.*	£	*s.*	*d.*
1. State Highways—									
Construction	687,974	0	8	2,613	16	4	690,587	17	0
Maintenance and reconditioning	2,267,745	5	8	75,320	6	10	2,343,065	12	6
2. Main Roads—									
Construction	162,603	2	0	163,714	16	0	326,317	18	0
Maintenance and reconditioning	400,477	14	0	2,799,683	1	5	3,200,160	15	5
3. Unclassified Roads—									
Construction, reconstruction, &c.	35,291	7	10	853,893	11	5	889,184	19	3
Maintenance	62,811	16	3	387,944	3	11	450,756	0	2
4. Tourists' Roads—									
Maintenance and reconditioning	285,655	1	6	8,939	17	6	294,594	19	0
5. Forest Roads—									
Maintenance and reconditioning	90,693	13	2	47,202	6	6	137,895	19	8
6. Murray River Bridges and Punts—									
Maintenance and reconditioning	29,911	8	6	270	5	0	30,181	13	6
	4,023,163	9	7	4,339,582	4	11	8,362,745	14	6

In addition to the amounts shown on the statement, the following expenditure was also incurred during the year :—

	£	d.	s.
Works on behalf of the Commonwealth Government ..	143,605	3	6
Works on behalf of State Instrumentalities, &c.	780,972	8	10
Flood and Bush Fire Damage	146,308	19	1
Railway Level Crossings	40,132	7	9
Sundry Items—			
A.M.P. Project—Kaniva Shire, Road Works at Heyfield, &c.	2,518	6	6
	1,113,537	5	8

STAFF.

Since the 1st July, 1954, the total number of officers on the Board's staff has increased from 466 to 499, made up as follows :—

	Total.
Permanent staff—305 males, 47 females	352
Temporary staff—95 males, 52 females	147
	499

Of these officers, 290 are located at the Head Office, Exhibition Building, 53 at the Central depot and workshops at Montague, 16 at the new offices at Drummond Street, Carlton, and the remaining 140 at the various country divisional centres.

Forty male officers and 27 female officers resigned during the year and new appointments totalling 100, comprising 71 males and 29 females, were made. Notwithstanding the increase in the total staff for the year, the Board is still greatly hampered through a shortage of competent female typistes, stenographers and machine operators, as well as qualified engineering officers. With regard to the latter, the serious position in the Bridge Division referred to earlier is typical of the whole engineering branch.

It is with pride and pleasure that reference is made to an act of conspicuous gallantry by Mr. David Hewson, a member of the Board's engineering staff, during bridge building operations on the Calder Highway in Gisborne.

Early in the afternoon of the 19th July, 1954, two employees of the bridge contractors were demolishing the centre masonry pier of the old bridge when one of them a non-swimmer fell into the creek. The other man, who could barely swim went in to try and save his companion, but was unable to support him and was in difficulties himself. Mr. Hewson dived into the water fully clothed, brought the second man back to the pier and then dived unsuccessfully for about 10 minutes in an endeavour to recover the first man's body. His quick action undoubtedly saved the life of one man, and his sustained efforts to try and recover the body of the man drowned were most praiseworthy, especially as the temperature of the water was very low at the time.

The Royal Humane Society of Australasia has awarded a Certificate of Merit to Mr. Hewson for his rescue work.

STAFF CHARITIES FUND.

Many members of the Board's staff continue to support this fund by way of regular voluntary contributions which are deducted from each fortnightly pay. The total amount contributed during the year was £508 11s. 4d., which included the sum of £157 15s. 3d., raised by a special appeal for the New South Wales Relief Fund. Quite apart from this, the amount contributed was about £90 higher than the collection for the previous year.

In addition to the amount subscribed to the New South Wales Flood Relief Fund, a total sum of £332 6s. was disbursed during the year to 21 charities throughout the State, amongst which were various metropolitan and country hospitals, the Junior Legacy Club, the Institution for the Blind and similar deserving institutions. The usual donations on a "bulk" basis were also made to several special button-day appeals by purchasing buttons for each contributor to the funds. The balance of £121 16s. 3d., in hand at the 30th June, 1955, will be used to meet commitments which will arise later in the calendar year.

OBITUARY.

The death in Queensland on the 28th February, 1955, of Sir John Kemp, M.I.C.E., M.I.E.(AUST.), marked the end of a long and distinguished career, not only in the sphere of civil engineering but also in public administration.

Sir John, who was born in Victoria, in 1883, received his engineering education at the Melbourne University and as a pupil in engineering and architecture of the Department of Public Works, Melbourne. He entered the municipal field, and at the time of the Board's inception in 1913 was engineer to the Shire of Karkarooc. He was appointed to the Board's staff in that year and was in charge of the Board's bridge operations in the early years of its activities. He then joined the Main Roads Board, Queensland, acting in the capacity of Chairman to that Board from 1920–1925. In 1925, he was appointed Commissioner for Main Roads in that State, a position which he occupied until 1938 when he became Co-Ordinator General of Public Works. At the outbreak of war in 1939 he was appointed Deputy Director-General of Allied Works in Queensland.

OFFICERS AND EMPLOYEES.

The Board again desires to express its keen appreciation of the loyalty and efficiency of its officers and employees during the year when it was necessary to cope with a very large programme of works with the attendant difficulties which invariably arise from frequent changes in personnel. Notwithstanding these conditions, all concerned responded most readily to the demands made upon them, and the Board is grateful to them for the splendid job they have done.

ACKNOWLEDGMENTS.

The sincere thanks of the Board are tendered to the Hon. S. Merrifield, who held office for most of the year as Minister of Public Works, and to the Hon. Sir Thomas Maltby, E.D., M.L.A., who succeeded him, for their help and interest in the Board's work.

The Board also desires to place on record its thanks and appreciation of the co-operation and assistance of officers in Government Departments, other State instrumentalities, and Municipal Councils, as well as the road authorities in other States. The happy co-operation between the Board's staff and these officers is also greatly appreciated.

We have the honour to be,

Sir,

Your obedient servants,

D. V. DARWIN, Chairman.

F. M. CORRIGAN, Deputy Chairman.

R. F. JANSEN, Member.

W. H. NEVILLE, Secretary.

CHIEF ENGINEER'S REPORT

Country Roads Board Office,
Melbourne.
1st December, 1955.

THE CHAIRMAN,

SIR,

I have the honour to submit a report on matters of technical interest included in work carried out during the financial year 1954-55.

MECHANICAL DIVISION.

Employees.

The total number of employees at Central and Divisional Workshops, excluding storemen, transport drivers and staff, was 267 compared with 205 in 1950-51, rising to 262 in 1953-54. The total number of fitters remained relatively constant but there was a slight decrease in the number at Central Workshops and a corresponding increase in the numbers employed in Divisional Workshops.

The labour turnover was from 15 to 20 per cent., i.e., of much the same order as for the previous year. A number of men left Divisional Workshops, particularly in Bendigo, for higher paid jobs with private employers.

Volume of Work.

Table 1 shows number of jobs completed in Central Workshops during 1953-54 and 1954-55, and gives some indication of the increase in work. In addition, a considerable number of small jobs of the car servicing type were done at the Drummond Street service station, relieving the Central Workshops of this kind of work.

TABLE 1.

	1953-54.	1954-55.
Workshops	5,164	5,316
Manufactured Stock	443	545
Equipment Repairs	246	184
Transport	1,338	1,658

Plant Repairs.

Divisional Workshops dealt with field repairs in all except the Dandenong and Metropolitan Divisions without material assistance from the Central Workshop.

The amount of work carried out in the field steadily increased. This was due partly to the expansion of the bituminous surface treatment plant, and partly to the reduction in the magnitude of repairs required to keep plant moving which was brought about by the action of mobile servicemen and plant inspectors in bringing defects to the notice of the Workshops in good time.

Overhauls.

Table 2 shows some of the principal items of plant given a major overhaul during the year.

TABLE 2.—PLANT OVERHAULED 1954-55.
Major items only, excluding B.S.T. plant.

Type	C/W.	Div. W.S.	Contractors	Total.
Compressors ..	1	7	..	8 (15)*
Power Graders ..	11	16	4	31 (24)
Loaders Front End (Wheel) ..	2	10	..	12 (40)
Scoops	2	1	1	4 (5)
Shovels ..	1	..	..	1
Tractors, crawler..	3	..	2	5 (10)

* Figures in brackets are for the pervious financial year.

The decrease in the overhauls listed was due to overhauling 31 extra Bituminous Surface Treatment Units, principally sprayers, loaders, rollers, carriers, &c., together with initial preparation in constructing bulk bitumen tankers.

Workshops.

(*a*) *Central Workshops.*—In view of the prospective move to Syndal no major alterations or improvements were made to the building at Central Workshops but additional good quality machine tools, including a large capacity radial drive, a slotting machine and engine dynamometers were purchased. These can be moved when the time comes.

(*b*) *Divisional Workshops.*—Small but continuous improvements were made in equipping these workshops and providing such accessories as steam cleaning bays, lubrication bays, overhead travelling cranes and machine tools.

Design of New Plant.

The Division undertook the design, drawing and production (by contract) of a number of types of new plant, particularly for bituminous surface treatment and the bulk handling of bitumen, i.e.,

2,000-gallon bitumen road tanker;
2,000-gallon bitumen storage tanker;
2,000-gallon water sprayer;
Road broom—heavy duty;
800-gallon bitumen sprayer (re-design);
Belt spreader carrier of 4-wheel tilting deck type.

In addition miscellaneous small jobs have been done, including the design of a bitumen pump testing unit and a trenching attachment for power graders.

Staff.

Due to the expansion of work it was found necessary to try to slightly increase the number of staff in the Mechanical Division. However, no suitable men were obtained for the technical positions at the salaries offered.

Plant Efficiencies.

Although £701,208 was spent in buying new plant the rate of replacement was still insufficient to make up lost ground and make it possible to dispose of a number of machines which, with the limited repair facilities available, should have been sold. Efficiencies for certain major items of plant are given in Table 3.

New Central Workshops at Syndal.

Further progress was made with planning and design of the new depot and workshop buildings at Syndal. The area was fenced and earthworks were commenced.

TABLE 3.—PLANT EFFICIENCY.

Type of Plant.	Number of Units in Group.	Average Age of Units in Group Years.	Overall Efficiency.			Overall Mechanical Efficiency.			Mechanical Efficiency of Units in the Field.		
			1952–53.	1953–54.	1954–55.	1952–53.	1953–54.	1954–55.	1952–53.	1953–54.	1954–55.
			%	%	%	%	%	%	%	%	%
Crawler Tractors—											
Class I.	47	3·4	34	34	32	50	59	40	79	78	85
Class II.	47	5·4	22	31	40	27	49	51	77	77	81
Class III.	17	6·5	20	22	15	27	35	26	72	70	66
Class IV.	40	5·3	29	21	33	38	35	42	82	81	79
Power Graders—											
Heavy—Tandem diesel ..	126	5·4	57	60	63	64	69	69	91	85	93
Medium—Dual wheel diesel	19	5·0	52	36	43	56	57	47	85	93	82
Lights—Single drive, power control	18	6·6	22	42	40	24	66	52	86	94	84
Patrol power graders ..	27	4·3	56	56	53	60	67	62	94	89	89
"Speed" patrols	7	6·0	35	35	51	38	53	73	93	89	91
Front End Loaders—											
Pneumatic-tyred ..	86	3·8	..	47	45	..	63	57	..	82	88
Crawler	13	6·4	..	26	28	..	41	36	..	71	76

Definitions :—

(*a*) Overall Efficiency $= \frac{\text{Days worked}}{\text{Working days}} \times 100$ per cent.

(*b*) Overall Mechanical Efficiency $= \frac{\text{Days worked}}{\text{Working days less days lost for reasons other than plant breakdown or overhaul or awaiting overhaul}} \times 100$ per cent.

(*c*) Mechanical Efficiency of Unit in the Field $= \frac{\text{Days worked}}{\text{Days worked + days broken down on the job}} \times 100$ per cent.

TRAFFIC ENGINEERING.

Economic Studies at Level Crossings.

Traffic studies at metropolitan and rural level crossings were continued during the year and the economic losses due to delays to road vehicles were estimated for the busier ones where gates are provided.

There are arguments for and against the validity of placing monetary value on time lost by the occupants of certain classes of vehicle, particularly if the delay periods are short, though the total may be large. On the other hand the evaluation of time saved can be considered as some measure of the benefits of giving greater convenience to the public. Taking local conditions into account, the following figures have been used when comparing various schemes for providing grade separation at busy gated level crossings :—

(1) Delay costs :—

(*a*) cyclists and pedestrians — ¼d. per person minute

(*b*) private cars .. — 1½d. per vehicle minute

(*c*) trucks .. — 2½d. per vehicle minute } includes fixed charges and driver's wages

(*d*) buses (assuming 20 passengers per bus @ ¼d. per minute and 2½d. per minute for vehicles) — 9d. per vehicle minute } includes fixed charges and driver's wages

(2) Stopping and starting cost :—¼d. per stop ton.

Assumed average gross weights were (*a*) cars—1·5 tons, (*b*) trucks—6·25 tons, (*c*) buses—7·5 tons.

The above rates, in conjunction with records of vehicles delayed, were used to estimate the total cost of delays per day at the crossings in question. The annual cost of delays was then taken as 300 x daily cost.

Extended Traffic Study on the Princes Highway East near Oakleigh.

In February, 1953, a continuous counting station was established on a 2-lane section of the Princes Highway near Oakleigh, using automatic traffic counters of both the cumulative and self-recording types. Certain of the information obtained was summarized in last year's report. The station was kept in operation until mid-April, 1955, the data obtained being daily and hourly volumes for each day during the period. The results are given in Table 4 for two periods of one year each, from 16th February, 1953, to 15th February, 1954, and from 15th February, 1954, to 14th February, 1955.

TABLE 4.—AVERAGE 24-HOUR VOLUMES FOR EACH DAY OF THE WEEK.

	1953–54.	1954–55.	Percentage Increase.
Monday	8,372	10,377	25·3
Tuesday	8,834	10,910	23·7
Wednesday	8,396	10,372	23·8
Thursday	8,316	10,176	22·5
Friday	9,378	11,249	20·0
Saturday	8,572	10,473	22·2
Sunday	10,614	12,303	16·0
Total	62,482	75,860	21·4
Annual Average Day ..	8,926	10,837	21·4
Annual Average Week Day	8,659	10,617	22·7

The average daily volumes expressed as a proportion of the annual average day's traffic are shown in Table 5 and compared with the findings of a transportation survey carried out in 1944–45.

TABLE 5.—AVERAGE DAILY TRAFFIC AS A PERCENTAGE OF THE ANNUAL AVERAGE DAY'S TRAFFIC.

	1953–54.	1954–55.	Transportion Survey (Average 7 Highway stations
Monday	0·94	0·96	0·92
Tuesday	0·99	1·01	1·03
Wednesday	0·94	0·96	0·86
Thursday	0·93	0·94	0·83
Friday	1·05	1·04	0·95
Saturday	0·96	0·97	1·08
Sunday	1·19	1·13	1·33

The percentages of the 24-hour traffic travelling between 7 a.m. and 7 p.m. was as set out in Table 6.

TABLE 6.—PERCENTAGES OF 24-HOUR TRAFFIC COUNTED BETWEEN 7 A.M. AND 7 P.M.

	1953–54.	1954 55.
	%	%
Monday	84·4	78·3
Tuesday	83·5	80·5
Wednesday	82·0	80·1
Thursday	81·5	78·9
Friday	79·0	75·9
Saturday	75·0	72·5
Sunday	73·7	69·1

From the figures in Tables 4 to 6 it is apparent that traffic on this overloaded section in 1954–55 was about 21½ per cent. higher than in 1953–54, but that during the more heavily trafficked periods the increase was less.

Variations in traffic throughout the year are illustrated in Fig. 1 where the patterns of the average daily traffic for each week of the two years shows a remarkable similarity.

A study of the traffic during the highest hours of the year on this particular section also shows that it has not increased by the same proportion as the annual average day. (See Table 7.)

TABLE 7.

	Annual Average Day.	Percentage of Annual Average Day in certain hourly volumes for year.				
		Max.	10th	20th	30th	50th
1953–54 ..	8,926	15·1	13·5	13·0	12·5	11·9
1954–55 ..	10,837	13·8	12·0	11·1	10·8	10·3

In 1953–54, approximately 80 hours were recorded with volumes in excess of 1,000 vehicles per hour and in 1954–55 the corresponding number of hours was 180.

Automatic Traffic Counters.

During the past year automatic traffic counters have been used extensively for—

(*a*) continuous counts at certain selected stations to determine daily and weekly traffic patterns, and seasonal variations;

(*b*) special traffic counts on roads where more information than that normally given by a short manual count was required;

(*c*) loan to a number of Municipalities who have requested the use of them to obtain extended counts.

Meters in Use.—Traffic counters at present in use in Victoria work on the pneumatic principle. A black rubber tube of approximately ⅝″ outside diameter, ¼″ inside diameter is laid across the roadway and connected to the meter. As the vehicle crosses the tube an air impulse is sent along it to the meter, inside which it deflects a diaphragm. The movement of the diaphragm completes a circuit, causing an instantaneous current flow to operate a relay connected to a counter, which records the passage of the vehicle.

The methods of recording vehicles are:—

(*a*) cumulative counter: in this type the counter mechanism advances one digit for each two-axled vehicle, and the meter must be read at intervals as frequent as the periods over which it is desired to obtain traffic counts;

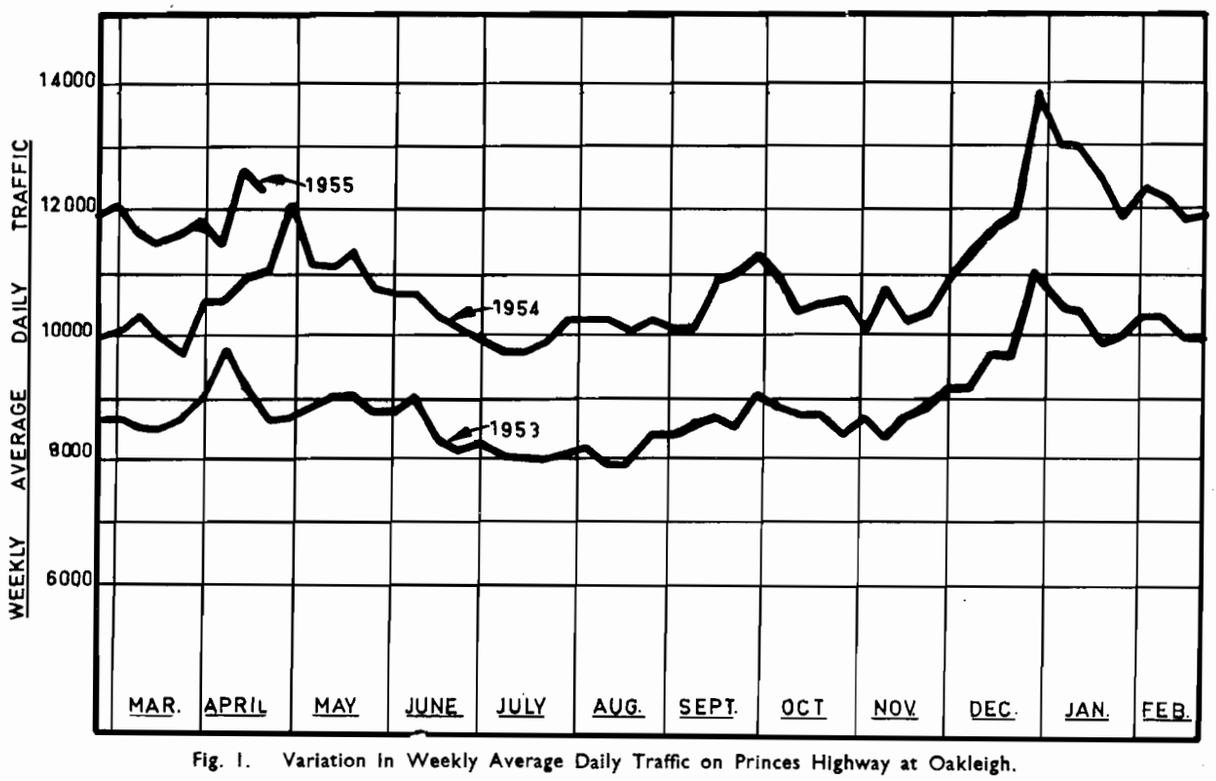
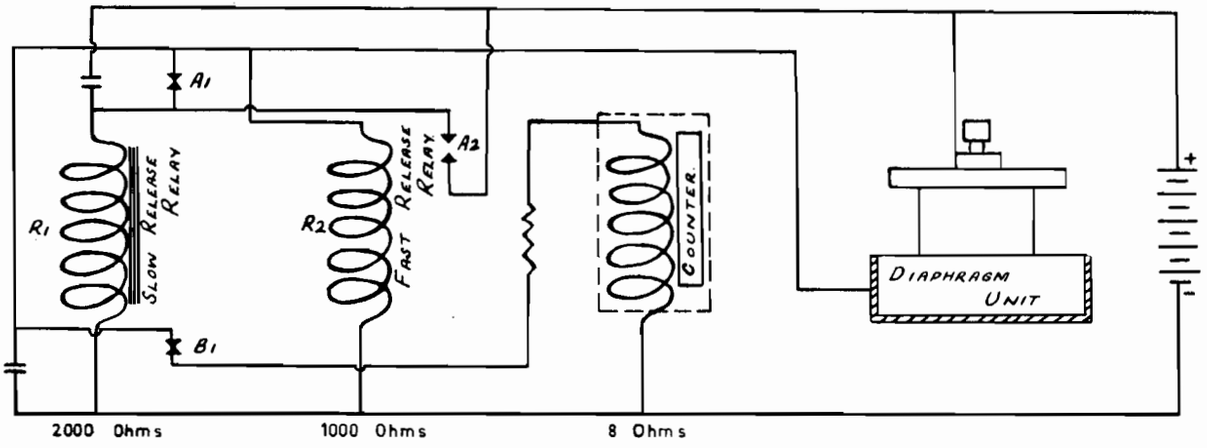


Fig. 1. Variation in Weekly Average Daily Traffic on Princes Highway at Oakleigh.



MODIFIED CUMULATIVE TRAFFIC COUNTER WIRING DIAGRAM

Fig. 2.

(*b*) self-recording counter: there are two types. One type stamps on a paper strip, hourly totals and progressive totals at one-quarter hour intervals. In the other type, traffic is recorded graphically in the form of a histogram, each bar of the histogram representing the hourly traffic volume. Self-recording meters can be left unattended for periods of up to eight days. They are ideal for studying traffic variations over long periods because, once installed, they require a minimum of attention.

Disadvantages of Meters.—When accurately adjusted, traffic counters give reliable counts, the maximum error being in the order of 5 per cent. for heavy volumes. These meters, however, have several disadvantages which include :—

(*a*) they must be re-adjusted at each particular station, adjustment depending on the type and speed of vehicles, type of surface, length of tube, &c. ;

(*b*) they will not give reliable results on unsealed roads ;

(*c*) they generally are not suitable for operation in city streets ;

(*d*) on lightly trafficked sealed roads adjustment takes considerable time ;

(*e*) they must be installed by experienced operators.

The above disadvantages apply to both the cumulative and recording types of meters. In addition, a number of moving parts have failed in the cumulative type.

Modified Cumulative Counter.—In an effort to overcome the above disadvantages a modified cumulative traffic counter has been developed. It consists essentially of two relays (one a fast release relay and the other of the slow release type), a telephone counter, and a diaphragm unit, the power supply being a 45-volt dry cell.

Method of Operation.—When an impulse from the road tube reaches the diaphragm unit, an electrical circuit is closed, the counter operates and the fast relay becomes energized. This enables the slow release relay to charge and isolate the counter from the diaphragm unit. Further impulses have no effect until the slow release relay discharges. (A period of approximately 0·5 seconds, depending on the relay setting.) Figure 2 is a diagram of the circuit used.

Since the initial pulse isolates the counter from the diaphragm unit for approximately 0·5 seconds, adjustment difficulties are eliminated. The telephone counter has overcome the majority of mechanical failings which were mainly associated with the counting mechanism.

Accuracy.—(*a*) On a two-lane road—the meter is extremely accurate for low volumes, its upper volume limit being about 300 v.p.h. when its error is in the order of up to – 5 per cent. It cannot be used satisfactorily for higher volumes.

(*b*) On a single-traffic lane—provided vehicle speeds are over about 5 m.p.h. it will record with 100 per cent. accuracy for all volumes.

Advantages.—The advantages of the modified cumulative counter are :—

(*a*) It can be installed in 10–15 minutes by an inexperienced operator (it is thus ideal for loan to Municipalities) ;

(*b*) It will record on all types of road surfaces ;

(*c*) Once adjusted, it is adjusted for all stations ;

(*d*) Mechanical failures have been overcome by the use of the telephone counter.

The same principle has been applied to one of the recording meters with satisfactory results, making it ideal for operation in country areas.

PLAN PRINTING AND REPRODUCTION.

During the year there was considerable improvement in the section which prints small plans, forms, &c. Three types of machine are now in use.

The "Multilith" printer is used for producing forms of various kinds in quantity by the offset process. The latest use to which it has been put is the reproduction in two colours of highway record plans from line and half-tone lithographic sheets compiled from aerial photographic strip maps. Taking the place of field survey work and hand plotting this is a rapid and economical method of preparing plans of this type.

The "Ozalid" machine, employing the ammonia dry process and dye-line printing, is used for producing copies from transparent originals. It will also produce from an opaque original a copy of tracing linen which may be used for further reproduction. Small plans for the Bridge Division, for road construction and also of mechanical equipment were printed in considerable quantity with this equipment.

The "Duplomat," which does reflex printing on sensitized paper is used for making copies of published documents and other papers which have printing or drawings on both sides of the paper.

The quantity of work done by this section increased considerably. In July, 1954, 10,000 prints were produced by the "Multilith" machine. In June, 1955, the number had increased to about 60,000. Likewise 2,000 prints were made on the "Ozalid" machine in July, 1954, and 3,600 in June, 1955.

CONSTRUCTION COSTS.

Economy in construction is a measure of the efficiency of carrying out work. In order to assess more readily the average costs of various works of a similar nature carried out each year, the costing system was recast in 1954, so that unit costs for work carried out under broadly similar conditions could be easily extracted.

Eventually the final detailed costs of all major direct labour and contract works will be recorded on punch cards so that the cost of carrying out any nominated type of work under stated conditions may be easily established.

Typical results obtained from an analysis of 42 direct labour works completed during the year 1954–55 are set out in Table 8. This table only deals with what may be called "on site" expenditure and does not include the cost of office expenses, staff salaries, plans, surveys, motor car expenses, &c., which, on the average, amount to an additional 7½ per cent. of the cost of carrying out work; neither does it include the cost of any land purchase.

TABLE 8.

Extract from an analysis of the "on site" costs of 42 major direct labour projects completed during 1954–55.

The cost of individual projects ranged from £4,000 to £200,000.

(*a*) *Distribution of Expenditure.*

Item.	Cost.	Percentage.
	£	%
Plant	320,966	39·9
Labour	273,420	34·0
Materials..	164,641	20·4
Stores	45,851	5·7
	804,890	100·0

Overhead charges included in the above totals are :—

—	Amount.	Percentage of Total cost of work.
	£	%
Unproductive Overheads— (Camp erection, camp maintenance, tools, records, plant overhead charges, provision for leave, insurance, pay-roll tax, etc.) ..	124,437	15·4
Productive Overheads— Job supervision, setting out, barrier (lighting, etc.)	45,469	5·65

(*b*) *Unit costs* (*including all "on site" overhead charges*).

Item.	Unit.	Quantity.	Cost.	Unit Cost.
			£	£ *s.* *d.*
Formation[1] work in rock[2]	c. yd. in place	22,950	9,018	0 7 10
Formation work in common earth[3]	c. yd. in place	295,087	91,852	0 6 3
Formation work in unclassified earth[4]	c. yd. in place	85,792	54,966	0 12 10
Total ..	..	403,829	155,836	0 7 9
Fine crushed rock in place ready for sealing	c. yd. loose	61,701	129,552	2 2 0
Other crushed materials ready for sealing	c. yd. loose	38,580	74,700	1 18 9
Gravel sand, &c. ready for sealing	c. yd. loose	342,682	304,371	0 17 9
Total ..	..	442,963	508,623	1 3 0

[1] Formation work includes all loosening, loading, moving, placing and consolidating necessary to provide base true to line and grade on which a pavement may be laid. It includes excavation of widening trenches.

[2] Rock is defined as material which can only be loosened by blasting.

[3] Common earth is defined as any material which can be loosened without blasting.

[4] Unclassified earth is material whose nature is unspecified; it includes an unknown amount of rock.

[5] Costs obtained from two projects only, both of which were carried out under good conditions.

Examination of the costs of these works shows that, on the average, 63 per cent. of the expenditure was for paving of all types. This compares with a figure of 60 per cent. quoted in a review of the 1953 Highway works programme in the U.S.A.

BITUMINOUS SURFACING.

Extent of Work.

During 1954–55, 1,642 miles of bituminous surfacing work was carried out. This is an increase of 213 miles on the 1953–54 total which at that time was the largest mileage done by the Board in a single season. The percentage increases in the work carried out over the 1953–54 mileages were :—

	%
Work on C.R.B. declared roads	6
Work on undeclared roads	124
Work for other authorities	28
All work..	15

Table 9 sets out the mileages of work under the different headings for 1954–55 and the previous season.

TABLE 9.—LENGTH OF WORK CARRIED OUT IN 1953–54 AND 1954–55.

Type of Road and Plant Used.	Miles.	
	1953–1954.	1954–1955.
(*a*) Work on C.R.B. Declared Roads—		
(i) Board's plant	1,146	1,242
(ii) Municipal plant ..	52	25
	1,198	1,267
(*b*) Work on Undeclared Roads to which the Board contributes—		
(i) Board's plant	74	149
(ii) Municipal plant ..	9	37
	83	186
(*c*) Work for other authorities done by Board's plant—		
(i) Municipalities	91	125
(ii) State Instrumentalities ..	3	2
(iii) Commonwealth of Australia	54	62
	148	189
	1,429	1,642

Table 10.—Mileage of Each Type of Work Carried out on Declared Roads during 1954–55.

Type of Road and Control of Work.		Length in Miles.																	
		Nature of the Work.																Summary of Work.	
		Initial Treatments.								Retreatments.									
		One Application. Seal Only.		Two Application. Seal Only.		I.T. Prime and Two Application Seal.		I.T. Prime and Seal.		Reseals.						R.M.S.	P.M.S.		
										Nominal Size of the Aggregate.					Two Application Reseal.				
Road.	Control.	E.	R.	E.	R.	E.	R.	E.	R.	¾-in.	⅝-in.	½-in.	⅜-in.	¼-in.				State Highways.	Other Declared Roads.
State Highways ..	Direct ..	2·28	10·43	..	0·17	7·83	0·50	92·10	41·45	62·73	114·18	50·43	52·60	54·70	2·11	..	6·34	497·85	..
	Municipal ..	..	0·85	..	..	..	..	2·01	..	..	3·89	13·32	..	..	..	..	0·82	20·89	..
Main, Tourist, and Forest Roads	Direct ..	2·52	2·87	..	..	..	..	40·79	2·89	1·53	3·37	6·69	5·73	..	..	..	..	..	66·39
	Municipal ..	40·52	20·23	2·08	..	10·19	..	231·80	29·13	31·35	82·10	116·77	90·58	21·30	1·53	2·97	1·53	..	682·08
		45·32	34·38	2·08	0·17	18·02	0·50	366·70	73·47	95·61	203·54	187·21	148·91	76·00	3·64	2·97	8·69	518·74	748·47
		79·70		2·25		18·52		440·17		714·91						11·66			
		540·64								726·57								1,267·21	
		1,267·21																	

Abbreviations.—E, Extension to the Bituminous Surfaced System; R, Initial Treatment on Reconstructed length of previously sealed pavement; R.M.S., Retreatment with Roadmix; P.M.S., Retreatment with Plantmix.

Note.—The Table does not include 137 miles of I.T.P. and S. extensions, 7 miles of I.T.P. and S. reconstruction, and 42 miles of retreatment on undeclared roads to which the Board contributes funds.

Fig. 3.—800-gallon sprayer.

Bituminous Sprayers.

Additional bituminous sprayers and spraying gangs were necessary to cope with the increasing volume of work. This year 8 four-hundred gallon sprayers and 12 eight-hundred gallon units were used as contrasted with the previous season when 7 small and 9 large units were employed. Fig. 3 shows one of the latest 800-gallon machines.

Extension of the Treated System.

Mileage of surface treated roads increased by 432 miles, bringing the total treated to 8,121 miles or 56 per cent. of the declared system of 14,430 miles. (See Table 10.)

Reconstruction and Retreatment of the Bituminous Surfaced System.

Initial treatments on reconstructed lengths of previously sealed pavements totalled 109 miles, this amount being only 1·4 per cent. of the treated mileage existing at the beginning of the year and indicating that progress in improving existing roads is still slower than desirable.

Retreatments of the declared system amounted to 726 miles or 9·4 per cent. of the treated system at the beginning of the year. Owing to financial limitations all of this work, with the exception of 12 miles, was sprayed work which does not provide in any way for correction of surface irregularity.

Reconstruction and retreatment together amounted to 835 miles. (See Table 10.)

Bituminous Surfacing of Undeclared Roads and for Other Authorities.

Table 11 sets out details of the 186 miles of work on undeclared roads, this being more than twice the amount of work carried out in the previous season.

For other Authorities the equivalent of 189 miles of work was carried out by the Board's bituminous surfacing plant as set out in Table 9.

TABLE 11.—MILEAGE OF WORK CARRIED OUT ON UNDECLARED ROADS DURING SEASON 1954–55.

Work.	Miles.
Initial treatments—	
Extensions	137
Reconstructed lengths of previously sealed pavements	7
	— 144
Retreatments	42
Total	186

Supply of Bitumen.

The total amount of bitumen used was 13,500 tons, of which 8,800 tons or 65 per cent. was supplied in bulk. Of this, 5,714 tons were delivered in road tankers and 3,086 tons by rail tank cars. Of this latter quantity, 2,076 tons were supplied from a refinery near Melbourne and 1,010 tons in rail tank cars at N.S.W. border stations from a refinery near Sydney. During the previous season rail deliveries had been confined to 350 tons from the Sydney refinery to N.S.W. border stations.

Bulk Handling of Bitumen.

On the Victorian Railway system rail tank cars are owned by the Company supplying the bitumen and consist of a single insulated tank having a capacity of 10,000 gallons, or 40 tons of bitumen. These tanks are fitted with fire tubes. At each delivery point a mobile heating unit is required, consisting of an air blower and oil pump and burners which are fitted to the rail tank cars on their arrival. (See Fig. 4.)

Fig. 4.—Rail tank car and mobile heating unit.

The Board's road tankers (see Fig. 5) are used to transport the bitumen to site of the works from the refinery or from rail tank cars. They have a capacity of 2,000 gallons and are mounted on heavy semi-trailer trucks. Mounted on the rear of the chassis these road tankers have a Ford V8 engine which drives a bitumen pump for loading and unloading and an air blower and fuel pump for the heating equipment required to maintain a minimum temperature for pumping on long leads. With this equipment bitumen can be pumped from a rail tank car, circulated in the road tanker, and discharged into storage tankers, heaters or sprayers as required.

Fig. 5.—2,000-gallon road tanker.

To minimize delays to rail tank cars, and provide a working reserve, storage tankers are provided for each gang drawing bulk bitumen from rail. They consist of a 2,000-gallon lagged tank on a two-axled trailer and are not designed for transport of bitumen. They are equipped with heating and pumping apparatus similar to that fitted to road tankers. (See Fig. 6.)

Owing to the development of the use of bulk bitumen consideration will have to be given to means of overcoming the problem presented by a refinery and rail transport facilities which can work all the year round and a demand which is confined to the summer months. The solution will probably include the provision of bulk storage at certain suitable centres.

The Board has a large number of oil-fired pneumatic-tyred heaters which were designed for handling bitumen supplied in drums. These heaters are being used to supplement the storage tankers, and should the price of bitumen produced outside Victoria drop, sufficiently to allow its importation in drums at a competitive price, this equipment will still be available to use such supplies.

Fig. 6.—Heater-storage tanker pumping into sprayer.

TABLE 12.—AVERAGE COST OF B.S.T. WORK CARRIED OUT BY C.R.B. PLANT ON ALL ROADS OF WHICH THE BOARD PROVIDED FUNDS DURING 1954–55.

(Cost in pence per square yard.)

Item.	Nature of the Work.																			
	Initial Treatments.								Retreatments.											
									Reseals.											
									Nominal Size or Gauge of Aggregate Used.											
	Seal Only—Binder. 0·25 gal. per sq. yd.		Seal Only—Two Applications of Binder and Aggregate.		I.T., Prime and Two Application Seal.		Prime and Seal—Primer 0·20. Seal 0·25 gal. per sq. yd.		¾-in. "E".		½-in. "F".		⅜-in. "G".		¼-in. "H".		¼-in. and Sand.		Two Application Seal.	
Square yards costed ..	977,508		26,379		140,589		4,345,153		1,180,712		1,929,611		1,589,519		1,311,767		576,177		37,132	
	*d.**	%	*d.*	%	*d.*	%	*d.*	%	*d.*	%	*d.*	%	*d.*	%	*d.*	%	*d.*	%	*d.*	%
Materials	16·4	69·8	21·2	69·5	27·3	70·4	23·3	65·1	15·5	64·6	15·6	67·8	12·8	64·6	11·0	64·7	10·4	70·3	19·9	73·4
Labour	3·8	16·2	4·7	15·4	6·2	16·0	7·3	20·4	4·9	20·4	4·2	18·3	4·1	20·7	3·7	21·8	2·7	18·2	4·0	14·8
Stores	0·6	2·5	0·9	3·0	1·2	3·1	0·9	2·5	0·6	2·5	0·6	2·6	0·4	2·0	0·4	2·3	0·3	2·0	0·5	1·8
Plant Hire	2·7	11·5	3·7	12·1	4·1	10·5	4·3	12·0	3·0	12·5	2·6	11·3	2·5	12·7	1·9	11·2	1·4	9·5	2·7	10·0
Totals ..	23·5	100	30·5	100	38·8	100	35·8	100	24·0	100	23·0	100	19·8	100	17·0	100	14·8	100	27·1	100

* Cost in pence per square yard.

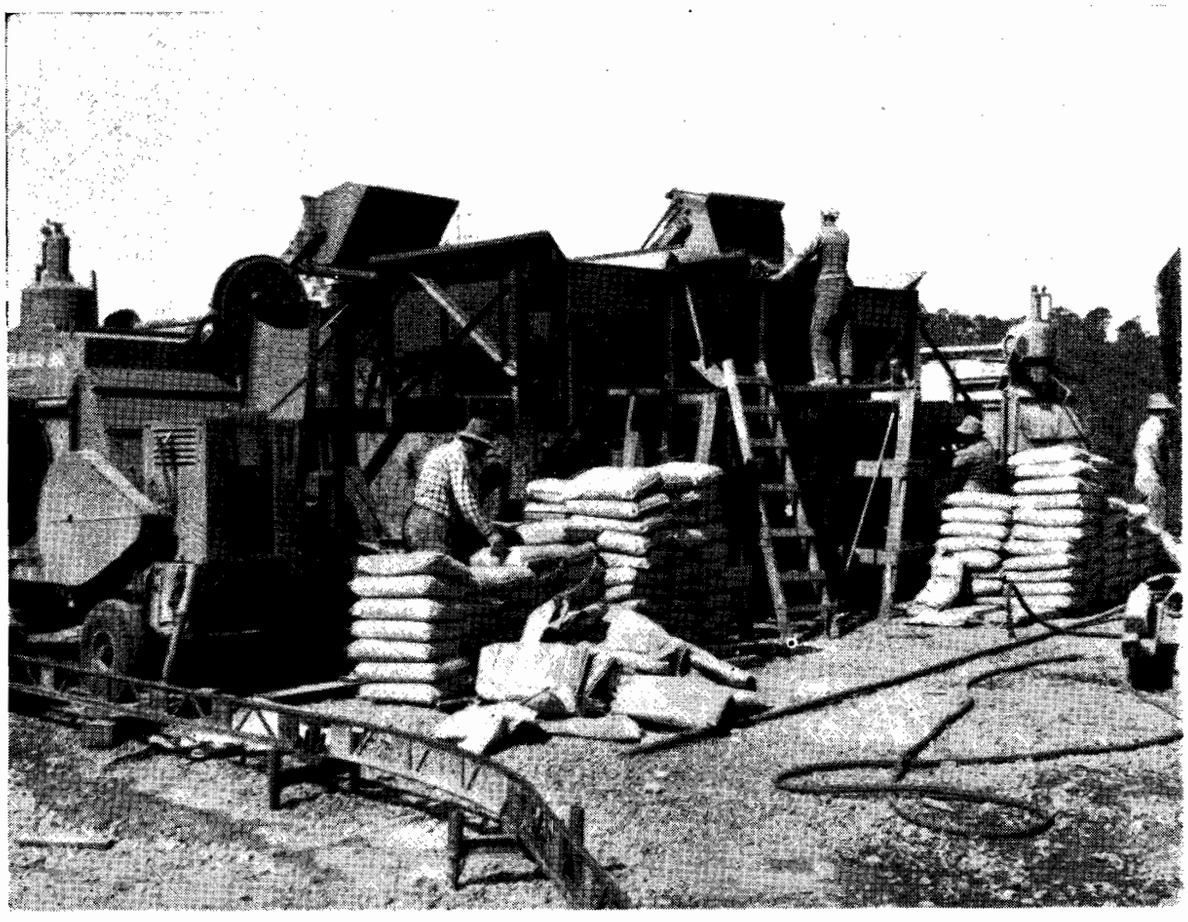


Fig. 7.—20-ton trolley weigh batcher serving two ½-cub.-yd. mixers.

Cost of Work.

Table 12 sets out the details of the cost of work on all roads carried out by the Board's plant during the season to which the Board contributed funds. With the exception of ⅜" reseals, the average costs of sprayed bituminous surfacings were in all cases lower than for the previous season. The reduced costs are largely due to savings in the cost of heating and handling bitumen but in the case of ⅜" reseals, increased labour costs have outweighed the saving.

Aggregate.

During the past season 178,686 cubic yards of aggregate were spread by the Board's plant, this total being 8,355 cubic yards more than the quantity handled during the previous season. The weighted average price per cubic yard of aggregate in roadside stacks for the past six seasons is shown in Table 13.

TABLE 13.—AVERAGE PRICE OF AGGREGATE FOR BITUMINOUS SURFACING AT PER CUBIC YARD IN STACKS BY THE ROADSIDE.

Material.	Price per cubic yard.					
	1949-50.	1950-51.	1951-52.	1952-53.	1953-54.	1954-55.
	s. d.	*s. d.*	*s. d.*	*s. d.*	*s. d.*	*s. d.*
Screenings ..	30 6	35 9	39 11	40 3	41 11	44 5
Gravel ..	33 11	32 0	39 2	42 4	40 10	40 4
Sand ..	10 4	22 5	21 5	21 0	17 7	23 4
Scoria ..	10 5	7 8	18 2	17 3	15 7	12 1
Weighted average	29 4	34 3	39 0	39 10	40 11	42 4

In 1938–39 the average price per cubic yard for aggregate was 12s. 10d.

BRIDGES.

General.

The amount of construction work carried out was greater than in previous years. More contractors tendered for work—several new ones having entered the field. The prices submitted by them, particularly by those tendering for the first time, have been very variable. The cost of all work has shown a slight upward trend. A considerable amount of work has been done for other instrumentalities, notably that made necessary by the Eildon project.

Design.

Further progress was made with the standardization of superstructures—particularly those in which pre-cast concrete sections, and composite steel and concrete construction is economical. A start was made with standardization of substructures for situations where this is possible, while progress was made with drawing up standard plans for cast in place box culverts of various sizes under various heights of fill. Due to the shortage of staff and extreme pressure of other work, progress was not as great as hoped for.

No prestressed concrete was used, mainly because tenders and quotations received for certain jobs were considerably higher than the cost of normal reinforced concrete work. Where foundation work can be reduced by longer spans, economics will determine the choice between steel and prestressed concrete.

Construction.

Steady progress was made with improvement of methods in the field, and the development of interest in the production of good quality concrete has been noticeable. Far too many old structures show the results of poor work as well as lack of cover on steel, indicating the importance of attention to detail on the part of all

concerned in construction. During the year the Board purchased a "Kolectric Covermeter" to measure the thickness of concrete over reinforcement in existing structures.

During the year considerable amounts of weighbatching equipment and Monorails for transporting the concrete were bought. It is hoped that in the near future all concrete mixed on Board's jobs will be batched by weighbatching devices. The value of weighbatching lies not only in the uniformity of the concrete but in the reduced manpower required. In a recent case, a consistent rate of 20 cubic gards per hour of mixing was maintained over long periods with the following equipment and organization :—

Equipment :

2 No. Front End Loaders (1 as a stand-by).
1 No. Trolley Weighbatcher.
2 No. ½-cubic yard Mixers, each discharging into a Monorail.

Manpower :

2 No. Front End Loader drivers.
2 No. Mixer drivers.
2 No. Trolley batch men.
4 No. Handling and tipping cement into Mixer Hoppers.
2 No. Handling Monorails.

The average of 17 standard 6″ x 12″ cylinders at 28 days, made from concrete produced on this project, was 4,730 lb. per square inch, the extreme values being 3,820 lb. per square inch and 5,790 lb. per square inch. Figures 7 and 8 are photographs of the plant in question.

Formwork.

The value of designing formwork and having it made under workshop conditions and then taken to the job has been evident. For the formwork on which to cast the deck between the pre-cast beams being used, trials have been made of 1″ thick x 12″ wide prestressed slabs, which are left in place, and it is now proposed to use them to carry the deck of a bridge to be built over an electrified railway, where the advantages of easy placement and avoidance of stripping will be considerable. Studies indicate that under more normal conditions they may well be more economical than removable shuttering and will save time.

Materials.

Steel.—The supply of plates and shapes of local steel was reasonable, but that of M.S. Rounds was well below requirements, necessitating the use of considerable quantities of imported steel. It appears that this will have to continue, a factor which is having its effect on costs.

Cement.—During the year all requirements were met from local sources—the Board receiving a regular weekly quota.

Timber.—The supply of good quality bridge timber was below requirements and timber had to be transported long distances. With the present prices and labour costs in the field, it is difficult to justify the use of timber except to keep old structures in service until they can be replaced by more permanent ones.

Painting Concrete Handrails.

After a period of years, many concrete handrails become discoloured and are often encrusted with a moss type of growth. Painting to restore appearance and to increase visibility is often advisable and the following procedure is suggested :—

(1) Age the concrete for 17 months at least.
(1*a*) Thoroughly clean surface.
(2) Apply one coat of Red Lead Primer.
(3) Use one or two undercoats of the Boards' standard undercoating paint (white).
(4) Final coat of Board's standard finishing coat paint.

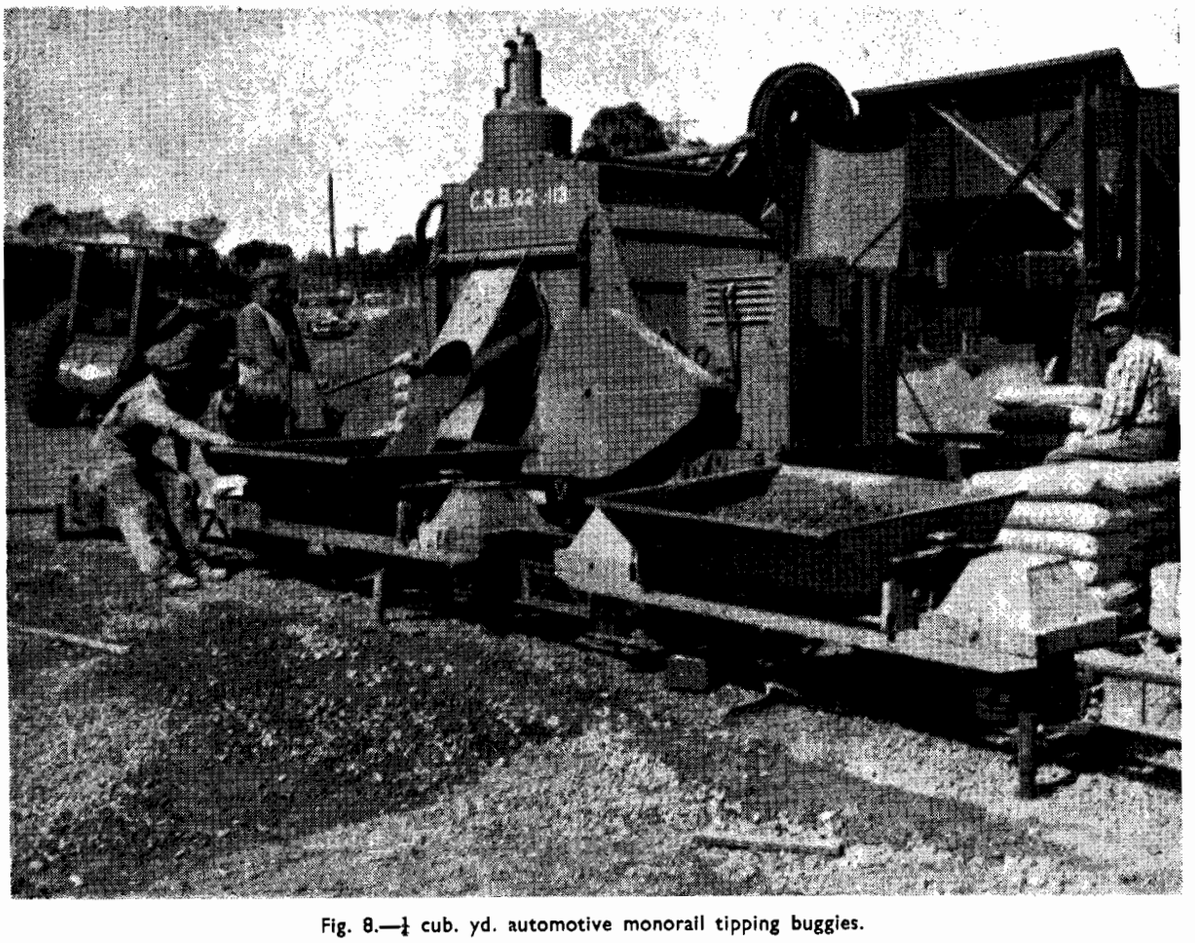


Fig. 8.—¼ cub. yd. automotive monorail tipping buggies.

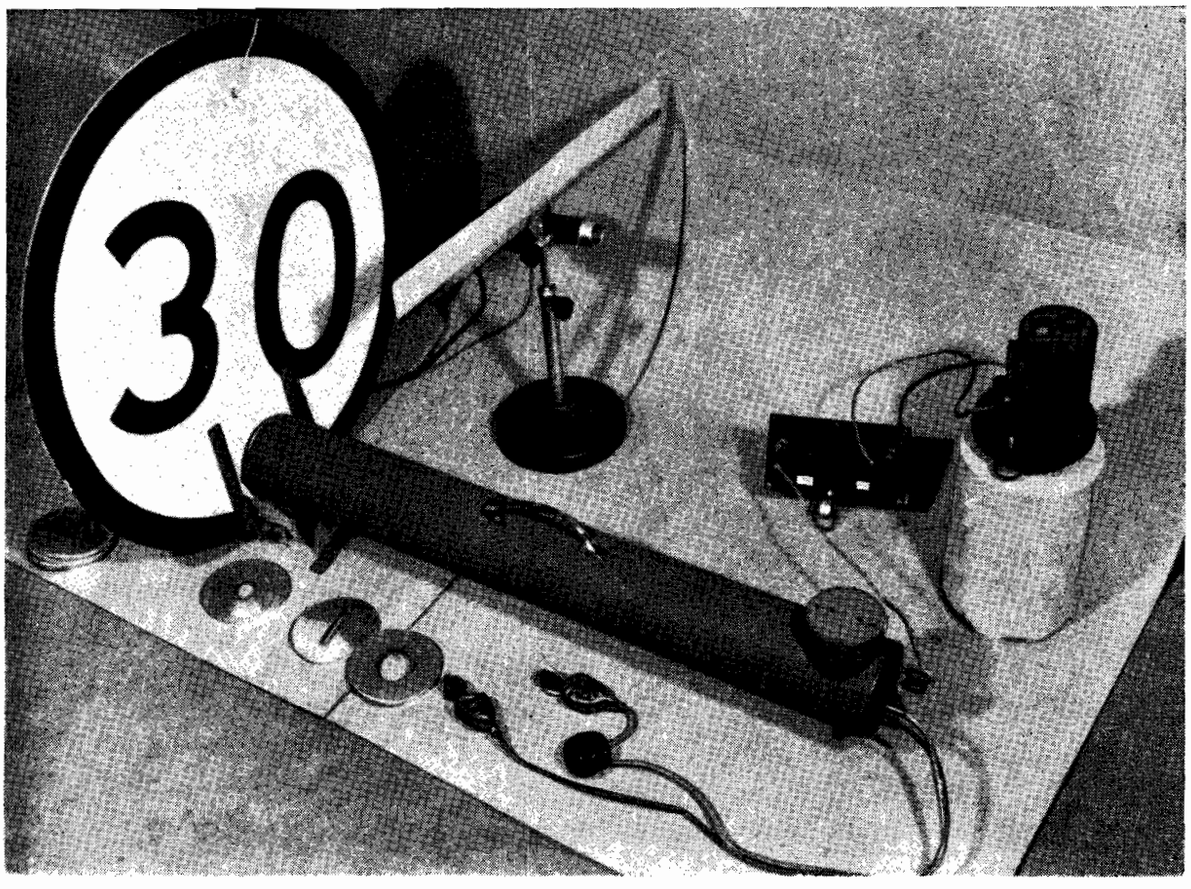


Fig.9.—Reflectometer set up to measure the reflectance of the surface of a speed-limit sign.

MATERIALS RESEARCH.

Pavement Thickness—Use of Cone Penetrometer.

Development of the use of cone penetrometers, as described in Annual Reports of the last two years has been continued and is discussed in detail in a technical paper written by a member of the staff of the Materials Research Division for presentation to the 2nd Australian and New Zealand Conference on Soil Mechanics and Foundation Engineering at Christchurch during January, 1956. It is considered that the work has been advanced so far that it can form the basis of a practical method of pavement design and that the use of these instruments may ultimately lead to more economical pavement design, particularly in the drier areas of the State. The use of the apparatus also lends itself to an investigation of the variation of the supporting power of the soil beneath the edges and centre of a pavement. Previously, moisture content determinations have been used for this purpose. The use of the cone will enable both lateral and seasonal variations in bearing value to be determined directly with a minimum of disturbance of the pavement surface.

Bituminous Materials.

The use of locally produced bituminous materials supplied in bulk has led to a great increase in laboratory work. This is expected to continue and may necessitate increases in staff and provision of further equipment.

The establishment of acceptable lower limits for the viscosity of standard grades at higher road temperatures is being given considerable attention following difficulties experienced in the field when using certain material for sprayed surface treatments.

Cement and Concrete.

The establishment in Victoria of new works for the manufacture of Portland cement has made it necessary for the laboratory to investigate in greater than normal detail the strength of concretes made with these new materials. This work will be continued as necessary in order to assist the Board's designing engineers in making the best use of these new materials.

Fine Crushed Rock.

Failures in pavements constructed of fine crushed rock produced from a certain basalt which had previously been considered satisfactory led to the realization that plasticity of the fines, which had normally been attributed to the inclusion of salamander or dirt in the product, was partly due to inherent properties of the stone itself. Milling of the fines with water indicated a much more rapid increase in their plasticity than when the test was applied to those produced from a softer stone from the same area which had given no similar trouble. Increase in plasticity with manipulation in the presence of water in the field, which would support the results of the milling tests, is suspected but has not yet been substantiated.

An investigation has now been initiated in an endeavour to correlate, for various commonly used stones, the increase of plasticity with wet milling, the mineral composition of the stones, and the observed behaviour of fine crushed rock pavements constructed with the stones in question

Moisture beneath Sealed Pavements.

In order to ascertain the variation in moisture content of the soil beneath sealed pavements, a complete Gypsum block installation was put down beneath a sealed pavement at the 179 M.P. on the Western Highway near Horsham, in conjunction with the Division of Soils, C.S.I.R.O. Periodical readings will be taken in order to observe the influence of changes in season on the movement of moisture.

Benkalmann Beam Pavement Deflection Indicator.

This instrument, developed by Benkelmann for the W.A.S.H.O. Road Test (H.R.B. Abstracts, September, 1953) was constructed by the Materials Research Division.

It is a fairly simple, quick and inexpensive means of measuring pavement deflection under load. Results of preliminary tests which have been carried out, tend to indicate that—

(i) deflections of 0·05 in. or greater between dual wheels carrying a load of 9,000 lb. indicate that a pavement is in very poor condition;

(ii) some sections of pavements are strong in the centre but weak towards the edges.

DIRECTION BOARDS AND WARNING SIGNS.

Measurement of Reflectances of Roads Signs.

During the year the Board acquired a reflectometer suitable for measuring the reflectances of sheet reflectors and reflector studs. This instrument was made in Hobart, to a design prepared by Dr. R. G. Giovanelli, Division of Physics, National Standards Laboratory, Sydney, who developed this instrument at the request of the Standards Association of Australia and the Country Roads Board.

The instrument is used to measure the reflectances of reflecting studs and sheet reflectors to determine if they comply with the Standards Association of Australia Interim Specification for Retro-reflecting Materials for Road Signs and Vehicles.

Figure 9 is a photograph of the reflectometer set up to measure the reflectance of the surface of a speed limit sign.

Typical results of tests of sheet reflectors are shown in the following table:—

Ref. No.	Material.	Reflectance.
1.	Yellow painted surface	0·9
2.	Magnesium oxide sheet (Reference standard)	1·0
3.	Yellow commercial reflecting surface—Type A	3·0
4.	Yellow surface beaded in Board's workshop	5·0
5.	Yellow commercial reflecting surface—Type B	5·0
6.	Yellow commercial reflecting surface—Type C	19·4
7.	Yellow commercial reflecting surface—Type D	19·5

The Board has discontinued the use of signs which are reflectorized by placing small glass beads onto the painted sign surface (Ref. No. 4 in above table) and is manufacturing signs using Type D commercial sheet reflecting material.

STAFF.

The engineering staff continued to give loyal service to the Board under conditions which at times are very difficult due to the fact that there are not sufficient members to provide the detailed supervision which is necessary for efficiency in the control of work or to ensure that the investigation and preparation of projects receive the orderly and detailed consideration which they warrant. Coupled with the inadequacy of supervision is a deficiency of good records of work carried out. The position is aggravated by the continued loss of young men to better paid positions after a period of training in the engineering branch.

During the year a paper, "The Fundamental Aspects of Reinforced Concrete Design" was read before a meeting of the Civil Engineering Branch of the Institution of Engineers, Australia, by Dr. K. G. E. Moody.

In addition to the usual work with professional organizations, senior staff served on the following committees of the Standards Association of Australia:—

(1) Road Signs and Traffic Signals Sectional Committee;

(2) Paint and Varnish Sectional Committee; Victorian Panel on Priming, Undercoating and Finishing Paints; Victorian Panel on Testing;

(3) Road Making Materials Sectional Committee; Sub-Committee on Bitumen.

During the year considerable assistance was given to the University of Melbourne, which organized a Summer School in Traffic Engineering. Of the 15 papers presented to the school five were given by the Chairman and members of the staff of the Board. Details of these are as follows:—

Paper.	Author.
"Highway Planning for Traffic Needs."	D. V. Darwin, M.C.E., M.I.C.E., M.I.E. Aust., F.A.P.I., Chairman.
"Methods of measuring traffic volumes, speeds and delays; traffic capacities."	H. P. George, A.M.I.E. Aust., F.A.P.I., Traffic and Location Engineer.
"Traffic control devices; parking control; pedestrian control."	J. Mathieson, M.C.E., M.I.E. Aust., Deputy Chief Engineer.
"Geometric design of roads".	G. J. Dempster, B.C.E., A.M.I.E. Aust., M.A.P.I., Engineer for Plans and Surveys.
"Traffic Engineering Economics.	C. G. Roberts, M.C., B.Sc. (Eng), A.M.I.C.E., A.M.I.E., C.E., F.A.P.I., Chief Engineer.

Engineering Circulars.

The following Research Memorandum and Engineering Notes were issued during the year:—

No.	Title.	Date of Issue.
	Research Memorandum.	
12	Traffic Behaviour and Road Capacity Study.	March, 1955.
	Engineering Notes.	
50	Soil Stabilization.	January, 1955.
51	Plant—Front End Loader Modified to load Field Stones.	March, 1955.
52	Conditions for Erection of Service Stations abutting C.R.B. Roads.	May, 1955.
52A	Conditions for Erection of Service Stations abutting C.R.B. Roads—amended.	May, 1955.
53	Measurement of Truck Volumes.	June, 1955.

The late Mr. H. H. Gray, C.E., L.S., A.M.I.E.(Aust.).

Mr. H. H. GRAY.

In March, 1955, the Board's Asphalt Engineer, Mr. H. H. Gray, proceeded overseas to investigate methods of bulk handling of bitumen, the properties of bitumen produced from crudes from some of the newer oilfields by modern refining methods and the possibility of extending bituminous work into the winter months. During his absence he forwarded many very valuable reports on the results of his enquiries. He had almost completed his inspections in the U.S.A., the United Kingdom, and Europe when he died in London on 26th September, 1955, as a result of injuries received in an accident.

Joining the Board's staff in 1929, Mr. Gray was Asphalt Engineer from 1933 until the time of his death. For his technical ability he was recognized as outstanding among Australian Engineers in his field. His happy manner and his high standard of personal honour and conduct obtained from all who dealt with him the liking and respect which these qualities compel. His loss will be deeply felt by the Board's staff, by municipal engineers in Victoria and by many in other parts of Australia who knew him.

C. G. ROBERTS,
Chief Engineer.

COUNTRY ROADS BOARD.

STATEMENT OF RECEIPTS AND PAYMENTS FOR YEAR ENDED 30TH JUNE, 1955.

(Adjusted to nearest pound.)

		Country Roads Board Fund.	Commonwealth Aid Roads Acts.		Loan Funds.		Total.
			Sec. 6 (1) 1950 Sec. 9 (2) 1954.	Sec. 7 (1) 1950 Sec. 9 (3) 1954.	Permanent Works.	Restoration of Flood and Bush Fire Damage.	
RECEIPTS.	£	£	£	£	£	£	£
Balances at 1st July, 1954		54,541	..	..	..	..	54,541
Motor Car Registration Fees	4,533,257						
Additional Registration Fees	452,939						
Drivers' Licence Fees	181,728						
Fines	144,459						
	5,312,383						
Less Cost of Collection	483,283						
		4,829,100	..	..	..	..	4,829,100
Municipalities Repayments—							
Permanent Works—Main Roads	5,522						
Maintenance—Main Roads	382,039						
		387,561	..	..	..	..	387,561
Surplus from Transport Regulation Fund		387,992	..	..	..	..	387,992
Moneys provided by *Commonwealth Aid Roads Act* 1950		..	145,730	89,885	..	..	235,615
Moneys provided by *Commonwealth Aid Roads Act* 1954		..	2,085,052	1,481,702	..	..	3,566,754
Receipts from State Loan Funds—							
Act 3662		..	..	..	265,412	..	265,412
Act 5363		..	..	..	690,588	..	690,588
Act 5657—Flood and Bush Fire Damage		..	..	..	..	104,259	104,259
Act 5763—Flood and Bush Fire Damage		..	..	..	..	42,050	42,050
Other Receipts—Fees and Fines		1,309	..	..	..	..	1,309
		5,660,503	2,230,782	1,571,587	956,000	146,309	10,565,181
PAYMENTS.							
Construction and Maintenance of Roads and Bridges—							
Main Roads		2,398,215	862,851	..	265,412	40,000	3,566,478
State Highways		979,900	1,363,165	..	690,588	..	3,033,653
Tourists' Roads		213,369	..	81,226	..	*Cr.* 5	294,590
Forest Roads		.	..	137,896	..	1,223	139,119
Unclassified Roads—							
Construction and Maintenance		..	4,652	884,533	..	105,091	994,276
Federal Maintenance		..	..	450,756	..	..	450,756
Murray River Bridges and Punts		13,005	..	17,176	..	..	30,181
Traffic Line Marking		25,398	..	..	..	..	25,398
Plant Purchases		584,712	114	..	..	..	584,826
Traffic Lights		489	..	..	..	..	489
Interest and Sinking Fund Payments		675,012	..	..	..	..	675,012
Interest and Sinking Fund Payments—Great Ocean Road		1,000	..	..	..	..	1,000
Payment to Tourists' Resorts Fund		57,572	..	..	..	..	57,572
General and Administration Expenditure		538,019	..	..	..	..	538,019
		5,486,691	2,230,782	1,571,587	956,000	146,309	10,391,369
Balances at 30th June, 1955		173,812	..	..	..	..	173,812

NOTES.—The amounts shown under *Commonwealth Aid Roads Acts* 1950, Sec. 6 (1) and 1954, Sec. 9 (2) do not include the proportions reserved for other works connected with transport in terms of those Acts, as those proportions are not disbursed by the Board.

Relief to Municipalities, granted under Acts 4140 and 4415, amounted in 1954–55 to £156,468.

AUDITOR-GENERAL'S CERTIFICATE.

The accounts of the Country Roads Board for the year ended 30th June, 1955, have been audited. In my opinion the above statement of Receipts and Payments fairly presents in summary form the transactions during that period.

E. A. PEVERILL,
Auditor-General,
11th January, 1956.

C. G. GRIFFITHS,
Accountant,
11th October, 1955.

COUNTRY ROADS BOARD.

Works Executed on Behalf of Commonwealth and State Authorities for Year ended 30th June, 1955.

Department or Authority.	Description of Works.	Expenditure Chargeable to Authority. £ s. d.
Department of Public Works	Bridgeworks: Chandler Highway; Roadworks: Australian Mutual Provident Society Project (Kaniva Shire, Big Desert Road), Heyfield; Various: School projects throughout Victoria	64,314 12 7
Forests Commission	Roadworks: Maffra, Otway Shires	4,710 15 6
Geelong Waterworks and Sewerage Trust	Bridgeworks: Bostock Dam Project	2,673 18 4
Housing Commission	Roadworks: Ballarat, Morwell, Norlane Housing Estates	79,623 3 4
Melbourne and Metropolitan Board of Works	Roadworks: Healesville, Upper Yarra Shires	2,443 1 10
Soldier Settlement Commission	Roadworks in Soldier Settlement Estates throughout Victoria	87,390 0 5
State Electricity Commission	Bridgeworks, Roadworks: Kiewa Valley, Morwell, Princes Highway East	39,050 7 1
State Rivers and Water Supply Commission	Bridgeworks, Roadworks: Eildon Project (Alexandra, Mansfield, Bonnie Doon), Hume Weir Project, Cairn Curran Reservoir	500,360 16 2
Victorian Inland Meat Authority	Roadworks: Ballarat	1,371 13 8
Victorian Railways	Roadworks: Morwell	105 1 0
		782,043 9 11
Commonwealth Department of Works	Construction and Sealing Works: Avalon, East Sale, Essendon and Mangalore Aerodromes, Bandiana Army Ordnance Depot, Longlea Explosives Depot, Mt. Alexander Radio Repeater Station, Wilson's Promontory; Bridge strengthening: Seymour area	143,605 3 6
		925,648 13 5

COUNTRY ROADS BOARD.

Loan Liability at 30th June, 1955.

—	£ s. d.	Main Roads. £ s. d.	Developmental Roads. £ s. d.	Total. £ s. d.
Permanent Works—				
Main Roads	6,065,552 2 8			
State Highways	4,530,566 15 0			
Tourists' Roads	55,292 10 3			
Forest Roads	1,083 18 11			
		10,652,495 6 10		
Developmental Roads		..	6,425,757 10 11	17,078,252 17 9
Discount and Expenses		188,414 13 6	239,708 19 0	428,123 12 6
Total amount borrowed		10,840,910 0 4	6,665,466 9 11	17,506,376 10 3
Less Redemption of Loans—				
Redemption Funds		85,219 1 1	646,386 7 4	731,605 8 5
Main Roads Sinking Fund		285,688 7 7	..	285,688 7 7
Developmental Roads Sinking Fund		..	55,083 0 2	55,083 0 2
State Loans Repayment Fund		962,587 14 0	..	962,587 14 0
National Debt Sinking Fund		947,280 17 0	1,349,629 12 7	2,296,910 9 7
		2,280,775 19 8	2,051,099 0 1	4,331,874 19 9
Loan Liability at 30th June, 1955		8,560,134 0 8	4,614,367 9 10	13,174,501 10 6

By Authority: W. M. Houston, Government Printer, Melbourne.