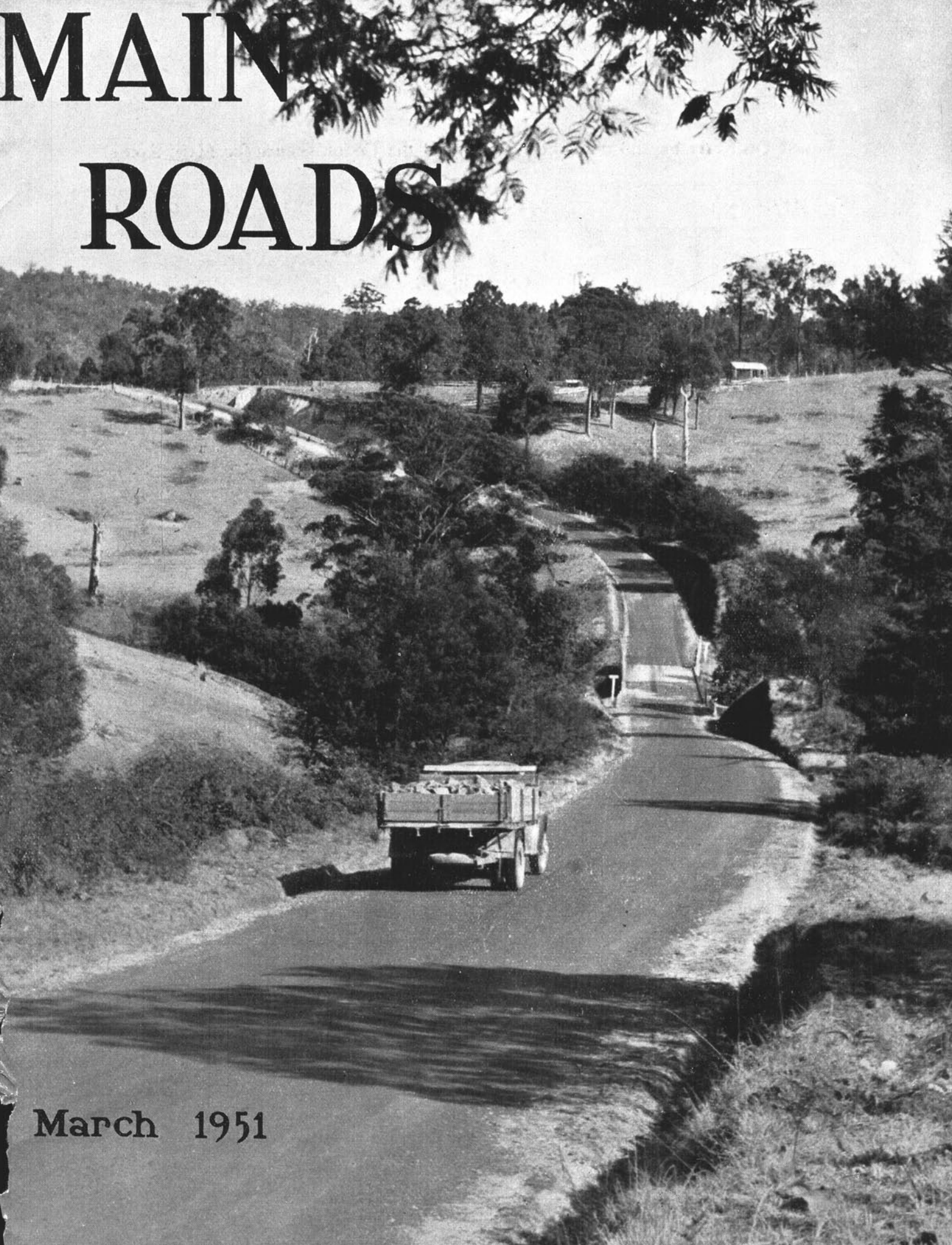


MAIN ROADS



March 1951

MAIN ROADS.

Issued Quarterly by and with the Authority of the Commissioner for Main Roads.

Vol. XVI, No. 3.

Sydney, March, 1951.

Price: One Shilling.

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Box 3903 G.P.O.

Telephone: M 6231.

Telegrams: "Mainroads" Sydney.

Annual Subscription, 4/- ; Post Free.

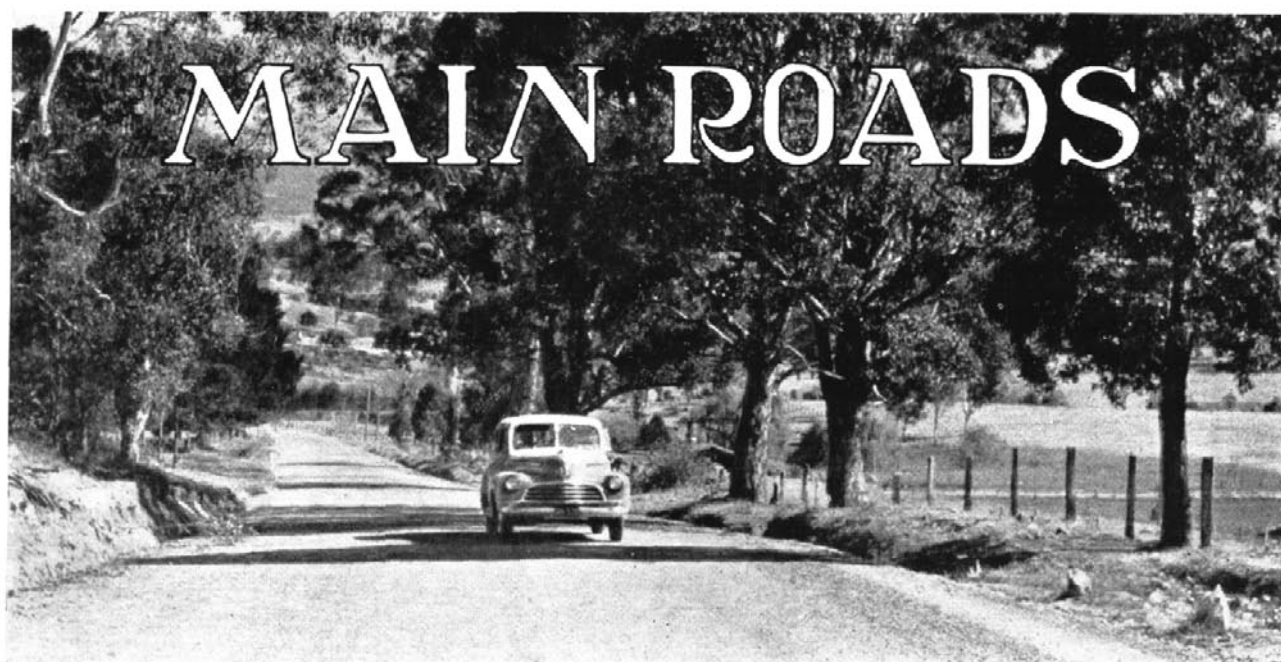
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Cover Page.

Bitumen surfaced section of the Prince's Highway S.H.1. near Couria Creek south of Tilba Tilba, Eurobodalla Shire.

Next Issue: June, 1951.

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Review of the Extent and Classification of the Country Main Roads System

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During the war years, expansion of the Main Roads system was necessarily confined to the inclusion in the system, of roads of importance from the point of view of National defence: reconstruction and improvement work was restricted largely to main roads in that category. The task of the immediate post-war period was to bring the existing Main Roads system as regards the lay-out and classification of the routes into line with present-day traffic needs and, at the same time, to ensure that, as far as practicable, alterations of route or classification would conform to future needs.

With this purpose in view a general review of the Country Main Roads system was carried out between 1946 and 1949. The area covered comprised the Eastern and Central Divisions of New South Wales, excluding the County of Cumberland in which Sydney is situated.

Investigations to determine the main road requirements of the highly industrialized cities of Newcastle and Greater Wollongong were undertaken first because

of the special traffic problems arising in and about these cities. The results of these investigations have been summarised in previous issues of this Journal, viz.: —“Planning of Newcastle and District Arterial Roads System”, Vol. XII No. 2, p. 43 and “Planning of Wollongong-Port Kembla Main Roads System”, Vol. XII No. 3, p. 86. Within the Newcastle Region outside the City of Newcastle and immediate environs, recommendations for extension or modification of Main Road routes have been deferred having regard to the planning investigations being carried out by the Northumberland County Council.

In view of the grouping of Local Government areas into Regions on the basis of community of interest and the setting up by the Government of Regional Development Committees, primarily to carry out resources surveys, the seventeen regional areas of the Eastern and Central Divisions of the State were adopted as units for the Departmental investigations.

The investigations were necessarily comprehensive, involving not only consideration of the volume, composition and direction of flow of traffic on country roads, but also the following:—

- (i) the physical resources of each region;
- (ii) the existing land use and possible future developments both in primary and secondary industries;
- (iii) the nature and extent of economic and social development;
- (iv) population distribution and trends.

The position in each of the seventeen Regions comprising the Eastern and Central Divisions of the State excluding the County of Cumberland was examined separately. The constituent Municipal and Shire Councils, 202 in all, were interviewed by Departmental Officers to obtain the views of the local authorities on the main road requirements within their areas. Any applications which had been submitted for the proclamation of new Main Roads or the reclassification of existing main roads were discussed with the Councils at the same time. The Regional Development Committees were also consulted and their views obtained regarding

developments likely to influence the flow of traffic and the lay-out and classification of main road routes.

Information assembled about conditions and developments likely to influence the flow of traffic has been represented graphically by a series of maps prepared for the purpose, both for the State and for each Region. As an example the map, fig. 1 on page 68, shows for the Richmond-Tweed Region, the present distribution of population and the growth or decline of the various centres for the period 1921-1947 in relation to the existing main roads, together with extensions and modifications of classifications of main roads now considered necessary in that area. Other supplementary maps in the series show the present land use, the physical and geological character, communications generally and the relationships between unimproved capital value, population density and road mileages.

Having ascertained the present requirements and the trends of development likely to influence the flow of traffic in each Region, the position was then examined comprehensively on a State-wide basis. The need for additions to, or alterations of, State Highways and Trunk Roads, which form the principal framework of the State's roads system, was considered in relation

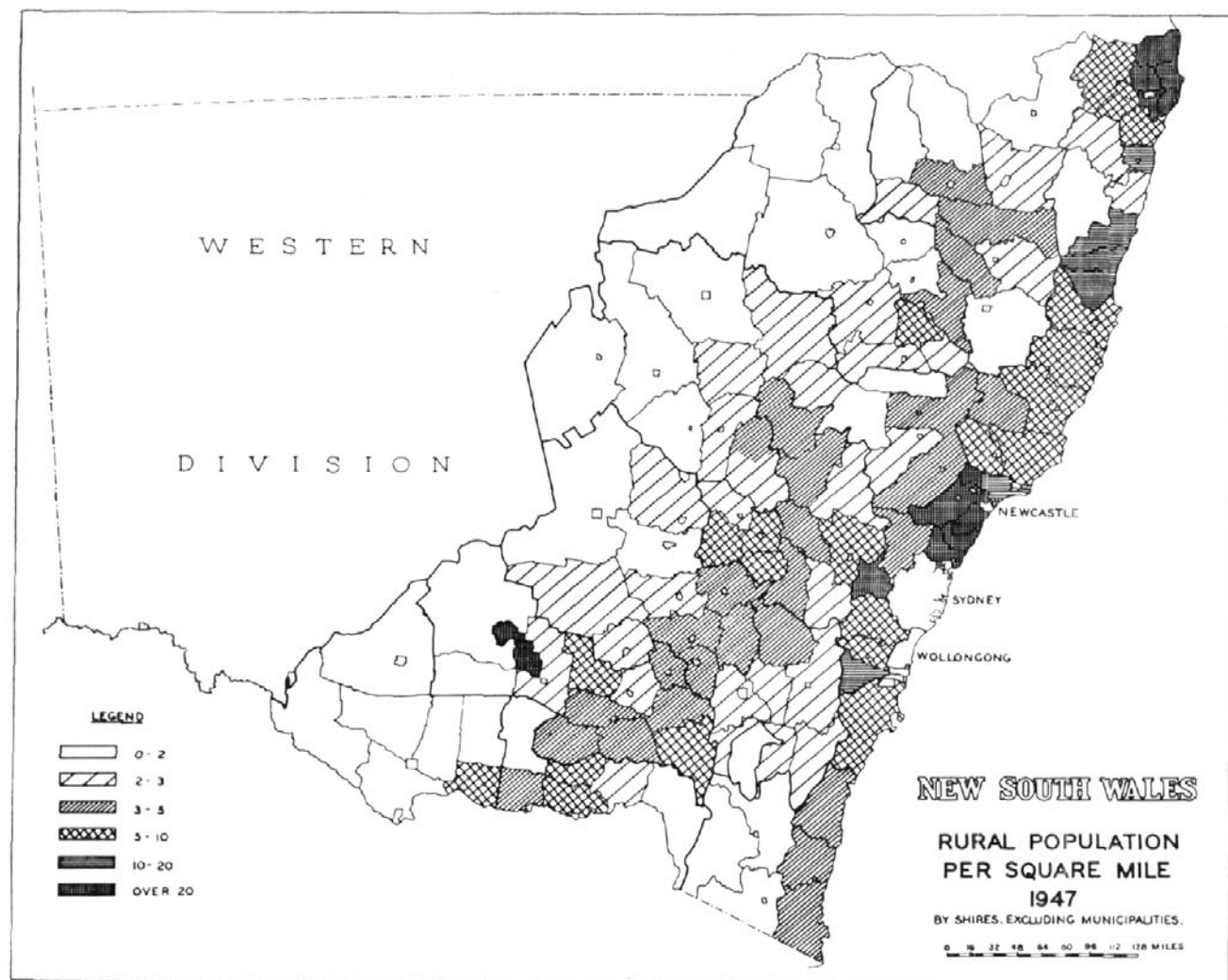


Fig. 2.

to National and State communications' distribution of population, major land uses and the broader features of State development. The accompanying maps, figures 2 and 3, show the relationship existing between rural population density and the major land use types in the Eastern and Central Divisions of New South Wales excluding the County of Cumberland.

THE GROWTH OF THE COUNTRY MAIN ROADS SYSTEM 1925-1946.

The Eastern and Central Divisions of N.S.W. excluding the County of Cumberland.

When the Main Roads Act came into operation on 1st January, 1925, roads having a total length of 12,667 miles were already proclaimed as Main Roads, these being the roads then in general use for purposes of intercommunication between towns and districts and previously proclaimed as Main Roads under the Local Government Act of 1906.

By an amendment of the Main Roads Act in 1927, provision was made for the classification, subject to proclamation in every case, of certain of the Main Roads as State Highways and Trunk Roads.

State Highways are the principal avenues of road communication between the coast and the interior, or throughout the State and connecting with such avenues in other States, and Trunk Roads are the secondary avenues of road communication forming with the State Highways, and other Trunk Roads a framework of a general system of intercommunication throughout the State.

With the classification of Main Roads, provision was also made for differential rates of contribution from the Country Main Roads Fund towards the cost of construction and maintenance of Country Main Roads, the present rates being as follows:—

State Highways.—The full cost of construction and maintenance of roads and bridges.

Trunk Roads.—Three-quarters of the cost of road construction and maintenance and the full cost of bridge construction works.

Ordinary Main Roads.—Two-thirds of the cost of road construction and maintenance and three-quarters of the cost of bridge construction works.

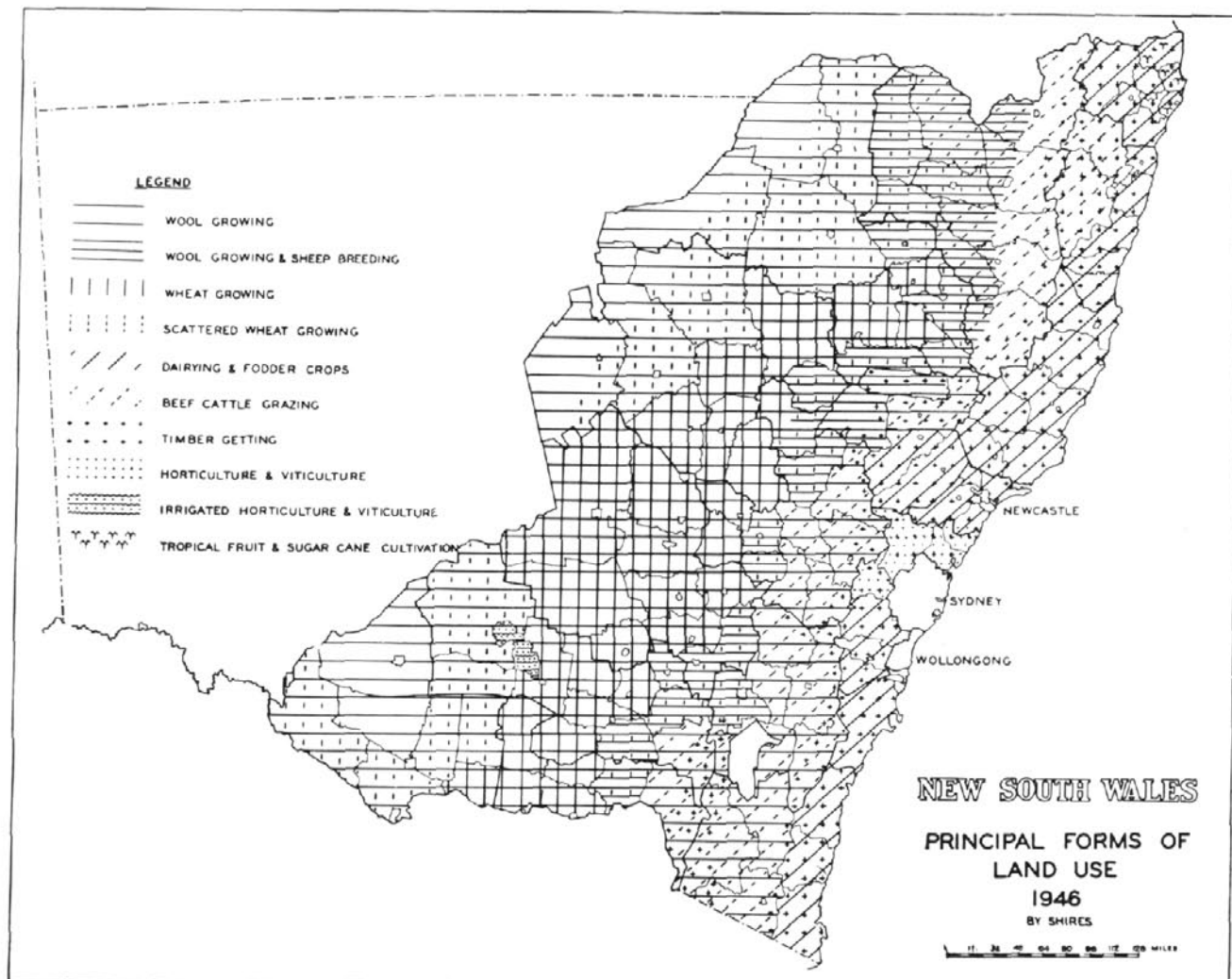


Fig. 3.

Between 1929 and 1937 the total main road mileage increased by 1,864 miles as a result of additions to the Main Roads network from time to time but there was little change in the mileage of the State Highways and Trunk Roads during that period. Following a review of the Main Roads system in 1938 the total main roads mileage was further increased in that and the following year by 1,083 miles by the proclamation of new Main Roads. This increase in the total main road mileage was accompanied by substantial additions to the State Highway routes, the mileage of which was increased by some 1,339 miles (about 36.6 per cent.). This increase resulted partly from the reclassification of roads formerly classified as Trunk Roads, and the mileage of Trunk Roads was sustained (approximately) by the reclassification of the more important Main Roads connecting the State Highway routes as extended.

The substantial additions to the State Highway routes following the 1938 review were considered to be justified by the trend of developments at that time. Considerable lengths of the roads included in the additional State Highways were sub-standard, requiring reconstruction or improvement involving major works. To some extent the additions were made in anticipation of future growth which was largely arrested during the period of the war, as was also the intended road improvement.

The increase in the total mileage of main roads during the period 1939-1946 is accounted for very largely by the inclusion in the Main Roads system of roads requiring improvement primarily for purposes associated with National defence.

Developments Affecting the Layout and Classification of the Country Main Roads System.

The more important developments affecting the layout and classification of the Country Main Roads system are summarised below:—

- (i) The phenomenal growth of motor-vehicle traffic in New South Wales over the past twenty-five years and, in particular, the increasing use of commercial vehicles, motor vehicle registrations in New South Wales increased from 95,941 on the 1st January, 1925, to 473,256 by the end of 1949. During the same period the number of registered commercial vehicles increased from 13,999 to 150,766. (See article in March, 1950, issue of *Main Roads*, p. 75).
- (ii) The growth of the population in the area under review, from 987,128 in 1921 to 1,235,479 in 1947.
- (iii) The marked movement of population since 1933 away from the rural areas and smaller country centres into the cities and larger country towns accelerating State and Regional centralization. Between 1933 and 1947 the population of the Eastern and Central Divisions of New South Wales excluding the County of Cumberland increased from 1,184,238 to 1,235,479. During this period,

population in the present country Municipalities increased from 455,382 to 548,825, whereas the Shires experienced an overall decrease in population of 42,202.

The abovementioned population changes are compared with the overall increase of population in New South Wales between 1933 and 1947 in the following table:—

Eastern and Central Divisions of N.S.W., excluding the County of Cumberland—	Population.		Increase or Decrease. Per cent.
	1933 Census.	1947 Census.	
Municipalities	455,382	548,825	+ 20.5
Shires	728,856	686,654	- 5.8
Total	1,184,238	1,235,479	+ 4.3
New South Wales*	2,595,808	2,977,317	+ 14.7

* Excludes migratory population and Lord Howe Island.

Evidence of the increasing importance of the larger towns and cities is contained in the following population figures:—

Region.	Town or City.	Population.		
		1921 Census.	1933 Census.	1947 Census.
Richmond-Tweed.	Lismore	8,700	11,762	15,214
Clarence	Casino	3,455	5,287	6,698
	Grafton	4,593	6,411	8,283
	Grafton Sth.	1,484	2,140	3,742
	Coffs Harbour	2,230	3,074	4,718
Oxley	Kempsey	3,613	4,824	6,330
	Taree	1,765	4,581	5,423
Newcastle	Newcastle	84,372	104,485	127,138
	Maitland	13,068	13,374	19,151
Sydney	Gosford	1,928	3,077	4,410
Illawarra	Wollongong	6,708	11,403	18,116
	Nowra	2,202	2,978	3,551
Monaro and South Coast.	Bega	1,933	2,277	2,856
New England	Cooma	1,834	1,969	2,249
	Armidale	5,407	6,794	7,809
	Inverell	4,369	5,305	6,530
Upper Hunter	Singleton	3,270	3,668	3,940
	Muswellbrook	2,152	3,287	3,939
Mitchell	Bathurst	9,440	10,413	11,871
	Lithgow	13,275	13,444	14,461
	Orange	7,398	9,634	13,780
Southern Tablelands.	Goulburn	12,715	14,849	15,991
	Queanbeyan	1,825	4,019	5,033
Namoi	Tamworth	7,264	9,913	12,071
	Gunnedah	2,664	3,591	4,314
	Moree	3,020	4,355	5,106
Macquarie	Dubbo	5,032	8,344	9,545
	Wellington	3,924	4,320	4,723
Lachlan	Parkes	3,941	5,846	6,897
	Forbes	4,376	5,355	5,949
	Cowra	3,716	5,056	5,473
Murrumbidgee	Wagga Wagga	7,679	11,631	15,340
	Cootamundra	3,531	4,683	5,250
	Temora	3,048	3,823	4,179
	Griffith	2,333	4,468	5,727
Upper Murray	Albury	7,751	10,543	14,412
Central Murray	Deniliquin	2,660	3,192	3,668
Total	...	258,675	334,175	413,887
Percentage Increase	+ 29.2%	+ 23.9%

Recent developments which have affected, or are likely to affect, the direction and volume of traffic on country roads in the post-war period are—

- (i) The institution of a number of large public works schemes, notably the Snowy Mountains Hydro-electric Scheme, and the various schemes of the Water Conservation and Irrigation Commission of New South Wales for irrigation and water power development.
- (ii) The development in country towns of secondary industries including textile manufacturing, cement making, wood processing and fruit packing and canning, also the proposed establishment of country-killing centres at Goulburn, Wagga Wagga, Dubbo and Gunnedah.
- (iii) Changes in the activities of butter factories in dairying districts, including—
 - (a) The closure of the smaller North Coast butter factories and the delivery of cream supplies to the butter factories of the larger towns.
 - (b) The concentration of the butter factories in the Newcastle, Sydney and Illawarra Regions upon milk pasteurization and distribution to the almost complete exclusion of butter making.
 - (c) The diversification of production in the factories of the central North Coast to include ice-cream, powdered milk and condensed milk manufacture and milk pasteurization and distribution, as well as butter production.
- (iv) The development of a number of coastal towns as tourist and holiday resorts and their consequent attraction to visitors from metropolitan and inland areas.
- (v) The increasing importance of forestry in the State's economy coupled with an unparalleled demand for both hardwood and softwood timbers.
- (vi) The development of open cut coal-mining in the northern and western coalfields of New South Wales.
- (vii) The inauguration of numerous bus services radiating from the larger country towns.

CONCLUSIONS FOLLOWING THE GENERAL REVIEW.

The Country Main Roads system was considered both from the broad viewpoint of traffic generally throughout the State in relation to State Highway and Trunk Road routes, and from the point of view of regional traffic needs in relation to those Main Roads required for communication between growing centres of population within the Regions.

State Highways. The recent investigations have revealed that in a few cases partial alteration of Highway routes is now required either for the purpose of improved inter-State communication or to provide for variation in the direction of traffic flow due to inland developments since the Highway was proclaimed. Consideration of the present trends of development and of

traffic indicates that limited additions to the State Highway routes may be required later in certain circumstances. Generally, however, the layout of the existing State Highway routes is found to provide an adequate system.

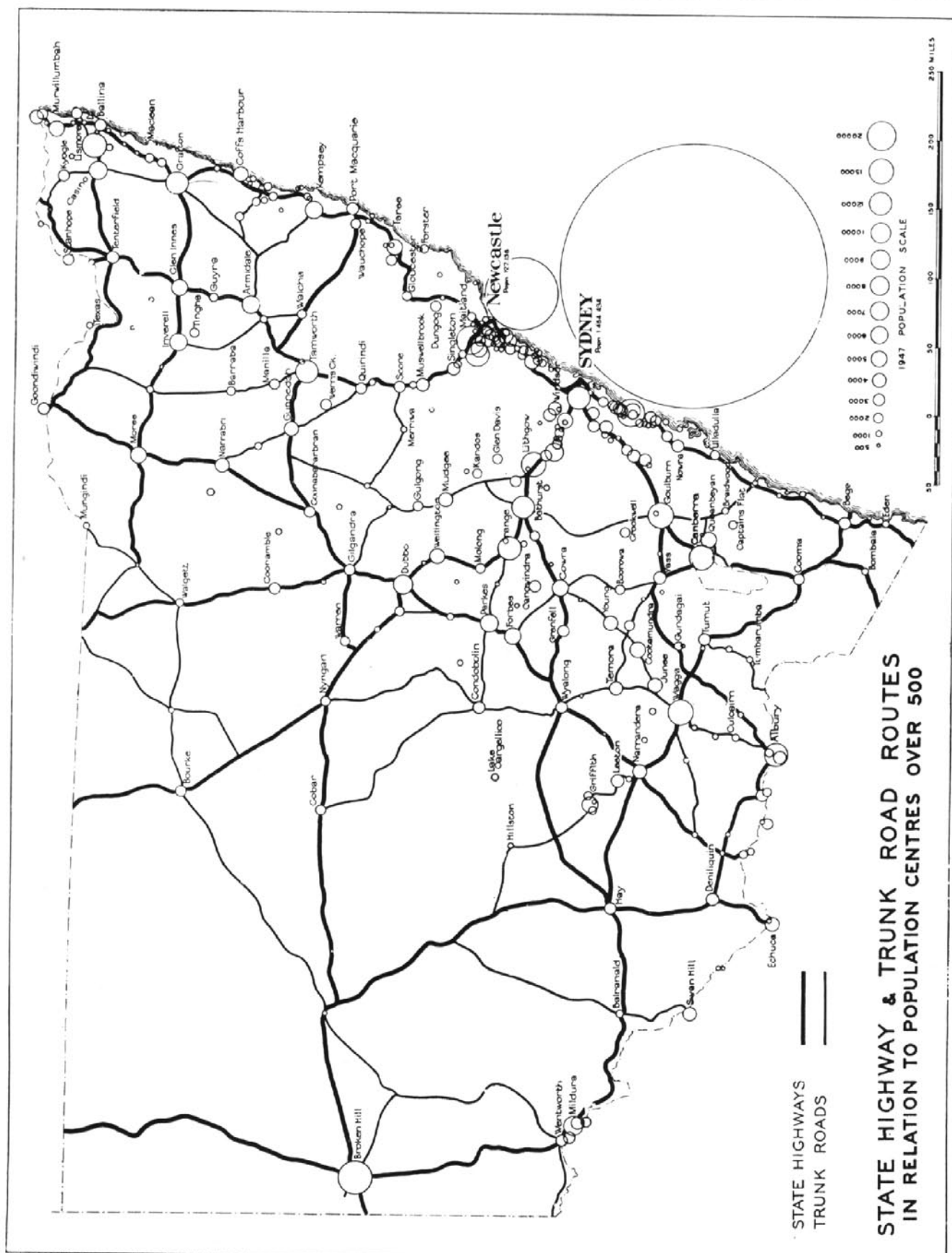
Trunk Roads. Whilst the existing State Highway routes are generally found to be adequate as regards layout, the investigations show that some additional Trunk Road connections are desirable owing to the increase in the cross-country movement of traffic resulting from increased freight transport by road and the growth of secondary industries in the larger country towns.

Main Roads. Recent developments in rural areas including the shift in population from the smaller to the larger country towns, the greater centralization of butter manufacture, the development of coastal tourist resorts, the growth of new settlements and the linking up of centres of population by developmental road construction have brought about numerous changes in the direction of traffic flow and, in total, have created a greater need in some regions than in others, for additions to the Main Roads network, a moderate increase in the mileage of Main Roads would be justified to make adequate provision for intercommunication in rural areas.

Consideration of traffic requirements generally leads to the following major conclusions:—

1. The outstanding need at this stage is for the improvement of the existing State Highway routes, which serve about 54 per cent. of the total rural population which is centred upon towns situated along those routes and which carry the larger proportion of all traffic on main roads. (See map, fig. 4.) The need for improvement of existing Highway surfaces far outweighs the need for proclamation of additional State Highway routes.
2. Next in order of need is the improvement of Regional communications by the inclusion in the Main Roads system of certain of the roads linking up growing centres of population with rail, port or Regional centres and with each other.
3. The reclassification of certain of the existing Main Roads as Trunk Roads is required to provide for the further improvement of cross-country roads which serve to connect the State Highways thereby strengthening the framework of the general system of communications.

Financial limitations and the pressing need for improvement of the existing Main Roads system in consequence of the increased weight and volume of traffic on those roads has rendered it impracticable at this stage to recommend all those extensions and modifications to Main Road routes and their classifications which investigations indicate are desirable. For the time being, therefore, it has been necessary to confine recommendations for the proclamation of new Main Roads to those routes which are now carrying traffic comparable in volume with existing Main Roads under like conditions. Similarly, recommendations for the



proclamation of Trunk Roads must be confined to the more important routes connecting State Highways where traffic conditions are comparable to those on existing Trunk Roads. As regards the State Highway routes, apart from minor extensions and alterations to several of the existing State Highways, it is not proposed to recommend any additions at this stage.

Summary of Recommendations.

Since the commencement of the review, unclassified roads having a total length of 619 miles have been recommended for inclusion in the country Main Roads system.

Recommendations for reclassification will affect the classification of 826 miles of Main Roads and, with proclamations of new Main Roads will result in nett increases of 69 miles of State Highways, 420 miles of Trunk Roads and 97 miles of Main Roads.

The alterations to the mileages of classified roads, which will result from the recommendations for proclamation, deproclamation or reclassification of Main Roads in the area under review, are given in the following table:—

Classification.	Mileage to be Proclaimed.	Mileage to be Deproclaimed.	Increase in Mileage.
State Highways ...	163	94	69
Trunk Roads ...	509	89	420
Main Roads ...	773	676	97
	1,445	849	586

The growth of the mileages of State Highways, Trunk Roads and Main Roads in the area under review is illustrated by the following graph, figure 5:—

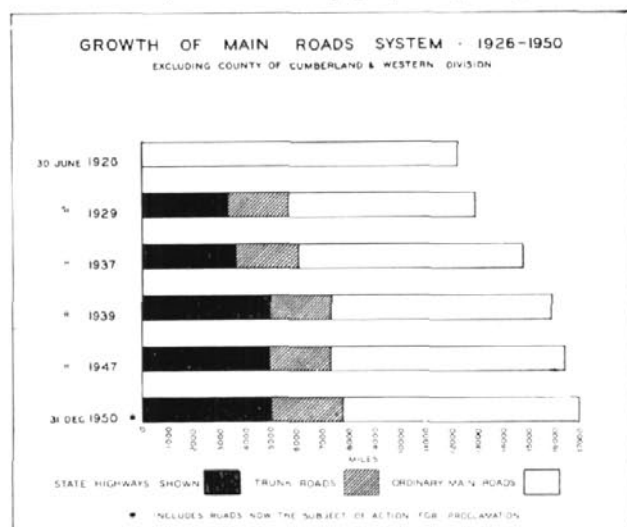


Fig. 5.

The resulting network of State Highways and Trunk Roads throughout the State is shown in relation to existing population centres of 500 and over in figure 4.

As a result of the recommendations of the review, country towns with populations of 300 and over, with few exceptions, will be directly served by classified roads, and the country Main Roads system will directly serve towns and villages which are the centres of 79.2 per cent. of the State's population outside the County of Cumberland. The extent to which the population centred upon New South Wales towns (excluding the County of Cumberland) will be served by State Highways, Trunk Roads and Main Roads is indicated in the following table and by the diagram, figure 6.

(Note.—The population centred upon towns or villages directly served by Main Roads and unclassified roads includes the number of persons resident in rural

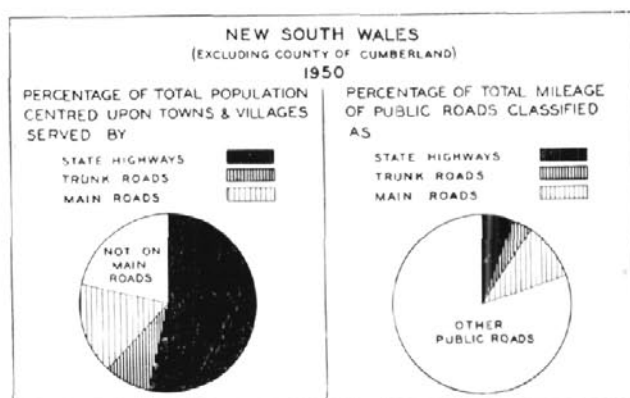


Fig. 6.

areas whose nearest town or village is situated on a Main Road or an unclassified road and is not confined to the number of persons residing within the boundaries of the town or village).

	Approx. population (excluding County of Cumberland) 1947 Census.	Percentage of Total.
State Highways	693,000	53.8
Trunk Roads (excluding centres also served by State Highways)	117,000	9.0
Main Roads (excluding centres also served by State Highways and Trunk Roads)	212,000	16.4
Not on main roads	270,000	20.8
	1,292,000	100.0

With the basic information obtained as a result of investigation of conditions in the various regions, the position will be further reviewed from time to time in the light of developments, and consideration will be given to such further extension and adjustment of the Main Roads network as may be warranted, having regard to the funds becoming available.

The History of the Prince's Highway

It was Captain Cook who filled in the first names on the map of the south coast of New South Wales, after he rounded the south-east tip of Australia in 1770. Sailing up the coast, he named a curiously-shaped mountain near the present Tilba, Mt. Dromedary. On the following day he came upon "an open bay wherein lay three or four small islands . . . This Bay seemed to afford but very little shelter from the Sea Winds, and yet it is the only likely anchoring place I have yet seen upon the Coast." (*Cook's Journal*); and named this Bateman Bay. Further north near the present Ulladulla, he observed ". . . a remarkable peaked hill, which resembled a square dove-house, with a dome at the top, and which for that reason I called the Pigeon House." In 1791 another name was added when Lieutenant Bowen, of the transport "Atlantic," entered Jervis Bay, which he named in honour of Sir John Jervis, under whom he had served in the navy.

Discovery was furthered in 1796 when Bass and Flinders, in the "Tom Thumb," sailed down the south coast as far as Lake Illawarra. They named the group of small islands out from Red Point (Port Kembla) the "Martin Isles" after the young boy who accompanied them on the voyage; the name was later changed to "Five Islands". At Red Point they were directed by natives to a small stream a few miles down the coast (the entrance to Lake Illawarra). Upon landing the voyagers were somewhat disconcerted by the crowd of curious natives who gathered about them, until Flinders devised the unusual entertainment of cutting the natives' beards, which saved what might have become an awkward situation; "I began with a large pair of scissors to execute my new office on the oldest of four or five chins presented to me, and as great nicety was not required, the shearing of a dozen did not take me long."

More information was gleaned in 1797 when Clark, a survivor of a shipwreck in the "southern strait" (Bass Strait), reported on arriving in Sydney overland from Cape Howe, the presence of coal at Coalcliff about thirty-eight miles south of Sydney. Bass was despatched to investigate and returned with a verification of Clark's report. Later in the same year on another voyage Bass landed at the present Kiama and saw the "blow-hole", and discovered and named a "little place which deserves no better name than Shoals Haven, for it is not properly a river, is very narrow at the entrance, the south side of which is formed by the rocky point." On this same voyage Bass entered and named Twofold Bay.

While on a voyage to Van Dieman's Land in 1812 Governor Macquarie "found it necessary to go into

Jervis's Bay . . . owing to the severity of the weather and contrary winds. Here he had the satisfaction to find a safe and very extensive harbour, not less than twenty miles in circumference." (*Sydney Gazette*, 11th January, 1812).

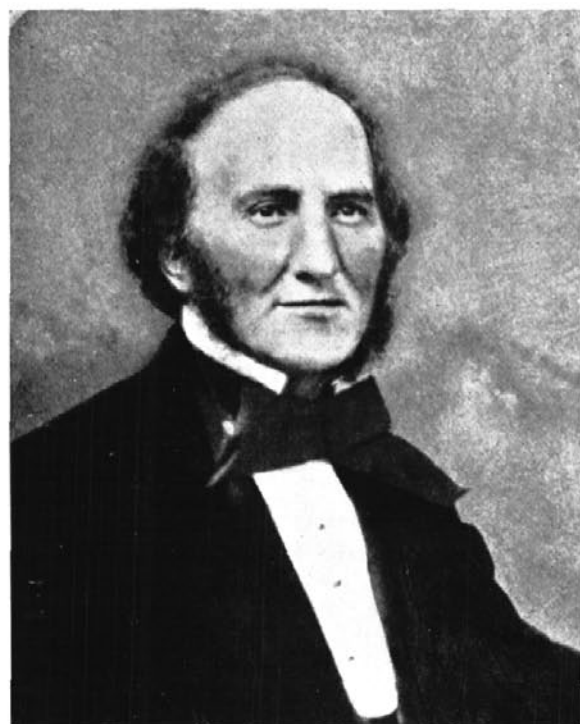
A further attempt at exploration of the Shoalhaven area was made in 1813 by Captain Collins of the "Matilda." The party landed at Jervis Bay and attempted to reach the Shoalhaven River, but was unable to proceed on account of swamps. Captain Collins' journal concludes "that a passage overland from Jervis Bay to Shoalhaven is perfectly impracticable." Hamilton Hume, a settler at Appin, gave a more propitious account of the country in 1821. "Mr. Hume left Appin . . . on the 25th November, set out on foot with nine pounds of flour, and went to the top of a high hill some miles on the south-east side of Shoalhaven River . . . Mr. Hume reports that he could without much trouble, cause a good road to be cut from Sydney to Jervis or Bateman's Bay; and also that the country is fertile and easy of access . . ." (*Sydney Gazette*, 29th December, 1821, and 11th January, 1822).

The potential value of the Bega district was first realised in 1829 when W. D. Tarlinton, a settler from Braidwood, penetrated to Cobargo and Bermagui, and later to Bega. He brought back the report of a large, undulating, fertile valley, lightly timbered and of an ample rainfall.

SETTLEMENT.

As early as 1810 unofficial settlement had begun in the Illawarra, or Five Islands, district with the arrival of cedar getters, but development was delayed for some time by the difficulty of access: "A considerable extent of fine grazing country is described by late travellers to be above the Five Islands; to which, however, it would be thoroughly impracticable to convey cattle by land." (*Sydney Gazette*, 18th March, 1815). Despite the *Gazette's* pessimistic observation, cattle were conveyed to the Illawarra by land, following the cutting of a track down the mountain, from Appin to Bulli, in 1815 by Dr. Charles Throsby of Appin, and in 1816 the first official grants were made: "Those Persons who have obtained Promises of Allotments are hereby required to avail themselves of the approaching occasion of the Surveyor being on Duty in Illawarra, to get their Locations marked out to them." (*Sydney Gazette*, 16th November, 1816).

Settlement was extended further down the coast in 1823 when Alexander Berry settled on the Shoalhaven River. Berry, a Scottish surgeon who had taken to



Alexander Berry.

trading, came to Australia with his partner, Edward Wollstonecraft, in 1819. At first the two established themselves in Sydney as merchants in the cedar trade, but attracted by the prospects of land-owning, they decided to apply for a grant in the Shoalhaven area. By tendering to maintain 100 convicts, they were given a grant of 10,000 acres, and selected the site for their home, which was called Coolangatta, at the mouth of the river. The Berry Estate prospered and grew eventually to an area of 60,000 acres.

Governor Macquarie suggested that below Shoalhaven "if a small Establishment were once formed in Jervis Bay, there might be a chain of Settlements and Farms continued from thence, till they joined those already Extended from Port Jackson to Illawarra, with Land, as well as Water Carriage all the way from Port Jackson to Jervis Bay . . ." (*Historical Records of Australia*, Volume IX). It was not till 1840, however, that the plan for a town at the head of Jervis Bay was approved. Governor Bourke chose the name Huskisson in honour of William Huskisson who became Colonial Secretary in the British Government in 1827. Development brought with it the need for some form of authority, and in 1826 a detachment of troops was stationed in the Illawarra district for the protection of sawyers and settlers against the aborigines. Settlement continued to creep further south, the Reverend Thomas Kendall arrived at Ulladulla in 1828 to make his home. The southern boundary of settlement which had been fixed at Bateman's Bay was extended to Moruya in 1829. Five towns were gazetted in the Illawarra district in this year, Five Islands, Kiama, Gerringong, Coolangatta and Ulladulla. Embryo towns were also springing up at Nowra and Bomaderry.

Settlement began in the Moruya district in 1827 by Francis Flanagan, and in 1830 by John Hawdon who had travelled down the Moruya River Valley from Braidwood. Due to the lack of overland communication the port of Broulee became the commercial centre of the district and a town was surveyed there in 1837. Bateman's Bay was surveyed in 1850. In 1860 Thomas Mort started dairying and cheese manufacture at Bodalla.

Following Tarlinton's favourable account of the Bega district in 1829, Braidwood settlers began to send cattle to the Bega pastures. Governor Bourke, who visited the south coast in 1834, reported, "Already the flocks and herds of the colonists spread themselves over a large portion of this southern country (Twofold Bay) . . . The excellence of the pastures in the part of the colony I am describing has induced the graziers to resort to it, and much of the fine wool, which is exported to England, is taken from sheep depastured on vacant Crown land beyond the limits assigned for the location of settlers". (*Historical Records of Australia*, Volume XVII). The Governor's recommendation for a town at Twofold Bay was sanctioned by the Home Office in 1836, and the town of Eden was laid out in 1843. The district of Twofold Bay extended



South Coast Road. Bulli to Kiama, 1834, from a report by Mitchell.

from Broulee to approximately the site of the present Victorian border. Three brothers, Alexander, George and Peter Imlay, had established themselves at Twofold Bay, originally with the intention of engaging in whaling, but realising the potentialities of squatting as well, they used the whaling depot as a shipping port for the produce of the district, of which they quickly became the leading citizens. In 1842 the Twofold Bay district received a fresh impetus when Ben Boyd arrived from London with a grandiose scheme, supported by a wealthy financial syndicate, for the commencement of large-scale whaling. Within two years he had acquired vast holdings, and built the prosperous and seemingly permanent Boyd Town on the south shore of Twofold Bay. But the financial backing suddenly failed in 1849 and Boyd's whaling industry and model town collapsed almost overnight. In 1851 the district was visited by Governor Sir Charles Fitzroy and in the same year the site for the town of Bega

was laid out. Eden was the port where thousands landed on their way to the Kiandra goldfields in the eighteen sixties.

SEA COMMUNICATION.

Originally, communication between Sydney and the south coast was solely by sea. When the cedar trade, which brought with it the first settlers, began in 1812, the cedar was brought down to the various ports and shipped to Sydney. For example, the *Sydney Gazette* records, "On Monday last arrived the *Speedwell* Colonial vessel from a place called Shoal Haven . . . whereat she procured a cargo of cedar said to be of good quality" (4th January, 1812). Most of the early settlers arrived by sea. Allan Cunningham on his tour of New South Wales in 1822, remarked, "a cart road will consequently never be practicable here: nearly all the produce, therefore, must necessarily be transmitted to Sydney hereafter, as now, by sea". (*Two years in New South Wales*).

Small private ships ran between Sydney and the various small ports along the south coast, bringing supplies to the settlers and taking back produce. It became the custom of many people to use their own cutters for journeys to the nearest coastal inlet, and in this way ports were opened up at Wollongong, Kiama, Shoalhaven, Jervis Bay, Ulladulla, Nelligen, Broulee, Bermagui and Eden and later at Narooma, Merimbula and Tathra. Ben Boyd in the heyday of Boyd Town ran trading ships to Sydney. John Edey Manning commenced a steamer service to Wollongong, Kiama and Shoalhaven. Aboard the "William the Fourth," a wooden paddle steamer, which took up the Wollongong run in 1845, comfort was apparently not the primary consideration, as one passenger relates, "As fifty years of prison labour had failed to produce a suitable means of communication by land, I was driven to the sole alternative of adopting the existing most unsuitable one by sea. With many misgivings I removed my household goods, my wife, my servants and a horse on board a wretched little tub of a steam boat—which it was absolute disloyalty to have named after England's Sailor-King, and which seemed to have been built expressly to disprove the omnipotence of steam as a motive agent". (*Our Antipodes*—Col. Mundy). The navigation companies which had been formed in the early 'fifties amalgamated in 1858 to form the Illawarra Steam Navigation Company, and the service was eventually extended to Twofold Bay. Communication was still primarily by sea and as well as freight there was a good passenger traffic. A steamer left Sydney for Wollongong daily, for Kiama four times a week, and for Merimbula and Twofold Bay twice a month.

RAILWAYS.

The South Coast Railway from Sydney was completed in 1893 to the northern side of the Shoalhaven River at Nowra. The South Coast Area between Cobargo and Eden is served also to some degree by the Sydney-Cooma-Nimmitabel-Bombala Railway on the Monaro Tablelands. This railway was completed to Cooma in 1889 and to Bombala in 1921.



Mitchell's map showing direct roads from Sydney to Illawarra in the 'Forties.

ROADS.

Illawarra:—Sawyers' tracks leading from small ports up the streams and into the forests formed the first means of road communication in the Illawarra district. With the expansion of settlement, the scattered centres of habitation became linked by similar tracks, which gradually developed into the first rough roads.

Because of the intervening steep coastal escarpment, overland communication between Sydney and the Illawarra district was at first considered impracticable, but reports of the fertility of the district, and Dr. Throsby's cutting of the cattle track down the mountain at Bulli in 1815, directed the attention of landholders about Appin to the previously inaccessible Illawarra area. In the same year, Surveyor James Meehan marked a line from Appin to the top of Bulli mountain.

Throsby's track remained the only route to Illawarra until 1821 when Cornelius O'Brien, a settler of the district, was pleased to inform "the Proprietors of Land in the District of Illawarra that a Track much shorter and of far less and more gradual declivity is discovered. Should the Proprietors think proper to subscribe towards the Expense of cutting away the Brush, etc., to make a passage for cattle. Mr. O'Brien will be happy to point out the track to those who may be employed on the work. It is estimated that £10 sterling from each Proprietor, supposing them to be seven in number, would be sufficient to make a Cattle Road from Illawarra to the District of Appin by the new track." Response to O'Brien's advertisement amounted to £60, and with this sum he employed six men to make the road which descended to the coast near Mount Keira. Throsby's cattle road was supplanted by O'Brien's Subscription Road, as it was called, and this route was chosen by the official party when Governor Macquarie visited Illawarra in 1822.

In the Illawarra district itself a coastal track had been developed from Bulli to the vicinity of Kiama. Here, increased settlement and the absence of any official



View from Mitchell's road down Mt. Kiera about 1850.

roads in the district caused disputes to arise among the settlers as to the location of extending tracks. One settler, J. Spearing, expressed the general dissatisfaction in a letter to the Colonial Secretary, "The whole of the land being now occupied, it is desirable that a . . . leading road in the District be laid out, from want of which, the District is in a state of continual contention, each individual taking on himself to stop the original Road." (1830). From Shoalhaven came a complaint from Alexander Berry that his property was being trespassed upon for want of a proper road. The Colonial Secretary, in response to complaints and petitions, instructed Surveyor-General Mitchell to "cause a good road to be marked through this District to suit the convenience of all Parties, as early as practicable." Mitchell considered that the construction of a road, which was to enter Illawarra from Appin, was not practicable at that time, as it was not as important as the other great roads then in progress and the means of the Road Department were not sufficient for the building of another great road, particularly considering "that the Cliffs which enclose the District on the land side, especially towards the Sydney extremity are such as to render the formation of a road, a work of great difficulty and expense". Mitchell's opposition to a new road into the Illawarra District from Appin may have been occasioned by the revolutionary proposal which he brought forward at this time—a direct road from Sydney to Illawarra. "This would cross the lowest ford on Cook's River, and George's River by a ferry, across a breadth of 250 yards, to a point

whence a continuous ridge leads in a very good direction to the heights over O'Brien's land at Illawarra. . . . a descent down the coast mountain might be made, similar to those at Mount Victoria and Wiseman's, and the road continued forward by either shore of the Illawarra Lake." This route apparently is that shown on Mitchell's map on page 75 as crossing George's River at Lugarno and proceeding south via Darke's Forest to Bulli, with a branch to Appin. It is likely that the lower ford over Cook's River was at or near the site of the existing bridge over Cook's River on the Prince's Highway, having regard to the fact that to-day Illawarra Street and Wollongong Road lead south from this point and join Forest Road which leads to Lugarno.

Mitchell relaxed his opposition to the idea of a road to the Illawarra district via Appin to the extent of stationing Surveyor Jacques in the district to make a detailed survey. The report came back that "the inhabitants along that part of the coast will require the Road to be properly set out for their use which the first accustomed tracks of 10 feet wide is not adequate, especially as the original course is lost and disputable through having been turned by almost every individual settler. Much confusion, quarrelling and litigation has ensued, and they must increase if not remedied by the proper authority directing the permanent route to be used and having it cleared two chains wide . . ." Progress was slow for in 1833 "the intended road through the districts of Illawarra," was still only being surveyed.

The urgency of the road need was the primary object of a visit to the district in 1834 by Governor Bourke. On his return he instructed Mitchell "to lose no time in marking out the road as formerly desired," i.e., via Appin. The time for procrastination was over and the dream of a direct line to the Illawarra had to wait until later years for its fulfilment.

By October, 1834, Mitchell was able to announce, "I have marked out the roads through the Illawarra district" The road commencing at Appin passed through Broughton's Pass to the top of Mt. Keira, whence, Mitchell reported, "I succeeded in marking a line by which an easy and immediate ascent may be made without much labour. This joins at the very lowest part of the range O'Brien's Road I proceeded to extend the lines Northward and Southward through the District" Northward the road extended to Bulli and southward as far as Saddleback Mountain to connect some miles inland with a line marked from Kiama to Bong Bong by Surveyor Hoddle in 1830.

Mitchell begged "to observe that the continuance of a great road further South than the Nurrima Range (Saddleback Mt.) should be considered with reference to the passage of the Shoalhaven River and the best direction for a thoroughfare through the Coast Country of St. Vincent." Mitchell was "of the opinion that the valley of Broughton's Creek would be the best direction for it to cross"

The work was to be executed by convict gangs, but Mitchell considered that it would "be necessary to clear the lines of these dense brushes, which cover many parts of them, before Ironed Gangs could be employed thereon," and suggested, "that they may be first cleared by contract, omitting, if His Excellency thought fit, the stumping, which might be part of the labour of the men in irons; breaking stones would be a part of the work, much required in the low parts (which are not,

however, numerous); whether chaining the prisoners in pairs would not contribute to their security while employed in these brushes."

The tender of one George Brown, was accepted for the clearing of the roadway to a width of four chains. The work proceeded apace; a gang of 80 prisoners was "sent from Goat Island to be employed in making a road from Illawarra to Sydney," and the convicts working on the construction of the boat harbour at Wollongong were transferred to the road work.

The Rev. Mr. Backhouse, who visited Illawarra in 1836, descended by "a rough track called the Bulli Road This road is difficult for horses and impracticable for carts, except by the assistance of ropes, passed round conveniently situated trees, by means of which, in a few instances, they have been got down." Backhouse continues, "we accompanied some of our friends in a ride along the newly-formed road, up the mountains, which is a few miles southward of the one by which we descended into the district. The whole descent is about five miles." The road was made wide enough for one carriage, but was then available only for horses as a creek on the way to Appin was still impassable without a bridge.

Approval of the new road was not unanimous; Alexander Berry voiced strong disapproval of the termination at Saddleback Mountain, "The major (Mitchell) had intended to throw a suspension bridge over the ravine and continue the road, but he found the expense of erecting the buttresses would cost £2,000, and so the affair was dropped with a loss that made the road useless."

By 1839 the new road must have fallen into considerable disrepair for the address read to Governor Gipps during his visit begged leave to call "attention to the state of the main road through the district, which has been rendered in some parts almost impassable for the last three months by the continued rains"



Scene on Bulli Pass, Prince's Highway, 1950.



View of the Illawarra district and City of Greater Wollongong from Sublime Point near Bulli Pass.

The question of the best descent down the coast mountain had raised some discussion during the building of the road, and in 1836 the position was further complicated by the discovery of a new pass by Captain Westmacott at Bulli. This new and better road was at first known as Westmacott's Pass, but later as Bulli Pass. A committee of seven reputable gentlemen who were appointed to consider the practicability of Westmacott's line, made a decision in favour of the new pass. In official quarters the preference was still for Mitchell's line down Mt. Keira, which was by that time available for carriages, the settlers having constructed a causeway of iron-bark logs across the Cataract River at Broughton's Pass. Local preference was still for Westmacott's Pass. A meeting was held at Bulli in 1857 to discuss the merits of the three passes and, when the decision was again made in favour of Westmacott's line, the tender of Thomas Heywood was accepted for £13 10s. 0d. per mile for the improvement of Bulli Pass. Apparently the improvements were not completely satisfactory; the Reverend Mr. Carruthers remarked that "the mountain ascent or descent at Bulli was too steep and dangerous for vehicles of any description to attempt with impunity," and in 1864 a deputation waited on the Minister for Lands with the request that the Bulli Pass be made available for general traffic. John (afterwards Sir John) Robertson favoured the formation of the road, but found that funds available were inadequate. However, by 1868 some improvements to the pass had been effected, and the *Sydney Morning Herald* reports, "The road to Sydney by way of this pass, has been open for some time for use by horsemen. It can now be traversed by vehicles. . . . the ascent is easy and a great saving of distance takes place, as well as the main road being made to run through instead of away from Bulli. During the past week a resident of our township drove the first vehicle to the summit and returned." (20th June, 1868.)

From Dapto part of a line north to Wollongong had been surveyed in 1829, but had been stopped up by landed proprietors. A Mr. Barrett of Dapto brought this trouble to a head in 1843 by fencing across the road in several places and refusing to allow anyone to pass. It was at this time that, "The Humble Petition of the Inhabitants of Dapto" was addressed to Sir Thomas Mitchell for "a line of road through the settlement of Dapto so as to form a direct communication with the main road to Wollongong." Mitchell marked out a line and recommended its proclamation as a Parish Road.

Further south "His Excellency the Governor . . . having deemed it expedient to open and make a Certain Parish Road from Kiama . . . to join the great south road leading southwards towards the Shoalhaven River," a line for a road from Kiama to Jamberoo was marked out by Surveyor Burnett in 1839. A party of convicts worked on the road for some months, but the work did not meet with the approval of the local landholders who decided to perform the work themselves. Trustees were appointed and a subscription list opened to obtain funds. This line of road from Kiama to Jamberoo was declared a Parish Road and in 1844 a toll bar was erected and the tender of John Bele for £53 per annum was accepted for the right to collect tolls.

Gerringong residents addressed a petition to Governor Gipps in 1841 "That your Petitioners grievously labouring under the many disadvantages arising from the Want of a practicable Road on the south side of Kiama do humbly pray your Excellency That you may be pleased to allow a continuation of the Jamberoo Parish Road to be surveyed through Kiama as far as Gerringong . . ." A new line was then marked to Gerringong to replace the old track which wound round the headlands.

Jamberoo, from the time of the construction of the two parish roads, was on the mail route from Sydney to Kiama, but with the advent of rail to Kiama, the mail route and subsequently main road were changed and Jamberoo was by-passed.

The care of the main road from Bulli to Saddleback Mountain and of the two recently-constructed parish roads from Jamberoo to Kiama and from Kiama to Gerringong was entrusted to the Illawarra District Council, elected by the freeholders of the area from North Illawarra to Jervis Bay. The task of maintenance was heavy for the newly-created Council whose attempts to secure revenue from toll roads outside Wollongong and Kiama were without success. In 1852 the Council surrendered its task and the Councillors in future were nominated by the Government.

Direct Route to Illawarra:—While the establishment and improvement of the route from Sydney via Appin to Illawarra was being gradually accomplished, the revolutionary idea of a direct road which had first been proposed in 1831 by Mitchell, was again examined and resulted in Mitchell being instructed to survey a new and shorter route to Wollongong.

As mentioned earlier, in 1831 Mitchell had announced that the projected line "would cross the lowest ford at Cook's River and George's River by ferry and follow a ridge down the coast mountain." After a further survey in 1843 Mitchell was able to report, "I succeeded in marking a line, not only remarkably straight between the two points given, but which does not cross a single watercourse between the head of the navigation of the Woronora and the point of Bulli on the Illawarra Coast . . . The passage of George's River may be established at once by a Punt, as I found, at the very best point for this general line to Illawarra old landing places on each side, and a road of access now passable for carts and which leads southward to where I propose to cross the Woronora." Mitchell was firmly convinced of the benefits that would accrue from the construction of this new road; it would bring into the market "much more land than would cover the expense of making this line passable and the Punt at George's River available," and it would enable "the mail cart from Wollongong to come to Sydney by a route at least twenty miles shorter than that now followed via Appin."

The coast road southward from Sydney at this time extended to Cook's River. The *Sydney Gazette* comments that, "The Cook's River road is every day becoming more a favorite drive with our Sydney folks. The fast increasing pretty village of New Town, and farther on the starch manufactory of Mr. Wilson . . . render it particularly attractive at this time of the year." (September 12, 1833), and that a "Mr. Prout has just finished a large and substantial punt at his residence, Cook's River, capable of conveying a loaded waggon and a team of bullocks across the river with perfect ease and safety. This will no doubt prove of very great advantage to the settlers in that district, as they may thus save a distance of six miles in their journey to Sydney, and avoid a long range of bush



Locality sketch showing route of the Prince's Highway between Sydney and Bateman's Bay. Earlier routes shown by dotted lines.

road, at times almost impassable, owing to the want of necessary repairs. Indeed, the settlers in the district of Cook's River have long complained of the want of a proper road to the capital; much of the inconvenience hitherto sustained, however, will now be remedied through the exertions of Mr. Prout." (August 1st, 1833).

Mitchell, commencing from Cook's River, marked out the course of the new road via Lugarno, Menai, Woronora and Heathcote to the top of Bulli Pass. He then sent Assistant Surveyor Roderick Mitchell, his son, to make an exact survey. The survey was soon afterwards taken over by Assistant Surveyor Darke, who was invested with the powers of a district magistrate so that he would be able to enforce discipline among the convict gang. Darke and his men surveyed and cleared the line. By May, 1845, Darke had reached Bulli, when he was warned by the Surveyor-General that "any descent into the valley of Illawarra is likely to interfere with the District Council's operations, with

which you must have nothing whatever to say . . . The object of the Government is the carrying of the road along the ridge not only to the present Bulli road, but across it to the descent at Mount Keira."

A regular punt service worked by a tow-rope began at Lugarno, and the first contract for the operation of

the ferry service was let to Charles Rowan in 1843. Assistant-Surveyor Darke received instructions: "the widening and foundations necessary to complete the way up to be completed before removal of tow-line; gravel to be spread on rough broken stone on this side of river; the wharf landing on the opposite side to be placed so as not to impede any possible permanent work, such as a bridge." The Woronora ford was improved to make it passable for carts.

Contrary to Mitchell's expectations, the direct road to Illawarra did not supplant the old route via Appin, primarily because that road connected the established towns of Parramatta, Liverpool and Campbelltown, which last became the rail head for Sydney transport in the 'fifties. In addition, the land from George's River to Bulli through which Mitchell's road ran had small attraction for settlers on account of poor soil.

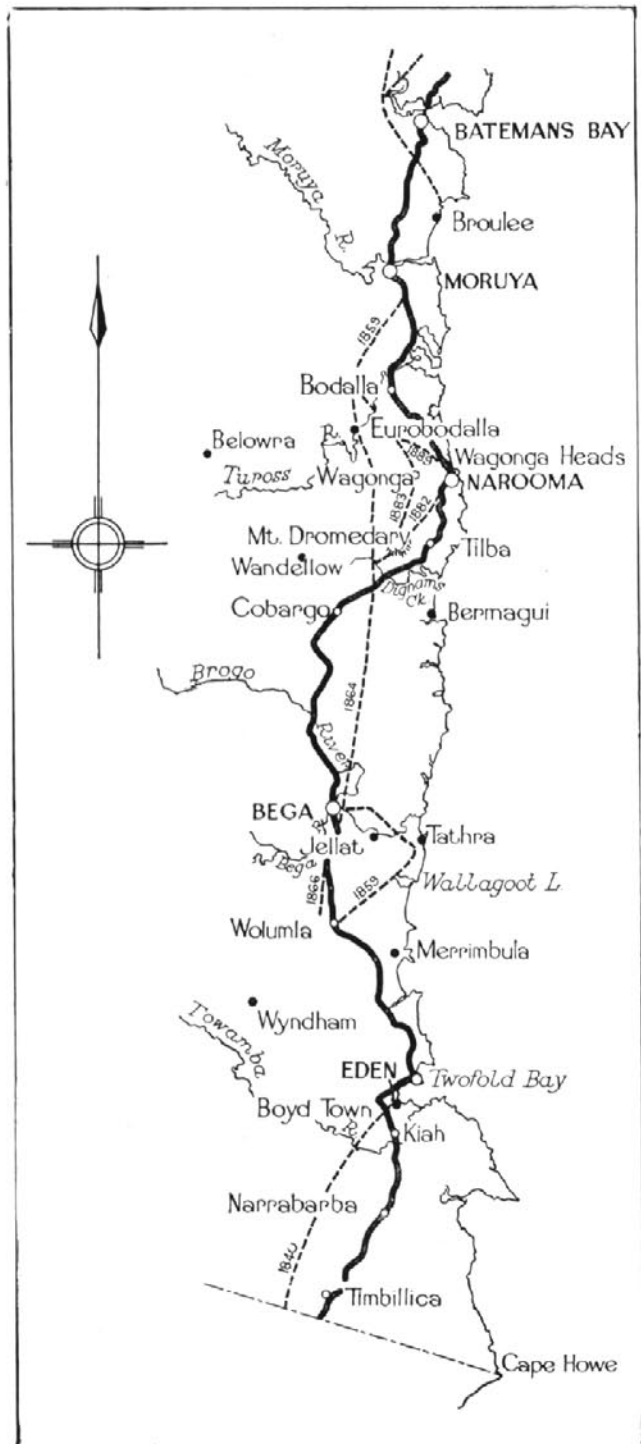
Following the extension of settlement at Kogarah and Rockdale the river crossing at Lugarno was transferred downstream to Tom Ugly's Point. The change threw into disuse that part of Mitchell's road from Lugarno to Bottle Forest (Heathcote) and necessitated the laying out of a connecting line from Tom Ugly's to Bottle Forest. This was executed by Surveyor Parkinson in 1864.

The year 1868 saw the first wheeled vehicle travel the road south from Tom Ugly's Point and descend the pass at Bulli. In 1870 its condition was still very poor and the Legislative Assembly voted £400 for its improvement. The *Illustrated Sydney News* observed that if the road were not made more passable for produce a year or two would see it overgrown for want of traffic. Three trustees were appointed to superintend the work, and it was "hoped and believed that a new line (16 feet 6 inches in width) of thoroughly trafficable road will be formed from the landing place facing Kogarah."

By 1874 the road had been cleared to a width of one chain and a carriageway 25 feet wide formed. The improvements to the direct road and the fact that it was so much shorter than the Appin road attracted increasing traffic from this time and eventually the new line entirely supplanted the line via Appin and became the main road from Sydney to the Illawarra district.

Shoalhaven:—The establishment of a road from Sydney to the Shoalhaven district was first mooted in 1817, when Governor Macquarie visualised a settlement at Jervis Bay "with Land, as well as Water Carriage all the way from Port Jackson to Jervis Bay." Throsby on his return from exploration of the area in 1818 reported that a good road could be made from Shoalhaven to Jervis Bay. There was no action from these suggestions, nor from Hamilton Hume's offer to "cause a good road to be cut from Sydney to Jervis or Bateman's Bay."

With the coming of settlers to the Shoalhaven district, connecting bridle tracks were formed between settlements. Although complaints from Shoalhaven assisted in the laying of a road in the Illawarra district in 1834, the line surveyed by Mitchell, terminating at Saddleback Mountain, was of small avail to Shoalhaven



Locality sketch of Prince's Highway between Bateman's Bay and the Victorian border. Earlier routes shown by dotted lines.

residents. Alexander Berry Voiced a vain protest against the uselessness of the road to his district. The area was still without land communication with Sydney. A meeting held at Kiama in 1841 to discuss the extension of the road from Saddleback Mountain to Shoalhaven was without result.

The plight of the settlers gained some official recognition in 1856 when Surveyor Shone was required to mark a line from Gerringong to Broughton Valley (Berry), and to report on the expediency of extending the line to Bomaderry. Apparently official action was delayed and Alexander Berry privately had the road from Gerringong extended to Broughton Valley and later to Bomaderry (1858).

Up to this time and before there was any real attempt to form a south coast road beyond Gerringong, Numba was the important town in the district, being the site of a ferry over the Shoalhaven River. Travellers crossed the Crooked River near the present Toolijooa and then proceeded via Seven Mile Beach and across the Shoalhaven River at Numba. But when the road was extended from Broughton Valley to Bomaderry the ferry was moved to Bomaderry, and Numba's importance faded. Bomaderry was in turn outstripped by Nowra when a bridge over the Shoalhaven River was built there in 1881.

As late as 1868 a land journey to Shoalhaven was still evidently not customary. Alexander Berry recorded, "I occasionally visit Shoalhaven, to which there is steam communication twice a week." The construction of the road from Gerringong to Bomaderry by Berry was not his only contribution to communications in the district. As he explained to the Rev. George Walker, "I have a new project on the tapis which is to erect two Roman Municipia on my property at Shoalhaven, which delights the Tenantry as they will be enabled to construct their own roads and bridges." In 1868 the Municipality of Numba was proclaimed and the council asked Berry for control of the roads and bridges constructed by his estate, these comprising all but one road in the district. Berry's roads were proclaimed and passed under the control of the Council, which then set about the systematic clearing and stumping of roads and the construction of small bridges and culverts. Rates collected for road construction were small and supplemented by a Government subsidy. One of the first concerns of the Council was the improvement of the road to Gerringong and contracts were let in various sections, some at 15s., some at 17s., and some at 19s. 6d. a chain, and a tolerable road from Gerringong to Nowra was eventually established.

Bateman's Bay District.—Overland communication to districts lying south of Nowra was also not continuous from the north, and access was usually gained by rough bridle tracks which led from the tableland to the coastal ports and settlements. From Braidwood, on the tableland, four routes led to the coast: the Wool Road extending across Pigeon House Range to Jervis Bay; the Clyde Mountain Road to Nelligen on the Clyde River; a road via Araluen and the Moruya River which led to Moruya and the port of Broulee; and a bridle



Typical view on the Prince's Highway about 15 m. south of Narooma, Shire of Eurobodalla.

track which led southwards from Braidwood along the tableland to Mt. Eurabene and then through Belowra and Wandellow to Cobargo and Bermagui. Such tracks were usually very rough and followed spurs and ridges to avoid low-lying areas, watercourses, etc.

Like the Illawarra and Shoalhaven areas, the Bateman's Bay district experienced unofficial and piecemeal road building. Nelligen was the port for the surrounding district and in 1839 a petition was addressed to the Colonial Secretary for a road from Braidwood to Bateman's Bay whereby the Braidwood district settlers "might ship their wool and receive supplies."

Road communication from Sydney along the coast to the Bateman's Bay district was still impracticable as late as 1856, when the only access from Sydney was either by rail to Goulburn and thence, via Goulburn and Braidwood, or by steamer.

North of Bateman's Bay the road was merely an old bush track which passed through steep and broken country and crossed some hills known locally as the Cockwhy Range. Surveyor Bundock, who was sent to the district in 1883, considered this route unsuitable for a possible main road and proposed a deviation to avoid the ascent and descent of the Cockwhy Range by following the lower levels along the Cockwhy Creek Valley. Due to the expense of the several bridges and culverts which the new line would necessitate and to the opposition of landowners who had cleared and cultivated properties there, Bundock's suggestion remained only a suggestion until 1930. However, in that year surveys were made in connection with a proposed deviation which was constructed in 1937 and now forms part of the route of the Prince's Highway.

Mails were carried between Nelligen and Moruya by packhorse in the fifties via Rummyford. From Moruya an inland route through the ranges extended south to

Bodalla and linked with Eurobodalla, Wagonga and the Bega Valley settlements. The Moruya-Bodalla section was replaced by a coastal line across the flats and over the Tuross River marked by Surveyor Rowlands, in 1859. This new road was said to be in "a fearful state" in 1863.

River crossings throughout the district aroused strong dissatisfaction and several drownings occurred; mails were often lost or arrived in damaged condition owing to swollen streams. It was not until the seventies that improvements began to be effected. At Moruya a punt had been established in the early fifties, the ferryman buying the rights for £15 10s. od. per annum and making what he could of it, but in 1858 the amount was raised to £60 per annum. The punt, which was not large enough to take a cart or dray or more than three horses at a time, was hardly adequate for the needs of the district and evoked strong criticism. Complaints against the Moruya punt became so insistent that the construction of the bridge was begun in 1875 and completed in 1876. "Mr. Clarke, M.P., in a speech declared the bridge to be open for public use free of toll, and the ceremony of smashing the bottle of brandy was performed by Mrs. Clarke."

Following the marking of the road from Moruya to Bodalla in 1859 a toll ferry was established at Trunketabella on the Tuross River, and did service for twenty years. The road then extended over its present route from Nowra to Milton then to Brooman (to avoid Burrill Lake), Currawan (to avoid wide deep crossings of the Clyde River), Nelligen, Runnyford, Mogo, Moruya and Bodalla. A bridge over the Tuross River replaced the ferry in 1879.

Further improvements on river crossings were effected in 1871 with the establishment of a punt at Bateman's Bay and the route via Currawan, Nelligen and Runnyford lost its importance.

Traffic along the roads connecting the coastal towns at this time consisted of horse and bullock teams conveying the produce of the district. Passenger traffic was not catered for with any degree of comfort, although the position was improved when Edward Corrigan installed a line of coaches between Bateman's Bay and Moruya in 1862.

Bega—Twofold Bay District.—In the Bega district roads first developed from the original cattle tracks of the Braidwood settlers who began to pasture their cattle there in 1829. A rough bridle track ran from Braidwood via Belowra, Wandella and Brogo to Twofold Bay. Produce was carried by packhorse or bullocks to the ports whence practically the only communication was by sea.

Road building was then purely a private matter in the district. Many settlers supplemented their incomes with road making contracts. The construction of a private road is narrated by Alexander Weatherhead, who settled at Timbillica in 1842. He describes how the Ben Boyd company "got drays for sale both new and second-hand, so some of us got a dray then we wanted a road to get out and in, but we did not apply to the Government, I don't think we ever thought of the like. We went to work and cleared a road from Timbillica

to the Kiah River, about 25 miles. Another private road was built from Bega to Tathra in 1857 and a bridge over Jellat Creek in 1860. Road communication with Sydney was still unrealised; the mail service from Sydney to Bega which was instituted in 1856 came by horseback via the Monaro Range. In 1889 the railway was extended to Cooma, which then became Bega's nearest rail town.

Roads of some kind must have existed from the early forties when the Walker brothers of Bega brought the first wheeled vehicles into the district. An official line was surveyed in 1859 by Surveyor Spenser Bransby from Merimbula via Wallagoot Lake and Jellat to Bega. In 1864 the Government extended the road from Moruya via Eurobodalla and Wagonga to Bega. This line was extended to Wolumla by Surveyor Heady in 1866, and a horse dray began to ply weekly between Bega and Merimbula. The Government-built road from Moruya to Bega occasioned the observation from the *Moruya Examiner* that on that road "the Bishop of Goulburn had to travel in his carriage escorted by a body of armed attendants, that is armed with axes to clear the way." (1875).

Alexander Weatherhead on a trip from Wyndham to Bega in the late forties contributes another picture of the times, "I saw a man mending some of the worst places by putting bushes in the holes and then covering them with earth, so that it looked better till a heavy load came along. One always expects to see things better as they come towards a town, in that I was not disappointed, at least I saw that they had a different way of filling up the bog holes. There was then a nasty hole on the south side where Frog's Hollow bridge is now, when I got there the hole was filled up, not with bushes, but with a dead bullock, a worker, I suppose, it appeared to fill the hole nicely."

An alternative route from Moruya to Bega was opened up in 1883 between Bodalla and Dignam's Creek. Eight miles shorter than the old road, it ran through Wagonga and Tilba Tilba and skirted the south-eastern side of Mt. Dromedary to meet the former road at Dignam's Creek. The new route became the mail road for several years, but in 1889 a new detour was made to pass through Wagonga Harbour (Narooma). Narooma was connected to Tilba Tilba by road in 1882 and to Bodalla in 1889; this line eventually became the route of the main road. Some traffic still followed the original route via Eurobodalla. The faithful chronicler, Alexander Weatherhead, reported of his trip from Bega to Moruya, "As I went by way of Eurobodalla, I came back by Tilba Tilba, but could not say much for the road either way." The coach service which ran from Nowra to Cobargo in 1893 accomplished the journey in 31 hours.

About the end of the seventies the wagon track between Cabargo and Bega crossed the Brogo Mountain, known locally as "Brogo Pinch". An easier route through the Brogo Pass was opened about 1885.

As in the Bateman's Bay district, river crossings were troublesome in the Bega district. Sometimes the Bega river could not be crossed for the whole winter. The want was remedied to a certain extent in 1867, when a settler named McGregor made a log raft which

could carry eight to ten people. This soon proved inadequate and was replaced in 1878 by a bridge built by Daniel Gowing, known as the Queen's Truss Bridge, it had the largest spans in the colony at that time.

A bridge over Narira Creek at Cobargo was opened in 1882 and a bridge at Brogo was completed in 1885.

At Narooma the need for a punt at Wagonga Heads become more pressing after the mail route detoured to Narooma in 1889. The Government did not see fit to establish a ferry at the time, incurring sharp censure from the *Moruya Examiner*. "The Government has refused to place the ferry across the Wagonga Inlet . . . because the assistant engineer . . . said it was not required . . . the only traffic was to each side of the water; good reason why there is no means of crossing it." (1890). Popular demand eventually secured a hand-propelled punt at Wagonga Harbour in 1894. For two years there was no puntman, those crossing operating the punt themselves. With the establishment of this ferry, the route via Wagonga was superseded. Towards the end of the century a continuous road was in existence between Sydney and Eden.

PRINCE'S HIGHWAY.

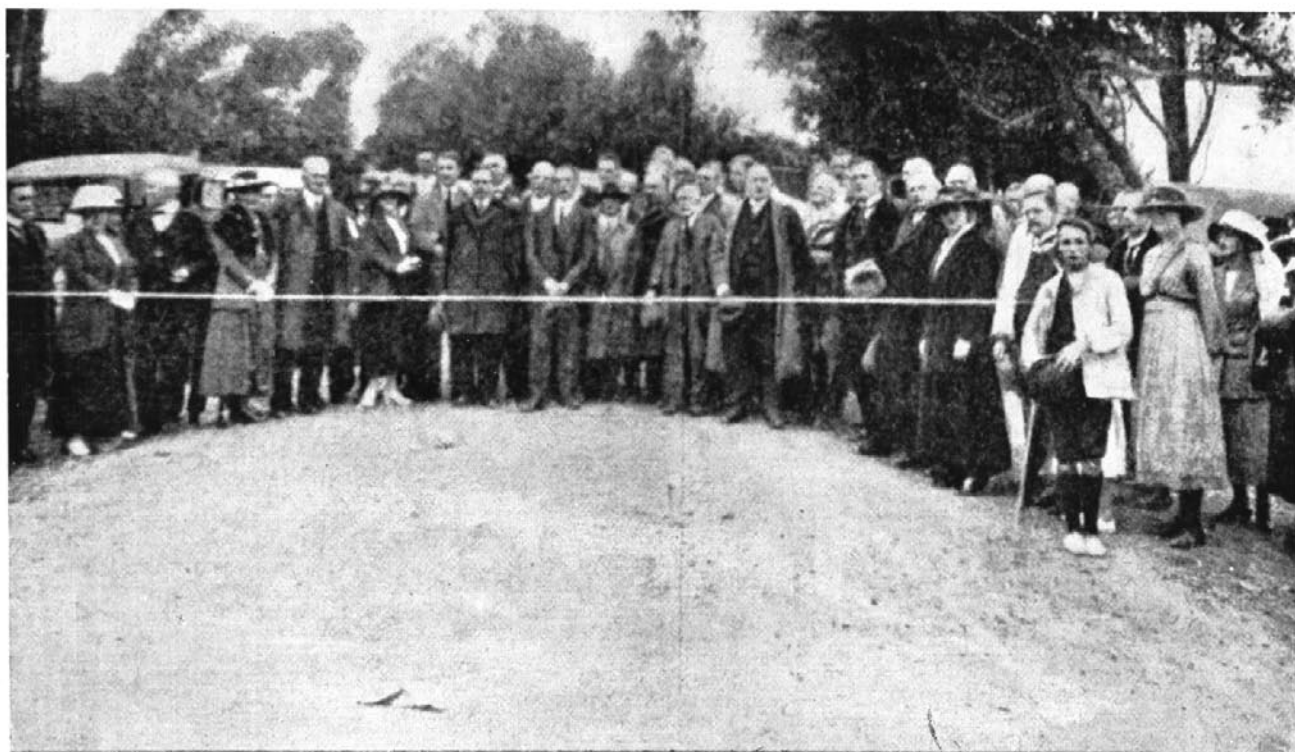
The Prince's Highway to-day is one of the four main arterial highways radiating from Sydney. It passes through some of the most beautiful coastal country in the Commonwealth, and on this account alone, attracts great numbers of travellers. In addition, in the absence of the railway along the coast south of Nowra, the Highway acts as the main feeder between the South Coast and Sydney.

During the visit to Australia of the Prince of Wales in 1920, the National Roads Association secured the approval of His Royal Highness to the naming of the coastal route from Sydney to Melbourne and thence to Adelaide as the Prince's Highway. The National Roads Association held an opening ceremony at Bulli on the 19th October, 1920. A photograph of the ceremony is reproduced on this page.

The road was formally reproclaimed as the Prince's Highway (State Highway No. 1) in 1928, the route extending from the City of Sydney at the corner of Cleveland Street and City Road, via Newtown, Tom Ugly's Point, Sutherland, Waterfall, Bulli Pass, Wollongong, Minnamurra, Kiama, Nowra, Ulladulla, Bateman's Bay, Moruya, Narooma, Cobargo, Bega, Merimbula and Eden to the Victorian border.

From the passing of the Local Government Act in 1906 to the passing of the Main Roads Act in 1924, improvement to the road in isolated sections had been effected by the Councils. Although the route was generally trafficable from Sydney to the Victorian border as early as 1910, it was not until 1925 that positive steps were taken to improve the road as a whole to meet the increasing demands of motor transport.

Soon after its inception in 1925, the Main Roads Board arranged with a number of the Councils for the reconstruction or construction of portions of the Highway that were in urgent need of attention. Subsequently the Department assumed full responsibility for the care, maintenance and construction of the whole



Opening of the "Prince's Highway" at Bulli, 19th October, 1920. Ceremony performed by Hon. T. D. Mutch, M.L.A., Minister for Local Government, under the auspices of the National Roads Association (N.S.W.).

length of 342 miles of the Prince's Highway between Sydney and the Victorian border, with the exception of a short section through Wollongong.

The extent of reconstruction or construction as originally required was, however, such that it could only be undertaken over a period of years. In order to improve conditions for traffic in the meantime, the Department, under annual maintenance and improvement programmes, undertook extensive minor works throughout the full length of the existing highway where reconstruction had not been commenced. These works included widening of existing formations and pavements, improvements to crests and curves, elimination of V-gutters by construction of culverts, erection of safety fencing, guide posts, strengthening of pavements, etc. The result has been that while many miles are still much below the general standard of design and construction aimed at, they can be travelled in comfort and safety, in practically all weathers.

The Prince's Highway has been reconstructed and provided with a bituminous surface continuously from Sydney to Moruya, a distance of 192 miles. The Highway from Moruya to the Victorian border is 150 miles long, of which approximately 33 miles has a bituminous surface, and 14 miles has recently been reconstructed. Reconstruction and bitumen surfacing is being continued to the extent that available resources permit.

ACKNOWLEDGMENTS.

Material for this article has been obtained from:—

Mr. B. T. Dowd, Department of Lands.
The Mitchell Library, New South Wales.
The Royal Australian Historical Society.
The Illawarra and South Coast Steam Navigation Company Limited.
The Rural Bank.
Sister Bernice Smith, Member of Illawarra Historical Society.
J.M.E.

PAYMENTS FROM THE ROAD FUNDS FOR PERIOD 1st JULY, 1950, to 31st DECEMBER, 1950.

	Amount Paid. £
COUNTY OF CUMBERLAND MAIN ROADS FUND:	
Construction of Roads and Bridges	340,630
Acquisition of Land and Buildings for Road Widening	30,762
Maintenance of Roads and Bridges	371,996
Interest, Exchange and Repayment of Loans	31,708
Other Expenditure	68,921
Total	£844,017
COUNTRY MAIN ROADS FUND—	
Construction of Roads and Bridges	663,564
Acquisition of Land and Buildings for Road Widening	7,102
Maintenance of Roads and Bridges	1,566,567
Interest, Exchange and Repayment of Loans	72,502
Purchase and repair of Plant and Motor Vehicles	224,253
Other Expenditure	142,130
Total	£2,676,127
DEVELOPMENTAL ROADS FUND—	
Construction of Roads and Bridges	14,766
Other Expenditure	1,257
Total	£16,023
SUMMARY ALL FUNDS—	
Construction of Roads and Bridges	1,018,960
Acquisition of Land and Buildings for Road Widening	37,864
Maintenance of Roads and Bridges	1,938,563
Interest, Exchange and Repayment of Loans	104,210
Purchase and Repair of Plant and Motor Vehicles	224,253
Other Expenditure	212,317
Total	£3,536,167

Manufacture of Road Signs

Signs for use on Main Roads are manufactured at the Department of Main Roads Central Workshop, Granville. The signs may be divided into four main groups, as follows:—

- (1) *Warning signs*—which convey to the road user by words or symbol the nature of special road conditions ahead.
- (2) *Direction signs*—which indicate towns and their mileage along a route.
- (3) *Information signs*—which give local government boundaries, town names, stream names, etc.
- (4) *Temporary signs*—which indicate that road or bridge works are in progress, and guide traffic past any point where works encroach on the travelled way.

WARNING SIGNS.

Warning signs in the past were made of pressed steel, by contract, but shortage of steel has necessitated the use of resin-bonded waterproof plywood, and they are now manufactured by the Department of Main Roads. The signs are cut from 1-inch thick standard 6-ft. by 3-ft. sheets, three signs being cut from each sheet. Surplus material is used for making attachment pieces on the back of the signs, through which pass the bolts fastening the sign to its post. This arrangement obviates passing the bolts through the board, with the possibility of rust stains on the face of the sign.

Warning sign blanks are cut in batches of at least fifty, templates being used to save time in marking out. After cutting, edges are smooth-rounded on a high-speed spindle moulder, and are then ready for incising. Incising of letters, figures and symbols is carried out to facilitate subsequent repainting of signs, as when incised, no great skill is required in repainting, which can be done in the field without removal of signs. Incising is carried out by the use of a routing machine. The first step is to assemble the required letter or figure guides in a frame in their correct relative positions. Arranging the guides in the frame calls for care on the part of the operator, as good or bad spacing can make or mar the appearance of a sign. The assembly is then correctly located on the board, and the incising operation is carried out by the use of the routing machine, to a depth of one-sixteenth of an inch. As well as facilitating repainting, incising also ensures constant uniformity in style of lettering. The routing machine is manually controlled, and contains a 3 h.p. motor driving a cutter at speeds of up to eighteen thousand revolutions per minute. After incising, the signs are examined and any small roughness removed by sand papering. With some classes of timber, furry edges are left after incising. These are corrected by burning-off with a blow lamp.

The boards are next drilled for reflectors, if required, and the attachment piece previously mentioned is fixed to the back of the board with waterproof nitro-cellulose glue and with brass wood screws. The sign is then



Routing machine
incising letters
through guides.



Inserting reflectors
in warning sign.

given three coats of paint by brush application—a primary coat of oil paint, a second coat of semi-flat oil paint, and a third coat of matt-finish oil paint. When dry, the incised symbols and lettering are painted with black oil paint.

Finally the reflectors, or "cats-eye", are driven into the holes previously drilled, a hard-setting mixture of

white lead, plaster of paris and gold size being used to cement the reflectors into the holes. After drying, the signs are packed in sisalkraft or similar wrapping for transport. Reflectors used are in three sizes, viz., $\frac{3}{8}$ -in., $\frac{5}{8}$ -in., and $\frac{7}{8}$ -in. diameters and the size of reflector to be used is determined by the size of the lettering in the sign. In most instances, $\frac{3}{8}$ -in. and $\frac{5}{8}$ -in.

Typical warning and
direction signs.



Stencilling temporary signs by silk screen process.



diameter are satisfactory for inserting in lettering or figures, but $\frac{7}{8}$ -in. diameter reflectors are normally used in red triangles and symbol signs.

DIRECTION SIGNS.

Direction signs are usually made from 8-in. by $1\frac{1}{2}$ -in. softwood, such as colonial pine, carabeen or oregon. As the length of the sign varies in accordance with the number of letters in the name and of figures in mileage, the boards are cut and machined by hand. Incising and painting are carried out in the same manner as for warning signs.

INFORMATION SIGNS.

Information signs are made in similar fashion to direction signs, except that the width of board is varied in accordance with the information to be displayed, as well as its length. In some cases, large signs are made of 8-ft. by 4-ft. by $1\frac{1}{2}$ -in. thick resin-bonded waterproof plywood; in other cases, solid timber is jointed, glued and made up into solid boards to meet the requirement. Sufficient thickness is allowed for fixing of reflectors when necessary.

TEMPORARY SIGNS.

Temporary signs are of various standard sizes and shapes, some being circular, 2-ft. in diameter, others 6-ft. by 2-ft. 6-in., 7-ft. by 2-ft., and so on, but standard size, lettering and colours are maintained for all signs conveying the same warning, *e.g.*, all "BRIDGE WORKS IN PROGRESS" signs are 6-ft. by 2-ft. 6-in., and are painted white with black lettering. All "BLASTING-STOP" signs are 3-ft. 8-in. by 2-ft., with white lettering on a red ground, and all

"DETOUR" signs are 7-ft. by 2-ft. with an arrowhead indicating direction, and are painted yellow with black lettering.

The process of manufacture of these signs is different from that of the others, to the extent that no incising is done and the signwriting is carried out by the silk screen stencilling process. Signs are made from $\frac{1}{4}$ -in. resin-bonded waterproof plywood sheets edged with a light steel channel to minimise fracture of the edges with rough handling. The paint treatment of the base board is the same as for all other signs.

The stencils are made by fixing a special screening silk to a metal frame. After stretching and fixing the silk to the frame, the stencil, which is cut from a specially glued paper, is applied to the silk by ironing with a hot iron, the heat causing the glue to melt and penetrate the silk, thereby giving perfect adhesion. The stencil is then ready for use, the paint, when applied by a rubber squeegee, passing through the uncovered portion of the silk screen on to the signboard and forming the lettering of the sign. By this method, signs are produced very much more quickly than by manual sign-writing.

Silk screens last for many years, provided they are properly washed after use with a paint solvent which does not affect the glue or paper, and provided they are correctly stored and carefully handled. Some screens at the Department's Central Workshop have been in use for nine years and are still serviceable.

Temporary signs are also made on calico and sisalkraft, these being economical to transport and store, and can be readily kept in stock to meet emergencies. The signs are made under contract. In use, calico and sisalkraft signs require wood backing and frame.

The reflectorised red triangle is made in a jig from three identical pieces machined from $1\frac{1}{2}$ -in. timber, which are glued and screwed together in the jig. All red triangles are equilateral and measure 2-ft. 6-in. along the outside of each side. Drilling for reflectors is done to jig. Painting is carried out in red enamel in contrast to the matt-finish of all other signs, there being no writing on these signs. The gloss of the enamel adds to the visibility by day, and assists with

reflection by night. Reflectors are fixed after painting.

Barrier boards are made from 8-in. by $1\frac{1}{2}$ -in. softwood, 10 feet long. The Department's initials "D.M.R." are burnt into the board by hot-iron branding. Boards are then given three coats of paint as for other signs, finishing with yellow. Black diagonal lines are painted on the yellow background, being first marked out by template.

PUBLICATION OF TABLES OF TRIGONOMETRICAL FUNCTIONS

In the land survey work of the Department of Main Roads there has been a need for tables of trigonometrical functions for every ten seconds of arc, to six places of decimals.

In 1885 tables of this kind, but for natural sines and cosines only, were compiled under the direction of the then Surveyor-General, the late P. F. Adams, and published by the Department of Lands, and in 1942 the Department of Main Roads arranged for the reprinting of these tables, with amendments. In 1948, when it again became necessary to consider reprinting the tables, it was decided to extend their scope. Accordingly, by arrangement with the Surveyor-General, Mr. D. S. Mulley, the Department assembled tables of natural sines, tangents, secants, cosines, cotangents and

cosecants, carried to six places of decimals, for every ten seconds of arc, with proportional parts for reduction to every one second. These were printed and published by the Government Printer in 1950.

Much consideration was given to the arrangement of the tables, and the form in which they have been printed was adopted only after consulting practising surveyors and others who constantly use such tables. Particular attention was paid to the size and spacing of figures, the quality of the paper and the provision of a suitable cover.

Copies of the tables are available to the public, and can be obtained from the New South Wales Government Printer, Sydney.

SYDNEY HARBOUR BRIDGE ACCOUNT.

Income and Expenditure for period 1st July, 1950, to 31st December, 1950.

<i>Income.</i>		<i>Expenditure.</i>	
	£		£
Road Tolls	253,219	Cost of collecting road tolls	20,140
Contributions—		Maintenance and minor improvements	31,316
Railway Passengers	67,054	Alterations to archways	286
Tramway Passengers	7,025	Construction of new Toll Barrier and Office	3,724
Omnibus Passengers	6,582	Administrative Expenses	1,720
Rent from Properties	6,546	Loan Charges—	£
Miscellaneous	81	Interest	116,500
		Exchange	12,300
		Sinking Fund	33,750
		Management Expenses	1,000
			163,550
		Miscellaneous	573
	<u>£340,507</u>		<u>£221,309</u>

Main Road Reconstruction to Serve Snowy Mountains Hydro-Electric Works

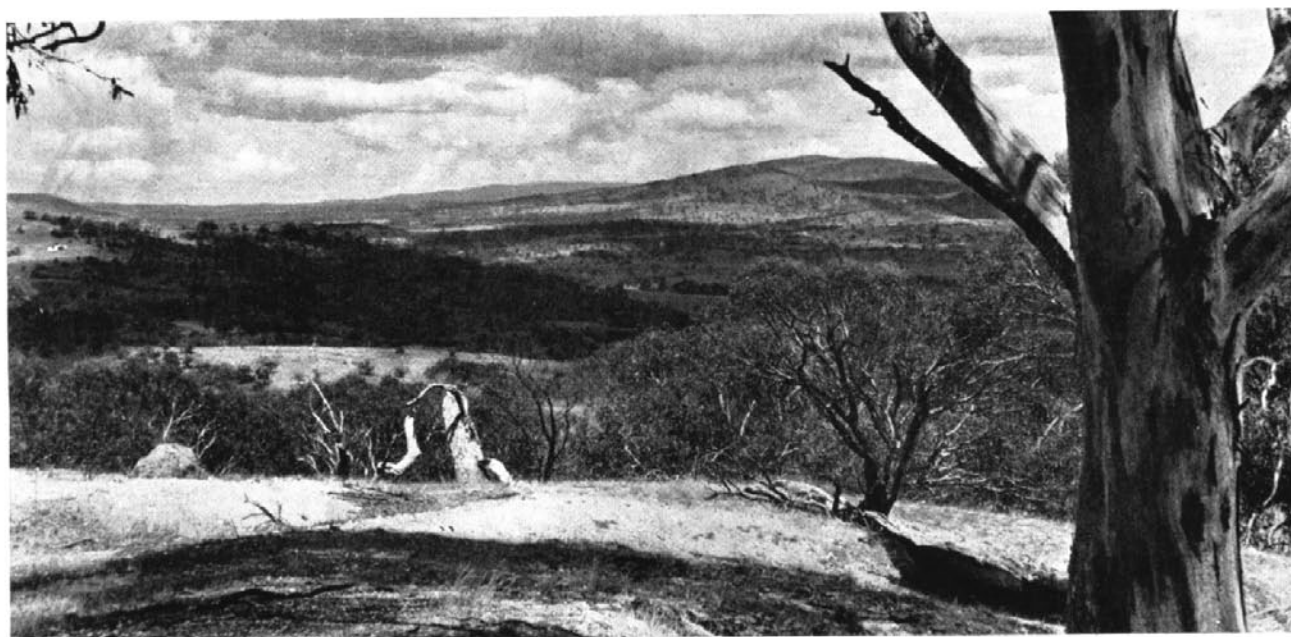
Following the setting up of the Snowy Mountains Hydro-Electric Authority in 1949, the need arose for substantial improvements to those main roads which lead from Cooma, the railhead for the Commission's principal operations, towards the site of large works to be carried out by the Commission. The main roads concerned are the Monaro Highway (State Highway No. 4) and the Cooma-Jindabyne-Mt. Kosciusko Road (Main Road No. 286). Further, some 6 miles of Main Road No. 286 and some 7 miles of the Monaro Highway will be submerged by the backing-up of water at dams to be built by the Authority, and require to be re-built on new locations. Main Road No. 287 also will be submerged to the extent of about 4 miles.

The Authority approached the Department of Main Roads regarding the carrying out of the required works on main roads, and the Department in co-operation with the Snowy River Shire Council, undertook to meet the needs of the Commission. The Department and Council also agreed to share in the cost of the main road works by contributing the present worth of the estimated cost of future improvement to a standard appropriate for normal traffic. About 85 miles of main road are involved.

Existing Conditions.—Prior to the inception of the Authority in 1949, State Highway No. 4, between Cooma and Adaminaby, and Main Road No. 286, each had a gravel surface only, with the exception of a short

length in Cooma on State Highway No. 4 and 4 miles on Main Road No. 286 near its junction with the Highway, which had received bituminous surface treatment. Sections of the country traversed are rough, particularly towards the Jindabyne end of Main Road No. 286, and the alignment involved curves with a radius as small as 50 feet and grades up to 12 per cent. The Department's and the Councils' programmes provided for progressive improvement of these roads, and at the end of 1949 the reconstruction (including bituminous surfacing) of State Highway No. 4 was in hand from Cooma to the junction with Main Road No. 286 by both Departmental and Monaro Shire Council's organisations. In addition, approximately 4 miles of bituminous surfacing as previously referred to had been completed on Main Road No. 286 adjacent to the Highway, and a further length of approximately 4 miles was in hand by the Snowy River Shire Council.

Design Standard Adopted.—In view of the large volume of heavy traffic to use the Main Roads after reconstruction, it was apparent that a strong pavement would be necessary, and that width, alignment and grading would need to be much superior to those on the existing roads. On the other hand, the roughness of much of the country and the nearness of hard rock to the surface indicated that there was an economic limit to achievable standards of alignment and grading. The design standard finally adopted for the road



Country north of Jindabyne through which M.R. 268 is to be relocated.

construction between Cooma and Jindabyne and between Cooma and Adaminaby varies from 50 m.p.h. to 30 m.p.h. according to the roughness of the country. In view of the very great volume of heavy haulage, upgrades on the outward journey from Cooma will be limited to 6 per cent. and on the inward journey to $7\frac{1}{2}$ per cent. The pavement will be 18 feet wide and will consist of a gravel base varying in thickness according to the supporting value of the sub-grade with a surface course of bituminous mixture of three inches total finished thickness.

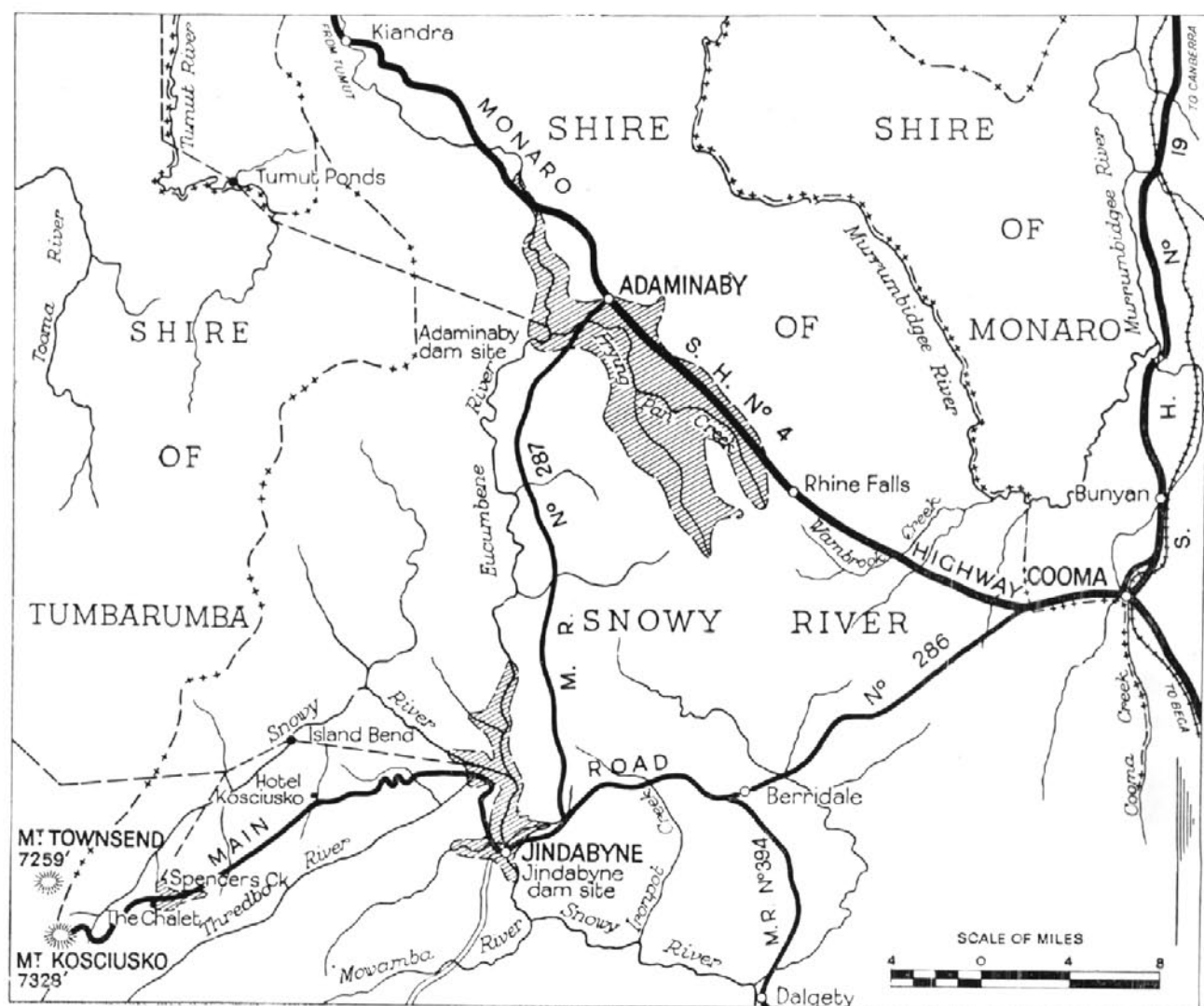
Assistance by Commission.—The Snowy Mountains Hydro-Electric Commission undertook to supply the bulk of the plant required for the work, quarters for employees, and some cottages for staff. It has also facilitated the supply of New Australian labour. The rate of work up to date has been controlled largely by the extent of plant available.

In view of the severity of the climate and the extent of the road work, it is desirable that all staff and employees be accommodated in huts, rather than tents.

The offer of the Snowy Mountains Authority to provide huts for the Department's employees similar to those in its own camps was therefore accepted. These huts are shown in the photograph on page 91. The huts, which are sheeted inside and out with fibro cement, are divided into single sleeping cubicles, each 9 ft. by 7 ft. Ample cooking, messing and ablution accommodation, including hot water service, have been provided. Similar facilities have been provided for Council employees on Main Road No. 286.

Single men on the staff are accommodated in huts at the depot, whilst the Authority has undertaken to provide houses for married men in the Authority's housing area now under construction on the outskirts of Cooma. Three houses are already occupied by members of the Department's staff.

Work Undertaken.—As soon as work was authorised to proceed, the Snowy River Shire Council commenced operations on Main Road No. 286, generally in the form of reconstruction along the existing road. At the same time the Department accelerated work already in



Locality map.



Cottage erected by Snowy Mountains Hydro-Electric Authority for married officer.



Huts for employees at Wambook Camp, about 10 m. west of Cooma.

progress on the Monaro Highway and extended this in the direction of Adaminaby. Surveys, aided by photographs, were also put in hand, and are still proceeding.

The Department's main depot is sited fronting State Highway No. 4 about one mile west of Cooma, and is connected to the Cooma water and electricity supplies. The principal buildings are of timber.

Following a decision to give first priority to the Spencer's Creek-Island Bend portion of the scheme, the Authority asked that the strengthening of the Kosciusko Hotel-Spencer's Creek section of Main Road No. 286 be proceeded with as a matter of urgency. The elevation of this section is from 5,000 feet to 5,800 feet, and snow makes effective work in the winter impracticable. Strengthening of the existing gravel pavement was started in December, 1949, and was continued until May, 1950. It was re-opened in October last, when work on drainage was undertaken. Conditions remained unfavourable for major earthworks and gravelling until December.

As next priority to the length between the Hotel and Spencer's Creek, a start is now being made on the same road between Jindabyne and the Hotel. As will be seen from the sketch plan, approximately 6 miles of the existing road will be submerged by the impounded water. On this length improvements to alignment and grade will be kept to the practical minimum to carry the construction traffic. This length, as well as the submerged section on the Cooma side of Jindabyne, will eventually be replaced by a road on a new location crossing the Snowy River on or adjacent to the wall of the dam and connecting with the township of Jindabyne in its future site. The Department previously met the full cost of maintaining Main Road No. 286 between Jindabyne and the summit of Mount Kosciusko, and carried out the work with its own forces. The Department is therefore also undertaking the improvement work now required on this length.

The number of men at present employed by the Department is 100, but these will be greatly increased



General view of Department's Main Depot and Local Office, 1 m. west of Cooma.



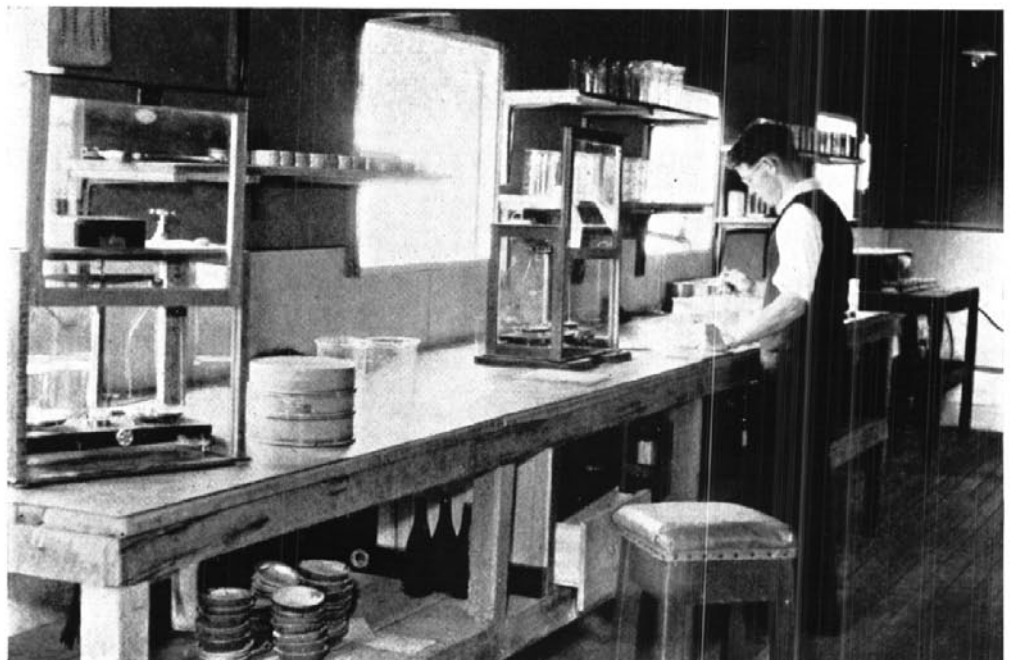
Work in progress
between the Hotel
and Spencer's Creek,
Mt. Kosciusko.
(M.R. 286.)

when the balance of the heavy earth-moving and crushing plant to be supplied by the Authority becomes available.

Materials.—In view of the magnitude of the work and the extremely heavy traffic to be carried by the road pavements, full emphasis is being placed on the testing of the sub-grade and gravels and on the control of

gravel supplies to ensure that all the material used conforms to the Department's standard rules. The organisation has accordingly been equipped with a full scale testing laboratory. This laboratory, which is staffed with an engineering analyst and testing operators, will carry out all the testing required by the Snowy River Shire Council as well as for the Department. The laboratory will also deal with the design

Road Materials testing
laboratory.



of the mix and testing of the 100,000 tons of bituminous mixtures required for surface course. Some testing is also being undertaken for the Authority pending the provision of facilities of its own.

The crushed stone required for the main road work already requested by the Authority amounts to approximately 100,000 cubic yards, and the testing of quarry

sites is in hand in anticipation of delivery of the crushing plants.

Control.—The work is under the control of Mr. R. W. P. Hirt, Divisional Engineer, South Coast Division, Bega. From the start of the work until September, 1950, the position of Resident Engineer, Cooma, was occupied by Mr. R. J. S. Thomas. The Resident Engineer is now Mr. F. A. Relf.

Tenders Accepted.

The following tenders (exceeding £1,000) were accepted by the Department during the period 1st October, to 31st December, 1950.

Council.	Road No.	Work or Service.	Name of Accepted Tenderer.	Amount.
.....	...	Supply of 1,300 tons of steel reinforcing bars, f.o.b. Glasgow.	Norman W. Hutchinson (Agents for Colville's Ltd., Glasgow).	£ s. d. 38,080 0 0 Sterling.
Lake Macquarie S.	10	Bridge over Lake Macquarie at Swansea. Contract No. 1 for manufacture, supply and delivery of metalwork and machinery.	Maschinenfabrik Augsburg-Nürnberg, A.G. Werk Gustavsburg, West Germany.	32,164 7 2 (Aust.).
Rockdale M.	2032	Construction of bridge over Muddy Creek near Bruce Street.	Robert Porter ...	11,055 5 3
Ryde M.	165	Adjustment of premises Nos. 2 and 4 Wharf Road, Gladesville.	R. W. Bateman Pty. Ltd.	3,180 0 0

The following Tenders (exceeding £1,000) were accepted by the respective Councils during the period 1st October to 31st December, 1950:—

Council.	Road No.	Work.	Name of Accepted Tenderer.	Amount.
Coolamon S.	387	Supply and delivery 8,342 c. yds. gravel ...	F. R. Grundy ...	£ s. d. 1,748 0 8
Crookwell S.	243	Spraying and supplying binder ...	B.H.P. By-Products Pty. Ltd.	1,203 17 11
Goobang S.	249	Supply, delivery and spreading 2,094 c. yds. gravel ...	E. Short ...	1,125 10 6
Guyra S.	73	Construction of R.C. bridge over Sandy Creek ...	Fraser Bros. ...	10,763 4 0
Hunter's Hill M.	2003	Reconstruction of shoulders in ballast and penetration macadam.	W. B. Carr Construction Pty. Ltd.	2,252 10 2
Kyeamba, Mitchell and Yanko Shires.	2	Supply of 3,565 c. yds. aggregate for surfacing ...	Murrumbidgee Sand and Gravel Co.	3,342 3 9
Lachlan S.	230	Supply, delivery and spreading 4,500 c. yds. gravel ...	R. E. Scarce ...	2,025 0 0
Macintyre S.	1207	Construction 0 m. to 5½ m. east from Woodstock Road ...	Frost and Spriggs ...	9,564 18 6
"	135	Construction of three R.C. Box Culverts and approaches at 27.4 m., 28.9 m. and 30.85 m. from Inverell.	"	3,300 0 6
Murrumbidgee S.	14	Supply, delivery and spreading 21,384 c. yds. loam ...	Hardie & Co. ...	4,000 0 0
Narraburra S.	398	Construction of Box Culvert at 3 m. from Arianah Park ...	E. Selmes ...	2,939 15 0
Tenterfield S.	9	Bitumen surfacing 450.41 m. to 461.33 m. ...	Construction Services Pty. Ltd.	2,823 13 2
"	9	Supply of 3,064 c. yds. aggregate to 461.33 m. ...	Frost and Spriggs ...	4,596 0 0
Timbrellongie S.	342	Supply and delivery of gravel and loam at various locations	J. C. Wooden ...	1,898 5 10
"	354	" " " " " " " "	" " " "	2,528 16 0
"	354	" " " " " " " "	" " " "	" " " "
Tumut, S.	4	Supply, delivery and spreading gravel ...	F. R. Delaney ...	2,634 0 0

Councils Make Progress on Developmental Roads

Further Works Completed

MACLEAN VIA TULLYMORGAN TO THE RICHMOND RANGE: DEVELOPMENTAL ROAD No. 1049: SHIRE OF HARWOOD.

Developmental Road No. 1049 commences at the Ashby Ferry at Maclean and proceeds for 11.12 miles via Tullymorgan to the Richmond Range at the junction of the roads to Bannyabba and Coraki.

It was proclaimed in January, 1926, as far as Tullymorgan, and re-proclaimed in 1938 to include the further length extending to the junction of the Bannyabba and Coraki roads. The object of proclamation was to assist production and settlement by providing access to agricultural areas which are elevated, free from frost, and suitable for growing beans, tomatoes, peas, potatoes, maize, sugar cane and dairy fodder.

The road also provides access to heavily timbered country carrying hardwoods, good paspalum flats which are suitable for dairying and undulating ridge country, which is devoted mainly to dairying and agriculture. The access tracks to these areas were previously very rough and almost impassable in wet weather.

The road for 7.24 miles from Maclean has been constructed by Harwood Shire Council with Developmental Road funds with an 18 feet wide gravel pavement; the remainder of the road has a formed sandy surface 14-18 feet wide. The work has been carried out by contract at a total cost from the Developmental Road funds of £10,814.

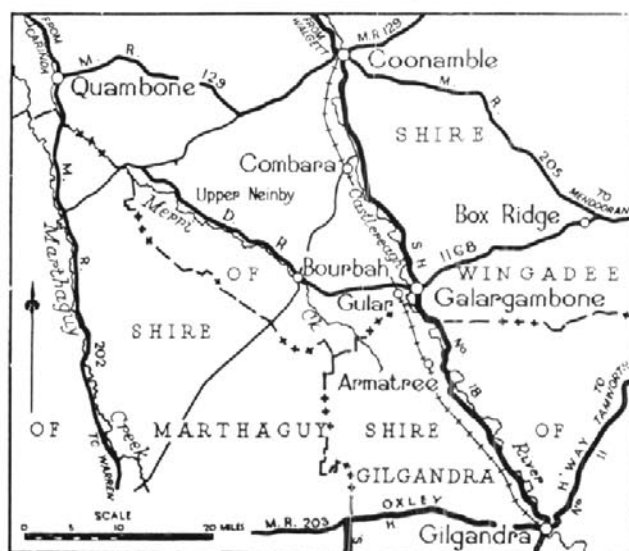
The opening of two timber mills near Tullymorgan within the last few years and the increase in dairying and agricultural products marketed give tangible proof of the part played by the road in developing this part of the country.

Plans for further improvements on this road include an extension of three miles towards the Richmond Range to provide access to further areas suitable for dairying and agriculture.



GULARGAMBONE TO QUAMBONE: DEVELOPMENTAL ROAD No. 1168: SHIRE OF WINGADEE.

Developmental Road No. 1168, proclaimed in February, 1937, commences 12 miles from Quambone, then proceeds via Bourbah, Gular railway station and Gulargambone to Box Ridge, a total length of 59 miles. The road provides access to State Highway No. 18 at the village of Gulargambone, which is the main business and social centre in the southern portion of Wingadee Shire, and to the railway at Gular.



Several Developmental Road grants were made to the Wingadee Shire Council for work on the road prior to 1939. Since 1939 a total amount of £4,082 has been provided from Developmental Road funds for construction over the less trafficable length westerly from Gulargambone.

From Gulargambone to Quambone the road traverses flat country having a black soil varying to a chocolate loam, with occasional short sections of red loam. Initially a small amount of wheat was grown in the vicinity of Gulargambone, but during recent years the land has reverted almost entirely to grazing. Substantial quantities of fat lambs and wool are despatched yearly from Gular railway station.

Due to the nature of the soil, much of the road was untrafficable for several days after heavy rain. (This condition still applies on unconstructed lengths.) The initial work therefore was confined to reshaping and top-dressing a series of the worst sections between 2.4 miles and 14.2 miles from Gulargambone. During 1939-40, 6.6 miles of reshaping and boxing and 7.2 miles of loaming were completed by the Council by contract, and 0.6 mile of reforming was carried out by the Council by day-labour. These works cost £1,192.



D.R. 1168. Gulargambone to Quambone.

After the war, a commencement was made on the work of connecting the previously-loamed lengths. Council undertook all work by day-labour except the supply and delivery of loam, and carried out 4.9 miles of formation with associated clearing and earthworks, together with the provision of seven pipe culverts. This work was completed at a cost of £1,910. Later, an additional £982 was made available for further formation and drainage works. On completion, the formation will extend to 34.8 miles from Gulargambone with only three short sections of firm ground remaining in their natural state. A periodically flooded creek at 29.5 miles will also be provided with a concrete causeway.

Under the Soldier Settlement Scheme, twenty-two families have recently been placed on the subdivisions of the Bedford Park and Tondebrine holdings, which depend for access on the eastern length of the Developmental Road. To date no similar development has taken place west of Gulargambone, but it seems reasonable to expect that, with improved access, this area will eventually attract an increased number of settlers.

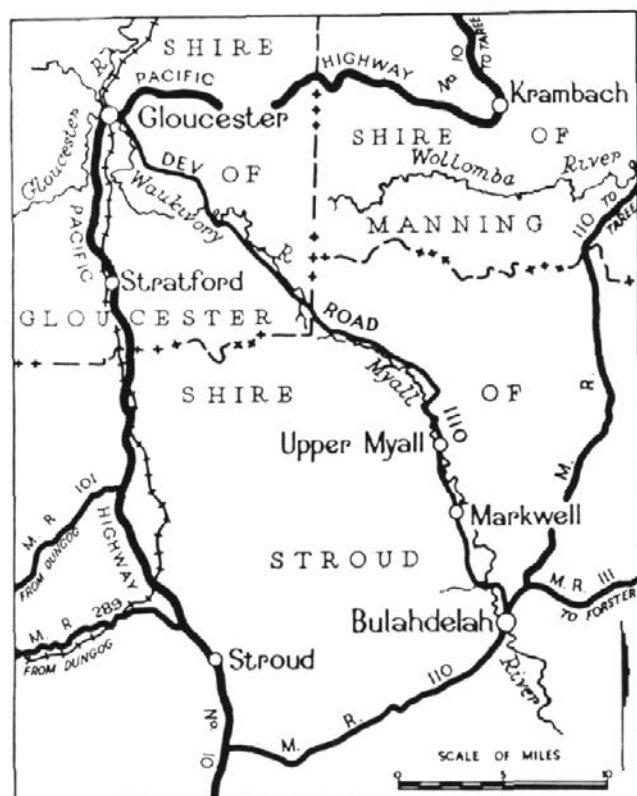
The works described were financed by grants from the Developmental Roads Fund.

GLOUCESTER TO BULAHDELAH: DEVELOPMENTAL ROAD No. 1110: SHIRES OF GLOUCESTER AND STROUD.

Developmental Road No. 1110 leaves the Taree-Booral road, Main Road No. 110, at Bulahdelah and follows generally in a north-westerly direction the valley of the Myall River, crosses the range near the Gloucester Shire boundary and then follows Waukivory Creek to the Pacific Highway (State Highway No. 10) near Gloucester, a total length of 38 miles. It serves rich dairying and grazing lands adjacent to the waterways and a large area of timber country north-west of Bulahdelah.

When this road was proclaimed in 1928 its condition was such that even in good weather the transportation of dairy produce and timber to Gloucester and Bulahdelah was difficult and irregular, and in wet weather some sections were impassable to all but light vehicles equipped with chains.

In 1931, a grant was expended in the reconstruction of the first three miles at the Bulahdelah end of the road. This was followed in 1935 by the forming and light gravelling of approximately 22 miles of road by



unemployed relief labour, extending from the Gloucester end toward the Shire boundary. Further grants enabled progressive improvements to the road to be effected in a systematic manner from the centres of Gloucester and Bulahdelah, including the construction of timber bridges over the Myall River, and by 1940, when the war curtailed expenditure on road works, approximately 32 miles out of a total length of 37 miles had been brought up to a reasonable standard and were available for use by all types of commercial vehicles.

During 1946-47 the Stroud Shire Council carried out by contract the strengthening of a previously lightly-gravelled section between 6.5 miles and 11.5 miles from Bulahdelah, and the construction of a further length between 17 miles and 19 miles.

The narrow, winding, steeply-graded track between 19 miles and 22 miles remained the only barrier to through traffic between Gloucester and Bulahdelah. A detailed investigation disclosed that a deviation would provide the most economical crossing of the range, and following preparation of plans by the Gloucester Shire Council, tenders were called and a contract let in the sum of £12,367 for the construction between 19 miles and 21.3 miles. This work is nearly completed. Construction work should be commenced shortly on a short section of heavy work between 21.3 miles and 22 miles, for which funds are available, on completion of which road communication between Gloucester and Bulahdelah will be available for all types of traffic.

Future work on Developmental Road No. 1110 will consist mainly of the bridging of wet crossings, the replacement of old structures and the elimination of causeways by pipe and box culverts.



D.R. 1110. Gloucester
to Bulahdelah.

In addition to providing reliable access to railhead and markets, the work carried out on Developmental Road No. 1110 has resulted in closer settlement and

increased production. Geographically, the road provides a direct communication between the centres of Bulahdelah and Gloucester.

(To be continued.)

Large New Bridge to be Built at Liverpool

Tenders are being invited for the construction of a new bridge on Main Road No. 512 at Liverpool, crossing both George's River and the main southern railway tracks. The new bridge will replace the existing timber structure across George's River built in 1898 and the existing bridge over the railway tracks nearby.

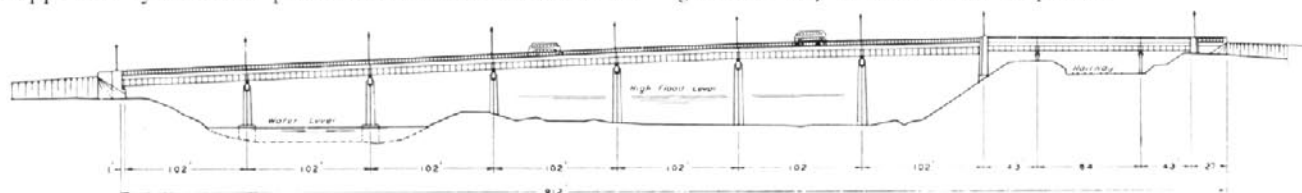
The old bridge over George's River, which has a length of 453 feet and a width of 15 feet between kerbs, has passed the end of its economic life. Further, it is inadequate for present and future traffic requirements in regard to allowable loading, width of carriageway and alignment of approach at the Liverpool end. The overbridge is also narrow and has badly aligned approaches.

The new bridge will be 912 feet long, and 58 feet wide, providing a carriageway 44 feet wide and two footways each 6 feet wide. The bridge will consist of a reinforced concrete deck resting on steel plate girders supported by concrete piers founded in some cases on

reinforced concrete cylinders, and in other cases on reinforced concrete piles. (See elevation below.)

The Liverpool approach to the bridge has been so designed that local traffic will have convenient access to the business centre and railway station, while through traffic will be able to avoid the busy street.

The Bankstown approach includes a level crossing of the single track branch railway line to Holdsworthy. The traffic on this railway is at present limited to about one train per week. However, the area south of the Bankstown approach is likely to develop, due to the establishment of commercial factories and the staff residential areas surrounding such factories. This development could result in more frequent railway traffic and possible duplication of the existing single track. Having this in mind, the grade of the new bridge has been so designed as to permit the bridging of the Holdsworthy branch railway line and the re-arrangement of the nearby intersection of Main Roads Nos. 512 and 167 if and when required.



MAIN ROADS STANDARDS.

NOTE: Numbers prefixed by "A" are drawings, the remainder are specifications unless otherwise noted

Form No.

EARTHWORKS AND FORMATION.

- 70 Formation. (Revised, June, 1949.)
- A 1532 Standard Typical Cross-sections.
- A 1149 Flat Country Cross-section, Type A. (Revised, 1930.)
- A 1150 Flat Country Cross-section, Type B. (Revised, 1936.)
- A 1151 Flat Country Cross-section, Type D1. (Revised, 1936.)
- A 1152 Flat Country Cross-section Type D2. (Revised, 1930.)
- A 1476 Flat Country Cross-section, Type E1. (Revised, 1937.)
- A 1101 Typical Cross-section One-way Feeder Road. (1936.)
- A 1102 Typical Cross-section Two-way Feeder Road. (1931.)
- A 114 Rubble Retaining Wall. (1941.)

PAVEMENTS.

- 71 Gravel Pavement. (Revised, June, 1949.)
- 228 Reconstruction with Gravel of Existing Pavements. (Revised, January, 1939.)
- 254 Supply and Delivery of Gravel. (Revised, August, 1939.)
- 72 Broken Stone Base Course. (Reprinted with amendments. August, 1947.)
- 68 Reconstruction with Broken Stone of Existing Pavement to form a Base Course. (Revised, October, 1933.)
- 296 Tar. (Revised, May, 1949.)
- 337 Bitumen. (Revised, February, 1939.)
- 305 Bitumen Emulsion. (Revised, September, 1942.)
- 351 Supply and Delivery of Aggregate. (Revised, July, 1941.)
- 65 Waterbound Macadam Surface Course. (July, 1939.)
- 301 Supply and Application of Tar and/or Bitumen. (Revised, June, 1950.)
- 122 Surfacing with Tar. (Revised, January, 1949.)
- 145 Surfacing with Bitumen. (Revised, January, 1949.)
- 93 Re-surfacing with Tar. (Revised, January, 1949.)
- 94 Re-surfacing with Bitumen. (Revised, January, 1949.)
- 230 Tar or Bitumen Penetration Macadam, Surface Course, 2 inches thick. (Revised, December, 1936.)
- 66 Tar or Bitumen Penetration Macadam, Surface Course, inches thick. (Revised, September, 1936.)
- 125 Cement Concrete Pavement (April, 1939) and Plan and Cross-section A 1147 (March, 1932.)
- 466 Bituminous Flush Seals and Reseals—Fluxing of Binders. (January, 1949.)

GENERAL.

- 342 Cover Sheet for Specifications, Council Contract. (Revised, January, 1948.)
- 24B General Conditions of Contract, Council Contract. (Revised, September 1950.)
- 64 Schedule of Quantities.
- 39 Bulk Sum Tender Form, Council Contract. (Revised, August, 1946.)
- 38 Bulk Sum Contract Form, Council Contract.
- 121 Provision for Traffic (Revised, June, 1947) with general arrangement, A 1323 and details A 1325 of temporary signs. (Revised January, 1947.)
- A 1342 Warning Signs, Details of Construction.
- A 1346 Iron Trestles for Road Barriers.
- A 1341 Timber Trestle and Barrier.
- A 1824 Light Broom Drag. (1941.)
- A 1924 Pipe Frame Drag.
- A 178 Mould for Concrete Test Cylinder.
- A 1381-3 } Tree Guards, Types A, B, C, D, E, F, and G.
- A 1452-5 }
- 197 Hire of Council's Plant. (Revised, April, 1937.)
- A 478 Specimen Drawings, Rural Road Design, with drawings A478A and A 478B.
- A 478C Specimen Drawing, Flat Country Road Design.
- A 1113 Rural Road Plan and Longitudinal Section Form (tracing cloth).
- A 1114 Rural Road Cross-section Form (tracing cloth).
- A 1115 Urban Road Plan Forms (tracing cloth).
- 193 Duties of Superintending Officer (instructions). (Revised, July, 1938.)
- 314 Standard Regulations for Running of Ferries. (Revised, December, 1948.)
- A 1645 Stadia Reduction Diagram. (1939.)
- 355 Instructions for Design of Two-lane Rural Highways (1937).
- A 1487 Horizontal Curve Transitions (diagrams).
- A 1488, A 1488A, A 1488B, and A 1488C.—Horizontal Curve Transitions (tables for speeds of 30, 40, 50, and 60 miles per hour).
- A 1614 Widening of Shoulders on Crests.
- 369 Instructions for Design of Urban Roads (1939).
- 288 Instructions for Design of Intersections (Revised, January, 1948.)
- 402 Instructions for Design of Rural Intersections (acceleration and deceleration lanes). (1941.)

Form No.

KERBS, GUTTERS, AND GULLY PITS.

- 243 Integral Concrete Kerb and Gutter and Vehicle and Dish Crossing, (Revised, July, 1939) and Drawing. (A134A.)
- 245 Gully Pit (Revised, May, 1939) and Drawings (a) with grating (A 1042); (b) Kerb inlet only (A 1043); (c) with grating and extended kerb inlet (A 1352); (d) extended kerb inlet (A 1353).
- A 190 Gully Grating. (1933.)
- A 1418 Concrete Converter. (1936.)

FENCING.

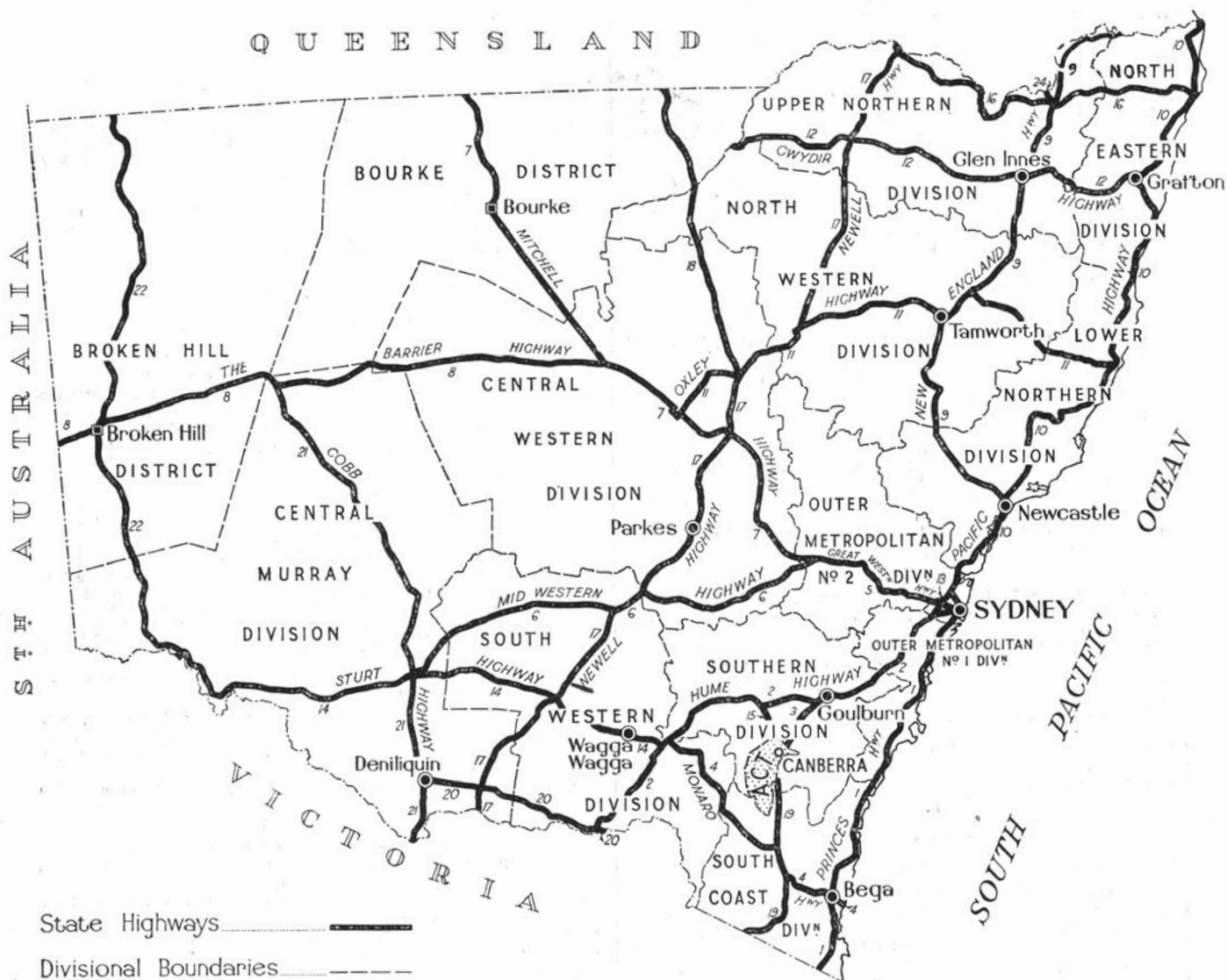
- 142 Split Post and Rail Fencing and Drawing (A 43).
- 141 Post and Wire Fencing (Revised, December, 1947) and Drawings (a) Plain (A 494); (b) Rabbit-proof (A 498); (c) Flood gate (A 316).
- 143 Ordnance Fencing (Revised, February 1934) and Drawing A 7. (Revised, November, 1939.)
- 144 Chain Wire Protection Fencing and Drawing (A 149).
- 246 Location of Protection Fencing (instruction) (Revised, May, 1940.)
- A 1301 Motor Traffic By-pass 9 feet wide. (1936.)
- A 1875 Motor Traffic By-pass 20 feet wide. (1942.)

BRIDGES AND CULVERTS.

- A 4 Standard Bridge Loading (general instruction). (1948.)
- A 4A Standard Bridge Loading (instruction for dead-end Developmental Roads.) (Revised, 1938.)
- 18 Data for Bridge Design. (Revised, November, 1948.)
- 84 Data accompanying Bridge or Culvert Designs.
- A 26 Waterway Diagram. (Revised, 1943.)
- 371 Waterway Calculations. (1939.)
- A 421 Boring Gear, 2 inches. (1930.)
- A 44 Boring Gear, 3½ inches. (1949.)
- A 2995 Rod Sounding Apparatus, with tripod (1947).
- 25 Pipe Culverts and Headwalls (Revised, December, 1939) and drawings Single Rows of Pipes, 15 in. to 21 in. dia. (A 143), 2-3 ft. dia. (A 139), 3 ft. 6 in. dia. (A 172), 4 ft. dia. (A 173), 4 ft. 6 in. dia. (A 174), 5 ft. dia. (A 175), 6 ft. dia. (A 177); Double Rows of Pipes, 15 in. to 21 in. dia. (A 211), 2-3 ft. dia. (A 203), 3 ft. 6 in. dia. (A 215), 4 ft. dia. (A 208), 4 ft. 6 in. dia. (A 207), 5 ft. dia. (A 206), 6 ft. dia. (A 213); Treble Rows of Pipes, 15 in. to 21 in. dia. (A 210), 2-3 ft. dia. (A 216), and Straight Headwalls for Pipe Culverts, 15-24 in. dia. (A 1153).
- A 1 Joint for Concrete Pipes. (Revised, August, 1933.)
- A 142 Inlet Sump Pipe Culverts for 3 ft. dia. or less. (Revised, December, 1947.)
- 138 Pre-Cast Concrete Box Culvert (Revised, February, 1948) and drawings 9 in. high (A 485), 12 in. (A 446), 1 ft. 6 in. (A 447), 2 ft. (A 448) 2 ft. 6 in. (A 449).
- 206 Reinforced Concrete Culvert (Revised, February, 1948) and instruction sheets (A 305, A 359, A 306, A 304).
- A 1832 Cast-in-Place Concrete Pipe Culverts. (1942.)
- A 309 Concrete Culvert Posts. (Revised, June, 1937.)
- 300 Pile Drivers, specification for 25 ft., and drawings for 50 ft. (A 209) 40 ft. (A 253), and 25 ft. portable (A 1148).
- A 1886 Arrangement of Bolting Planks for various widths of deck. (Revised, September, 1948.)
- A 45 Timber Bridge, Standard Details. (Revised, May, 1949.)
- A 1791 Timber Beam Skew Bridge Details. (Revised, May, 1949.)
- 164 Timber Beam Bridge (Revised, April, 1947) and instruction sheets, 12 ft. (A 3469), 20 ft. (A 70) revised, May, 1949, and 22 ft. (A 1761). (Revised, May, 1949.)
- A 3470 and A 3471.—Low Level Timber Bridges—Instruction sheets for 12 feet and 20 ft. between kerbs. (Revised, May, 1949.)
- A 1223 (Revised, May, 1949) and A 3472 (Revised, May, 1949) Single Span Timber Culverts instruction sheet for 20 ft. and 22 ft. between kerbs.
- 139 Timber Culvert (Revised, January, 1950) and drawings, 1 ft. 6 in. high (A 427), 2 ft. (A 428), 3 ft. (A 429), 4 ft. (A 430), 5 ft. to 8 ft. high, (A 431). (1928.)
- 326 Extinction of Termites in Timber Bridges. (Revised, October, 1940.)
- A 222 Pipe Handrailing Details. (Revised, July, 1947.)
- 350 Reinforced Concrete Bridge. (Revised, April, 1949.)
- 495 Design of Forms and Falsework for Concrete Bridge Construction. (September, 1947.)

All Standards may be purchased from the Head Office of the Department of Main Roads, 309 Castlereagh Street, Sydney, single copies being free to Councils.

State Highway System of the State of New South Wales



State Highways.....

Divisional Boundaries.....

Divisional Offices.....

SCALE OF MILES

40 20 0 40 80 120 160 200

Area of New South Wales, 309,433 square miles.
Length of public roads within New South Wales, 126,272 miles.
MILEAGE OF ROADS CLASSIFIED UNDER THE MAIN ROADS ACT, AS AT 1st JULY, 1950.

State Highways	6,513
Trunk Roads	4,031
Main Roads	12,628
Secondary Roads (County of Cumberland only)	68
Developmental Roads	2,783

26,023

UNCLASSIFIED ROADS, in Western part of State, coming within the provisions of the Main Roads Act

2,617

TOTAL 28,640

