

link was, however, completed on the 1st May, 1889, by the opening of the Hawkesbury River bridge, 2,900 feet in length, and railway communication was thus established between the four capital cities, Brisbane, Sydney, Melbourne, and Adelaide.

By the opening of the Trans-Australian railway, to which reference has already been made, Western Australia is now linked to the other States, and an unbroken line of communication established from one side of the continent to the other. The construction, moreover, of lines decided upon, and in some cases already made, connecting Victoria with the Riverina district in New South Wales and with the wheat-growing districts of South Australia, will undoubtedly facilitate interstate exchange and will allow the produce of inland areas to find its natural outlet at the nearest port.

7. Unification of Gauge.—The development of the railway systems of the Commonwealth has shown that the adoption of different gauges on the main lines in the several States was a serious error. As already mentioned, the extra cost, delay, and inconvenience incurred by the necessity of transferring through-passengers and goods at places where there are breaks of gauge are becoming more serious as the volume of business increases. As an indication of the extra cost thus involved, the junction charges on interstate traffic between New South Wales and Victoria range from 1s. 2d. to 2s. 11d. per ton.

Although the cost of alteration to a uniform gauge would be great, many propositions have from time to time been put forward with the object of securing such a gauge, and attention has been drawn to the importance of the unification of gauges before further expenditure on railway construction is incurred by the States. The problem is, however, one which is by no means easy of solution, and the difficulties are increased by the introduction of what may be called questions of local or State policy.

The first question that naturally arises in considering the problem is as to which gauge should be adopted as the universal gauge of the Commonwealth. As regards State Government railways, the 4-ft. 8½-in. gauge has a mileage of 4,975.81, all in New South Wales; Victoria and South Australia have a combined mileage of 5,215.70 of 5-ft. 3-in. gauge; while New South Wales, Queensland, South Australia, and Western Australia have together 10,442.17 miles of 3-ft. 6-in. gauge. In addition, the Commonwealth Government has (i) 4.94 miles in the Federal Territory, 597.36 miles in South Australia, and 453.94 miles in Western Australia of 4-ft. 8½-in. gauge, and (ii) 477.96 miles in South Australia, and 198.68 miles in the Northern Territory of 3-ft. 6-in. gauge. By far the greater part of the mileage of private railways open for general traffic has also been constructed to the 3-ft. 6-in. gauge. The mere question of preponderance of mileage, therefore, indicates the 3-ft. 6-in. gauge for adoption. But this question is obviously subordinate to those involving engineering and economic considerations. Thus, the relative efficiency from the widest point of view, the relative costs of alterations of the permanent way and rolling stock, of carrying capacity and speed, that is to say, questions of a technical nature about which figures are not available, enter into the grounds for decision.

Many conferences on the subject of the unification of gauge have taken place from time to time both between the Railways Commissioners and between the Premiers of the States concerned, and references to these conferences have been made in previous issues of the Year Book (see No. 11, pp. 657-8). A conference between the engineers of the Commonwealth and States railways was held in Melbourne in August, 1918. Much consideration was given to the devices to deal with the break-of-gauge question, which had been submitted to the conference, but all of them failed to meet the requirements of the conditions laid down by the conference in order to ensure both safety and celerity of action in train working.

In June, 1920, a conference took place at Sydney between the Commonwealth and State railway engineers. Four proposals were dealt with, of which the third was considered the most satisfactory compromise for the present conditions of traffic. This proposal favored the conversion of existing lines between the capitals and the construction of such new lines as are advisable to the 4-ft. 8½-in. gauge, the cost of which was estimated at £26,581,000, of which £8,154,000 would be for new line construction.

In July, 1920, a conference took place at Melbourne between the Commonwealth and State representatives of three Governments, and a decision was arrived at under which a committee, consisting of two experts from abroad and an Australian representative not connected with the railways, was to consider the whole question of gauge unification and report to the various Governments concerned as to the best course to be adopted.

On 8th February, 1921, the Governor-General appointed a Royal Commission consisting of two railway engineers—one civil and one mechanical—together with an independent commissioner to inquire into and report on the question of the unification of gauges. The Commission was constituted as follows:—Chairman, Mr. John James Garvan; Civil Engineer, Mr. Rustat Blake; Mechanical Engineer, Mr. Frederick Methven Whyte; with Mr. E. Simms as Secretary. (See also Appendix.)

8. Rolling Stock Gauges.—Allied to the question of the gauges of the railways of Australia is that of the rolling stock gauges which are in use, the rolling stock gauge being the maximum transverse dimensions to which the rolling stock may be constructed. In the following table will be found particulars of the rolling stock gauges, together with maximum length and weights of vehicles, at present in use on the Government railways, State and Federal:—

**STATE AND FEDERAL GOVERNMENT RAILWAYS.—ROLLING STOCK GAUGES
IN USE, 1920.**

PASSENGER ROLLING STOCK.

Railway.	Gauge of Track.	Maximum Rolling Stock Gauge.			Maximum Tare.
		Width.	Height above Rail Level.	Length over all.	
	ft. in.	ft. in.	ft. in.	ft. in.	t. c. q.
New South Wales	4 8½	10 6	14 0	74 4½	44 2 1
Victoria	5 3	10 0	14 2	74 1½	47 16 0
"	2 6	7 0½	10 4½	31 8	8 11 0
Queensland	3 6	9 4	12 9	55 5	26 17 0
"	2 0	6 3½	10 0	22 0	3 0 0
South Australia	5 3	10 4½	14 1¾	74 1½	40 11 0
"	3 6	9 4½	12 1	62 6	24 18 0
Western Australia	3 6	8 10	12 7	61 9	31 10 0
Tasmania	3 6	9 6	12 5	64 0	30 0 0
"	2 0	6 6	10 0	30 2	5 10 1
Federal—					
Trans-Australian	4 8½	10 6	14 6	78 11½	48 0 0
Northern Territory	3 6	9 4	12 9	39 0	12 0 0
Oodnadatta	3 6	10 2	12 4	39 0	12 0 0

GOODS ROLLING STOCK.

Railway.	Gauge of Track.	Maximum Rolling Stock Gauge.			Maximum—	
		Width.	Height above Rail Level.	Length over all.	Tare.	Carrying Capacity.
	ft. in.	ft. in.	ft. in.	ft. in.	t. c. q.	t. c. q.
New South Wales	4 8½	9 8	13 6	60 11	20 10 3	40 0 0
Victoria	5 3	9 7½	13 7½	55 4½	20 13 1	30 0 0
"	2 6	6 5½	9 7½	27 3½	7 12 2½	10 0 0
Queensland	3 6	8 9	12 0	45 5	14 16 0	21 8 0
"	2 0	6 6	9 0	22 0	4 10 0	16 0 0
South Australia	5 3	10 0½	12 10½	43 6	16 0 0	30 0 0
"	3 6	8 6	12 1	38 9	11 15 0	25 0 0
Western Australia	3 6	8 8	12 6	44 9	17 18 0	27 0 0
Tasmania	3 6	8 6	11 0	40 10	12 5 0	30 0 0
"	2 0	6 0	6 6	27 0	5 15 2	20 0 0
Federal—						
Trans-Australian	4 8½	10 6	14 6	47 6½	15 0 0	40 0 0
Northern Territory	3 6	9 4	12 9	34 6	9 11 0	12 0 0
Oodnadatta	3 6	10 2	12 4	18 0	5 0 0	5 0 0

In the above tables the transverse dimensions given are not necessarily those of one particular vehicle, but are the greatest employed on any vehicle.