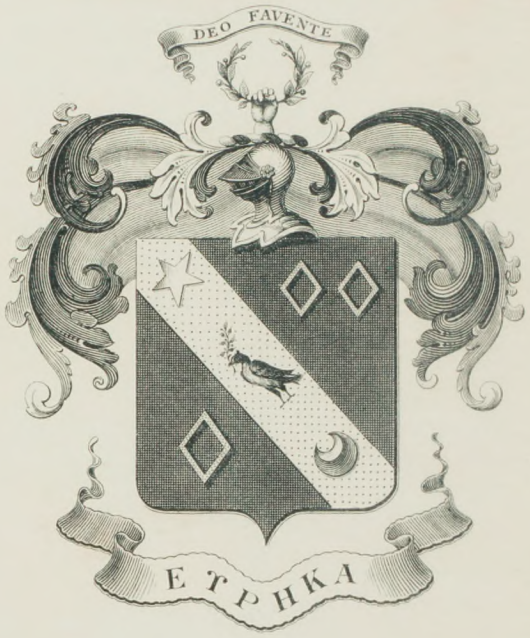

David Scott Mitchell.

1908.
(SECOND SESSION.)

LEGISLATIVE ASSEMBLY.

NEW SOUTH WALES.

PARLIAMENTARY STANDING COMMITTEE ON PUBLIC WORKS.

REPORT

TOGETHER WITH

MINUTES OF EVIDENCE AND PLAN

RELATING TO THE PROPOSED

DEVIATION OF GREAT WESTERN RAILWAY LINE

TO AVOID THAT PORTION OF THE LITHGOW ZIGZAG BETWEEN THE BOTTOM POINTS AND THE COAL STAGE AT ESKBANK.

Presented to Parliament in accordance with the provisions of the Public Works Act, 64 Vic. No. 26.

Printed under No. 14 *Report from Printing Committee,* 19 *November,* 1908.

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MEMBERS OF THE COMMITTEE.

LEGISLATIVE COUNCIL.

The Honorable Frederick Flowers, Chairman.
The Honorable William Fergus Hurley.
The Honorable William Thomas Dick.

LEGISLATIVE ASSEMBLY.

Richard Thomas Ball, Esquire, Vice-Chairman.
Robert Davidson, Esquire.
John Rowland Dacey, Esquire.
William Fleming Latimer, Esquire.

INDEX.

LIST OF WITNESSES.

PLAN.

PARLIAMENTARY STANDING COMMITTEE ON PUBLIC WORKS.

DEVIATION OF GREAT WESTERN RAILWAY LINE TO AVOID THAT PORTION OF THE LITHGOW ZIGZAG BETWEEN THE BOTTOM POINTS AND THE COAL STAGE AT ESKBANK.

REPORT.

The Parliamentary Standing Committee on Public Works, appointed during the first Session of the present Parliament, under the Public Works Act of 1900, 64 Vic. No. 26, the Public Works Committee Election Act of 1901, 1 Ed. No. 58, the Public Works Committee Act of 1904, 4 Ed. No. 5, and the Public Works Committee (Amendment) Act of 1906, 6 Ed. No. 43, to whom was referred for consideration and report "the expediency of constructing a Deviation of the Great Western Railway Line to avoid that portion of the Lithgow Zigzag between the Bottom Points and the Coal Stage at Eskbank, Section "B," have, after due inquiry, resolved that it is expedient that the deviation should be carried out, and, in accordance with subsection (d) of clause 28 of the Public Works Act of 1900, report their resolution to the Legislative Assembly:—

Matters leading to the Proposal.

1. The question of abolishing the Lithgow Zigzag was mentioned as far back as the year 1885, but the first definite proposal for doing away with it was put forward in 1894, when Parliament referred the matter to the Public Works Committee for inquiry and report, six schemes being submitted—two by the Railway Commissioners, two by the Railway Construction Branch of the Public Works Department, and two by private persons; and, as the professional as well as much of the evidence generally given in the inquiry indicated that the deviation was not a matter of urgency, and that the traffic over the western line was showing signs of decrease rather than of increase, the Committee decided that it was not expedient that the work should be carried out.

In 1901, the matter was revived by the Railway Commissioners, who, on the grounds that the traffic was showing material increase, and that great difficulty was experienced in working it over the Zigzag, urged that the work be proceeded with, and, on 18th December, 1901, Parliament again referred the work to the Public Works Committee, the proposal then submitted by the Department being in two sections, on each of which the grade would be 1 in 90, viz.:—

	£	s.	d.
"A" (Dargan's Creek to the Bottom Points), 5 miles 34 chains ...	256,872	10	0
"B" (the Bottom Points to Coal Stage, Eskbank), 3 miles 46 chains...	120,881	19	0

Of these two sections the Railway Commissioners recommended the carrying out of section "A," but with regard to section "B," suggested a modified scheme providing for a grade of 1 in 50 in place of 1 in 90, at a cost of £30,000 instead of £120,881 19s., the heavier grade being, in their opinion, preferable on the grounds of economy and shorter length of line. "While the grade of this amended scheme," they explained in their statutory report,—

is 1 in 50 as against 1 in 90, the former is deemed sufficient for all practical purposes for many years to come, as all goods and stock trains can, without difficulty and with economy, be assisted by bank engines at an estimated annual cost of £925 per annum, which is considerably less than would be the interest on the £90,000 additional expenditure involved if scheme "B" were accepted. Further, the amendment has the advantage of shortening the length of the line.

As

As the recommendation and suggestion of the Railway Commissioners were supported by the evidence generally, and particularly by the professional officers of the Railway Department who were examined, the Committee approved of them, and an Act to carry out the work as recommended by the Committee was assented to on 18th December, 1906. The work was not, however, immediately proceeded with, for as during the progress of the Bill through Parliament strong representations were made in the Legislative Assembly in favour of a grade of 1 in 90 on both sections of the scheme, it was decided by the Cabinet not to commence the work until the arrival in the State of the new Chief Railway Commissioner, who having the benefit of modern railway experience in England should be particularly well qualified to express an opinion on the question of grade. In due course, therefore, the matter was submitted to Mr. T. R. Johnson, and he after going over the locality and discussing the subject with the Assistant Commissioners and those of his officers who had made a close study of the question, reported under date 11th May, 1907 :—

I am satisfied that the original proposal submitted, providing for a grade of 1 in 90 throughout, would be the better arrangement. It admittedly entails a considerably higher expenditure than the modified scheme with a 1 in 50 grade on the Lithgow side, but the advantages of the easier grade and the facilities it will afford in the working of the heavy and increasing business over the Western Line, justify the more comprehensive scheme being adopted.

The carrying out of Section "A" was then proceeded with, and, on 11th December, 1907, Section "B," with a grade of 1 in 90, was referred by the Legislative Assembly, for further inquiry and report, to the present Committee.

Description of the Work.

2. The proposed deviation commences at the Bottom Points of the Zigzag, and proceeding in a northerly direction for about ¾ of a mile, curves sharply, and runs south-westerly until it adjoins the existing line of railway at 94 miles 6 chains on the proposed new route, from which point to the terminus at 94 miles 20 chains from Sydney, its course is almost parallel with the existing railway. As far as possible, the latter will be utilised in the new construction. The works are heavy, and include two double-line and therefore well ventilated tunnels, the longer being about 1,021 yards in length. The ruling gradient is 1 in 90, and the sharpest curve, 14 chains radius. About half the land passed through is alienated.

Railway Commissioner's Report.

3. Following on the report made shortly after his arrival in the State, the Chief Commissioner, reporting on the proposed work, under date 9th December, 1907, states that—

Having perused the evidence and report of the Works Committee, and also inspected the locality, I am satisfied that the original proposal, providing for a grade of 1 in 90 throughout, has most to recommend it, notwithstanding that it involves a much greater expenditure than the modified scheme with a 1 in 50 grade passed by the Works Committee in 1902 by a majority of one vote.

The growth of traffic along the Western Line has been so rapid, and the expansion continues, that something more than a temporary expedient is warranted; and, although the deviation proposed will add 1 mile and 15 chains to the existing mileage, the advantages of the easier grade, and the facilities it will afford in the working of the heavy and increasing business over the Western Line, amply justify its adoption.

It is not practicable to show in figures what actual monetary saving would be effected by the carrying out of the larger scheme now proposed; but I can confidently recommend the increased expenditure on a work which will be in keeping with modern railway practice, and reproductive in its results.

Estimated Cost.

4. Two estimates of what the proposed work will cost have been submitted to the Committee, one by the Chief Engineer of the Railway Construction Branch of the Public Works Department (Mr. W. Hutchinson), and the other, prepared at the request of the Committee, by the Engineer-in-Chief for Existing Lines, Department of Railways (Mr. J. Fraser). The former amounts to £149,427, or £28,545 above what the estimate was in the last inquiry (£120,881 19s.), and the latter to £115,532, or £33,895 less than the latest estimate of the Works Department. The increase from £120,881 19s. to £149,427 is accounted for by the Chief Engineer for

for Railway Construction on the ground that, in making his estimate, more information before him than was at the disposal of those responsible for the previous estimate led him to increase the quantities to some extent, and to alter the prices to what he considered to be equal to the carrying out of the work, mainly in connection with the tunnels, excavations, and cuttings, his price for the tunnels being 12s. 6d. per cubic yard as against 10s., and for excavation 2s. 6d. per cubic yard as against 1s. 9d.

DETAILS OF WORKS DEPARTMENT ESTIMATE.

The details of the estimate of the Public Works Department, which the Chief Engineer for Railway Construction regards as fair and reasonable, are as follow :—

Great Zigzag Deviation—Bottom Points to Coal Stage, Eskbank.

Part I.

Revised estimated cost of a double line of railway, 3 miles 46 chains in length, with 80-lb. rails. Ruling grade, 1 in 90 against the load ; sharpest curve, 14 chains radius.

Description.		Estimated cost.		
		£	s.	d.
Earthworks		22,688	15	0
Culverts		2,268	1	3
Fencing		157	10	0
Tunnels, No. 2 length, 1,313 yards		79,255	7	2
Contingencies, tunnels, 2 per cent.	£1,585			
Other items, 10 per cent....	2,511			
		4,096	0	0
Supervision		1,000	0	0
		109,465	13	5
Permanent-way		12,395	18	9
		121,861	12	2
Less credit for materials on existing line ...		2,985	0	0
		£118,876	12	2

Part II.

Estimated cost of a double line of railway, from 94 miles 6 chains to 95 miles 36 chains, coal stage, a length of 1 mile 30 chains, alongside the existing line.

Description.	Estimated Cost.		
	£	s.	d.
Earthworks	19,363	12	6
Culverts...	1,495	11	5
Level crossing	25	0	0
Permanent-way...	7,796	0	0
Deviation, Oakey Park Siding, and altering points and crossings	1,318	15	0
	29,998	18	11
Contingencies, 10 per cent.	2,999	17	10
	32,998	16	9
Less Credit for materials on existing line ...	2,448	6	0
Total	£30,550	10	9

Total Estimated Cost.

	Estimated Cost.				Average per mile.			
Part I	£118,876	12	2					
Part II	30,550	10	9					
Total, Bottom Points to Eskbank ...	£149,427	2	11	.....	£41,798	0	0	
Estimate, November, 1907...	£149,427	2	11	or	£41,798	per mile.		
„ „ 1901...	120,881	10	0	„	33,813	„		
Increase	£28,545	12	11		£7,985			

DETAILS OF ESTIMATE OF ENGINEER-IN-CHIEF FOR EXISTING LINES.

The details of the estimate prepared by the Engineer-in-Chief for Existing Lines are—

Zigzag Deviation.

"B" Section—Bottom Points to Eskbank.—Grade, 1 in 90. Length, 3 miles 46 chains.

Part I—91 miles 70 chains—94 miles 6 chains.

Estimate of cost—			
Excavation from cuttings on line of way, 110,000 cubic yards, at 2s. 3d.	£12,375	0	0
Excavation, widening of cuttings to make up embankments, 66,000 cubic yards, at 1s. 9d.	5,775	0	0
Side ditches and stream diversions (say)	1,000	0	0
Culverts (say)	2,500	0	0
Fencing, 2½ miles, at £50	112	10	0
Tunnelling, 1,240 lineal yards, at £50	62,000	0	0
Tunnel fronts, 4, each at £180	720	0	0
Permanent-way, 4·4 miles, at £2,000	8,800	0	0
Contingencies and supervision	5,000	0	0
	£98,282	10	0

Part II.—Parallel with, and partially on alignment of existing line, 94 miles 6 chains to 95 miles 36 chains.

Estimate of cost—	£	s.	d.
Earthworks, mainly embankment, 90,000 cubic yards at 2s.	9,000	0	0
Side ditches, &c.	50	0	0
Culverts	900	0	0
Level crossing	50	0	0
Permanent-way, 2·75 miles, at £2,000	5,500	0	0
Deviation, Oakey Park Siding	250	0	0
Contingencies	1,500	0	0
	£17,250	0	0

Part I, as above	£98,282	10	0
Part II, as above	17,250	0	0
Total	£115,532	10	0

DIFFERENCE BETWEEN THE TWO ESTIMATES.

5. The difference between the two estimates is due chiefly to the Engineer-in-Chief for Existing Lines proposing, in the carrying out of the deviation, to utilise earthworks on the existing railway, and to shorten the tunnels, and also to his prices for the work being based on the assumption that it will be carried out by day labour under the Railway Commissioners, whereas those of the Chief Engineer for Railway Construction are for work done by contract.

Comparing the two, it is found that Mr. Fraser's estimate is less than that of Mr. Hutchinson's in :—Earthworks, £14,902 ; culverts, £363 ; fencing, £45 ; tunnels, £16,866 ; permanent way, £5,891 ; and deviation, Oakey Park Siding, £1,068 ; in addition to which Mr. Fraser takes no credit for materials on the existing line, while Mr. Hutchinson does, to the amount of £5,433.

EARTHWORKS.

When walking over the ground with the late Engineer-in-Chief for Railway Construction, Mr. H. Deane, just prior to the completion of the survey for the two sections of the deviation, Mr. Fraser explains, he suggested to Mr. Deane an alteration which he thought would materially reduce the cost of the work, and by which instead of running for Eskbank parallel with the existing line, and at a distance of something like a chain away, the deviation would go on to the alignment of the existing railway, thus enabling those carrying out the work to make use of the earthworks already there. This suggestion was not adopted, but Mr. Fraser contends that it should be, inasmuch as by doing so the earthworks necessary to be carried out are practically halved. "We have on that portion of the line," he says, "a fairly big embankment starting right from Eskbank, and by utilising that existing embankment as a core for the new one, the quantity to be made up would be reduced to a very great extent." He proposes to cross the existing railway to the south side at 94 miles 6 chains, where the grade of the existing line

and

and that of the new line are much the same, and take advantage not only of the existing embankment but of higher ground; but if the work should be carried out by the Construction Branch, it is not likely that the Railway Commissioners would allow the officers of that Branch to adopt this plan. While the Commissioners could carry out the work without interfering with the traffic, they could not, Mr. Fraser explains, "allow people who know nothing about our rules or our methods of working to come on to the line and do work there." That is a thing which is never done.

On this matter, Mr. Hutchinson admits that the course proposed by Mr. Fraser is, if he can do it, the proper one to take, as it would largely decrease the cost of the work; but he points out that the Railway Construction Branch could not do it, and that therefore their plans and estimates were made for running on the north side of the existing line all the way.

With regard to earthworks, Mr. Hutchinson explains that though, in the estimate submitted to the Public Works Committee who inquired respecting the proposed deviation in 1902, 1s. 9d. per cubic yard was the price put down for excavations and cuttings, his estimate is 2s. 6d., because, as far as his knowledge goes, the Department has never yet had work of this nature done for 1s. 9d., and, in his opinion, no contractor would do it for less than 2s. 6d. Mr. Fraser's estimate is 2s. 3d., but he admits that 2s. 6d. is a reasonable price for the work to be done by contract. His own estimate he regards as a liberal one for excavations as he is carrying them out on Section "A," for there one shot fired displaced 30,000 tons of rock at a cost of about 4d. per ton, or about 6d. per cubic yard, while another shifted about 16,000 tons at a cost of about four-fifths of a penny per ton, or about 1¼d. per cubic yard, at places where the Public Works Department's estimate for the work was 2s. 3d. per cubic yard; and he thinks, in regard to Section "B," that there are places where considerable quantities of rock can be blown out at very small cost. For the widening of cuttings Mr. Hutchinson's estimate is 2s., while Mr. Fraser's is 1s. 9d., and this Mr. Hutchinson cannot see his way to alter.

Tunnels.

The difference in connection with culverts and fencing is small; but, in respect to tunnels, Mr. Fraser states that, by slightly increasing the amount of cutting, he can reduce the length of tunnelling to the extent of a little over 3 chains, at an estimated saving of over £500 per chain, in addition to which, he believes, basing his estimate on the cost of the work now being carried out on Section "A," that the tunnelling work can be done at a much less price than Mr. Hutchinson's estimate represents, which is £59 12s. 6d. per cubic yard as against £50 the estimate of Mr. Fraser. Mr. Hutchinson agrees that it is desirable to shorten one tunnel of the two on the deviation, by which it would be possible to save about £1,000, and states that the omission from his estimate of this was an oversight; but in regard to the second tunnel he considers it should not be shortened, believing it to be unwise to touch the existing cliff which is very steep and over 70 feet high. On the other hand, Mr. Fraser is confident that the shortening of both tunnels can be done without any trouble, and that it will have the effect of saving a considerable sum of money, not only in the construction of the tunnels but by providing material for embankments. On section "A," he says, there are tunnel faces cleared to a height of 120 feet over the arch at the entrance, and while one tunnel on that section has been rendered unnecessary by the whole of the cliff through which it was to go being blown away to provide for a cutting, other tunnels have been shortened to the extent of 13 chains. So far on this section tunnel excavations have cost the Railway Commissioners about 7s. 4d. per cubic yard as against Mr. Hutchinson's estimate of 12s. 6d.; but, in qualification of this, Mr. Fraser explains that the work has not proceeded sufficiently far to enable him to say that 7s. 4d. is the absolute cost per cubic yard of a tunnel completed. Apart from his admission that one tunnel could be shortened, Mr. Hutchinson is not prepared to reduce his estimate for tunnelling, as he considers his prices already sufficiently low for any contractor to undertake the work.

Permanent Way.

In the matter of permanent-way, Mr. Hutchinson is providing, Mr. Fraser states, for rails at a price which represents practically the highest ever paid in this State, while Mr. Fraser's estimate is based on quotations very much less,

received by the Railway Commissioners recently. Some months ago, he says, advices came to hand that the price of rails was going down, and the Commissioners taking the precaution at the time to lay in a fairly large stock, would be able to provide for section "B" at a price about £2 5s. per ton less than that estimated by Mr. Hutchinson, which would represent a saving of about £300. Then as to sleepers, he would be able to put them on the work at 4s. each as compared with Mr. Hutchinson's estimated price of 5s., thereby saving £53, though the number of sleepers used would be larger than Mr. Hutchinson provides for; and the Commissioners having a quarry at Tarana from which ballast can be conveniently and cheaply obtained, the ballasting of the permanent-way could be carried out at 2s. 6d. per cubic yard as compared with Mr. Hutchinson's 5s. Mr. Hutchinson admits that his estimate for rails might, in view of the price falling, be somewhat reduced; but, generally, he cannot see his way to reduce his permanent-way estimate, which he explains was made out carefully and in accordance with the work being done by contract.

Old Material.

Respecting the credit of £5,433 taken by Mr. Hutchinson for permanent-way materials, principally rails, which with the completion of the deviation will be removed from the existing line, Mr. Fraser explains that when the rails are taken up their value will practically be no more than that of scrap iron.

Mr. Fraser's Estimate Generally.

As to his estimate generally, Mr. Fraser states that it includes everything that should be charged to the work, but at the same time he admits that if a contractor should carry out the deviation he would not have the facilities at hand which are available to the Railway Commissioners, and would have to pay certain charges (in this case, about £1,000) to which the Commissioners would not be liable.

Necessity for the Work.

6. The evidence given in the present inquiry points strongly to the carrying out of the work, which, in view of the increasing traffic on the Great Western Railway, and the inconvenience and risk of accident from the use of push-up engines, is regarded as very necessary. At the date of the last inquiry both existing conditions and anticipations for the future indicated that a 1 in 50 grade from the Bottom Points to Eskbank would meet requirements for at least ten or fifteen years, and in any case was considered by the Railway Department officials to be preferable to a flatter grade which would involve the payment annually of interest amounting to £4,228, as compared with £1,975, the annual cost connected with a 1 in 50 grade and the use of a push-engine; but since that time conditions have changed, and now it is held that if traffic necessities are to be adequately met, the grade must be 1 in 90 on both sections of the deviation.

As evidence of the altered conditions in connection with the Zigzag, and the section of the railway between the Bottom Points and Eskbank, it is pointed out that not only have several new railway lines connecting with the Great Western Railway been opened since the date of the last inquiry, but so considerable has the growth of traffic over the Zigzag been that, as may be seen from a statement prepared by the Chief Railway Traffic Manager, in the year ending 30th June, 1908, 207 passenger trains, 1,252 goods trains, and 808,972 tons of goods in excess of the figures for 1902, passed over that portion of the Western line, while, according to the evidence of the Chief Mechanical Engineer, in September of the present year there were running on the Penrith, Bathurst, and Wellington sections of the railway, 247 of the largest type of passenger and goods engines, as compared with 93 in September, 1901. These figures in themselves, it is considered, impart to the proposal before the Committee importance not apparent in the inquiry of 1902, but with the further development of the western districts, which must take place, especially as new railways connecting with the Great Western line are constructed, a much larger traffic increase is expected, making the 1 in 90 grade all the more necessary.

According to the Assistant Government Geologist, who has made a special study of the subject, there is no doubt about the permanency of the coal industry associated with the Lithgow coal measures, and though of late the coal trade of Lithgow has declined, and the operations of the iron works there have considerably lessened,

lessened, this is due to circumstances not likely to be lasting, and it is anticipated not only that the Lithgow industries will shortly return to normal conditions but that their output will be increased. Further west, either in close proximity to the main railway, or on branch lines connecting with it, there are other important industries whose operations contribute to the traffic over the Zigzag, and in view of this, and the probable early construction of the proposed railway from Cowra to Canowindra, and of other contemplated connections with the Western line, later on, including, it may be, one between Condobolin and Broken Hill, it becomes essential, it is urged, that every obstacle on the main railway in the way of dealing with traffic satisfactorily should be removed.

So strongly does the Chief Commissioner for Railways feel in the matter that he describes the use of push-up engines between the Bottom Points and Eskbank as, under the circumstances, "a perfect absurdity." Though push-up engines, he says, are devices that were common in the earlier days of railway working, the practice now-a-days is for railway companies to spend large sums of money in flattening grades for the purpose of enabling ordinary engines to draw very much larger loads; and to make a deviation such as that on section "A" with a 1 in 90 grade, and finish up with a grade of 1 in 50 on section "B," which will involve the use of push-up engines, seems to him to be "almost ridiculous." A 1 in 50 grade could only, he points out, be a temporary expedient, the cost of which would eventually have to be written off as unproductive expenditure, and if the 1 in 90 grade cannot be obtained it would be better, he considers, to go on for a year or two longer with the existing grade of 1 in 40.

Of the Chief Railway Traffic Manager, the Engineer for Existing Lines, and the Chief Mechanical Engineer of the Department of Railways, two of them qualify their support of the 1 in 90 grade with the condition that the cost of the work should be paid out of the Public Works Fund, and not from loans, but all consider that the increased traffic justifies the provision of satisfactory methods for dealing with it. Push-up engines, they explain, mean not only expense additional to the ordinary cost of running trains, but however carefully they may be worked there is always some risk when using them, and this risk on the Zigzag is greater now than formerly, because of the employment of larger and more powerful engines. Through the use of push-up engines passenger trains have on the Zigzag become buffer-locked, and the locking of buffers is a first step towards derailment; and goods waggons have been derailed. Such engines, the Chief Mechanical Engineer states, are risky at any time, there being always a danger of crippling the train to which they are attached, particularly if the train be a long one, and the engine behind one of the heavy type, as it generally is.

How the Cost should be Met.

7. With regard to the cost of the work, the question arose in the inquiry as to where, if it should be decided to carry out the deviation, the money should come from—whether from loans or from revenue. Until 1905 all railway deviation works were paid for from loans, but since then, in accordance with a recommendation of a Treasury Committee, appointed by the late Government, the cost of such works, instead of being debited to capital account, has been provided from revenue. In the case of section "A" of the Zigzag deviation, now being carried out, the cost, so far, has been paid from revenue, £100,000 having been voted by Parliament for the purpose from the Public Works Fund, and the Chief Commissioner for Railways and his officers hold that the cost of section "B" should be met from the same source. All such improvement or betterment works, the Chief Commissioner considers, should, as a matter of sound finance, be charged to revenue, or if charged to loans, the cost of the original line, the place of which the deviation takes, should be written off out of revenue, which is practically the same thing. A deviation at Sodwalls, on the Great Western Railway, he states, was dealt with in that way, the cost of the original line being written off, and the same principle was followed in connection with the old cable tramways in Sydney. It is pointed out that the general results from the improvement in the railway will operate to the benefit of the users of it, as while the more the capital cost of the railways is increased the greater becomes the necessity for maintaining the railway rates at a certain standard, a reduction of interest charges and a saving of working expenses lead to railway rates being reduced.

The Constructing Authority.

8. Closely associated with the question of how the cost of the work is to be met is that of by whom the work should be carried out—whether by the Railway Construction Branch of the Department of Public Works, or by the Railway Department. As already stated, the estimate of cost submitted to the Committee by the Chief Engineer for Railway Construction is £33,895 above that of the Engineer-in-Chief for Existing Lines. The difference arises chiefly from the fact that the larger estimate is framed on the assumption that the work will be carried out by contract, the prices quoted being those contractors would be likely to charge; while the smaller is based on the carrying out of the work by day-labour, on certain modifications of the scheme, and on the possession of an up-to-date and adequate working plant. The Chief Railway Commissioner, who is a strong believer in railway deviation and duplication work in the State being done by day-labour, informed the Committee that the cheapness and rapidity with which some duplication work on the Main Northern Railway was recently carried out by this method surprised him; and the Engineer-in-Chief for Existing Lines, in addition to stating that the work on Section "A" of the Zigzag deviation, which also is being done by day-labour, is proceeding very satisfactorily, mentioned that a deviation on the Great Western Railway at Locksley, recommended by a former Public Works Committee, had been carried out by the Railway Commissioners on the day-labour plan at a cost nearly 30 per cent. below the Works Department estimate. Further, he points out that since making his estimate he finds that he will have a larger surplus of material from section "A" than he originally anticipated, owing to which it is quite possible that the work on section "B" can be carried out for £1,000 or £2,000 less than the estimate, and he fears, he states, that if the work should be done by the Public Works Department it would lead to a duplication of officers and to consequent difficulty and unnecessary expense. Railway contractors who would be likely to tender for the work on section "B" are not, experience has shown, usually possessed of proper plant for carrying out important railway work, and while not having the advantages available to the staff of the Railway Commissioners, are subject to many expenses from which that staff is free.

All works of the nature of the proposed deviation, the Chief Commissioner for Railways is of opinion, should be constructed by the Railway Department, as he believes they can be carried out by the Department's staff at less cost and more rapidly than can be done by contractors under the supervision of the Railway Construction Branch of the Department of Public Works; but in the case of section "B" of the Zigzag deviation, he considers it to be very desirable that the work should be done by the Railways staff, if only for the reason that the deviation will run close to the existing line, which will be affected by it to a considerable extent.

Conclusion.

9. In view of the increased and increasing heavy traffic on the Great Western Railway Line, and the inconvenience, expense, and risk attending the use of push-up engines, the Committee are of opinion that section "B" of the deviation work at the Zigzag should be carried out as proposed—with a grade of 1 in 90, so that from the commencement of section "A," at Newnes junction, to the end of section "B" at the coal stage, Eskbank, the grade may be uniform, and such, as the evidence shows, is necessary to satisfactorily meet traffic requirements. As to how the cost of the work should be provided—whether from loans or from revenue—or by whom the work should be carried out, they make no recommendation, but having stated the position with regard to those matters, leave them to be determined by the Government and Parliament.

Resolution Passed.

10. The resolution passed by the Committee is shown in the following extract from their Minutes of Proceedings:—

Mr. Dacey (*with concurrence*) moved,—"That, in the opinion of the Committee, it is expedient the proposed Deviation of the Great Western Railway Line to avoid that portion of the Lithgow Zigzag between the Bottom Points and the Coal Stage at Eskbank, Section "B," as referred to them by the Legislative Assembly, be carried out."

The motion was seconded by Mr. Dick, and passed.

FRED. FLOWERS,
Chairman.

Office of the Parliamentary Standing Committee on Public Works,
Parliament House, Sydney, 16 November, 1908.

PARLIAMENTARY STANDING COMMITTEE ON PUBLIC WORKS.

MINUTES OF EVIDENCE.

DEVIATION OF GREAT WESTERN RAILWAY LINE TO AVOID THAT PORTION OF THE LITHGOW ZIGZAG BETWEEN THE BOTTOM POINTS AND THE COAL STAGE AT ESKBANK.

TUESDAY, 28 *JANUARY*, 1908.

Present:—

THE HON. FREDERICK FLOWERS (CHAIRMAN).

The Hon. WILLIAM FERGUS HURLEY.	RICHARD THOMAS BALL, Esq.
The Hon. WILLIAM THOMAS DICK.	ROBERT DAVIDSON, Esq.

WILLIAM FLEMING LATIMER, Esq.

The Committee proceeded to consider the expediency of constructing a Deviation of the Great Western Railway Line to avoid that portion of the Lithgow Zigzag between the Bottom Points and the Coal Stage at Eskbank, Section "B."

William John Hanna, Under Secretary, Department of Public Works, sworn, and examined :—

1. *Chairman.*] Do you desire to place before the Committee plans and sections of this work, and also a statement? Yes ; it is as follows :—

DEVIATION OF GREAT WESTERN RAILWAY LINE TO AVOID THE LITHGOW ZIGZAG.

THE question of abolishing the Great Zigzag was mentioned as far back as the year 1885 ; but the first definite proposal was put forward in 1894, when Parliament referred the matter to the Public Works Committee for inquiry and report, six schemes being submitted, viz., two by the Railway Commissioners, two by the Construction Branch, and two by private persons. The Committee decided it was not expedient to carry out the work, one reason advanced as influencing this decision being that the traffic over the Western Line was showing a decrease.

In 1901, the Railway Commissioners revived the matter, and stated that as the traffic was showing a material increase, they urged that the work be proceeded with. Subsequently, on 18th December, 1901, Parliament again referred the matter to the Public Works Committee for report.

The proposal submitted by the Public Works Department was in two sections, viz. :—

	£	s.	d.
"A" (Dargan's Creek to the Bottom Points) 5 miles 34 chains	256,872	10	0
"B" (the Bottom Points to Coal Stage, Eskbank) 3 miles 46 chains.....	120,881	19	0

This scheme would give a grade of 1 in 90 throughout. In submitting their Statutory Report upon it, however, the Railway Commissioners intimated that while agreeable to section "A," they desired to substitute an alternative proposal for section "B." This alternative was described by the Commissioners as follows :—

"With regard to section "B," we would suggest a modification. . . . Scheme "B," as proposed by the Engineer-in-Chief for Railway Construction, would cost something over £120,000, whereas the present modification could, it is estimated, be carried out for a sum of £30,000.

"While the grade of this amended scheme, as proposed, is 1 in 50, as against 1 in 90, the former is deemed sufficient for all practical purposes for many years to come, as all goods and stock trains can, without difficulty and with economy, be assisted by bank engines at an estimated annual cost of £925 per annum, which is considerably less than would be the interest on the £90,000 additional expenditure involved if scheme "B" were accepted. Further, the amendment has the advantage of shortening the length of the line.

The Committee ultimately adopted the proposal of the Public Works Department as to section "A," and the Railway Commissioners' suggestion with regard to section "B," and recommended accordingly.

Subsequently, upon the question of Parliament determining the expediency or otherwise of carrying out the work, and later, during the progress of the several stages of the Bill to authorise it, strong representations were made in the Legislative Assembly, as to the desirability of carrying out the scheme with a uniform grade of 1 in 90, as originally proposed by the Public Works Department.

The Act to sanction the carrying out of the work in accordance with the recommendation of the Public Works Committee, was assented to on 18th December, 1906.

The Cabinet decided, however, not to proceed with the work until the arrival in the State of the new Chief Railway Commissioner, who, having the benefit of modern experience in the Old Country, was particularly qualified to express an opinion on the two schemes mentioned.

On the 11th May, 1907, the Chief Commissioner reported as follows :—

Office of the Chief Commissioner,
Sydney, 11th May, 1907.

Deviation of Great Western Line to avoid Zigzag, and duplication of line between Emu Plains and Glenbrook.

With regard to the enclosed papers relative to the proposals to avoid the Zigzag, and particularly in regard to the works suggested in connection with the portion from the bottom points to Eskbank, I have had an opportunity of going over the locality, and of discussing the matter with the Assistant Commissioners and my officers, who have made a close study of the question.

I am satisfied that the original proposal submitted, providing for a grade of 1 in 90 throughout, would be the better arrangement. It admittedly entails a considerably higher expenditure than the modified scheme with a 1 in 50 grade on the Lithgow side, but the advantages of the easier grade and the facilities it will afford in the working of the heavy and increasing business over the Western Line, justify the more comprehensive scheme being adopted.

At the same time, I recommend that approval be given, and Parliamentary sanction be obtained for, the duplication of the line between Emu Plains and Glenbrook.

The cost is estimated at £120,000.

The work will afford greatly-needed relief to the Western Line ; will complete the gap in the duplication of the Western Line between Sydney and Mount Victoria, and its advantages will amply justify the outlay.

In regard to both proposals, it is highly desirable that the works should be undertaken by this Department.

T. R. JOHNSON,
Chief Commissioner.

The question then arose as to whether the Minister could legally carry out the first portion, viz., section "A," and the matter was submitted for the opinion of the Crown Solicitor.

The following is a copy of the opinion obtained from the Crown Solicitor :—

"I see nothing in the Act to prevent the Department from proceeding with the construction of section "A", and at the same time submit-

Witness—W. J. Hanna, 28 January, 1908.

ting a proposal, for reference to the Public Works Committee, for the construction of the Great Western Railway deviation, from the bottom points to the coal-stage at Eskbank, with a grade of 1 in 90, in accordance with the original proposal of the Engineer-in-Chief for Railway Construction, in place of the deviation with a grade of 1 in 50, authorised by the Act, No. 36, of 1906.

"In the event of the Legislative Assembly declaring that it is expedient to carry out the proposed work, a Bill could then, in terms of section 31, be introduced, to amend the last-cited Act, and schedule thereto, and so sanction the carrying out of such work."

The Statutory Report of the Chief Commissioner for Railways is as follows :—

N. S. W. Government Railways,
Office of the Chief Commissioner,
Sydney, 9th December, 1907.

Proposed deviation of the Great Western Line in connection with the cutting out of the Lithgow Zigzag.

In compliance with the request of the Hon. the Minister, and in accordance with section 28 of the "Public Works Act of 1900," I beg to report as follows :—

Estimated Cost—

	£
Estimate of Chief Engineer for Railway Construction for a length of 3 miles 46 chains, *i.e.*, from the bottom points of the Zigzag to the coal-stage at Eskbank	149,427
Interest Charge— Calculated at 3½ per cent. per annum, equals	5,230

Official Description—

This proposed deviation commences at the bottom points of the Zigzag, and proceeds in a northerly direction for about ¾ of a mile, curves sharply, and runs south-westerly until it adjoins the existing line of railway at 94 miles 6 chains on the proposed new route ; from this point the existing line will be moved over and lowered for about 32 chains, then raised until the coal-stage at Eskbank is reached, where the deviation terminates at 95 miles 36 chains (new mileage), by a junction with the existing railway at 94 miles 20 chains, from Sydney.

The works are heavy, and include two tunnels, the longer being about 1,000 yards in length. The ruling gradient is 1 in 90, and the sharpest curve, 14 chains radius.

The proposal now submitted is identical with that which was reported upon by the Public Works Committee in July, 1902, and is known as section "B" of the complete scheme originally suggested for cutting out the Zigzag. The estimated cost of the work has, however, been increased from £120,882 to £149,427.

Having perused the evidence and report of the Works Committee, and also inspected the locality, I am satisfied that the original proposal, providing for a grade of 1 in 90 throughout, has most to recommend it, notwithstanding that it involves a much greater expenditure than the modified scheme with a 1 in 50 grade passed by the Works Committee in 1902 by a majority of one vote.

The growth of traffic along the Western Line has been so rapid, and the expansion continues, that something more than a temporary expedient is warranted ; and although the deviation proposed will add 1 mile and 15 chains to the existing mileage, the advantages of the easier grade, and the facilities it will afford in the working of the heavy and increasing business over the Western Line, amply justify its adoption.

It is not practicable to show in figures what actual monetary saving would be effected by the carrying out of the larger scheme now proposed ; but I can confidently recommend the increased expenditure on a work which will be in keeping with modern railway practice, and reproductive in its results.

The Common Seal of the Chief Commissioner for Railways and Tramways was hereunto affixed this 10th day of December, 1907, in the presence of,— T. R. JOHNSON, Chief Commissioner.

H. McLACHLAN.

The Hon. C. A. Lee, M.L.A., Minister for Public Works.

On 11th December, 1907, the Secretary for Public Works moved in the Legislative Assembly "that it be referred to the Parliamentary Standing Committee on Public Works to consider and report upon the expediency of constructing a deviation of the Great Western Railway Line, to avoid that portion of the Lithgow Zigzag between the bottom points and the coal-stage at Eskbank, section 'B.'"

The following is the official description of the line as submitted by the Chief Engineer for Railway and Tramway Construction :—

Deviation to avoid the Great Zigzag, "B" *section*. Length, 3 miles 46 chains. Estimated cost, £149,427, or £41,798, per mile, exclusive of land and compensation.

This proposed deviation in connection with the cutting out of the Great Zigzag on the Great Western Railway, commences at the bottom points of that Zigzag, and proceeds in a northerly direction for about ¾ of a mile, curves sharply, and runs south-westerly until it adjoins the existing line of railway at 94 miles 6 chains on the proposed new route ; from this point to the terminus at 94 miles 20 chains from Sydney the new line will run almost parallel with the existing railway, and as far as possible, the latter will be utilised in the new construction.

The works are heavy, and include two tunnels, the longer being about 1,021 yards in length. The ruling grade is 1 in 90, and the sharpest curve is 14 chains radius.

About half the land passed through is alienated.

W. HUTCHINSON.

2. I see this matter was mentioned in 1885, and it was put forward again in 1894, but the Public Works Committee decided it was not expedient at that time to carry out the proposal for the reason that there was a decrease in the traffic ;—was 1894 about the time of a bank crisis? Yes.

3. It is stated here that the Public Works Committee in 1902 reported in favour of the construction of section "A" of the proposal, and it recommended the adoption of the then Railway Commissioners' proposal to construct section "B" at the cost of £30,000? Yes.

4. Are we to understand that the new Chief Commissioner refused to carry out section "B"? He pointed out that the larger expenditure necessary to obtain a much easier grade would be a better scheme than the cheaper one with a ruling gradient of 1 in 50.

5. Did he make fairly strong representations as to the folly of carrying out an incomplete scheme? Yes.

6. Is the first section now being carried out? Yes ; by the Railway Commissioners.

7. Does the Chief Commissioner refuse to entertain any proposal with reference to the second section to cost £30,000? No ; because it was decided to refer section "B" to the Public Works Committee.

8. There is a paragraph in the statement that I would like to have explained ;—the Chief Commissioner recommends that approval be given, and Parliamentary sanction obtained for the duplication of the line between Emu Plains and Glenbrook? That has no connection with the present inquiry. Those are two questions embodied in one report.

9. What is the object of putting in that paragraph? Probably the papers dealing with these two questions were referred to the Chief Railway Commissioner for report, and he dealt with them in one report.

10. Do you know the reason for the increase of cost between the estimate laid before the previous Committee and the one now laid before us? There is an increase of £25,000. The conditions are not the same now as when the first estimate was made ; the cost of material has increased, and also the cost of labour. A special class of labour is required, as there is a large amount of tunnelling and rock work.

11. Who makes up these estimates? The departmental estimates are made up by the Chief Engineer, Mr. Hutchinson.

12. As this work is carried out by the Railway Commissioners, do they not make up their own estimates? No doubt they do.

13. All that your Department have to do is simply to make an estimate of the work as passed on to the Railway Commissioner? In this case we prepared an estimate for the information of the Public Works Committee. No doubt the Railway Commissioners also make an estimate.

14. Where is the need for the overlapping of the two Departments? We prepare all schemes for submission to the Public Works Committee.

15. Is this the only work that the Railway Commissioners carry out? They carry out all deviations on existing lines ; we carry out new lines or extensions.

16. Why has there been a different method adopted in this case where the deviation will cost as much as 30 or 40 miles of railway? The question as to whether the work should be carried out by the Department or by the Commissioners was discussed, and I think it was eventually decided that it should be carried out by the Commissioners, inasmuch as it is a deviation of an existing line.

17. Have they expressed a desire to carry out all their own deviations? Yes.

18. Has that been the custom for some time past? Yes; but this being a very large work, and much more expensive than ordinary deviations the question was raised whether it should not be carried out by the Department.

19. Is this a special case? Yes; it is a large and costly deviation.

20. Was your Department fairly determined with regard to the proposed "B" section as laid before a previous Public Works Committee? Yes; we held that ours would be the better and more economical scheme of the two in the end, although it would cost very much more in the first instance.

21. Were you in favour of constructing the line which the Chief Commissioner now urges? Yes; the new Commissioner agrees with the proposal submitted by the Department in the first instance—that is adopting the larger scheme giving a grade of 1 in 90.

22. Did your Department oppose the suggestion of the previous Railway Commissioners for carrying out a temporary work? Yes; we were not in favour of the shorter deviation with a steeper ruling gradient.

23. It is described here as a temporary expedient which would cost £30,000;—was it looked upon as a temporary expedient by your Department? Yes; in the sense that eventually it would have to be improved if a considerable increase in traffic took place, as no doubt it would.

24. *Mr. Davidson.*] With reference to the large plan before us does the new section practically cut out two lines of the Zigzag? "B" section is being constructed for the purpose of improving the grades and flattening the curves.

25. So that practically the effect of constructing section "B," and the deviation will be to do away with about 1 mile of the present railway? Yes; it will do away to a greater or less extent with the whole of it, because while we utilise some portions of the existing line—in fact as much of it as the formation of the country will permit in order to cut down the expense—the ruling gradient on the deviation will be a decided improvement on that on the existing line between the points where the two lines practically come together and the 94-mile post on the existing line.

26. Will there practically be 1¼ mile of new railway parallel to the old railway? Yes; but with a much improved gradient.

WEDNESDAY 29 JANUARY, 1908.

Present:—

THE HON. FREDERICK FLOWERS (CHAIRMAN).

The Hon. WILLIAM FERGUS HURLEY.	ROBERT DAVIDSON, Esq.
The Hon. WILLIAM THOMAS DICK.	JOHN ROWLAND DACEY, Esq.
RICHARD THOMAS BALL, Esq.	WILLIAM FLEMING LATIMER, Esq.

The Committee further considered the expediency of constructing a Deviation of the Great Western Railway Line to avoid that portion of the Lithgow Zigzag between the Bottom Points and the Coal Stage at Eskbank, Section "B."

William Hutchinson, Chief Engineer, Railway and Tramway Construction Branch, Department of Public Works, sworn, and examined:—

27. *Chairman.*] Have you prepared a statement with respect to this work? Yes; an estimate of cost. It is as follows:—

26 November, 1907.

NEW SOUTH WALES RAILWAYS, CONSTRUCTION BRANCH, PUBLIC WORKS DEPARTMENT.

Great Zigzag Deviation—Bottom Points to Coal Stage, Eskbank.

REVISED estimated cost of a double line of railway, 3 miles 46 chains in length, with 80-lb. rails. Ruling grade, 1 in 90 against the load; sharpest curve, 14 chains radius.

Description.	Estimated Cost.	Summary.	Average per mile.
		£ s. d.	£ s. d.
Earthworks		22,688 15 0	
Culverts		2,268 1 3	
Fencing		157 10 0	
Tunnels, No. 2 length, 1,313 yards		79,255 7 2	
Contingencies, tunnels, 2 per cent.	£1,585		
Other items, 10 per cent.	2,511		
		4,096 0 0	
Supervision		1,000 0 0	
		109,465 13 5	
Permanent-way		12,395 18 9	
		121,861 12 2	
Less Credit for materials on existing line		2,985 0 0	
		£118,876 12 2	
94 miles 6 chains to 95 miles 36 chains Coal Stage		30,550 10 9	
Total, Bottom Points to Eskbank		£149,427 2 11	41,798 0 0

	£ s. d.		£	
Estimate, November, 1907	149,427 2 11	or	41,798	per mile.
,, ,, 1901	120,881 10 0	,,	33,813	,,
Increase	£28,545 12 11		£7,985	

Witness—W. Hutchinson, 29 January, 1908.

26 November, 1907.

NEW SOUTH WALES RAILWAYS, CONSTRUCTION BRANCH, PUBLIC WORKS DEPARTMENT.

Great Zigzag Deviation.

ESTIMATED cost of a double line of railway, from 94 miles 6 chains to 95 miles 36 chains, coal stage, a length of 1 mile 30 chains, alongside the existing line.

Description.	Estimated Cost.	Summary.	Average per mile.
	£ s. d.	£ s. d.	£ s. d.
Earthworks	.....	19,363 12 6	.....
Culverts	.....	1,495 11 5	.....
Level crossing	.....	25 0 0	.....
Permanent-way	.....	7,796 0 0	.....
Deviation, Oakey Park Siding, and altering points and crossings	.....	1,318 15 0	.....
	.....	29,998 18 11	.....
Contingencies, 10 per cent.	.....	2,999 17 10	.....
	.....	32,998 16 9	.....
Less Credit for materials on existing line	.....	2,448 6 0	
Total	.....	30,550 10 9	.....

28. There is an increase in the estimates between 1901 and 1907 of £7,985 per mile,—how is that increase made up? I would like to explain my position with regard to that. I had no connection whatever with the original estimate, and when the Minister asked me to prepare information to enable him to submit the proposal to the Public Works Committee, I naturally thought it very desirable to submit my own estimate. I had the detailed quantities taken out, and the earthworks, and everything gone into very carefully, and I put down what I thought was a fair value. As a result the increase is shown to be over £28,000. I think that in making my estimates I had a little more information before me than my predecessor, Mr. Deane, had. I had the detailed drawings and cross-sections. I have also altered the prices which he put down as being, in his opinion, equal to carrying out the work, mainly the tunnels and excavations. He put down the excavations and tunnels at 10s. per cubic yard. I did not think a contractor would take the work at that money and I put down 12s. 6d. It is true that on the Hawkesbury line where we had a number of tunnels, but where there was also a large amount of other paying work, we had the tunnels done from 10s. to 11s., but the latest sandstone tunnels that we have done were on the North Shore line. They were tendered for at 15s. I considered that in putting down 12s. 6d. it was only a fair reasonable value for the work. Then the excavations and cuttings in the previous estimate were put down at 1s. 9d. per cubic yard. I put it down at 2s. 6d., because, as far as my knowledge goes, we have never yet had excavations of the same nature as they will be on this deviation done for 1s. 9d. The last contract that we let, which is the double line from Belmore to Chapel-road, the contract price was 2s. 3d. for excavation. There it is not all rock, but a mixture. Those two items add largely to the increased cost. Then the quantities have been increased to some extent. The quantities put down here are required for the work. How the difference arises I cannot say, but the items I have just given account largely for the increase.

29. Do I understand that between 1901 and 1907 for this class of work skilled labour was not so easily found, and that the rate of wages has since increased? No; I cannot say that. I consider that in 1901 no contractor would have taken up the work at those prices.

30. Do you think that in 1901 the estimate was not a reasonable one? It was low. It is not an estimate that I would feel justified in putting before this Committee.

31. Do you think that if tenders had been called for they would have been much in excess of that estimate? Yes.

32. Is it looked upon as a special class of work? The tunnelling is. There is a large amount of excavation.

33. Did you give evidence before the previous Committee? No; I had nothing to do with it before.

34. Have you been all over the work and got out the quantities and estimates? Yes, I have been over it thoroughly.

35. Will this scheme be a satisfactory solution of the difficulties in connection with the grades with regard to the necessity of push-up engines? This will do away altogether with push-up engines, and it is the only scheme, as far as I can see, which you can get. A great many schemes have been tried and this is the best of all of them. The Commissioners' engineers put forward other schemes, but they have now finally agreed that this scheme, as worked out by the Construction Branch, is the best one that can be put forward, and I do not think you can get anything better.

36. A scheme was laid before a previous Committee by the late Commissioners, involving an expenditure of £30,000;—are you familiar with the details of that scheme? No; it was prepared by the Commissioners' officers. I have had nothing to do with that, and you will get information about it from them. I know what it means. On that section there is a grade of 1 in 42 with sharp curves. They intended to eliminate that grade and make it 1 in 50, and to cut out the sharp curves. By that means they considered that by using a push-up engine they could take a train up to the bottom points, which could then be taken along by one engine over the grade of 1 in 90.

37. It would still necessitate the use of a push-up engine? Yes.

38. So that the decrease in the cost of haulage would be very small? The Commissioners' officers gave evidence that the cost of a push-up engine would be about £1,000 per annum.

39. Do you know what it costs on the existing grade? They are only using one push-up engine there; but it cannot take the same load as could be taken over a grade of 1 in 50.

40. Have you in your mind any other method than the one which you have placed before the Committee for lowering the grades at much less cost than under the proposal before us? I have nothing else in my mind suitable for a position such as that on the main line.

41. Is it not a large sum to spend? Yes, a very large sum.

42. Do you give the cost per mile as £41,793? Yes.

43. In your experience of railway construction, except in the case of expensive bridge work, is that about the most costly line that could be constructed? I should say it is about the most costly in these States.

44. Do you know of any other railway so costly in any part of the world? I should think that the Mont Cenis tunnels and others would cost more per mile. They are all tunnels, about 6 or 7 miles long.

45. Do you recollect the proposal in this case to tunnel right through? Yes; the Commissioners' officers submitted a proposal of that kind.

46. Was that considered practicable? It was before the previous Committee, and was investigated by them. Of course, it is possible to do it, but the grade would not be very much improved. It was 1 in 50, and you would still have to use a push-up engine or limit your load.

47. Was that grade of 1 in 50 against the load? Yes; under this scheme we would get a grade of 1 in 90. That will be the ruling grade for the whole of the way.

48. When the Zigzag was first suggested, and ultimately carried out, was it not considered to be a great piece of engineering skill? Yes.

49. And, probably, the only method of getting over the mountain? I consider that Mr. Whitton, in those days, did a very great thing in building the Zigzag. It was a very proper thing to do. Anything else would have been an impossibility in those days.

50. From what point of view? Owing to the excessive cost, and the difficulty in those days of getting such work done.

51. Has it been considered a very successful temporary method of tapping the whole of our western districts? Certainly.

52. Is there any comparison between the haulage in those days and the haulage of to-day? None whatever, and especially with the haulage that must take place owing to the extension of lines that is going on and is likely to go on.

53. What may have been a very satisfactory method in those days is proved to be utterly unsatisfactory to-day? Exactly.

54. Has it been proved, when working, to be very expensive, and is it now considered not to be quite as safe as it should be, in view of the large amount of traffic? Yes; I believe there is a certain amount of danger on the Zigzag which there is not on other parts of the line, and, certainly, there is a difficulty in getting the traffic over it.

55. With the completion of the section which has been authorised and the completion of this proposed section, will that be looked upon as a complete scheme, and do you think that it will prove in working to be all that is expected of it with regard to the western trade? Yes; you will then have a better grade on that section, or as good a grade as you will have on any other difficult portion of the line. Of course, the "A" section cuts out the Zigzag altogether.

56. Was engineering skill so far advanced when the Zigzag was built as it is to-day? No; engineering is advancing as every other profession is.

57. There is a paragraph in the Commissioner's report referring to the duplication of the railway between Emu Plains and Glenbrook; what does that refer to? I believe that is another deviation proposed by the Commissioners and intended to be submitted to this Committee; but I have had no connection whatever with that proposal. The Commissioners' officers have gone into that.

58. Later on will that be submitted to this Committee? Yes.

59. *Mr. Latimer.*] Do you make provision for a double line in this deviation? Yes.

60. How far will that carry the double line from Sydney on the Western line? That double line is simply for "B" section from the bottom points to the coal stage at Eskbank.

61. Do you know how far the double line will extend on that section if this alteration is carried out? No; because the Commissioners of late years have been duplicating the line at different places.

62. What is the worst grade on this Western line? The worst grade on that line now going from Sydney to the west is a short length of 1 in 30; that is near Knapsack Hill going out from Emu Plains. The Commissioners propose to cut out that grade. Then there are two or three bits of 1 in 33. That is up near Valley Heights and near Blaxland. Most of those will be cut out in the new proposal; but there are some bad grades which I do not think will ever be cut out. Beyond Faulconbridge to Linden there is a grade of 1 in 33. Those are all with the load. Coming back against the load, there are grades of 1 in 40. In time they will be cut out. I think the 1 in 90 grade will enable full loads to be taken up to Mount Victoria at present, and, later on, to Blackheath. There is always a push-up engine used from Emu Plains to Katoomba. They propose to split the trains there, so that when they get to Penrith, there will be another engine to take the trains down.

63. Will this deviation obviate the necessity of going down in two sections? No; this deviation has nothing to do with going down. They can go down that deviation all right with one engine, but there are the steep grades going the other way.

64. What I want to know particularly is this: supposing this deviation is carried out, will it be necessary at any time in future to make an alteration on what is now proposed? Certainly not.

65. Will this grade of 1 in 90 suit the western traffic for all time? Yes.

66. *Mr. Ball.*] In the Commissioner's report does he advise that the construction of this line should be done by them? Yes.

67. Why? I cannot say. It is a line that has been located entirely by the Construction Branch. It was found by them and located by them. I admit that I am very disappointed that I have not the carrying out of the work, but it was referred to the Cabinet, and it was decided that the Commissioners should carry out the "A" section which they are now doing, and I presume they will carry out "B" section which is now before the Committee.

68. To do that have they to be appointed the Constructing authority? I think the Constructing authority still remains with the Minister. I do not think the Minister has so far delegated his powers. They simply do it under him.

69. Is your Department responsible for this deviation? Yes, entirely.

70. Without any suggestion from the Railway Commissioners' officers? No; this location is entirely carried out by the Railway Construction Branch. Now that it is finished, it has met with the entire approval of the Railway Commissioners.

71. Had they anything to do with the original laying out of the scheme? Nothing whatever; they had their own schemes.

72. Have you or your officers explored all that country? Yes, the country has been explored in all directions.

73. Is this the best possible route? This is agreed to as the best possible route obtainable to get that grade.

74. Are you responsible for the estimate you have placed before the Committee? Yes.

75. Assuming that the Railway Commissioners carry out the work, is there any guarantee that your estimate will be exceeded in any way? No; they may do it cheaper. My estimate is one for inviting tenders for the work and carrying it out by contract. I think they are doing a section by day labour. Probably they contend that they can do it a little cheaper.

76. Can you give the Committee any reason why they can do it cheaper? No.

77. Have they carried out nearly all previous deviations by day labour? Most of them.

78. Is there a difference between this deviation and most other deviations, seeing that this goes right away from the line and does not touch it again? Yes, there is a distinct difference.

79. You are not likely to interfere with the traffic in any way except at the connection? From the top connection down to the bottom where we join the line the new line will be practically different from the old line.

80. With regard to your estimate, do you think it is possible that they may do it for less? I am not prepared to say that. I have given an estimate which I think is fair and reasonable.

Witness—W. Hutchinson, 29 January, 1908.

81. Are you aware whether the Commissioners have stated that they can do it for your estimate or have they admitted that it is a reasonable estimate? They have undertaken the "A" section at our estimate, and I presume they are satisfied.

82. Is there any guarantee that they will carry it out according to your estimate? No, and there would not be if we were going to carry it out. We can only go by what has taken place in the past. We have had a large amount of experience with regard to these estimates, and I think we have been fairly within the mark. Sometimes we have exceeded an estimate; but taking them as a whole, while we are not infallible, I think our estimates have been very fair. Mr. Deane was always very fair in his estimates, and since he has left, my estimates have come out very well with the tenders.

83. Supposing that the cost should be considerably in excess of your estimate, I presume you could reasonably say that if you had the construction you would have possibly kept within the mark? I would not like to say that. I feel that I have given a correct estimate. I would not like to come into conflict in any way with the Commissioners' officers. I believe they are capable of doing the work probably as well as I am.

84. Will you admit that there is a divided responsibility? No; if they do it they take the responsibility; if we do the work we take the responsibility.

85. But you are responsible for the design and for the estimate? Yes.

86. I assume you contend that you are in the best position to carry out the work, having gone so far with it? Yes.

87. *Chairman.*] I take it that the Commissioners have every facility, like your own Department, for carrying out such a work as this? Yes; or they can get those facilities.

88. And, even by day labour, they have all the plant necessary? I do not know what they have, but they can get it. As far as the work is concerned, I think the Commissioners will get all the facilities. I do not intend to convey for a moment that they are not in equally as good a position as we are to carry out the work.

89. Are they equally as capable, with respect to professional men? Yes; they have their own Engineer-in-Chief and other professional men, but, as we have carried out so much construction work, we have probably had more experience in new works. Their Engineer-in-Chief has experience of maintenance.

90. It is not overlapping or making a new Department to carry out this work? Not at all. I may say I am very heavily loaded up with work now, and, in one sense, I am glad to be relieved of this work; but there is a certain amount of kudos attached to the carrying out of this work, and I feel somewhat aggrieved that we are not carrying it out.

91. *Mr. Ball.*] Is there any reason why the Railway Commissioners should not carry out any other railway proposal which might be placed before this Committee,—for instance, the North Coast railway? If they had the staff they could do so, but they have not the staff.

92. But I presume they have not a staff to do this work without engaging one? I think they now have engineers who would do this.

93. Assuming that they could increase their staff, is there any reason why they could not carry out any railway proposal? If they had the staff, there is no reason why they should not do so.

94. And if it could be shown that they could construct a railway cheaper by day labour than by contract, would there be any reasonable objection to their doing so? No. We have done railway work by day labour. If you want to make a comparison, you might compare what they do, and what we have done, by day labour,—and what anybody else could do.

95. I presume the main object is to get the line constructed as cheaply as possible? Yes.

96. Do not all your railway extensions join on to the existing railways somewhere? Yes.

97. What difference is there between this proposal and any other railway proposal as far as traffic is concerned? I do not know of any.

98. Then, can there be any reason why the Railway Commissioners should not carry out any other railway proposal? It is entirely a matter of policy.

99. I notice by the map that the length of the line is considerably increased by these deviations? Yes.

100. To what extent? I cannot say, but I shall work it out.

101. Is it intended to charge the traffic in future for the increased length? The Commissioners' officers will be in a better position to give that information. All the rates are made out on a mileage basis.

102. Has that question been raised between you? I think the extra distance has been considered, but their charges in the rate book are all based on mileage; consequently, I assume the extra mileage will be charged for.

103. Is this deviation being made for the benefit of the Department, so as to give better results in haulage? Yes, and for the benefit of the western country generally. It will make a great difference in stock trains.

104. When you speak of the up and down line, do you speak of coming up to Sydney and going down to the country? Yes.

105. Going up the mountains you speak of as coming down? Yes.

106. *Mr. Hurley.*] Is it understood between the two Departments that the Commissioners only carry out deviations? Yes, that has been the practice.

107. So that the proposal that the Railway Commissioners should construct the North Coast railway would be altogether out of the question? Yes, under present conditions.

108. *Mr. Dick.*] Going from Sydney up to the 94-mile post, which is practicaily the end of the deviation, what do you say is the heaviest grade? There are short lengths of 1 in 30.

109. Is that at Knapsack Hill? Yes; the Commissioners' scheme proposes to cut that out.

110. Is that where you said the train was split? No, they always have two engines on the trains going up there.

111. So that until that Knapsack section is cut out the line will not have the full benefit of this deviation? I think under any circumstances they will always have steep grades. As I understand the position, they always have two engines taking goods trains from Emu Plains on to Katoomba. Then one engine takes the train from there to Eskbank.

112. Going from the 94-mile post further west, what are the heaviest grades? There are some short lengths of 1 in 40 and 1 in 50. Between Emu Plains and Glenbrook there are short lengths of 1 in 30 and 1 in 33.

113. Is that at Knapsack Hill? There are others besides.

114. Is there any proposal to deal with that section from Emu Plains to Glenbrook? Yes; the Commissioners are working out a scheme to wipe out the existing tunnel, and to cut out those heavy grades.

115. Is there a scheme for cutting out all those grades from Sydney to the new deviation? No; there are some grades there which would mean the reconstruction of the whole line if they were to be cut out, and they never will be cut out.

116. *Chairman.*] I think some questions put by Mr. Latimer and myself have been misunderstood;—I put a question to you, and so did Mr. Latimer, as to whether this would be a satisfactory solution as regards lowering the grades to take traffic to and from the west, and your answer was yes;—is that correct? I misunderstood the question. To take traffic from the west to Sydney it will be a satisfactory solution; but going out from Sydney to the west there are very severe grades, and it is impossible to cut out those grades without completely altering the whole line, which I think will never be done. The country is not adapted for any better grades probably than they have got.

117. *Mr. Davidson.*] Do the heavy loads come from the west towards Sydney? Yes.

118. Then with regard to traffic from the west to Sydney, will this deviation cut out all the bad grades? It will cut out all the bad grades between Eskbank and Sydney.

119. *Mr. Latimer.*] Therefore the grades of 1 in 30 and 1 in 33 that you spoke of are with the load? Yes.

120. *Chairman.*] But between Emu Plains and Glenbrook would there still be a necessity for push-up engines? Yes; because from Emu Plains to Katoomba you are rising the whole way, and there are still grades of 1 in 33 and 1 in 40.

121. But is there a proposal to be put before this Committee on some future day to lower the grades between Emu Plains and Glenbrook? Yes; to improve the grade on that particular section only.

MONDAY, 28 SEPTEMBER, 1908.

[*The Committee met at the Municipal Council Chambers, Lithgow, at 9·30 a.m.*]

Present:—

THE HON. FREDERICK FLOWERS (CHAIRMAN).

The Hon. WILLIAM FERGUS HURLEY.	ROBERT DAVIDSON, Esq.
The Hon. WILLIAM THOMAS DICK.	JOHN ROWLAND DACEY, Esq.
RICHARD THOMAS BALL, Esq.	WILLIAM FLEMING LATIMER, Esq.

The Committee further considered the expediency of constructing a Deviation of the Great Western Railway Line to avoid that portion of the Lithgow Zigzag between the Bottom Points and the Coal Stage at Eskbank, Section "B."

John Edmund Ireland, storekeeper, and Mayor of Lithgow, sworn, and examined:—

122. *Chairman.*] How long have you had experience of this district? Seventeen years.

123. How long have you been in aldermanic life? Nine years.

124. Have you previously taken any interest in the proposal before the Committee? Yes; I attended a large deputation to the Premier some years ago. The matter was considered, and was referred to the Public Works Committee five or six years ago. The carrying out of the project would be of great advantage to Lithgow and the Western areas generally. It would considerably help Lithgow as a manufacturing centre. I was President of the Progress Association for two years, and we have always advocated the cheap carriage of coal, so as to enable us to compete with the collieries which have greater advantages than we have. Although there have not been many serious accidents on the Zigzag, it has always been deemed to be a dangerous place. It is really the neck of a bottle, and there has always been trouble in getting through.

125. Is it the opinion of the local Progress Association that the development and progress of Lithgow has been retarded by the difficulties of the railway grade? I believe the lessening of the grade would cheapen the carriage of our material.

126. It is generally considered that your coal production is handicapped by railway difficulties? Yes; that has always been the great drawback to us.

127. Can you give the Committee any idea of the development which has taken place in Lithgow since the last Committee met there six years ago? Lithgow has advanced because of the industries which are established here. The Great Cobar mine sends its copper here for smelting. That has materially helped to increase the population and the number of employed. Since the Committee met here last, a number of men have been employed in the erection of the blast furnace, and in the making of iron from the native ores. Altogether, there has been great development, and the population has increased 3,000 to 4,000.

128. Has the increase been spasmodic, or of a permanent character? The population has gone up and down. I think it will be more permanent if the iron industry is permanently established.

129. You are so situated that in the event of a certain thing happening, you are likely to have a very large industrial population here? Yes, we consider that in a few years we shall have a very large population.

130. Has there been any falling off in the production of coal? There is at present a falling off, but five or six months ago the coal trade here was very large. More men were employed six months ago than have been employed for a number of years. But speaking of seventeen years ago, there were more men employed in the coal industry than there are now.

131. What you have lost in that direction have you made up in others? Yes.

132. Has there been any advance in the pottery industry? No; that has gone down materially.

133. Has there been any reason for it? I think the only reason was trouble with the workmen, or, perhaps, they could not compete with other potteries.

134. Can you say whether the duplication of the mountain line was considered to be a more important matter as affecting Lithgow than a reduction of the grade? I would not say more important, but it has helped us considerably. I think the cutting away of the Zigzag is looked upon as a more important work.

135. I understand that the duplication has already reached Mount Victoria? Yes.

136. Has that given any relief? Yes, it has helped us considerably.

137. Perceptibly so? Yes. The traffic, however, keeps on increasing, and there is still a block on the Zigzag.

138. A previous Public Works Committee recommended that section "A" should be carried out, and that £30,000 should be spent on section "B," to reduce the grade from 1 in 42 to 1 in 50;—do you think that would be satisfactory? No, it would not help matters very much.

139. There would still be a difficulty? Yes. A heavy grade would be left in the last section, necessitating much inconvenience, loss of time, and expense, in connection with push-up engines.

140. Then you are of opinion that the whole work should be carried out to its completion, and that the ruling grade of 1 in 90 should be obtained? Yes. If you simply give us a ruling grade of 1 in 50 or 1 in 70, you relieve us somewhat, but not sufficiently.

141. I presume that if £30,000 were spent on section "B," the work would, in a few years, be found to be altogether inadequate, and that a grade of 1 in 90 would be necessary? Yes, there is no doubt about that.

142. Do you think the development likely to take place in Lithgow and the west generally would justify a large outlay of money in securing a better permanent-way? There is no doubt it would. In the near future there will be great developments in the mining as well as in the agricultural industry.

143. Has there been any check in development lately? There has been a slight falling off in connection with the iron and coal industries.

144. Do you entirely depend upon what may happen in connection with the iron industry? No.

145. You have admitted that there has been a decline in the coal and pottery industries? Yes. We anticipate that very shortly we shall have other manufactures established.

We are promised a small-arms factory, for which a site has already been secured, and that will provide employment for a great number of men. I think other industries will naturally follow, especially as we have good coal, lime, and water.

146. Apart altogether from Lithgow, do you think the suggested expenditure would be justified with a view to meeting the development likely to take place in the west generally? Yes. There will be a large growth in the producing centres, especially when the closer settlement policy of the Government is given effect to. That will mean a great increase in the production of wheat, &c. There are also likely to be mining developments at Cobar and Nymagee.

147. What is the character of the development at Portland? Portland, a few years ago, had only a few hundred inhabitants, now it has a few thousands.

148. Does most of its production go to Sydney? Yes; for export.

149. Do you think 80 per cent. of it goes to Sydney? Yes, fully.

150. Have you any further information to offer? Between Eskbank and the bottom points there is a population of 2,000 people, and the distance from there to this place is fully $1\frac{1}{2}$ to $1\frac{3}{4}$ mile. We are told that on account of the steep grade there it will be impossible for the Commissioners to provide a platform at Oakey Creek.

151. *Mr. Hurley.*] In what way do you consider the Zigzag to be dangerous? The danger is in the push-up engines. The Commissioners have somewhat relieved the difficulty at the top loop-line. The second part of the Zigzag is a very nasty place. The brake-van of a train is allowed to come down first, and the engine is at the back, and you never know when anything is going to break.

152. Have you ever heard anything as to mining under the Zigzag for coal? I know there are coal mines close to it.

153. Do you know whether the foundations of the Zigzag have been cut out? No.

Alderman Horace Edward Seymour Bracey, general storekeeper, Lithgow, sworn, and examined:—

154. *Chairman.*] Do you hold any official position? I am licensing magistrate here and an alderman of the Council.

155. How long have you been in Lithgow? Twenty-three years.

156. Will you state what steps have been taken to urge upon the Government the necessity of carrying out the proposed work? On every occasion there has been any movement I have taken an active part, although, perhaps, not a prominent part. I have recognised the importance of the deviation. The Zigzag is a very serious block, not only to the trade of Lithgow but also to the trade of the whole of the west. I go to Sydney every week, and it takes me half an hour to come from the top points to Lithgow, and *vice versâ*. That is a very serious loss of time to a business man. If the deviation is carried out that delay should be remedied.

157. Do you think the existence of the Zigzag has retarded the development of Lithgow itself? I think it has, but I cannot give you actual instances of it. When a man starts an industry here he has to take everything into consideration. My twenty-three years' experience leads me to believe that the Zigzag is a hindrance to the development of Lithgow and Eskbank. When I first came here it was regarded as so serious a hindrance that people did not care to travel upon it at night.

158. Was that on account of fear? Yes.

159. But it has been remarkably free from accident? Yes; for this reason: very often the most dangerous portion of a line is the safest, because more care is taken. On no part of the line is so much care exercised as on the Zigzag.

160. What is the nature of the development which has taken place in Lithgow during the last ten years? It has been very great. Ten years ago the ironworks were in a struggling position. The coal-mines were only working intermittently. To the mining industry the Zigzag is a very serious drawback. Since the Cobar Copper Company secured ground here for the purpose of erecting smelting works the town has developed very considerably. The iron industry is at present a large factor in the prosperity of the town. Everything which tends to hinder or delay the carriage of freight must be regarded as a hindrance to our development.

161. Do you think the existence of the Zigzag has prevented any industries being established here;—have capitalists regarded its existence as a hindrance? I have entered into conversation with gentlemen who have come here from other States. They have pointed out to me the difficulties and dangers of the Zigzag. They have spoken of it as a beautiful piece of scenery, but they have regarded it as a hindrance to the development of the town.

162. Have you any recollection of any serious block during the last six years as the result of a breakdown? I cannot call to mind any specific instance. The records, however, will show that a little over six years ago a goods train ran away and the goods were left at the bottom of the Zigzag. On another occasion a horse-box attached to a passenger train was thrown over. That was when the push-up engines were used. Since then the system has been altered, and now the engine is taken off at the bottom points, attached to the head of the train, and drawn up. It is then taken off again, put on the head of the train, and taken to Lithgow.

163. Can you say whether, during the last six years, there has been any remarkable development of the town? Yes.

164. Owing to what? To the industries which have been started—primarily to the increase in the coal trade and the ironworks development. The population has increased 3,000 to 4,000 during the last four years. Four years ago the town was in a state of stagnation, but since then the population has about doubled.

165. Have you the same output as you had six years ago? We have considerably increased it.

166. Has there not been a decline within the last few months? Yes; still there is a greater output than there was six years ago.

167. Is the decline likely to be permanent? No.

168. Is the decline due to any cause you could name? It is due to the actions of the firm in Sydney—the agents for a particular shipping company. I allude to Scott Fell & Co. in liquidation.

169. But that is only a temporary matter? Yes.

170. Has there been a decline in the pottery industry? Yes; in my opinion, through want of management. The clay is here and the coal is here.

171. And the possibilities of the industries are here? Yes; just as good as ever they were. We turn out bricks and pipes to a large extent.

172. Is there a clay for white ware? Yes. White ware has been made at the pottery, but it is not being made now. That portion of the works has been closed down, but the possibilities of the industry are still there.

173. I believe that ten years ago you were making white ware? Yes. A large quantity of domestic pottery was at one time being turned out.

174. Do you think the railway difficulty had anything to do with the decline of the industry? I could not blame the railways for that. I think it was due to want of management.

175. Are bricks or sanitary ware being made now? At present, bricks and all kinds of pipes for drainage are being made. In addition, we have the tweed mills here, which turn out all the tweeds required for military purposes by the Government. They are situated at Bowenfels, in the municipality of Lithgow.

176. Has there been any development of that industry? Yes; new machinery has been installed and the premises have been enlarged.

177. Have you any doubt of the permanency of Lithgow as an industrial centre? The fact of my having been here for twenty-three years, and have extended my business premises three times, and am prepared to extend them again if the Bonus Bill is passed, is an answer to your question.

178. Would you say that the prosperity of Lithgow depends on the stability of the iron industry? Certainly not. Independent of the iron industry Lithgow must develop. The Coal Measures are so large that nothing can hold the place back.

179. Apart altogether from Lithgow, do you think the development of the west in regard to mining, pastoral, and agricultural industries is likely to justify a large expenditure of money in giving an easier and better grade at the Zigzag? Yes, I am emphatically of that opinion.

180. Do you understand what was recommended by a former Public Works Committee? I understand that the last Committee recommended a deviation. Instead of a grade from the bottom points of 1 in 90, the House recommended a grade of 1 in 50. I understand that the deviation has already been sanctioned, and that there is a difference of opinion as to whether the grade should be 1 in 90 or 1 in 50.

181. As a matter of fact, the Committee recommended that section "A" should be carried out, and that is being done;—then with regard to section "B," they recommended that from the bottom points to Lithgow there should be a grade of 1 in 50, involving an expenditure of £30,000;—do you think that that would meet the case for the time being? No; as a business man, I am entirely opposed to it. I understand that a push-up or auxiliary engine would have to be used on the grade of 1 in 50. That would not recommend itself to me unless there were to be no future developments of trade. We know from statistics, and the developments which have already presented themselves, and which are likely to be presented in connection with the construction of various branch lines, that the future of the western district must be very great. Although at present it may be more economical to work on that system, we have to look to the future.

182. What you really mean is that if trade develops during the next ten years as it has done during the last ten years, the completion of this work will be absolutely necessary, and the £30,000 will be absolutely wasted? Yes.

183. Was not the duplication of the line at one time considered to be of more importance than the reduction of the grade? It was at that particular time. When you cannot get a whole loaf, you must be content with half. The duplication of the line was necessary in order to get the trucks here. I was a member of a deputation which attempted to get the two works carried out. Failing getting the one work, we recognised that the duplication of the line was essential not only to us, but to the west generally. At that time it took from ten to twelve hours to get trucks from Penrith to Eskbank owing to them being shunted upon the various sidings. Although there were plenty of trucks, we could not get them over the single line, and that meant a serious business loss to everyone concerned. A large deputation, representing the district from Bourke to Parramatta, placed the matter before the Railway Commissioners in such a way that they carried out the duplication.

184. And that afforded you the necessary relief? Yes; but for the duplication of the line, we could not have carried out the work we have done during the last three or four years. I think the Railway Commissioners themselves would admit that.

185. If the proposal recommended by the last Public Works Committee is carried out, it will only give you half the relief required? It will amount to a waste of money.

186. Would it give you any relief at all? I do not think it would. When the Committee took evidence on a former occasion, this district was not developed as it is to-day—I am speaking now not only of Lithgow, but of the whole of the western district. There was not then the amount of traffic there is now over the line. Consequently some of those who recommended a grade of 1 in 50 would now be prepared to recommend a grade of 1 in 90.

187. Do you think it is possible that the condition of the finances of the country had anything to do with the number of officials giving evidence favourable to the recommendation of the Committee? I think it must have had a great deal to do with it. At that time the condition of the finances was not so satisfactory as it is now. We had a heavy debt on our shoulders, and the question was how we were going to meet it.

188. If you had the power to deal with this work yourself, do you think you would advise the carrying out of section "A" first, leaving it to be demonstrated whether section "B" was necessary or not? No. I know from experience that piecemeal works are very expensive, and cost a great deal more proportionately to carry out. I think it would be cheaper to construct the whole of the work from end to end.

189. You are of opinion that if the whole of the work is carried out it will meet the whole of the traffic requirements and be a convenience to all concerned? Most emphatically so.

190. *Mr. Latimer.*] When the agitation for the duplication of the line took place, was it considered that a way could be found over the mountains without touching the Zigzag? I think that ten or twelve years ago the Railway Department sent out four or five different lots of surveyors. They were surveying in all directions to find a route for the deviation of the Zigzag. Mr. Suttor, our present Agent in Japan, was one of the engineers. Mr. Little, now in Mudgee, had command of one of the camps. I understand that they prepared plans which would give a reasonable grade from Clarence to the bottom points.

191. But the route now suggested had not been discovered? I think not.

192. If the grade, which is now possible, had been discovered, would not the agitation have been for the cutting out of the Zigzag instead of for the duplication? No, we must have had the duplication first. It was absolutely the most important work.

193. *Mr. Hurley.*] In your opinion the scheme would be incomplete if the grade of 1 in 90 is not secured? Yes.

194. And you think a great deal of money would be saved by completing the work at once? Yes.

195. *Mr. Ball.*] Have you a good deal of freight from Sydney to Lithgow? Yes.

196. You are aware that this proposal will lengthen the line? Yes.

197. As a business man, would you be prepared to pay freight on that extra length? Yes.

198. Do you think those who send their goods over the line would also be prepared to pay? Yes.

199. Are the people at the pottery works making suitable fire-bricks? They are making very good fire-bricks, but I have never tried them.

200. Do you think fire-bricks are likely to be required extensively? Yes.

201. Do you think the supply can be met? Yes. I may mention that on the estate belonging to Messrs. Hoskins & Co. a clay has been discovered which is eminently suitable for the manufacture of fire-bricks. It was tested by Mr. Sandford when he had charge of the works. I am told that the samples were equal to anything imported. That is an industry which could be developed with sufficient inducement; the possibilities of this district are simply unbounded; we do not know what they are. The district has only been scratched up to the present time. We are finding new clays and all sorts of things which will help to increase the prosperity of the district. We have the possibilities, and the rest is only a question of management.

Samuel Hodge Gannon, retired storekeeper, Eskbank, sworn, and examined:—

202. *Chairman.*] How long have you been in Eskbank? Twenty-five years.

203. *Mr. Dick.*] Do you hold any official position? I am a justice of the peace, and President of the hospital.

204. What has been the history of the district during your period of residence in it? It has been one of steady progress.

205. Has its progress been hindered owing to the fact of the heavy grades on the railway and the difficulty of getting products over them? Yes, at times.

Witnesses—S. H. Gannon and J. Ryan, 28 September, 1908.

206. Do you think the progress of the district would be improved if a grade of 1 in 90 was secured from Lithgow to Mount Victoria? I believe it would. There have been times when the traffic on the line has been almost completely blocked. I believe that traffic has been diverted in another direction owing to the blocks which occur at the Zigzag.

207. Do you anticipate that the development of Lithgow and Eskbank will be as rapid in the future as it has been in the past if the deviation is carried out? I believe the progress of the district very much depends upon the market value of commodities. For instance, the copper industry is dependent upon the price of copper. Mines have been closed because the low price of copper does not pay to work them. I believe that ten times the quantity of potatoes would be grown in the district if the price would pay for their growth.

208. What bearing on the future progress of the Lithgow district will the cutting out of the Zigzag have? It will help to reduce the cost of freight. Less hands will be required at this end. We have a large railway staff here. If the Zigzag is cut out, a great many of those hands will not be required. Of course, that will somewhat interfere with the trade of the storekeepers. On the other hand, the copper mines will send their products here to be treated. We should also have less difficulty in getting our coal to market. With quicker despatch we should have a greater demand.

209. Can you give any specific instances of blocks of traffic on the Eskbank side of the duplication? Yes. A few months ago the yards were crowded with coal, chaff, and produce of different kinds. I believe that if the Zigzag was removed the produce would be got away in half the time at present required.

210. How long did the block last, and what was the extent of the delay to each train-load of coal? The block lasted for a month or two. There are times when the line becomes congested by reason of the wool, sheep, and produce traffic generally.

James Ryan, journalist, Lithgow, sworn, and examined:—

211. *Chairman.*] How many years have you resided in Lithgow? I have resided twenty-four years in the district, most of the time being spent in Lithgow.

212. Have you had an opportunity of witnessing the development of the west, and of Lithgow in particular? Yes.

213. Have you any reason to alter the opinion you expressed when appearing before the Public Works Committee in 1902? No. My opinion then was that the people of Lithgow were prepared to take anything which would mean relief from existing conditions, but I personally was in favour of the 1 in 90 grade.

214. You are aware that the Public Works Committee recommended that the proposal as referred to them with respect to section "A" should be carried out? Yes.

215. That is already being done; but with reference to section "B," they recommended that an easier grade of 1 in 50 should be secured at an expenditure of £30,000; did you agree with that recommendation? No, I disapproved of the expenditure of £30,000.

216. On what grounds? On the ground that it was merely patchwork, and the construction of a deviation with a grade of 1 in 50 is opposed, I think, to public policy, inasmuch as being patchwork it does not take into account the development which is proceeding in the western district. I also think the construction of new lines with a grade of 1 in 50 is opposed to the modern policy of railway construction.

217. Would you view it as a palliative, provided there was a disinclination to spend the full amount required on the "A" and "B" sections? I would be inclined to disagree with it still. We have had one instance, perhaps two, on the western section of the ineffectiveness of patchwork. The first occurred when they cut out the Little Zigzag near Emu Plains and put a single line tunnel through Lapstone Hill. That is possibly the best they could have done at the time, but now they find they will have to make another deviation. Again, they have constructed a short deviation near Clarence Siding. Possibly, too, that was the best they could have done eight or ten years ago, but it represents merely patchwork.

218. But you will admit that the proposal involves the expenditure of a very large sum of money? I do not hold that it is prohibitive, taking into account the growth of traffic throughout the west and the probable growth in the future.

219. Still some justification should be shown for the expenditure of such a large amount on the two sections? Speaking as a layman, I should say that the justification exiss in the difference between a grade of 1 in 50 and the grade of 1 in 90.

220. Has the development in Lithgow been marked during the last six years? It has been very marked. The mineral traffic is the traffic which chiefly interests the railway people. The returns of the Railway Department show, for the year ending 30th June, that the coal forwarded from the Lithgow Coal Association was 403,261 tons for twelve months. That represented an increase of 93,000 tons over the preceding twelve months. That is in Lithgow alone. Then I come to the Portland return. Of course, everything from there must come over the Zigzag. The Portland traffic mounted to 14,572 tons. That represented an increase over the preceding year of 5,403 tons. Then I turn to the Torbane return—that is on the Mudgee section. It is a station from which the shale is sent by rail. The Torbane return for the last twelve months is 5,451 tons—a decrease of 38 tons; but I would like to draw attention to the fact that during the greater portion of the year there was a strike at the mine, which, I think, lasted eight months, and materially affected the return. I have no doubt that had the strike not occurred the return would have been double. Those are centres in which the traffic has grown steadily, and it is likely to in greater proportion in the future.

221. And it has grown in spite of the difficulties of the grade? Yes.

222. Do you think the development would have been greater if there had been better facilities for carrying the produce to market;—in other words, have these districts lost anything in trade? Lithgow has lost severely during past years.

223. Can you give any direct instance to show it? No; you will have to get the details of loss from the Coal Association.

224. Do you know of any industry which probably would have been commenced here had it not been for the difficulties of the line? I do not know that the block which the Zigzag presents has stopped anyone from establishing an industry.

225. Has it retarded the industries already established? Yes; it has considerably prejudiced the coal-trade in past years. I have been in my present position for nearly twenty years, and, week in and week out, particularly in the busy season, the complaint has been constant. It was set down to scarcity of trucks; but we grew wiser as we grew older, and we found that it was not due so much to the scarcity of trucks, but to the difficulty of working, especially on the Zigzag section.

226. There was a block during particular months of the year? It was particularly severe during grain and wool seasons.

227. Has that been somewhat relieved by the duplication of the line to Mount Victoria? Yes.

228. Has it been relieved altogether? No.

229. Are there any blocks now similar to those which occurred prior to the duplication of the line? No; they have not been so severe.

230. Is that because of better supervision? No; I think it is simply because of the greater facilities for railway work a double line affords.

231. The difficulty of the Zigzag is not so apparent now as it was before the duplication? No.

232. There has been a decided relief? A sense of relief.

233. I suppose it resolves itself now into a question of working the line more economically? Yes, and expeditiously.

234. That is to say, that it will pay for the expenditure of the money for the relief of a ruling grade of 1 in 90 as against the existing grade? Yes; expedition is a great factor. There is a constant block of goods trains, extending up to twenty minutes per train. That is a serious thing, both for the producers and the traffic manager.

235. In 1902 you held that the duplication of the line was more important than the cutting out of the Zigzag? I cannot say from memory whether I put it in that way, but we looked to the duplication first because we knew it would relieve the position, and because we felt that duplication was the portion of the problem which would be dealt with most speedily. The Zigzag is a formidable proposition, and involved greater expenditure than the duplication of the line.

236. You were asked, "As long as the people get a double line are they indifferent as to the grade" and you replied "Yes"? Yes—the people of Lithgow.

237. You were expressing what you thought was the opinion of the people of Lithgow? Quite so.

238. And that has been borne out by the fact that the duplication of the line has been effected, and you have no difficulties now similar to those you experienced previously? I would not say no difficulty, but we have not the same difficulty. The difficulty has not been so acute since the line was doubled.

239. You are of opinion that to carry out the work as recommended by the late Committee, giving a grade of 1 in 50 for an expenditure of £30,000, will not result in satisfaction? Yes; and it will have to be altered after a few years, and a ruling grade of 1 in 90 will have to be established.

240. Then the expenditure of £30,000 on a grade of 1 in 50 would be a waste of money? I would regard it as an improvident policy, having in view the development which has taken place in the west, and the still greater development which must take place in the near future.

241. Has there been a decline in any of Lithgow's industries during the last few months? The coal trade has suffered a temporary slump in the shipping sections.

242. Is there any particular reason for that? I am inclined to think that the reasons are partly of a business character, into which I could not enter.

243. Is there any reason why you could not enter into them? Yes—because I have not any official knowledge of them.

244. There has been a serious decline in coal production during the last few months? Yes.

245. Is there any other industry which has declined? No. The iron industry has been affected by circumstances with which you are all familiar. It was stopped for a few weeks towards the end of last year, but since the resumption under the control of Messrs. Hoskins it has gone on fairly regularly. There was a slight break two months ago, but that was connected with a matter which has been adjusted. Of course, the immediate future of the iron industry will be largely determined by the action of the Federal Parliament towards the Bonus Bill.

246. Supposing the Federal Parliament is opposed to the Bonus Bill, would you say that the prosperity of the district depends solely upon the establishment of the iron industry? No. I think the industrial prosperity of this district is entirely based upon its possession of coal. The iron industry, after all, is based on coal. If we had no coal, we would have no iron and smelting industries here.

247. Had you not another industry here—the pottery industry—which has declined? We had a pottery industry here up to 1892 or 1893. It was never a very large industry. It is fifteen or sixteen years since it closed up.

248. Was not white ware manufactured from the clay found in the district? Yes. There were three sections—pipe-making, brick-making, and pottery. The pottery section closed down.

249. Can you say why? No; it is a big problem to pronounce upon.

250. Was it an important industry? We never regarded it as very important. It does not compare at all with such industries as the iron industry.

251. But it should have compared, with the opportunities they had, it being practically the only white-ware factory in the State? These are only matters of opinion after all.

251. Do you think we are likely to get sufficient development from mining and agriculture in the western districts to give sufficient traffic to warrant the expenditure of this large amount of money? Yes.

253. Have you any other information to offer? It seems to me that to construct the deviation with a grade of 1 in 50 would be running counter altogether to modern railway policy. In England or America they would not look at such a thing. When the matter came before the Legislative Assembly, about three years ago, I had occasion to write about it in the newspaper of which I am the editor, and I strove to express what I considered to be the modern view in a few sentences. I had about that time returned from a trip, during which I travelled over American, English, and continental railways. I will read what I wrote:—

> A grade of 1 in 50 as the basis for a working arrangement is entirely foreign to the spirit of modern railway management, and if the new Railway Commissioners are imbued with modern notions, they are certain to view any such patchwork arrangement with strong disapproval. In America, the Pennsylvania Railroad Company is spending the large sum of £20,000,000 for a terminal and for river tunnels, to save twenty minutes in train time, which is at the rate of £1,000,000 a minute. The New York Central is at the same time spending £1,000,000 sterling to gain just a minute in time. The Southern Pacific, two years ago, spent £8,000,000 in a new road and bridge across Great Salt Lake, the object being to reduce the schedule time by two hours. On the Baltimore and Ohio line, a tunnel was built at a cost of about £1,400,000 to save fifteen minutes. Since 1900, between New York and Chicago, the stupendous sum of £40,000,000 has been spent on improving the road, in order to reduce the running by five hours between these two great cities. And these are only a few instances out of many which might be quoted. In America, steep grades and sharp curves are treated to dynamite, even if the cost runs into millions, in order to expedite traffic. In New South Wales, the Railway Department trembles at an expense of £90,000, to give a practical grade to a section of line which carries the traffic of the largest and richest area in the State. It may, of course, be argued that the vast traffic carried on American main lines justifies the huge figures we have quoted. The answer is that the smaller New South Wales traffic equally justifies the small expenditure of the £90,000 extra needed to give a satisfactory grade on an important section of our chief line of railway.

That was my view then, and that is my view to-day.

254. *Mr. Dacey.*] Where did you get your figures from? I travelled over a portion of the lines, the Southern Pacific, the new line across the Great Salt Lake, and I obtained the local statistics. Some of the information I obtained from Home publications.

255. *Mr. Hurley.*] Do you know whether, in connection with the proposal to construct the line from Blayney to Harden, any capital was made out of the fact that it would remove traffic from the Zigzag? I am not familiar with the agitation which led to the construction of that line.

256. I presume you will have noticed that Parliament has agreed to construct railways which will, practically, intersect the whole of the agricultural country towards Forbes? Yes, and every one of those lines must act as a feeder to the Western line, and the whole of the traffic will have to go over the Zigzag.

257. Everything, so far as you know, justifies the proposal before the Committee? Yes; everything justifies a deviation with a grade of 1 in 90. With the prospects of growth in the west, the proposal to make a deviation with a grade of 1 in 50 is purely archaic; it is a Middle Age proposal.

Alderman William Alfred Isley, President, Progress Association, Lithgow, sworn, and examined:—

258. *Mr. Ball.*] How long have you been in the district? Six years.

259. Has there been much development in Lithgow during that time? The town has practically doubled itself in six years.

260. What is the development due to? To the advancement of the coal, iron, and brickmaking industries. There has also been development at Portland, Airlie, and Torbane.

261. Has that development affected the population of the town? It has brought a certain amount of money into the place.

262. Does the Lithgow Progress Association support the proposal before the Committee? Yes.

263. Have you noticed any serious block in the traffic on the line? I cannot say that I have, but I have heard that blocks have occurred, preventing the empties coming back.

264. Does your association favour the proposal to obtain a uniform grade of 1 in 90? Yes. We have two stations here—Eskbank and Lithgow—and it is only a question of time when we shall have only one. The population at the Oakey Park, at the end of the municipality, have been agitating for a platform, which they have not succeeded in getting. With a grade of 1 in 90, it will be easier to have a platform there than it will with a grade of 1 in 50. I take it that the population will warrant the establishment of a platform there in a short time. It has been mooted that we are to have a central station, which will do away with Eskbank and Lithgow. These reforms will economise matters; hence a grade of 1 in 90 compared with a grade of 1 in 50 speaks for itself. The line over the mountains is the main artery for an enormously rich back country. Although the line to Harden will carry a certain amount of traffic, still, between Harden and Lithgow there is a tremendous amount of rich country. It will be sheer waste of money to spend £30,000 on a grade of 1 in 50, and then, in ten or twenty years' time, to find that we are compelled to spend another £100,000 to alter it.

THURSDAY, 8 OCTOBER, 1908.

Present:—

THE HON. FREDERICK FLOWERS (CHAIRMAN).

The Hon. WILLIAM FERGUS HURLEY.	ROBERT DAVIDSON, Esq.
The Hon. WILLIAM THOMAS DICK.	JOHN ROWLAND DACEY, Esq.
RICHARD THOMAS BALL, Esq.	WILLIAM FLEMING LATIMER, Esq.

The Committee further considered the expediency of constructing a Deviation of the Great Western Railway Line to avoid that portion of the Lithgow Zigzag between the Bottom Points and the Coal Stage at Eskbank, Section "B."

George Proudfoot, railway contractor, and engineer, Balmain, sworn, and examined:—

265. *Chairman.*] You see the plan before you, showing the whole scheme submitted to the previous Committee; probably you are aware that section "A" was recommended by the Committee, and that section "B" was rejected, but in its place a proposal was made for lowering the grade to 1 in 50 at a cost of £30,000; since then section "B" has been again referred to the Committee as a portion of the original scheme, the estimated cost of carrying out the work being £149,000;—could you, as the result of your long experience as a railway contractor, assist the Committee in the consideration of the question before them? When the matter was before the Committee previously, I met the late Minister for Works, Mr. O'Sullivan, and told him that I thought the Commissioners were making a grave mistake. I pointed out that a ruling grade of 1 in 90 would result in a great acceleration of the railway service on the main trunk line to the west. I pointed out that the chief factor in railway work was safety, and that the easier your grade the greater the factor of safety. Mr. O'Sullivan then instructed me to at once send him in a report on both grades, showing the advantage of the 1 in 90 over the 1 in 50, which had been adopted. I did so, and I believe it had the effect of stopping its construction. As I had previously pointed out to Mr. Eddy, I again laid stress on the fact that this country was going ahead by leaps and bounds, and that if it were intended to reduce the grade to 1 in 50 the line might as well be left alone.

266. You are speaking of the 1 in 50 grade from the bottom points to the coal stage? Yes.

267. You constructed the Glenbrook tunnel? Yes.

268. What is the grade? Going through the tunnel it is 1 in 40.

269. Do you know that there is a suggestion to lower the grade and practically cut out the tunnel? Yes, I do not know why it was not done in the first instance. Before I put a pick into the ground I pointed out to Mr. Eddy and the members of his staff, the absurdity of constructing that tunnel for a single line of railway. I advised Mr. Eddy to go up there and see the place for himself, and he did so with the members of his engineering staff. I pointed out that in view of the very large traffic and its probable rapid increase it would be much better to construct the tunnel for a double line.

270. Did you speak of the grades then? Not at that time. I told him that I was prepared to carry out the tunnel for a double line at an extra cost of £6,000. It was not that I wanted to make any more money, but I thought my men would be able to work to so much more advantage.

271. What was the total cost? £37,000. Mr. Eddy had some consultation with the members of his staff, and he said it was thought best to adhere to the contract. In regard to the want of ventilation, also to which I called attention he said they would adhere to the contract. I pointed out that some people would probably be suffocated. The construction of that tunnel was just about as great a blunder as the building of the Zig Zag.

272. Is the grade uniform from the Emu Plains station to Glenbrook—is it 1 in 40 all the way? I do not think so. I think the grade is easier on the lower part of the line.

273. Do you remember whether anything was said about the grade when you were carrying out the work? No; but there was some mention in conversation that an easier grade could be found.

274. You are of opinion that it would be a great mistake to have a grade of 1 in 90 to Clarence Siding, and 1 in 50 from the bottom points to the coal stage—you think it should be a ruling gradient of 1 in 90? Undoubtedly. If the cost involved were £250,000 it would be justified. I scarcely like to say it, but I do not think the Commissioners or their engineer have studied the matter sufficiently.

275. The matter of grade is one of the most important in connection with railway construction? On main trunk lines decidedly.

276. You think that an easy grade on a long distance would be preferable to a heavy grade on a short distance? Undoubtedly.

277. In years to come there will be need of a 1 in 90 grade, and you think that £30,000 spent in making a line, with a grade of 1 in 50, will be thrown away? Yes. I think that there is an unaccountable difference in the estimates of the Department for the two grades.

278. The estimate submitted on a previous occasion was £120,000, and that has been increased to £130,000? Yes. I have been a railway proprietor, a railway constructor, and a railway administrator, and I have also had charge of tramways; and I think that it would be a very stupid thing to construct any section of a main trunk line on a grade of 1 in 50, particularly in a case where the traffic is increasing so fast.

279. You think that the needs of the West will demand a 1 in 90 grade? Yes; the grade should have been reduced twenty years ago.

280. *Mr. Hurley.*] Why did you advocate the provision of ventilators for the Glenbrook tunnel? Because of the smoke that would be created, and the stoppage of the train on the grade. I have only once been through the tunnel—it was in the summer time—and the steam and smoke were coming through the floors of the carriages.

281. Did you look upon the Glenbrook tunnel as a death trap? I would not say that, but it seemed to me to be a childish thing not to make the tunnel wide enough to carry a double line of track when the extra cost was so small.

282. Under present conditions, what would you do to ventilate the tunnel? Sink a shaft.

283. Down to the roof or by the side? To the roof.

284. How long is the tunnel? About 44 chains.

285. Do you think it is necessary to have ventilating shafts in the tunnels proposed to be constructed in the deviation? A good deal will depend upon the contour of the country. The mouth of the Lapstone tunnel is in a gully, and there is no current of air. I have no doubt that, in view of the lessons of the past, the engineers will take good care to provide for ventilation.

286. Why do you demur so much to the difference of a few thousand pounds in the estimate for the grades of 1 in 40 and 1 in 90? It seems to me that the one estimate is as excessive as the other is too low. I should very much like to see the drawings, and take out the quantities for myself. The railway engineers have not had the practical experience of a contractor.

287. *Chairman.*] Could you give us a case in point showing the difference in the estimated cost and the amount of the contractors' tenders;—what lines have been built in this State? I have been interested in a good many contracts. Our first contract was over the New England country, from Uralla to Glen Innes.

288. How much lower was your tender than the estimate? I think that in that case our tender was very near the estimate which was based on Mr. Amess' contract over similar country. Mr. Whitton, although he made mistakes as an engineer, was a very sound man and pretty reliable in his estimates unless something unforeseen cropped up. I could not just now give you an instance showing any great discrepancy between the estimate and the contractor's price.

289. Is it not a fact that the contractor's price is generally over the estimate? Yes.

290. Fresh tenders are very often called? Yes.

291. That is more often the case than that the contractor is under the estimate? I think so. Of course, unforeseen circumstances sometimes occur that carry the cost entirely beyond the engineer's estimate. In the case of the Mullet Creek embankment, for instance, the material kept on sinking, and it very much exceeded the estimated cost.

292. *Mr. Ball.*] You stated that you offered to make the Glenbrook tunnel wide enough to carry a double line for an extra £6,000 on a £37,000 contract? Yes. That price was for the tunnel only.

293. Is that on record? I should scarcely think it would be, because the conversation to which I referred took place on the site between Mr. Eddy and myself. There might be an offer in writing from myself to Mr. Eddy, but there would be no official record so far as the Commissioners were concerned.

294. You have no doubt that you made a definite offer? Not the slightest.

295. Could you widen the tunnel now at the same cost? No.

296. Is the tunnel lined? Not quite throughout.

297. What would be the increase in the cost if the tunnel were widened now? I should want three times the money I asked at first, because at the time I made my offer the men would have been able to work at so much more advantage.

MONDAY, 12 *OCTOBER*, 1908.

Present:—

THE HON. FREDERICK FLOWERS (CHAIRMAN).

The Hon. WILLIAM FERGUS HURLEY.	ROBERT DAVIDSON, Esq.
The Hon. WILLIAM THOMAS DICK.	JOHN ROWLAND DACEY, Esq.
RICHARD THOMAS BALL, Esq.	WILLIAM FLEMING LATIMER, Esq.

The Committee further considered the expediency of constructing a Deviation of the Great Western Railway Line to avoid that portion of the Lithgow Zigzag between the Bottom Points and the Coal Stage at Eskbank, Section "B."

John Harper, Chief Traffic Manager, Department of Railways, sworn, and examined:—

298. *Chairman.*] You are well acquainted with the subject under consideration? I knew all about it six or seven years ago; but I have just returned from a holiday, and I am a little bit rusty on the subject now.

299. I suppose you are well acquainted with the position taken up by the Chief Railway Commissioner in reference to this matter? Yes.

300. In giving evidence on the previous occasion when the matter was before the Public Works Committee, what position did you take up? I held the view that, as the money to be spent on the work was to be taken out of loan funds, it would be more economical to use the push-up engine than to spend £120,000 in reducing the grade to 1 in 90. At that time I thought that we might very well leave the reduction of the grade until the traffic had developed to such an extent as to render that work necessary.

301. You agreed to the proposal to make a grade of 1 in 90 from Newnes Junction to the bottom points, and a grade of 1 in 50 from the bottom points to the coal stage, because you considered that the traffic at that time failed to justify the carrying out of the full work? It was more economical to utilise the push-up engine than to pay the interest on the capital outlay that would have been involved.

302. In 1902 you submitted a table showing the traffic on the line? Yes.

303. You were asked if there had been a large increase of traffic since the proposal was inquired into by the previous Committee in 1898, and you stated that, according to the last return made up to 1899, there was an increase of about 150,000 tons a year, and that the increase was considerably over 200,000 tons to that date? Yes.

304. What is the increase now? I have not had time to go into details. Certain returns were made out for September, 1901. During that month we had 439 goods trains and 179 passenger trains. In January of the current year we had 770 goods trains and 220 passenger trains.

305. Therefore, in seven years—taking the two months into comparison—the traffic has doubled itself? Yes, but I should explain that in January last there were very heavy movements of coal for shipment, and the traffic then may be taken as a record. Apart from that, however, there has been a very considerable increase in the traffic. The Commonwealth Company have developed their cement works, there has been a large increase of the coal output, and the traffic generally has developed.

306. There has been a great development in the west from the agricultural and pastoral standpoint? Yes, and that has considerably helped to increase the amount of freight during the last seven years.

307. Would you be prepared to say whether the increase in the freight would now justify the carrying out of the work proposed to be done on section "B"? Yes. If the money is to be charged to the Capital Account and interest has

to be paid, it would not be justified, but the policy of the Chief Commissioner is, wherever it is possible, to pay out of revenue for all improvements of this character. If the cost of the line could be defrayed out of revenue, I think that the work would be a good one to carry out, but if on the other hand the cost is to be charged to Capital Account, and interest has to be paid, I should hesitate about making the alteration. It would be more economical to continue the push-up engine than to pay interest on loan fund for the present. I do not mean to say for all time, but with the traffic we have at present.

308. A large amount of work has been carried out by the Department in making deviations and lowering the grade generally on the mountains? Yes, that principle has been generally adopted.

309. Has that work been paid for out of revenue? No, but I understand that in connection with the deviations now in progress—that is section "A"—£100,000 is to be provided out of the Public Works Fund.

310. Was the matter of duplicating certain lengths on the mountains brought prominently before the last Committee, who considered the deviation proposals now before us? Yes, it was brought before the Committee in this form, that the utility of the double road would be limited by the single road of steep grade on the Zigzag.

311. So that practically the duplication has made the proposed deviation of greater importance than ever? Undoubtedly.

312. But was it not stated that it would be a relief? Yes, the duplication has been a relief, undoubtedly. As a matter of fact, we could not have worked our traffic over grades of 30 and 33 on a single line as we have worked them but for the duplication.

313. The duplication has led to more economical and quicker working of the line? Yes, but for the line having been duplicated from Glenbrook to Mount Victoria we should not have carried the traffic over it.

314. Whatever may be thought with regard to section "B," section "A" was an absolute necessity? Yes.

315. When you gave evidence before did you fully consider the rapid progress of the west generally, the likelihood of the establishment of the iron industry at Lithgow, the development of the coal trade, the development of the copper industry at Cobar, and the general pastoral and agricultural development, and did you consider that, judged by the increase that had taken place during the previous ten years, it would be an absolute waste of money to reduce the grade to 1 in 50, when there was a probability of the lower grade of 1 in 90 shortly becoming absolutely necessary? Yes, if you look at it from that point of view, but, the economy of using a push-up engine as compared with the capital cost of the increased mileage of the larger scheme had to be considered.

316. Would you say that it was economy in view of the development that has taken place? Yes, if the proposed alterations were to be made out of loan money.

317. But apart from the question of money, and from the point of view of railway management and control, would it not be a waste of time to build the line to a grade of 1 in 50, and to retain the push-up engine? No. For all time they will have to work the northern line from the Hawkesbury to the top of the hill on a steep grade.

318. Can you conceive that the traffic will demand that the grade shall be lowered to 1 in 90? I have that much belief in the future of my country that I think the time will come; but I do not think that the day has arrived when we should spend £150,000 of loan money in carrying out the works. If, on the other hand, the work is carried out with money taken from revenue which will not be subject to any interest charge, it will be more economical to construct the deviation than to continue the present practice.

319. If, some day or other, this work must be undertaken, will not the £30,000 spent in lowering the grade to 1 in 50 be absolutely thrown away? No, because the material used in the construction of the line would return something—it would not be all loss.

320. You mentioned another reason in opposition to the section "B" being constructed;—you mentioned an awkward tunnel there as an objection? Yes, but I think that has been modified. The approach was on a fairly sharp curve.

321. You think that the new deviation is an improvement on the last? Yes, if, as I understand, the objection has been overcome, so far as that curve is concerned.

322. Generally speaking, you are in favour of the reduction of the grade to 1 in 90? Yes, subject to the condition I have mentioned. I still maintain, as I did in 1902, that it would be more economical to continue the use of the push-up engine than to pay interest on the outlay necessary for the new work.

323. You are aware that the Chief Railway Commissioner made very strong representations to the Government on this matter? Yes, purely on the ground that the line should be built out of other than loan money.

324. Are you expressing his opinion now? Yes.

325. Then he is of opinion that provided that the money is taken out of the Public Works Fund and not out of loans, the work should be carried out right through from Newnes Junction to the coal stage at Eskbank at a uniform grade of 1 in 90? Yes, that is from the bottom points to Eskbank.

326. Does the increase in the estimates from £120,000 to £149,000 make any difference in your view of the matter? None whatever.

327. *Mr. Hurley.*] I suppose you had a conference with the other officers of the Department? As a matter of fact, Mr. Thow, Mr. Fraser, and myself made a special report on this matter.

328. You all agreed as to what you were going to say? We have discussed the matter, but I do not know what the other gentlemen are going to say.

329. If you will look at question 523 in the former inquiry, in 1902, you will see that it reads as follows:—

> Practically the heads of the Railway Department, in giving evidence now, have agreed to take the scheme originally submitted by the Construction Department, with certain modifications? Yes.

Have the officers of the Department and yourself come to any agreement as to the evidence you are going to tender on the scheme now before the Committee? I think it will be found—we discussed the matter this morning—that the views of the other officers are that the work should be carried out, provided that the cost is paid for out of revenue.

330. Do you think it is really good policy for the officers of the Department to consider the question as to where the money is to come from apart from the point as to which is the best scheme to adopt? I think it is a matter of vital importance.

331. Would that be applied to all matters, such as, for instance, engines, and would it lead you to select a cheap article instead of getting the better one? Decidedly not, we generally find that the best is the cheapest.

332. You put down the cost of the push-up engine at something like £925 per annum;—do you make allowance for the value of the engine? Yes.

333. What would be the life of a locomotive if it had nothing else to do but to perform this push-up work? With renewals, and perhaps a new boiler, you would get twenty-five years' work out of her.

334. At question 505, in the same inquiry, reference was made to the fact that passenger trains had to be divided in order to negotiate the Zigzag; you were asked whether that frequently occurred, and you stated "No; passenger trains, as a rule, are so made up that the wings of the Zigzag will hold them"; were the wings of the Zigzag lengthened in 1902? They have been increased in length because the trains have been lengthened. We have two more sleeping-cars now as compared to what we had in the old days.

335. Would the fact that these wings have been constructed strengthen your feeling in favour of sticking to the old line? That does not affect the question. The wings would be useless when the new work was carried out, but it was a matter of very great urgency to lengthen the wings in order to enable us to get the traffic through.

336. At question 508, in the previous inquiry, you point to the fact that the worst tunnel on the whole section has a very bad outlet and inlet—has that been altered? Yes, a distinct improvement has been made.

337. You apprehend no danger at all? No, the whole of my objection disappears. I should think that the new plan provides for a curve of 1 in 20 instead of 1 in 14.

338. Then at question 537, you make a further reference to the difficulty that would arise in connection with the tunnel; you seem to attach a great importance to the inconvenience and probable danger arising from these tunnels;—do you think that the ventilation will be good in the tunnels as now proposed? Yes. In the last seven years we have improved our methods of ventilating tunnels, and I do not think we shall have much trouble under any circumstances with a double-line tunnel.

339. What is the grade in the Lapstone tunnel? 1 in 33.

340. At question 542, further reference is made to this awkward tunnel? Yes, as I have explained, the tunnel has been improved; or if not, I take it that it is capable of improvement.

341. At question 565, you say "the grade of 1 in 50 from the passenger point of view, is probably better than a 1 in 90 grade, because they will pass through no tunnel; tunnels are always regarded as possessing an element of danger, especially on a double road;"—that contradicts your statement just now? I do not see that. So far as the tunnel is concerned the inlet and outlet have been improved. The risk on double roads in regard to the traffic is, that in the event of a derailment in the tunnel there would be a disaster, and there would be no chance of a clear road.

342. At question 584, you stated that the Department were only too anxious to get the best scheme possible; you did not then give financial reasons against the best scheme possible? If you could get an obsolutely level road, it would, no doubt, be the best thing possible, but you cannot altogether ignore financial considerations—you must be guided by some reason.

343. At question 609, you make further reference to the fact that tunnels are never liked by the travelling public; on the next page, at question 635, you say that you do not favour the grade of 1 in 90 on account of the increased cost of construction and increased length of line, and you make further reference to the bad inlet and outlet of the tunnel;—have the inlet and outlet of that tunnel been altered? I do not know, but Mr. Fraser will probably be able to tell you.

344. If you do not know, how can you favour the construction of the deviation? I know, as a matter of commonsense, that Mr. Fraser is not likely to construct a tunnel of that character. I should say that he would improve it.

345. At question 621, you make further reference to the awkward tunnel;—does that refer to the tunnel to which you have objected all along? Yes.

346. And from what you have heard from Mr. Fraser, there is no danger to be apprehended at all? No.

347. *Mr. Ball.*] Your only objection rests on the question of where the money is to come from? Yes.

348. Was that aspect of the question considered when you previously gave evidence? In those days the question of paying for these works out of revenue had not been considered.

349. No reference is made by the Chief Commissioner in his report to the question of where the money is to come from—he does no make a condition such as you have? Perhaps not, but I know from the conversations we have had that the question was in his mind before he recommended the construction of the deviation.

350. Do you not think that if that were a condition he would have mentioned it? Perhaps he intends to do so. Before the report was sent in that phase of the question was discussed very thoroughly.

351. What is the great difference between paying for the work of loans and out of revenue? In one case the money is paid and the whole thing is done with, whilst in the other it becomes the subject of an interest charge in perpetuity.

352. Would it not mean a sacrifice in some other direction if the money were paid out of revenue? No, it would operate to the benefit of the users of the railway, because the interest charges would be reduced. So long as you build up your cost you must maintain your rates. When you are able to save interest and reduce your cost every member of the community is benefited.

353. Your idea is to keep down as far as possible the capital charge on the Railway Department? Yes.

354. Then all the difficulties raised by you at the previous examination disappear if it is understood that the work is to be constructed out of revenue? Yes, but the objection would remain if the line were to be built out of capital.

355. Do you know, as a matter of fact, that the proposal before the Committee is exactly the same as was before the previous Committee? I do not know whether any alterations have been made, but I am sure that all objections will disappear before the line is built.

356. *Mr. Latimer.*] As a matter of fact, in 1902, a section was considered a stupendous alteration of the railway? Yes, it was.

357. Since that time the attitude of the Chief Commissioner and his officers has altered somewhat? Yes, because the Chief Commissioner believes in paying as much out of revenue as he possibly can.

358. A natural alteration of view has also been brought about owing to the increase of traffic, and the projected increased lines that will be served by the deviation? Yes.

359. Do you know under what financial conditions section "A" is being constructed? I think that £100,000 is to be paid out of the Public Works Fund.

360. Is the whole of the deviation to be paid for out of the Public Works Fund? I do not know, but I hope so.

361. You do not know what arrangement has been arrived at? No.

362. *Mr. Davidson.*] When the proposal was last before the Committee it was estimated that £925 per annum would be the cost of the push-up engine if the new deviation were made from the bottom points to Eskbank at a cost of £30,000;—was that cost based on the traffic of the day? Yes.

363. And you told us that for the month of January last the traffic returns as compared with those of September, seven years ago, showed that the traffic had practically doubled? Yes.

364. Would the cost of the push-up engine on the deviation with such an increased traffic be increased? Yes. I should say that it would require at least two engines, and the cost would be practically doubled. It might be a little more, because with a large volume of traffic it might be difficult to get your engines back to the place where they were required.

365. Then, if the push-up engines were done away with, there would be a saving of £1,850 per annum? Yes.

366. What would that saving amount to if it were capitalised? I could not say.

367. Would you capitalise the saving at 3½ per cent.? More than that, owing to the allowance to be made for the wear and tear of the machine.

368. Was not wear and tear considered in your estimate of £925? Yes; I think 5 per cent. was allowed for depreciation.

369. Would you capitalise the cost at 4 per cent.? Yes.

370. The saving upon the two engines capitalised would represent a capital of £55,000;—would it be fair to the other sections of the country if that £55,000 were taken off the capital cost of the railway and the whole amount of £149,000 were paid out of revenue? They would have to renew the engines.

371. But the yearly cost would be saved? Yes.

372. So that the Railway Commissioners would be carrying the traffic cheaper to themselves? Yes, and to the public.

373. If the deviation were constructed the line would be lengthened? Yes, by 1 mile 16 chains.

374. Would there be any extra cost for freight and passenger traffic owing to the line being lengthened? Yes; the probabilities are that on the remeasurement of the line that 1 mile 16 chains would be added to the freight and fares.

375. Would the Railway Commissioners derive sufficient benefit from the extra freight and fares to recoup them? I could not say.

376. Still it would be of some benefit? Yes.

377. Would it be fair that the whole of the cost of the deviation should be paid out of revenue? Yes; I think so, because facilities of that character enable the revenue to be earned.

378. But there would be more revenue earned at less cost to the Commissioners? Yes.

379. *Chairman.*] Could you tell us any instances in which, having lengthened the line, you have increased the freight charge? During the last five years we have had a remeasurement over the whole of the lines, and we have increased our rates all round.

380. You have increased them on the Newcastle line? Yes; in some cases they have been reduced, and in others increased.

381. *Mr. Dick.*] Would it be more economical during the working of the railways, purely from the Commissioners' standpoint, to have this work constructed out of loan money, at a grade of 1 in 90, or to work the line under present circumstances on a grade of 1 in 50? Under present circumstances and with the present traffic it would be more economical to work the line with a push-up engine.

382. Could you supply us with a comparative statement, showing us what would happen if the line were carried out by the expenditure of loan money as against the cost of the push-up engine? ——

383. *Chairman.*] We should also like to know the amount of tonnage carried over the railways, in and out, compared with seven years ago; also the number of passengers carried? I do not think we could give the number of passengers.

384. Could you supply us with the tonnage coming into Sydney as against that leaving Sydney for the west? I shall do the best I can to give you an approximate statement.

James Fraser, Engineer-in-Chief for Existing Lines, Department of Railways, sworn, and examined:—

385. *Chairman.*] You are well acquainted with the project before the Committee, known as section "B"? Yes.

386. Do you recollect having a consultation with the Chief Commissioner upon the subject? Yes. A consultation took place after some discussion as to the advisability, generally, of defraying the cost of a work such as this out of surplus revenue. In view of the fact that the work might be paid for out of surplus revenue, it was thought desirable to adopt a grade of 1 in 90 rather than a grade of 1 in 50. We looked upon the matter in this way: if the money would not bear any interest neither work would cost anything, and, therefore, we wanted to get the best we could for nothing.

387. The Chief Commissioner raised very strong objections to the carrying out of section "B" on a grade of 1 in 50? I do not know whether he raised very strong objections. When he first came here and heard of the proposal he said he thought it would be better to have a grade of 1 in 90 rather than 1 in 50; but the conditions when he came here were very different from those which prevailed a good many years previously.

388. It is now generally accepted by railway engineers all over the world that the mere matter of money or of trouble, should not stand in the way of a uniform grade of 1 in 80 or 90? Yes; but the question of money is one that must be considered. Engineers will always get the best they can for the least amount.

389. Yes, but is it not a ruling principle in railway construction that you should endeavour to get the lowest grade possible, even at the sacrifice of distance? Yes; we have adopted that principle in many cases. We have had to do it in order to carry our traffic. We have had an isolated grade of 1 in 40 ruling the traffic on a section 30 or 40 miles long.

390. You say that there were some new conditions prevailing when Mr. Johnson came here? The traffic during the year ended June, 1907, was enormously greater than that of the preceding twelve months.

391. That is to say, the traffic is practically doubled? That may be, but I do not know.

392. Assuming that the traffic has doubled, would that make any difference in the view held by you? I do not know that it would, if you went into the financial aspect of the matter as it stood in 1902. The financial aspect has distinctly altered.

393. Do you hold that a grade of 1 in 50 would, so far as you can anticipate, meet the conditions for all time of the traffic from the west? Yes. The traffic could be carried on a grade of 1 in 50 with the assistance of a push-up engine.

394. Do you think that that would lead to no inconvenience or loss? No, because the distance is short.

395. If it was suitable then, would it not be equally suitable now? Yes, but you are up against the question of cost again.

396. I am speaking of the best thing to be done, apart altogether from the question of cost;—on page 14 of the evidence in the 1902 inquiry you say, in giving evidence with regard to the grade of 1 in 50 in the "B" section, that you do not think it will ever be necessary to alter that grade, and you point out that the cost of making a grade of 1 in 90 would entail an outlay with interest of nearly £3,000 per annum? Yes; that is, practically, correct, and for this reason, that the financial aspect was gone into wholly and solely. If the traffic were to develop to ten times the amount that it was in 1902, we should, probably, want six lines instead of two. Four more new lines would have to be constructed at a cost of £700,000 or £800,000, so that the financial aspect of the matter is an important one. We were dealing with the financial aspect and not the relative merits of the two grades. A grade of 1 in 90 is distinctly better than a grade of 1 in 50, but from a financial point of view the latter may be preferable and cheaper.

397. If you can get the money free of interest charge, you think that the work should be constructed and the grade reduced to 1 in 90? Yes. In doing that work we shall be following the practice adopted in other parts of the world.

398. That would make the running of the railways more profitable? A little.

399. Would it not mean a lessening of the running staff and less expense? Yes, probably it would.

400. Would it not also result in economy of time? I do not think so.

401. Was it not stated in evidence that there would have been delay with a push-up engine? I did not say that.

402. Is it not highly probable? No.

403. Could the push-up engine be used without waste of time? It should be. You must remember that a grade 1 in 90 entails an additional 1 mile 16 chains in running. I think that I stated in 1902 that, as a matter of fact, goods trains would pass over the grade of 1 in 50 in slightly less time than over the grade of 1 in 90.

404. Then what would be the advantage of having the lower grade? We should use only one engine instead of two to carry the load.

405. Would that save wear and tear on the locomotives? Not a great deal, because in either case the locomotive would be loaded to its maximum power.

406. Is there no advantage in having the grade of 1 in 90 besides that of being able to dispense with the push up engines? Yes; there will be a few other advantages, including less wear and tear both on the permanent-way and the rolling-stock.

407. A great deal of duplication has been done on the mountains? Yes.

408. Was the money spent there taken out of the Public Works Fund? No; the duplication consisted in the construction of additional line, and therefore the work was distinctly a capital charge, and was voted out of the Loan Estimates by Parliament.

409. Do you know whether it was understood that section "A" was to be constructed out of the Public Works Fund? There was no agreement with the Government, but the view of the Chief Commissioner was that that work should be done out of the surplus revenue, and the Government have agreed to give us £100,000 out of the Public Works Fund. This year we are actually paying out of our working expenses for similar works carried out some years ago. One case to which I refer is the deviation at Sodwalls, carried out three years ago at a cost of £20,000. That money is being paid back out of working expenses.

410. Do I understand that at this consultation that view of the question was discussed;—I am referring to the report of the Commissioner in which he says, "I have had an opportunity of going over the locality and discussing the matter with my assistant commissioners and officers, who have made a close study of the question"? We did have a discussion on the top of the Zigzag.

411. Was the question as to where the money was to come from discussed? Yes.

412. And did you then agree that if the money was to come from the Public Works Fund you would be prepared to change the position you had previously taken up and favour the construction of the line? The resolution was not quite in that form, but it was agreed that if we could get a grade of 1 in 90 practically for nothing, it was distinctly better to have it than a grade of 1 in 50.

413. You are of opinion now that the work should be carried out? Yes, some alteration will have to be made.

414. Are you favourable to the project before the Committee, which is practically on all-fours with the proposal before the previous Committee? Yes. On the understanding that the work is to be paid for out of the Public Works Fund.

415. *Mr. Davidson.*] Has any alteration been made in the plan of "B" section? Not that I am aware of.

416. You had nothing to do with the plan? No.

417. The evidence you gave before the last inquiry was to the effect that a grade of 1 in 50 from the bottom points to Eskbank would suit the traffic for all time; you stated to the Chairman that this would be so, even if the traffic were increased ten times as compared with what it was in 1901;—would it be possible for ten times the traffic of 1901 to be carried over a double line of rails? No; I stated that if the traffic multiplied tenfold, it would probably be necessary to have six lines of way.

418. Why? Because we should be having more traffic than is now carried over our suburban line.

419. How many trains will run over a double set of rail in a day? It is impossible to answer the question.

420. How many trains pass over the suburban lines? Ninety trains per day on each of the down roads.

421. Would it be possible for ninety trains to pass over one of the lines from Eskbank to Lithgow if the grade were reduced to 1 in 90? Not under existing conditions.

422. With a grade of 1 in 50 or 1 in 90? It would not matter about the grade.

423. Where is the difficulty? That arises from the large mileage between the block stations.

424. How many trains do you think could run on that line under existing conditions with the present number of block stations? I could not say. I think the present schedule provides for fifty trains up and down, or twenty-five each way.

425. Does that include the breaking up of the goods trains because of the heavy loads? That does not happen to-day. We have lengthened the wings of the Zigzag to get rid of that.

426. If the block stations were nearer, could you run more trains? Yes. We have had to put in additional block stations owing to the heavy traffic on other lines. We have put in twelve additional stations on the Northern line.

427. Would it be possible by the increase of the block stations to travel ninety trains each way? Yes; speaking generally, we could carry as many trains as are running on the suburban line if we had sufficient block stations. It must be remembered, however, that the suburban lines are level and the mountain lines are not, and that would probably make some difference.

428. Do you think it possible, with sufficient block stations and a grade of 1 in 90, to run eighty trains per day on the up line? I daresay it would be possible.

429. Do you think it possible that the traffic from the west will ever increase to eighty trains per day? I shall be very disappointed if it does not.

430. Could you give us an idea of where the traffic is to come from? A very big area is drained by the western system.

TUESDAY, 13 *OCTOBER*, 1908.

Present:—

THE HON. FREDERICK FLOWERS (CHAIRMAN).

The Hon. WILLIAM FERGUS HURLEY.	ROBERT DAVIDSON, Esq.
The Hon. WILLIAM THOMAS DICK.	JOHN ROWLAND DACEY, Esq.
RICHARD THOMAS BALL, Esq.	WILLIAM FLEMING LATIMER, Esq.

The Committee further considered the expediency of constructing a Deviation of the Great Western Railway Line to avoid that portion of the Lithgow Zigzag between the Bottom Points and the Coal Stage at Eskbank, Section "B."

James Fraser, Engineer-in-Chief for Existing Lines, Department of Railways, sworn, and further examined:—

431. *Mr. Davidson.*] Could you, as an engineer, tell us the difference in the cost of hauling over a grade of 1 in 90 as compared with 1 in 30? That is a question that involves more than one element for consideration.

432. So far as tractive force is concerned the amount that could be hauled by a given engine over a grade of 1 in 90 would be about double that which could be hauled over 1 in 50? I do not think it would be more than double.

433. What would be the difference in wear and tear on the engine running over the two grades with the same load? I do not think it would be possible to answer that question.

434. I suppose there would be less wear and tear on the engine in the 1 in 90 than on the 1 in 50? Yes, there would be with the same load.

435. Is there any difference in the wear and tear on the trucks on a steep grade as compared with the flatter grade? Not more wear going up, but there is more wear coming down. On a grade of 1 in 40 or 50 going down there must be brake control or the trains would run away,

436. Is there no more wear and tear going up a grade of 1 in 50 than 1 in 90? Very little. I do not think it would be possible to fix the percentage.

437. What is the influence on the rails and the line as a whole? There is more wear and tear on steep grades coming down. When trains are going up steep grades they travel slowly, and consequently there is comparatively little wear and tear.

Witness—J. Fraser, 13 October, 1908.

438. Is there any difference in the wear and tear on the rails in connection with the effort which the engine has to make to get up the grade? No, we do not find it so. On rising grades there is much less wear and tear than on falling grades, owing to the brake action on the latter, and the skidding which sometimes occurs, besides which the high speed tells on the permanent-way.

439. Do you think that on the whole there would be less wear and tear on the engine, trucks, and permanent-way if double the distance had to be travelled on a 1 in 90 grade as compared with half the distance on a 1 in 50 grade? I should not like to say positively. I think the possibilities are that if you travelled twice the distance on the latter grade the wear and tear would be pretty nearly equalised.

440. All through? I think so. The question is a difficult one to answer.

441. Do you find that there is more labour required to keep the railway line in repair apart altogether from the life of the rails on a grade of 1 in 50 than on a grade of 1 in 90? There is a distinct difference. Where we have heavy grades the cost of maintenance is greatest. I have not made any comparisons recently. I made comparisons some years ago of the difference in the wear of the rails on steep as compared with flat grades, but I cannot rely on my memory as to the exact differences.

442. What is the difference in time taken by an engine and train of the same weight to travel over a mile on 1 in 90 as compared with 1 in 50? There would be no difference really if the engine had sufficient power to pass at the maximum speed permissible over the 1 in 50 grade.

443. Suppose that an engine was hauling twenty-five trucks, and was put almost to its full capacity in passing over a 1 in 50 grade, what would be the difference in time occupied by the same engine and load in passing over a mile of 1 in 90 grade? I could not say exactly. An engine loaded to pretty nearly its maximum capacity for a 1 in 50 grade would not travel more than 10 or 12 miles an hour. The same engine would haul the same load over a 1 in 90 grade at double the speed. That is to say, that the horse-power involved in travelling at twice the speed over 1 in 90 would be about the same as in the other case.

444. *Mr. Dick.*] I take it that generally the departmental attitude is, that if the carrying out of the proposed work does not involve any increased interest charge they will be prepared to take it over? We are very anxious to take it over. We must have an improvement between Eskbank and the bottom points, otherwise the work we are doing at present will not give us the result we ought to get. The attitude I take is, that if we can get a grade of 1 in 90, the cost being defrayed out of surplus revenue we should take it by all means.

445. But you already have power to flatten the grade to 1 in 50? I understood that that part of the authority was cancelled to permit of a further reference to the Committee.

446. From the engineering point of view, and apart from the question of finance altogether, do you consider that the exigencies of the traffic over the Zigzag now demand that a grade of 1 in 90 should be laid down? But I think you must consider the question of cost.

447. Do you think the circumstances of the traffic at present absolutely demand that the grade should be flattened to 1 in 90? I should not like to say that.

448. In what way would the best effects expected to be produced by the construction of section "A" be rendered nugatory if we do not get a grade of 1 in 90 on this section? What I mean to say is this: to-day we have a 1 in 40 grade and very sharp curves, and those conditions must be altered. That is absolutely imperative, or otherwise we shall not get the best results from the flattened grade between the bottom points and Dargan's Creek.

449. Would a grade of 1 in 50 be sufficient for the purposes of section "A" and the present traffic? As we said some years ago, a grade of 1 in 50 with a push-up engine would permit us to take the loads that we can haul over a grade of 1 in 90.

450. Do you regard the use of the push-up engine as quite up-to-date in the circumstances of our case here? Push-up engines are used all over the world. In some cases as many as three are used on the one train in the Rocky Mountains. In Canada I have seen as many as six engines on a train.

451. Can you quote any such examples from the United Kingdom? I did not see any push-up engines being used there, but the conditions in the United Kingdom are very different from those which prevail here, because the majority of their lines are constructed on flat grades.

452. Did they not flatten their grades quite recently? I do not know of any particular case in the Old Country. When I was in Canada they were flattening a grade of 1 in 100 to a grade of 1 in 400, at a cost of £400,000. That work was being carried as a betterment, the cost being defrayed out of working expenses. The Committee appointed by the Treasury recommended that all such works should be carried out at the cost of revenue rather than be debited to capital, and that is the principle that has been adopted during the last few years.

453. Do you understand that that is a permanent arrangement? I gather so, and that is the reason I stated that works of this character should be paid for out of surplus revenue.

454. Do you remember the date of the report of the Treasury Committee? No; but I know that we have acted on it since 1905. The report was presented during the Carruthers' Administration.

455. Such a principle as you have mentioned was not seriously thought of in 1902? Up to that date every work of this description was debited to capital account. Our capital account has been increased by £1,000,000 in connection with works of this kind.

456. From an engineering and general point of view, how much greater would be the improvement if the deviation were constructed in a grade of 1 in 90 as compared with 1 in 50? I should say that the 1 in 90 grade would be, practically, 100 per cent. better than the other, if you compare one work with the other without going into the question of cost.

457. Is it worth while incurring an oulay of £149,000 to secure the flatter grade? If the whole of the cost were cleared off straight away, it would be decidedly better to have a grade of 1 in 90.

458. What other engineering improvement would take place in addition to the higher load that trains could carry over the flatter grade? There would be less wear and tear.

459. Would it be easier to manage the traffic? Yes, to some extent.

460. Presuming that it was not considered wise to defray the cost of the work out of revenue, and that the same increase of traffic would take place during the next two periods of seven years, as has occurred during the last period of seven years, and that as compared with the one push-up engine used seven years ago two were now employed, and that it would be necessary to employ eight engines during the second seven-year period in the future, do you think that the flatter grade should be adopted? You are adopting a ratio of increases that seems to me to be very much too high.

461. But the traffic has doubled during the last seven years? I do not know whether Mr. Harper in making that statement was speaking with a full knowledge of the facts, but I am extremely doubtful that the traffic has doubled.

462. Suppose that it was necessary to have four push-up engines in constant use, would any confusion in the traffic be brought about? Not necessarily. I think that by the time the traffic increased to such an extent as that we should have to multiply the number of lines.

463. Presuming that a grade of 1 in 90 were laid down, do you think that under any circumstances in the future it would become necessary to obtain an even flatter grade to meet the demands of the traffic? I think that a flatter grade would be amost impracticable in that country. I do not say that it would be absolutely impossible, because nothing is impossible if you like to spend the money. But we have to start from a certain point and get back to a certain point, and I do not think it is possible within the bounds of economy and reason to get a better grade than 1 in 90, and we shall have to be satisfied with that.

464. The report of the Chief Commissioner says that it would be highly desirable to have the work carried out by the Department; could you give us the reason for that? I think that is a matter that will settle itself. It has been decided that the section between Dargan's Creek and the bottom points shall be carried out by us—in fact, we are carrying it out now. It is even more desirable that we should carry out "B" section, owing to the fact that, for a considerable length, the new line runs parallel with the existing one, and involves alterations of the existing line which should be carried out by the Existing Lines Department.

465. Do you think that your Department is in a better position to carry out the work economically than is the Works Department? So far as the "A" section is concerned, I think it is very likely we shall save a very considerable sum upon Mr. Deane's estimate of £256,872.

466. Could you tell us why the estimate for section "B" has been increased from £120,000 to £149,000? I do not know why. I have never seen the estimates in detail.

467. Is it not a fact that all the detailed survey work is carried out by the Works Department—even of the "A" section? The whole of it was carried out by Mr. Deane's staff.

468. And yet in spite of that fact you think that your Department would be able to carry out the work more economically? The chances are that we should be able to carry it out for a little less.

469. *Mr. Dacey.*] Do I understand you to say that you are now carrying out the "A" section? Yes.

470. Are you doing anything in connection with "B" section? Nothing whatever.

471. Did your Department have anything to do with the preparation of plans for "B" section? No, not for that shown on the map. That was part of the original scheme surveyed by Mr. Deane.

472. How many tunnels are there in the "B" section? Two.

473. The curve shown on the map is mainly in one of the tunnels? Yes, if the map be correct, that would appear to be the case.

474. Is that tunnel likely to be free from the defects in other tunnels which have caused annoyance and trouble? We have made a small alteration with respect to the tunnels on the "A" section by making them wider than any other tunnels previously constructed in the State.

475. What is the length of the big tunnel in section "B"? 1,000 yards.

476. Has any arrangement been made that trains shall not cross in that tunnel? I do not know. That is a traffic question. It is reasonable to suppose that trains will cross in the tunnel.

477. Is any provision to be made for lighting up the tunnel in case of accident? Not that I am aware of.

478. Would there not be greater likelihood of accident there than on an open line? No, quite the reverse. We have never had an accident in a tunnel in this State.

479. I suppose that in making the survey the Works Department consulted the Railway authorities? Yes, I walked over the route with Mr. Deane.

480. Was it not possible to get over the mountains by an easier route than that now being used? I think it is quite possible that some better route might have been obtained in the first instance.

481. Would it not have been a much easier route *via* Richmond and the Colo River? It would have been a frightfully expensive line. A survey was made some years ago by Mr. Townsend, and the cost of the line by that route was found to be absolutely prohibitive. It would have been merely a series of tunnels from beginning to end.

482. Then after all the present route is the cheapest? This is undoubtedly the cheapest arrangement that we can make for the moment.

483. Would the carrying out of the proposed work permit of trains travelling more rapidly than at thepresent? Yes, much more so.

484. Has any portion of section "B" been started on yet? No. I am in a slight difficulty in answering that question owing to this fact: when Mr. Deane made this through survey, his section for the lower part of the scheme, "A" section, was slightly different from what it would have been if he had connected at the bottom points. We are carrying out the lower part of the "A" section, as if the 1 in 90 grade were to be carried right through. So that, in respect to the slight alteration of the level, we are carrying out Part of the "B" section, although we could couple up with the existing line or with a grade of 1 in 50 or 1 in 90.

485. How many lines of rails are laid through the tunnels? A double road.

486. Will that be sufficient? Yes; it will carry our traffic for a good many years—how many I should not like to say.

487. Has any estimate been made bearing on that point? I do not know. I have made none, as the matter is not within my province. I should think, however, that a double line would serve for a good many years.

488. Would it be a very expensive matter to widen the tunnels? If additional roads had to be laid down we should have to put in new tunnels alongside the old ones, as it would be cheaper to adopt that course.

489. Is it a rule among railway engineers to put only two lines of railway in a single tunnel? No, the practice varies very much. In some cases it is thought better to have a single line, in others a double line, and you may find as many as four or six lines in a tunnel.

490. Is preference given to the smaller number of lines? No. The number of lines depends entirely upon the conditions of the traffic. A tunnel to carry electric traffic would be entirely different in form from a tunnel used for steam traction purposes.

491. Would that be principally on account of considerations of ventilation? Yes.

492. Is special provision being made for the ventilation of the tunnels on the deviations? Yes. We have enlarged the tunnels, particularly with a view to giving greater areas for the dissemination of smoke and other fumes. That, of course, permits of a larger percentage of pure air in the tunnel to mix with the fumes, and, consequently, the air is fresher.

493. *Mr. Latimer.*] Have you examined the curves on "B" section? Yes. Speaking from memory, I think the sharpest radius is 14 chains.

494. Is that satisfactory? Yes; it is very much better than we have on the other parts of the Main Western line.

495. Is that likely to be a satisfactory curve for all time on the double line? Yes.

496. What is the sharpest curve on the Western line at present? Eight chains radius.

497. And that is not regarded as satisfactory? By no means.

498. What is the sharpest curve on the "A" section? Fourteen chains.

499. When Mr. Harper was here yesterday he said something about the dangerous character of the inlet and outlet of the big tunnel on the "B" section? I do not know what he had in his mind, because I cannot understand that there is anything about the tunnel that can be characterised as dangerous.

500. Has the original plan been altered? Not so far as I am aware.

501. Did your hear Mr. Harper say that he would depend on you to make the tunnel more satisfactory? I gathered that he was referring to the ventilation.

502. *Chairman.*] Mr. Harper, in giving evidence before the last Committee, at question 635, referred to a very awkward tunnel, having a bad inlet and outlet; that was repeated by him yesterday, but he was of opinion that an improvement had been made, and that if not he would depend on you to see that everything was right? I do not know what Mr. Harper had in his mind. The only improvement we have made in connection with the tunnels is in the enlargement of the area in the way I have described, which, no doubt, will greatly improve the ventilation.

503. The question of the safety of the tunnel would come within your province—if you saw anything that could be regarded as dangerous it would be in your province to apply

the remedy? Undoubtedly. I understood that Mr. Harper had in his mind some objection to the outlet of the tunnel into a rather narrow gully, with consequent probability that the ventilation would be throttled.

504. What is your view upon that matter? I think that by the enlargement of the area of the tunnel we shall overcome the difficulty with regard to ventilation. If anything more is required we shall find it out as we proceed.

505. Is the enlargement of the tunnels a new thing? The new form of tunnels is being adopted for the first time on the "A" section.

506. Was the enlargement of the tunnels discussed by the Public Works Committee in 1902? No.

507. So that, personally, you see no awkwardness about the inlet or outlet of the tunnel as proposed in the "B" section? No, I do not see any difficulty there or any possibility of danger, and I think that the word "danger" should be eliminated in that connection.

508. Mr. Harper says that tunnels always possess a certain element of danger, especially where there is a double road, whereas you say quite the contrary;—you have pointed out that there has not been any accident in a tunnel in this State? Quite so. Tunnels may be a source of discomfort to passengers, but not of special danger.

509. *Mr. Davidson.*] Are there many double-line tunnels in this State? Yes, throughout the North Coast line and the Northern line.

510. *Mr. Latimer.*] You do not apprehend any danger in connection with a tunnel as proposed? No, I should have nothing whatever to do with it if I did.

511. Do you know how much of the money to be expended on the "A" section is to be contributed out of revenue? No, I only know that the money that we shall spend during the current year is being contributed out of the Public Works Fund. It would be for the Chief Commissioner to make arrangements with the Treasurer, so far as that is concerned.

512. Suppose that half the money required to construct "B" section had to be found out of Loan Funds, would you still advocate the flattening of the grade from 1 in 50 to 1 in 90? Yes, because the difference to be considered would be that between the original proposal for an expenditure of £30,000 and half the cost of "B" section as now proposed, namely, £60,000. The net difference, therefore, would be only £30,000.

513. But the estimate is now £150,000? Yes. I do not know how the increase comes about; but we must assume that there is justification for it.

514. In the first place, would not the estimate be increased owing to enlarged area of the tunnels? No. We shall probably carry out the "A" section for less money than Mr. Deane estimated despite the fact that we have increased the size of the tunnels.

515. Does not that point to the fact that Mr. Deane's estimate is rather liberal? He based his estimate for both sections upon the same units of cost.

516. What percentage of saving do you anticipate? I should not like to say. But there is no doubt, judging from the experience through which we have already passed, that we shall carry out the work for less than the estimate.

517. On the same ground, you think it is more than likely that you will carry out "B" section for less than £149,000? I think it is probable.

518. Take the cost as £150,000 and the cost of the proposed alteration with a grade of 1 in 50 at £30,000, there would then be a difference of £45,000 if the Railway Department had to find half the mony;—would you feel justified in spending £75,000 out of capital to get a grade of 1 in 90? It would not be quite so much as that. If half of the £150,000 were paid out of revenue £75,000 would have to come from somewhere else. Against that you would have to off-set the £30,000 that would be involved in securing a grade of 1 in 50.

519. Would you spend the extra £45,000? Yes, because the interest on that amount at 3½ per cent. would amount to only a little more than the cost of maintaining one push-up engine.

520. Would you have carried out the work on the 1 in 50 grade out of capital? That was intended.

521. *Chairman.*] You are satisfied that there will be a saving on the original estimate for section "A"? Yes.

522. Could you tell us what it has cost for excavations in the tunnels? The cost is variable. It amounts in some cases to 4s. per cubic yard, and in others to 7s. and 8s. I think the maximum is 8s.

523. I find that in Mr. Deane's original estimate he has allowed 10s. per cubic yard, whilst in the revised estimate for section "B" 12s. 6d. is put down;—do you think those amounts are rather excessive? I am perfectly sure we can carry out the work for much less. As I have said, we are in some cases paying only 4s. per yard, and we have put through one short tunnel which has, on the average, cost us not more than 6s. per cubic yard.

524 Have you had any experience of tunnelling on the Hawkesbury or North Shore line? No. I had the assistant charge of the work of tunnelling on the Illawarra line, which was exceptionally difficult.

525. Are you using any improved machinery for tunnelling that was not in use when Mr. Deane made his estimate? Yes, we have all the most modern machinery and appliances. I have one machine which, worked by one man, will do as much as ten men did in the old-fashioned way.

526. Would that machine do as much as ten men under the system Mr. Deane had in mind? I do not know. I do not think the machine was in existence when he made his statement in 1902. But it has been at work since Mr. Hutchinson made his estimate.

527. We were told that the tunnels on the Hawkesbury and North Shore lines cost 10s. to 11s. per cubic yard, and that on the North Shore line some of the tunnels were tendered for at 15s. per yard; Mr. Hutchinson stated that in setting down an estimate of 12s. 6d. he was allowing a fair and reasonable value for the work? On the Illawarra line twenty-six years ago, the tunnels were taken out under contract at 10s. per cubic yard for a single-line tunnel. The cost per unit for a double-line tunnel is always less, because the initial cost of the heading is the same in both cases, and in the double tunnel so much more stuff comes to you easily. If, under the old system of handwork, we could carry out single-line tunnel work at 10s. per yard, we ought to be able, with our present facilities, to carry out double-line tunnel work at something under that price.

528. *Mr. Davidson.*] What was the cost of labour then as compared with the present time? It was quite as high as now, and the hours of labour were the same.

529. *Chairman.*] I suppose we can take it that Mr. Hutchinson's estimate is rather excessive? I do not want to criticise his estimate. I have told you what we can do the work for.

530. Then you have the facts against the probabilities? That is so.

531. Do you think you would get a contractor to do the work at the prices you have mentioned? Certainly not. A contractor has to make his profit, and to put on something for risks.

532. The estimated cost of excavations and cuttings in the previous estimate were put down at 1s. 9d. per cubic yard, whereas Mr. Hutchinson has put down the cost at 2s. 6d., because he says they have never carried out excavations of the same nature for 1s. 9d.;—what is your excavation costing you? The amount varies from about 4d. per cubic yard to about 2s. 3d. We shifted 30,000 tons of stuff for 4d. per yard in one shot.

533. Mr. Hutchinson said that the Belmore to Chapel-road contract price was 2s. 3d. per yard for excavation, and that in that case there was no rock but merely a mixture? I should not like to say anything as to that without looking at the cuttings.

534. Will you undertake to bring in an estimate of the probable cost of section "B"? Yes, if you order me to do so.

535. The character of work in section A would be about the same as in section "B"? There would be no difference in the rock.

536. *Mr. Ball.*] Have you been over the section "B" route? Yes. I walked over it with Mr. Deane before the survey was finally settled. I have been over parts of the routes since then, and know the character of the country, which is practically the same as that on which we are now working in connection with section "A."

537. So that the cost of the work you have already done would be a fair and reasonable guide in respect to the cost of the other section? Yes.

538. Had you anything to do with the deviation from Dargan's Creek to Clarence tunnel? Yes, that was carried out by contract in 1896-7.

539. Was anything known then of the deviation that you are now carrying out? No, not in its entirety. I think that in 1894 Mr. Deane submitted to the Public Works Committee plans for a deviation between Dargan's Creek and the bottom points, somewhere along the same route that he has followed in connection with the present proposal, but that was on a grade of 1 in 60. On the Dargan's Creek deviation we got a ruling grade of 1 in 70 against the load, which was better than the grade proposed by Mr. Deane in 1894 for the alteration of the Zigzag.

540. Was your Department responsible for the deviation carried out at that time? Yes, we recommended it. The survey was carried out by Mr. Deane at the request of the Commissioners.

541. You say that the section "A" deviation was not under consideration at that time? Not under our consideration. The Public Works Committee in 1894 rejected the proposal to alter the Zigzag.

542. Can you tell us when the survey was made by the constructing authorities? I believe that it was finished either late 1901 or 1902—that is, the survey for the 1 in 90 grade.

543. Was this proposal before the Public Works Committee in 1895? No. It was not the same proposal, but one not dissimilar.

544. You would notice that in the report of the Committee of 1902 a grade of 1 in 90 is referred to? Yes; but a survey had been made over the same line of country to a grade of 1 in 60 prior to that, in 1894. I think that there is reference to it in Mr. Deane's evidence. The grade of 1 in 60 was before the Committee in 1894, and that was along the route very much the same as the "A" section now being carried out.

545. Do you think that if any suggestion had been made for a deviation from Dargan's Creek to Clarence tunnel you would have recommended it at that time? Yes, I think so. If we had known there would have been a great lapse of time before the Zigzag deviation was carried out we would have recommended the other scheme, because it would have earned its cost. It has, in fact, earned its cost in a very few years. I think the contract ran out to about £17,000. That gave a ruling grade going west of 1 in 60 as against 1 in 33, and a grade of 1 in 70 going east as against 1 in 50.

546. Do you say that that deviation has paid for itself since it has been constructed? Yes, twice over.

547. Then it cannot be looked upon as a waste of money? No.

548. You stated that you had some curves on the Western line of 8 chains radius? Yes; between the top points and Eskbank.

549. Are you not trying to cut out all these curves? Yes; we have cut out all of them, except those between the top points and Eskbank. One of them is on the middle road of the Zigzag, and it is impossible to alter it.

550. With regard to the question of curves and grades, has not a decided change taken place in the views of engineers and as compared with twenty years ago? Yes. Twenty-five years ago we were satisfied with 10-chain curves, but the locomotives operating then were very different from those in use to-day.

551. You would not put in a 10-chain curve if you could avoid it? No.

552. Is there not a tendency to pay more and to flatten the grades as compared with twenty years ago? Yes; provided we can see a return for the expenditure, we always go for the flat grades.

553. Have you not some kind of instruction not to exceed 1 in 100? That is a condition that we cannot enforce.

554. Have not the surveyors instructions to that effect? I do not know what instructions they have, but they certainly depart from that maximum. I think that the Committee will, probably, have submitted to them some proposals for railways with grades of 1 in 25. I do not mean narrow-gauge lines.

555. Has not the present Commissioner intimated to the construction authorities that he desires them to keep as flat a grade as possible? Undoubtedly.

556. And in designing new railways that object is kept in view? Yes, to keep the flattest grade economically possible. That, of course, has always been the object.

557. You do not consider it possible to get a better route than that placed before us? Not without incurring enormous expense.

558. Consideration has been given to that aspect of the matter and trial surveys have been made? Yes. I stated that a trial survey had been made for a line by the Colo River, and other proposals have also been looked into, but the cost would have been so great in any of these cases that we could not bear it.

559. In the matter of deviations, have you any voice before the plans are sent to you by the constructing authorities? In nearly all cases of deviations my staff make the surveys. This was an exceptional case, or was treated as such. My staff made some surveys, but Mr. Deane's men found a better route than the existing lines' staff, and that was accepted, because it is undoubtedly the best.

560. You are not responsible for the estimate of the cost? No, it was framed by Mr. Deane. The estimate placed before the Committee to-day was framed by Mr. Hutchinson.

561. In carrying out the work you do not give any undertaking that you will keep within the estimate? I do not give any undertaking, but naturally one tries to keep within the estimate. I am bound to use every effort to do so.

562. If you exceeded the estimate I suppose you could say that you were not fairly responsible, because you did not frame the estimate? If I take on a job I naturally accept all the responsibilities connected with it.

563. But what is your liability if you do not complete the work within the estimate? I do not know that I carry any personal responsibility, but one naturally likes to work within the estimate.

564. You satisfy yourself that the cost will be covered by the estimate when you take on a job? Yes; I am satisfied with the estimate.

565. You are not carrying out the "A" section according to the original plan? We are enlarging the tunnels over anything previously constructed in the State and beyond the provision made by Mr. Deane.

566. Did you consult the constructing authorities in reference to that alteration? No.

567. You are at liberty to alter the plans as you think proper? Yes, provided I do not go outside the authority given by the Public Works Committee and Parliament.

568. So that the constructing authorities have no control once the work is handed over to you? No.

569. You state that you have the best and most up-to-date appliance for excavating and tunnel work? Yes.

570. I suppose that ordinary contractors are using the same appliances? It is doubtful. That is one of the reasons why I stated that I thought we could carry out the work cheaper than a contractor. The Department can afford to spend a lot of money on plant, because we always have work of this character to do. A contractor might hesitate about incurring a big outlay on plant, because at the end of his job he might have to sacrifice it, whereas in our case work of the same character is going on almost continuously, and has been since away back in the nineties. We always have forward use for any plant that we buy, and consequently the best plant procurable is the most suitable for us.

571. You feel more at liberty than a contractor would, because you are not bound by any specifications? I am not bound by specifications, but I am bound to make at least as good a job as the contractor, and probably a better one; and therefore I think that I am just as much bound as is the contractor.

572. You are the contractor and the engineer combined? I do not think that helps me.

573. Would not your argument in regard to the construction of these works also hold good in relation to the construction of new railways? I would rather not go into that phase of the question.

574. *Mr. Hurley.*] You stated that we had been very free from accidents in our tunnels—would that apply to the Glenbrook tunnel? Yes, so far as accidents to trains are concerned, although we have had trains stuck up there.

575. Had you anything to do with the construction of the Lapstone tunnel? Personally, no. At the time the work was commenced I was Divisional Engineer at Goulburn.

576. In view of the evidence you have given as to the improvement of the ventilation by the enlargement of the tunnel on the "A" section, what do you think would have been the increased cost of the Glenbrook tunnel if it had been made sufficiently large to carry a double line? It would have cost about 70 per cent. in excess of the original price.

577. Have you any recollection of the cost of that tunnel? I believe it was about £34 per yard.

578. Do you think that tunnel could have been carried through for a double line at an extra cost of £6,000 when the contractor was on the job? No; I think that the additional cost would have been about £15,000. I believe that the tunnel is about 31 chains long, or about 680 yards.

579. Your Department would have no say in the construction of that tunnel? Yes, it was carried out by our Department.

580. Did you ever hear of the contractor having made an offer to carry out the tunnel for a double line at an extra cost of £6,000? No. I do not believe it could be done for the money.

581. *Mr. Dick.*] In connection with the "A" section, do you compensate the grade when you are on the curves? No, we have not done it in this case. The compensation is carried out on sharp curves where there is great resistance, and our experience is that the resistance on 14-chain curves is trifling as compared with that on 10-chain curves. The resistance is only about one-fifth of that on the 10-chain curves.

William Thow, Chief Mechanical Engineer, Department of Railways, sworn, and examined:—

582. *Chairman.*] For some years past you have taken great interest in the work which is the subject of the proposal now before the Committee? Yes.

583. In 1894, you gave evidence with respect to a work of a similar nature, and also in 1902, and you are fairly familiar with the whole of the circumstances connected with proposal? Yes, generally.

584. When you gave evidence before the previous Committee, you favoured practically the results arrived at by the Committee, namely, the flattening of the grade on the "B" section to 1 in 50. Yes.

585. Do you still hold the same view? No.

586. Why have you changed your opinion? Simply owing to the enlargement of the increase in the traffic and the prospective developments in the near future.

587. On the previous occasion, I think you based your objection to the grade of 1 in 90 on the fact that the traffic was not sufficiently large to justify such a large expenditure as would have been involved? I think I objected to it chiefly on the score of the cost. It seemed to be a large amount of money to pay for that section when the traffic could be carried over it by adopting a method which would be very much less expensive.

588. That is to say, that at that time you did not consider the expenditure would be justified? Yes, that was my opinion.

589. Now you are of opinion that the traffic has so increased that the construction of the "B" section on a grade of 1 in 90 would be justified? Yes.

590. Have you any other evidence to offer as to the increase in traffic? Yes, I have a comparative statement here, showing the number of miles run by our engines in September, 1901, as compared with September, 1908, over the Penrith, Bathurst, and Wellington sections. These two sections are so interwoven and worked together that it is fair to take them in conjunction. In September, 1901, the miles travelled by the engines was 295,241, whereas in September, 1908, the mileage run was 341,037 miles, so that there was an increase of something like 46,000 miles. That does not, however, measure the whole of the work done. In September, 1901, we had only ninety-three large engines running, that is, engines of the "P" class, which are the largest of the passenger engines, and of the "T" class, which are the largest goods engines. Now we have 247 engines of these classes running. Therefore, it will be seen that the traffic passing over the section between Wellington and Penrith has very largely increased, and as far as I can see, it will still go on increasing unless we have some serious set-back that we do not expect.

591. Would you say that the traffic has doubled during the last seven years? I should think that the tonnage or merchandise carried has doubled.

592. Would the passenger traffic also have been doubled? No, I would not say that, although the passenger traffic has increased very largely. The principal development has, however, taken place in merchandise, live-stock, and minerals. The Eskbank district alone has given us a great deal of work in connection with the despatch of coal to Sydney, about which we knew very little before. There has also been a large increase on account of the Lithgow Valley becoming more populous and a more busy centre.

593. Has there not been an almost phenomenal development of the copper industry at Cobar? Yes, and besides that, there has been the increase natural to the extension of railway communication, and the general development of the trade throughout the country.

594. What lines have been opened up since this matter was before the previous Committee? The line to Coonamble, the Warren railway, the Brewarrina railway, and, I think, also the extension from Parkes to Condobolin.

595. What further extensions do you anticipate? I am not able to speak as to that, because it is out of my Department.

596. There is every probability of the lines you have spoken of being extended, or of new territories being connected with the Western line? Yes. Then it is proposed to make a connection between the Northern line at Werris Creek, and the Western line at Dubbo, or some other point, and I feel sure that that connection will be made sooner or later.

597. I suppose that not one-third of the trade that will eventually be carried over the Western line has yet been tapped;—that is apart altogether from the natural development that will take place in the territory that is now connected with the railway? I think that we may expect a large increase of traffic over the Western line.

598. In view of the increases that have taken place and the prospect of increase of traffic, do you think it would be unwise to delay the laying down of a 1 in 90 grade? Yes, I think that any change that is made in the existing grades should take the form of a reduction to 1 in 90.

599. At the previous inquiry you were asked:—

Would you advise the Committee to recommend the more expensive work, and to spend an extra £90,000 in getting a 1 in 90 grade? No; I do not think that would be justified at present.

Then you were asked further:—

From your knowledge of the working of the railways in the State, for how many years do you think that grade would answer before it would be necessary to carry out the more expensive scheme to give a grade of 1 in 90? It is impossible to say. If the traffic were to be increased in the same ratio as it has done during the last eight

years, when we are ten years older we might find that it would be an advantage to remove that 1 in 50 grade, and adopt the plan which has been suggested by Mr. Deane.

And you think we have arrived at that stage? Yes.

600. Then you were asked whether you did not think it would be better to recommend the 1 in 90 grade at once, and do away with the necessity of a push-up engine;—you said that the only objection you saw was the one of cost, and that if the cost could be borne, there was no doubt that, from a railway standpoint, it would be the best thing to do;—do I understand that you now favour the construction of section "B" apart from any financial consideration? No; I think that the time has arrived to carry out the work.

601. Even though it may be, so far as interest is concerned, a charge on the working expenses of the railways? Yes, even so, I think that it would pay to put down the lesser grade.

602. You do not qualify your approval by insisting that the work shall be paid for out of the Public Works fund and not out of loan funds? It is not my function to consider where the money is to come from. I am looking at it from the economical standpoint, as far as the working of the railways is concerned.

603. Then, even though an interest charge of over £4,000 may be incurred, as against the cost of about £1,000 for the push-up engines, you prefer that the lower grade should be put down? I do not like push-up engines at any time, and they ought to be abandoned wherever possible, particularly where long trains are in use, such as those that are being run over the Western line now.

604. Is any delay incurred in working the traffic by means of push-up engines? No; I do not think there would be any delay in the working of the system as compared with the running of the trains on a 1 in 90 grade. Push-up engines are risky at any time. No locomotive engineers care to have push-up engines where they can be avoided. There is always a danger of crippling your train—particularly a long train—if you have a heavy engine behind. There may be some stoppage in front, owing to the forward engine having something wrong with it, or owing to the engine-driver finding the signal against him, and the engine behind may push on and cripple the train. We have had several accidents, but, fortunately, they have not been serious. We have had waggons pushed off the line by the engines behind, and there is always an element of danger.

605. *Mr. Ball.*] In your previous evidence, I think, you took up much the same position;—question 428 reads as follows:—

I think Mr. McLachlan stated that even if the traffic increased tenfold it would not be necessary to alter that grade of 1 in 50;—do you agree with that? No; I should hardly put it at so high a ratio. I think it might pay at some future time, when the traffic is much more than it is at present, to change that grade.

Do you think that the future time to which you refer has arrived? Yes, either it has arrived, or it will arrive very shortly. I think the present traffic justifies the laying down of the lower grade.

606. Irrespective of whether the work is constructed out of revenue or loan funds? Yes.

607. You told the Chairman that you had a larger number of heavy engines employed now than formerly;—did the numbers you gave relate to the Western line only? No, those were the engines employed over the whole system.

608. Has there not been an all-round increase of traffic over all the lines? Yes; and perhaps it has been more marked on the Western line than any other. The coal traffic from Lithgow has added very much to the haulage over the Western line.

609. With reference to the engines you have referred to, I think you said that it would be necessary, in order to get good results, to have curves of 14 chains radius? The wider the curve the more economical it is. When very powerful engines are used, the rails are ground to pieces very soon if the curves are sharp.

610. Then, there is great necessity for reducing the curves to suit these heavy engines? Yes. I might direct your attention to the wear and tear that takes place on the tram-lines where the curves are sharp. The rails are worn out in a very short time, although the vehicles travelling over the lines are comparatively light. If heavy vehicles travelled over the lines the rails would be worn out still more quickly.

611. What is the difference between the hauling-power of the "P" and "T" class of engines over a grade of 1 in 90 as compared with 1 in 50? Just in the ratio of 5 to 9, or nearly double.

612. Is that the difference at the same rate of speed? Yes.

613. Is there any difference in the wear and tear on the engines? There would not be very much difference so far as grade is concerned. The grade would not affect the wear and tear on the curves very much, assuming that the speed was the same.

614. Are you not short of hauling power at the present time? We have been short, but we are getting engines at the present time. We are just now landing sixty-five engines from England, including fifteen of the "P" class, a few surburban engines, and the rest of the "T" class. In addition to that an order has been given for seventy-five engines of these three classes, chiefly of the "T" class. We are also getting a number of engines from the Clyde works, and we are making some ourselves. These engines are intended to make good the shortage, and to provide for the increase in the traffic.

615. When will these engines be delivered? The engines are ordered from England, and will be shipped at the end of June next. The Clyde engines are to be delivered over a series of years, and I do not think the contract finishes until 1913.

616. Then you are making provision for some time ahead with regard to the hauling power? Yes.

617. What is the position with regard to other rolling-stock? There are a great many waggons under order—live-stock vehicles and also carriages.

618. That is to meet the demand of the increased traffic, and of the further developments that you anticipate within a very short time? Yes.

WEDNESDAY, 14 OCTOBER, 1908.

Present:—

THE HON. FREDERICK FLOWERS (CHAIRMAN).

The Hon. WILLIAM FERGUS HURLEY.	ROBERT DAVIDSON, Esq.
The Hon. WILLIAM THOMAS DICK.	JOHN ROWLAND DACEY, Esq.
RICHARD THOMAS BALL, Esq.	WILLIAM FLEMING LATIMER, Esq.

The Committee further considered the expediency of constructing a Deviation of the Great Western Railway Line to avoid that portion of the Lithgow Zigzag between the Bottom Points and the Coal Stage, at Eskbank, Section "B."

William Thow, Chief Mechanical Engineer, Department of Railways, sworn, and further examined :—

619. *Mr. Dick.*]. Taking into consideration the traffic that now goes over the Zigzag, could you give us the life of a rail on a grade of 1 in 50? I could not give you that information, because it does not come before me in any way. Mr. Fraser might do so.

620. Could you give us some idea of the life of the tyre of the wheel of a locomotive under the existing conditions of the traffic on the respective grades? It is the curves and not the grades that cut up the tyres. Tyres will last quite as well on grades as on the level, assuming that the engine is working at the same power.

621. You stated yesterday that the load an engine would carry over a grade of 1 in 90 as compared with 1 in 50 would be about 9 to 5? That is simply due to the grade. There are other resistances that have to be taken into account.

622. Would the coal consumption be the same? The engines would be loaded up to the maximum under both conditions, and the coal consumed would be the same.

623. Then practically the main advantage to be derived from reducing the grade from 1 in 50 to 1 in 90 would be the increased loads the engines would be able to carry? Yes; and the opportunity that would be presented to get rid of the bank engines.

624. Would there be any saving of time? No, I do not anticipate that there would be. If there was any difference it would be in favour of the lower grade—1 in 90.

625. Generally speaking, does the use of the push-up engine produce any confusion or dislocation of the traffic? I would not say that it produces dislocation, but it does involve delays. The push-up engine when on the top of the grade has to get off the train, and then go back again. In the meantime the other line is occupied, and down trains which may be on the other side of the push-up engine are delayed until the line is clear.

626. Does the use of push-up engines involve keeping some of the engines out of use for a portion of their time? Yes. If we have to keep engines for push-up purposes we cannot use them otherwise.

627. But I mean under present conditions, apart from their use in drawing trains, is it not a fact that you require to have them located at the wings, or to keep them idle for a considerable portion of their time? We do not keep powerful engines that would be available for traffic standing at these stations merely that we may have them there. The only thing that we do keep at outside stations is an emergency engine, but all the emergency engines we have at present are too small to conduct traffic. We should not use them under any circumstances, but in the event of difficulty occurring, the emergency engines are sometimes useful. Take, for instance, the case of a flood and a washaway on part of the line. The traffic might be separated, and an emergency engine might then be used with advantage.

628. Would you mind particularising the dangers you see in the use of push-up engines at such a place as the Zigzag? The chief risk is the one I mentioned yesterday. Two engines on a train, both of them powerful, one at the head and the other at the back end, are both of them doing all they possibly can. Something goes wrong with the mechanism of the first engine, and it breaks down and must stop. The second engine cannot be brought to a standstill precisely at the same moment, because the engine-driver does not know what is wrong. He is merely aware of an increased resistance to his engine. In the meantime, the carriages or waggons may be pushed off the track. Waggons, particularly on a long train, may easily be pushed off the track, and that has occurred on two or three occasions.

629. Would that happen more readily on a curve? Yes.

630. What is the condition of a train having an engine pushing behind as well as one dragging in front;—are the buffers all together? Not necessarily; they may be separated. Assuming that the engines are of the same power, the buffers may be closed or separated, each engine doing equal work; but if the push-up engine is not so powerful as the leading engine, the buffers would be opened, and the couplings would be strained.

631. How far from the rear engine would the buffers be together in the case of two engines of equal power being employed? Perhaps one-third of the waggons at the end of the train would have their buffers closed—that is, buffer to buffer—and the two-thirds in front might have their buffers open.

632. I suppose that, in 1902, your Department anticipated just as much danger from the use of push-up engines as they do now? Just the same.

633. Was that matter of the danger as important a determining element then as it is now? It was a risk, I would not call it a danger. It is one of the risks that interfere with the safe working of a railway.

634. Was that pointed out in 1902, when the 1 in 50 grade was discussed? I do not know that I pointed it out specifically, but it is a well-known fact.

635. You do not know whether the question was raised at all? No.

636. Would Mr. Harper or Mr. McLachlan consult you before giving evidence on a point of that kind? I do not think so, because the facts are known to them.

637. Are you aware that, in 1902, those gentlemen suggested that it would be more economical, and more to the interest of the Department, if they used push-up engines instead of having the grade reduced? Yes.

638. Did you, at that time, feel inclined to challenge their statement? No, I concurred with their statement then, on account of the cost. I think that in my evidence I did say something about the risks attaching to the use of push-up engines. But we have to use push-up engines in some places—on the South Coast line, and from Penrith to Katoomba. It does not constitute a very prominent danger; but there is not the least doubt that the pushing of a train behind is a risky thing when the first engine happens to require to stop.

639. When you are taking heavy loads up from the Hawkesbury to Berowra, you put the assisting engine in front? Sometimes, and sometimes we put a push-up engine behind for goods and live stock trains.

640. Do the conditions at the Zigzag preclude you from putting both engines in front? Yes; because we have to divide the trains at the Zigzag, and, therefore, we must have an engine at each end.

641. Do you think the question of the danger attending to the use of push-up engines would outweigh the additional interest charged of £3,000 per annum? Yes, I think it should. I think that the interest would easily be recouped by the greater convenience in working the line.

642. Even if it did not produce any net result in the way of cash, and the interest was not recouped, would you still hold that the interest charge was a fair payment to

make for getting rid of the danger of push-up engines? I think so, under the circumstances of the increased occupation of the line. I think it would be advisable not to occupy the line with push-up engines returning to Eskbank.

643. *Mr. Ball.*] Have you ever had any accident with a passenger train owing to the use of a push-up engine? Yes, some of the passenger trains have become buffer-locked. I do not know that I can recall any case in which a passenger train has been pushed off the road, but we have had goods waggons derailed. The locking of the buffers is the first step towards getting off the road, and accidents of that kind are warnings that derailments may easily occur.

644. Do not buffer-lockings take place on curves? Yes, and on straight lines as well. Accidents due to the use of push-up engines have occurred on straight as well as curved pieces of line.

645. *Mr. Dick.*] Question 329 in the evidence of the former inquiry, in 1902, reads as follows:—

To make a grade there of 1 in 90 would mean an expenditure of £120,000, but by having a grade of 1 in 50 it can be constructed for £30,000; in view of that, do you think it is desirable to have a steep grade of 1 in 50 at less cost? I think it is at present, because, although we would have to push up, it will be a very simple matter compared with what we have to do at present. A push-up engine from Eskbank to the bottom points could return at once, there is a double line; and it could get back almost immediately to Eskbank. It would then be ready for pushing up another train, whereas, at present, we have to take the engine right along to Clarence Siding, and sometimes it cannot get back for hours, because the line is occupied. It is a single line from Clarence Siding to the bottom points, and the engine sometimes cannot get back. It would simplify matters very much if we could return from the bottom points to Eskbank.

What do you mean by saying that "It would simplify matters very much";—do you mean that you would eliminate the danger of a push-up engine, or simplify the working of the line? We should simplify the working of the line to the extent that the line would not be occupied, as at present owing to its being necessary to take the push-up engine on to Clarence.

646. Did you have in your mind the question of the risk arising from the use of the push-up engine? Yes, I had that in my mind as well as the occupation of the line.

647. Did you think at that time that the demand was not sufficiently pressing for the reduction of the grade? I did not think that there was sufficient traffic at that time to warrant what I am now recommending.

648. Would there be the same percentage of danger on the traffic then as now? I think the same percentage would exist; but the traffic being greater, the risk would increase. At the same time, my strongest reason for suggesting that a grade of 1 in 90 be adopted between the bottom points and Eskbank is the advantage we should gain in working the line without any obstructions.

649. Would the flattening of the curves from 8 to 14 chains radius make a material difference in the case of the tyres of the engines? Yes, it would be very much easier on the tyres and also on the rails.

650. *Mr. Latimer.*] You stated that in 1902 you had only ninety-three engines of the "T" and "P" classes;—could you tell us the hauling power of those two classes of engines? They stand in the ratio of 11 to 14.

651. How do they compare with the other engines you have? The "T" class is a goods engine, and is at least five-elevenths more powerful than the standard goods engine which preceded it. The "P" class passenger engine has about two-thirds more power than the passenger engine which preceded it.

652. How many of these powerful engines have you in use now? 247.

653. Are there any other engines besides those used for push-up purposes on the Western line now? Oh, yes, we use the old goods engines, and sometimes the old passenger engines.

654. What do you designate them? The old goods engine is "B" class and the passenger engine is "D" class.

655. What is the relative hauling power of an engine of the "T" class and a Baldwin engine? A Baldwin goods engine and a "T" class locomotive are about equal in power. They came into the country about the same time, one being of American and the other of British manufacture.

656. What is the relative life of the respective engines? The American engine requires more attention than the English locomotive, and therefore has a shorter life.

657. Could you fix the matter by giving us a percentage? I could not give you the exact figures, but I should think that the cost of maintainance of the Baldwin engines exceeds that of the British engines by about 25 per cent.

658. Seeing that there are so many more of these larger engines crossing the Zigzag now as compared with 1901, how much increased traffic is represented, assuming that the same number of trains are run? I should think the trains—taking passenger and goods together—are now heavier than formerly by 35 per cent. or 40 per cent.

659. So that, for the same number of trains to-day, the actual tonnage would be 35 per cent. to 40 per cent. more than in 1901? Yes, I think so. I am giving you a rough and ready opinion, because I have not the traffic figures by me.

660. How many more trains are run now than in 1901? The figures furnished by the traffic office show that in September, 1901, the total number of trains passing the Zigzag was 618, whereas in September, 1908, there were 684, or an increase of 66 in the month.

661. That represents a very substantial increase in the business going over the mountains? Yes, very considerable. I gave you yesterday the increased number of miles travelled by the locomotives in September, 1901, as compared with September last, but the increased haulage power of the engines taken together with the additional number of trains, is a better indication of the increase of traffic.

662. In view of the increased traffic that has taken place in seven years, have you any other suggestion to make that would obviate the necessity of spending £149,000 on section "B"? No; I do not think I can make any other suggestion.

663. It does not come within your province to examine the route? No.

664. Is there greater or less risk in the use of the large engines you now employ as compared with those in operation formerly? I think there is a certain increase in the risk. For instance, there must be very much more resistance to a large engine than a small one on a curve, and, therefore, there must be more tendency for the engine to leave the rails. I am assuming, of course, that the speeds of the two engines are the same.

665. Is there a very large increase in the risk? It is merely a question of the influence of centrifugal force. There is a decided and appreciable increase, and one that has to be taken into consideration, and, therefore, it is desirable to, as far as possible, increase the radius of the curves where large engines are employed.

666. Is that one of the reasons why the radius has been increased? Yes.

667. *Mr. Davidson.*] Would the danger be increased proportionately to the weight of the engine? No, it would not be exactly in the same proportion, but it would be appreciable. You can easily understand that moving engines comply with one law of motion, and that is, a body in motion must move in a straight line. All bodies moving in straight lines follow that law. If you turn a moving body out of a straight line of motion, you have to do so by force, and the heavier the body the greater must be the force employed. The only deflecting force that a locomotive meets with when it is turned from a straight course is the friction of contact between the tyre flanges on one side of the engine and the rail, and the heavier the engine the greater the friction, so you must compensate matters by increasing the radius of the curve.

668. Would not the resistance be increased by extra speed as well? Oh, yes; the centrifugal force increases rapidly with the speed.

669. *Mr. Latimer.*] Does the same danger exist now with the heavier engines on a curve of 1 in 12 as existed before with the smaller engines on a curve of 8 chains—do the

Witness—W. Thow, 14 October, 1908.

heavier engines feel the same pressure as the lighter ones? Yes; roughly speaking, I should think it would be about the same.

670. That is to say, that the heavier engine on a 12 chain curve has the same pressure as the lighter engine on a 8-chain curve? Yes; the tendency to leave the road.

671. So that in order to afford the same security to the travelling public, it was absolutely necessary to reduce the curves? I think so.

672. You are not concerned with the question as to where the money is to come from for carrying out the work? No.

673. *Mr. Ball.*] With regard to the question of the safety of the larger engines on the curves, is not the danger minimised by the heavier road that has been provided? Not materially. The heavier permanent-way has a greater resistance to the bursting open of the road, but it does not lessen the pressure between the flanges of the wheels and the rails.

674. Does it not minimise the risk of the train leaving the track by requiring a greater pressure to burst it open? No; it only reduces it to the extent that a weak permanent-way is apt to burst. The friction which causes an engine to leave the rail by climbing it is not reduced by the strength of the permanent-way.

675. *Mr. Davidson.*] Is it altered in any way by the weight of the engine on the flat of the rail? No, I do not think so. The flat part of the wheel does not resist very much.

676. Does it not grip the flat of the rail? No, it merely rolls over it.

677. But has it not some sort of grip to make it roll? There is no grip except that of the friction. The engine has to be turned out of the straight line by the flanges of the wheels impinging on the rail, and the consequence is, that the rails become worn away very materially and the flanges of the wheels become so sharp that the wheels have to be put on the lathe and brought back to a proper form.

678. *Mr. Latimer.*] Has the danger arising from the use of these larger engines been increased on the Zigzag owing to the push-up engines being used at the same time? Yes, I think so, because the push-up engines are more powerful now than formerly, and the trains are also longer.

679. And you have not been able to make any corresponding improvements in the curves to meet the greater risk? Not on the Zigzag; the curves are still of 8 chains radius.

680. Then the element of danger on the Zigzag has been increased during the last seven years? Yes, I think the Zigzag has gradually become more risky.

681. Have representations of that kind been made to the Minister for Railways? I cannot say. Of course, there have been various inquiries, such as this, into the condition of the Zigzag, and I think that some of the evidence given at these inquiries would indicate that the Zigzag was gradually becoming more risky.

682. Do you know whether the Railway Commissioners have been aware of these increased dangers owing to the use of the larger engines? Generally speaking, I have no doubt they have. But the Railway Commissioners are obliged to meet the demands of the traffic by hook or by crook.

683. Have you personally made any representations to the Commissioners as to the increased risks of using these more powerful engines on the sharp curves? Not on that particular question. I take it for granted that the Commissioners know as much as I do about it.

684. Would it be part of your duty to direct attention to the matter? Not unless I saw a very imminent danger that might be controlled.

685. Whose duty would it be to point out the increased danger arising from the employment of the larger engines on the curves? I take it that it would be the duty of all the officers to do so, if it had to be represented to the Commissioners.

686. In whose Department would that come? It might come in Mr. Fraser's Department if the rails were destroyed to an extent that he could not control, whereas if engines were derailed to an extent that I could not control, it would be my duty. But we do not wait until such contingencies arise.

687. Would it not be wrong to wait until something happened before pointing out the increased danger to the Commissioners? As I endeavoured to point out just now, we have to carry the trade of the country over the Zigzag, and this can only be done by certain means. One of these is the lengthening of the train and the consequent employment of heavier engines. For many years past efforts have been made by the Commissioners to secure the removal of the Zigzag. They have not succeeded, but yet the traffic has to be carried through. What good purpose could have been served by any officer pointing out to the Commissioners that there was absolute danger of working the trains on the Zigzag? Under the cirumstances, we have been obliged to deal with the conditions in the best way we could.

688. Notwithstanding the fact that the danger has been increased during the last seven years? Yes, and if the Government were to say now, "We are not going to alter the Zigzag," we should still have to carry the traffic through, and we could not do so with small engines.

689. Do you regard it as imperative that the proposed work should be carried out now? Yes, decidedly. I think that the time has come for an alteration of the line.

690. Do you think the conditions there are so dangerous as to warrant you in regarding it as unsafe to work the line? I think that the curves on the Zigzag are too sharp for safe working, and that the grades ought to be reduced to secure economy

691. There are 8-chain curves on the present line from the bottom points to Eskbank, and on the wings of the Zigzag? Yes.

692. Would your statement with regard to the danger on the Zigzag apply also to the sharp curves between the bottom points and Eskbank? Yes, I believe that there is a liability on the part of a heavy engine to leave the road on an 8-chain curve wherever it may be.

693. Just as much between the bottom points and Eskbank as on the Zigzag? Yes, I think so.

694. Are you aware of the radius of the curves on the deviation now before the Committee—that is, on the new line between the bottom points and Eskbank? I think it is 14 chains.

695. And, in your opinion, is that sufficient? Yes, that is a very good radius.

696. It would be better if it was flatter still? Yes. I should like to see it flattened, if it were not for the difficulties of the situation.

697. Will those curves provide the element of safety to which the public are entitled? Yes. I think that our present rolling stock would negotiate 14-chain curves very well.

698. What are your intentions with regard to the engines in the immediate future—are you anticipating any great increase in the weight? Not in the immediate future, but if the traffic becomes very much larger we may have to put on more powerful locomotives.

699. You are aware that, in other parts of the world, they are building very much heavier locomotives? Yes—in America particularly.

700. Is anything of that kind contemplated here? Not at present.

701. There is no intention to increase the hauling power or more powerful classes of engines? No, but we are going to build at the Eveleigh shops a few engines which will be better suited for running at high rates of speed than is the "P" class.

702. Will the haulage power be greater? No, it will be about the same, but the engines will travel at a higher rate of speed.

703. What will their weight be as compared with the "P" class engines? They will be, perhaps, 6 or 8 tons heavier.

704. Will there be any more danger as the result of their travelling at a greater speed on 14-chain curves? They will not travel faster over the curves, but merely on the straight roads.

705. *Mr. Hurley.*] I gather from your evidence this morning that it does not matter to you where the money comes from for the construction of the proposed works? I said that it was no part of my functions to consider the money question.

706. Still, you made an important point of that in the evidence you gave when you were before the previous Committee? That was upon the question of cost, I thought that the cost should not then be incurred, as there was not sufficient jnstification for it; but the question I was asked to-day was whether I had considered how the money was to be obtained. When I spoke of the cost in 1902, I had in my mind the interest that we should have to pay on the loan money that might be spent. In that matter I took as much interest as any other officer of the Department.

707. Is it customary for the officers of your Department to have a conference before giving evidence before this Committee? Not necessarily.

708. But you do? Sometimes.

709. I suppose that it was quite startling to the officers when the Chief Railway Commissioner expressed his approval of the 1 in 90 grade? I cannot speak for the other officers, but it did not surprise me in the least, because that was the view I would have taken myself.

710. When more locomotives or trucks are wanted is the application made to you or the Commissioners? To the Commissioners. Sometimes applications are made by myself, and sometimes by the traffic officer. The traffic officer usually asks the Commissioners for waggons or carriages, and I then have to deal with the question of engines, and ask the Commissioners for further supplies.

711. In all cases, do you get what you want from the Commissioners? Not in all cases. I have not had all the locomotives I have asked for.

712. Have the reasons given satisfied you? The reason has been simply that money was not available.

713. *Mr. Davidson.*] When this question was before the Public Works Committee in 1894, you gave evidence with regard to the number of trains passing over the Zigzag both ways, and you stated that they numbered 4,562 in the year; in answer to Mr. Latimer to-day, you stated that the engines now in use were more powerful than those employed in 1901;—could you give us an idea of the power of the engines employed in 1894? At that time we had fifty engines of the "P" class.

714. Passing over the Zigzag? No, on the whole service.

715. I want information with regard to the engines that were utilised on the Zigzag? I could not tell you.

716. I presume that the engines then used were of much lower capacity than those employed in 1901? Yes; the bulk of the trains would be hauled by smaller engines.

717. Could you compare the capacity of the trains then for carrying goods, passengers, or stock with the trains to-day? No, I could not give you that. The information given by me and quoted by you was obtained from the Traffic Office.

718. I want to get at the power of the engines to-day to to take heavier loads than the hauled in 1894;—what would be the difference in capacity of the average engine? I stated that it would be 35 per cent. to 40 per cent.

719. That was in 1901 as compared with to-day? They would be, practically, the same engines in 1894.

720. Could you give us any information as to the number of trains travelling over the Zigzag in twelve months now, in order to enable us to make a comparison with the figures given for 1894? No, I have not that information.

721. You gave us information as to the number of engine-miles travelled on the Penrith, Bathurst, and Wellington sections for the month of September in 1901 and 1908—do your figures go back to the month of September in 1894? Yes; the engine mileage on those sections in September, 1894, was 232,321.

722. And each mile run to-day would practically amount to about 35 or 40 per cent. increase, as compared with 1894, so far as hauling power is concerned? Yes, I think so.

723. Taking into account the figures you have given us, has not the traffic more than doubled, taking last September as against September, 1894? I dare say it has; but the better way to make the comparison would be to obtain from the traffic department information as to the tonnage moved.

724. *Mr. Dacey.*] I understand you to say that the trains going over the Zigzag are divided? Not exactly, now, because the wing at the top point has been lengthened; but only a short time ago they were divided both at the top and the bottom points.

725. In view of the extension of the wings, there is not the same risk attached to the use of the push-up engine? Oh yes, there is, because the push-up engine comes behind the train. Instead of dividing the train, as used to be the case, one string of trucks is hauled, the push-up engine being behind just as it was formerly.

726. Is there any reason, in view of the fact that the trains are not divided, why the two engines should not be used in front? Yes. It is considerably safer on that part of the road to have an engine on the back end of the train in the event of a coupling breaking, or the train becoming divided in any way. Sometimes the couplings jump off, and the engine at the back prevents the waggons from running back and dashing into the rock at the bottom points.

727. With reference to the difference of opinion as to the construction of "B" section, is it correct to say that, in giving your decision previously in favour of the 1 in 50 grade, you were not governed by monetary considerations? No. In 1902, I said that I thought the grade should be altered to 1 in 50, and, first of all, I thought the work was going to be taken in hand at once, and not after the lapse of seven years. Then I stated that I considered the saving of something like £90,000 would justify the delay in the construction of the lower grade of 1 in 90. I was not in favour of the 1 in 50 grade as against the 1 in 90; but, at that time, I did not consider that the necessity for the lower grade was pressing enough to justify the expenditure of an extra £90,000.

728. Was your view influenced by the additional time that would be occupied in constructing the line on the lower grade? No; I have never been quite convinced that there would be very much additional time occupied in carrying out the work.

729. You looked upon the 1 in 50 grade as a matter of expediency—a temporary expedient? Yes, I thought it was sufficient to meet the immediate requirements of the traffic. I did not think it was likely to last for more than ten or twelve years.

730. Then, all through, as a matter of fact, you have been distinctly in favour of the 1 in 90 grade? Yes, as an ultimate result.

731. *Mr. Ball.*] You stated that the cost of maintenance of the Baldwin engines exceeded that of the English engines by 25 to 30 per cent.? Yes. In the first place, they take a great deal more coal, and then there are extra repairs.

732. Does that apply to the Baldwin engines which, I understand, you had made to your own design? The Baldwin people did, four or five years ago, make for us twenty "P" class engines. These engines were built in America, but were not of American design. They have made engines for us according to both English and American designs, and we really ought, I think, to speak of the American engines, and not the Baldwin engines, as involving 25 per cent. more in maintenance than the English engines.

733. Do the engines made according to your design by the Baldwin Company cost more for maintenace than the English engines? No, there is very little difference. There was a little, but it was only at first. We found some weak points about the construction, which we have remedied.

Witnesses—W. Thow, 14 October, and T. R. Johnson, 19 October, 1908.

734. Have you not a special officer to supervise the construction? Yes, the works manager went over to supervise the construction of the "P" class engines in America, and the consulting engineer at Home employs an inspector to supervise the construction of the English engines.

735. Are the Baldwin-built "P" class engines as satisfactory as those of English make? I think they are, after the corrections made by us at the outset.

736. *Mr. Latimer.*] When you gave evidence in 1902 regarding the necessity for push-up engines on the "B" section, how many engines did you think would be required after the alteration of the grade to 1 in 50? I thought one would do the work.

737. You thought that the number would be reduced from three or four to one? Yes.

738. *Chairman.*] Would you say now that one would be sufficient? No; we may have to use two to cope with the present traffic.

739. Would you say that, in view of the probability of a further increase of traffic, two push-up engines would be sufficient seven years hence? We can only get a certain amount of work out of one engine, and we might have to put on three or four.

740. There has been a necessity for an increase in seven years, and, probably, in another seven years the need may arise for the employment of more engines? I hope that the traffic will increase, and I think that it is likely to do so.

741. *Mr. Dacey.*] I understand you to say that in haulage, ton for ton, the American engines cost 25 per cent. more for upkeep than the English engines;—all things being equal, do they both carry the same load? Yes, they both carry the same load, and I was speaking of the proportion of the cost of maintenance of the locomotive, and not the cost of haulage.

742. I wanted to guard against any injustice being done to the American engines, which might do more work than the English engines? I did not say what the additional cost of haulage was. The wages of the men are the same on both engines, but the repairs and the fuel and water the engines consume represent 25 per cent. additional cost.

743. If a Baldwin engine hauled 100 tons as against 75 tons hauled by an English locomotive, would it not be entitled to cost 25 per cent. more for maintenance to make things equal? No, because the wages paid in both cases are the same. The wages go into the cost of haulage.

744. What I want to get at is the fairness of the comparison; should not the haulage be taken into account when the cost of maintenance is being reckoned? I was speaking of the maintenance only, and that includes the consumption of fuel and water. The power of the American goods engines is about the same as that of engines of the "T" class.

745. Comparing the amount of work done by both of them in a given time, would the American engine come out 25 per cent. dearer? No, because the traffic charges are the same. The cost of doing the work includes the traffic charges, the wages of the driver and firemen, and all the permanent-way charges. Those items are not increased; it is only the maintenance that is more costly, and also the consumption of fuel.

746. Comparing an English locomotive with an American locomotive doing an equal amount of work, would the maintenance of the American engine amount to 25 per cent. more? The repairs, fuel, and water, would probably amount to 25 per cent. more, but the wages would be the same.

747. *Mr. Latimer.*] The engines you are referring to are those designed by the Baldwin Company, and not those designed by your Department and manufactured by the Baldwin Company? Exactly.

MONDAY, 19 OCTOBER, 1908.

Present:—

THE HON. FREDERICK FLOWERS (CHAIRMAN).

The Hon. WILLIAM FERGUS HURLEY.	ROBERT DAVIDSON, Esq.
The Hon. WILLIAM THOMAS DICK.	JOHN ROWLAND DACEY, Esq.
RICHARD THOMAS BALL, Esq.	WILLIAM FLEMING LATIMER, Esq.

The Committee further considered the expediency of constructing a Deviation of the Great Western Railway Line to avoid that portion of the Lithgow Zigzag between the Bottom Points and the Coal Stage at Eskbank, Section "B."

Tom Richard Johnson, Chief Commissioner for Railways and Tramways, sworn, and examined:—

748. *Chairman.* You have been called to give evidence with respect to a proposal submitted to the Committee for the construction of a deviation on the Western line, known as section "B," between the bottom points and the coal staging at Eskbank; you are familiar with that proposal? Yes.

749. I presume you are also familiar with the more comprehensive scheme which was submitted to a previous Committee in 1902, for a deviation of a 1 in 90 grade from Dargan's Creek to the coal stage? Yes.

750. You are aware that the proposition originally before the Committee embraced section "A" of the deviation which is now being carried out by your Department, and section "B," which is now before the Committee? Yes.

751. The Railway Commissioners of the day placed before the then Works Committee a modification of that portion of the scheme known as section "B," which was ultimately adopted by the Committee? Yes.

752. When you assumed the responsibility of your present position you urged that the more comprehensive scheme, placed before the Works Committee in 1902, should be adhered to? I did.

753. You reported to the Minister to that effect? Yes.

754. I think your report is contained in the evidence presented to us by the Under Secretary for Public Works, on 28th January last? I believe that it is; I know that the report is included in the evidence given by the Under Secretary. The date of my report is 11th May, 1907.

755. You say in your report:—

> I am satisfied that the original proposal submitted, providing for a grade of 1 in 90 throughout, would be the better arrangement. It admittedly entails a considerably higher expenditure than the modified scheme with a 1 in 50 grade on the Lithgow side, but the advantages of the easier grade and the facilities it will afford in the working of the heavy and increasing business over the Western line justify the more comprehensive scheme being adopted.

Will you be good enough to amplify the reasons which led you to submit that report to the Minister? In what direction do you wish them amplified.

756. First of all, the justification you speak of in view of the difference in the expenditure for the 1 in 50 scheme, bearing in mind the additional maintenance of push-up engines necessitated in the alternative proposal, and the £150,000, the cost of the proposal at present before the Committee? It seems to me that the main justification is the enormous growth of traffic which is taking place in the Western district. That, to my mind, would appear to make any idea of working a push-up engine between Eskbank and the bottom points a perfect absurdity in this year of grace 1908. Push-up engines are devices that were, of

course, common in the olden days, in the earlier days of railway working, but the practice nowadays is for railway companies to spend large sums of money in flattening grades for the purpose of enabling ordinary engines to carry very much larger loads. That has been done to an enormous extent in America. The Pennsylvania Company alone has spent millions of money out of revenue in what are called "betterments," largely consisting of duplications and improvements of grades with a view to working very much heavier traffic with existing engines. To make a deviation of the sort involved in scheme "A"—admittedly a very important deviation—and then to finish up with scheme "B," leaving a 1 in 50 grade, which will involve the use of a push-up engine, seemed to me in 1907 to be almost ridiculous. Of course, it may have been different six or seven years ago when the question was before the then Commissioners. I am not dealing with whether they were right or wrong at that time; I am dealing entirely with the question as it was presented to me shortly after I arrived in the State in 1907.

757. I suppose you have read the evidence tendered by your officers at the previous enquiry? I am not quite sure that I read the whole of it, but I discussed the evidence with my officers. We were on tour in the Western district, and we spent one whole evening discussing this question.

758. Have you read the evidence of 1902, upon which the then Committee came to their conclusion? I do not think I read the evidence given by the officers at that time, but I know the purport of it.

759. Was not the evidence tendered by your officers at that time unanimous with respect to the advisableness of section "B" being steepened to 1 in 50 as against a grade of 1 in 90? Yes, that was the opinion expressed at that time.

760. Then, according to the evidence tendered, the Committee came to a correct verdict? At that time, yes, although had I been here I should certainly have recommended a different course.

761. Under the circumstances which prevailed at the time, you would have favoured a 1 in 90 grade throughout? Certainly I would.

762. Even though it involved an additional interest charge of between £5,000 and £6,000 a year? Certainly; I say that without a moment's hesitation.

763. The Assistant Engineer-in-Chief for Existing Lines (Mr. Fraser) gave this evidence in 1902:—

With regard to the grade of 1 in 50 in the "B" section, do you think it is probable that within a reasonable time it will be found necessary to alter that grade? No; I do not think it will ever be necessary. The cost of making a grade of 1 in 90 there would entail an outlay with interest of nearly £3,000 a year. No matter to what extent the traffic may develop, if it becomes ten times as much as it is to-day, a push-up engine could be used at much less cost than the interest on the capital required.

You entirely disagree with that? I am obliged to disagree, for this reason: that if the traffic became ten times greater one push-up engine would not do the work; you would want, possibly three or four push-up engines, and so the annual cost would be multiplied by the number of engines necessary to work the traffic, and you would have just as large expenditure for push-up engines as you would have interest to meet on the additional capital.

764. Mr. Fraser, in giving evidence here last week, qualified the statement I have just read to you, by saying that he is now favourable to this work being undertaken on a grade of 1 in 90, provided the cost is met out of the Public Works Fund? In other words, charged to revenue—yes.

765. Do you take up the same position? I do, undoubtedly, and I think it was as the result of the discussion I had with the officers, in which I very strongly advocated the advisableness of charging all such improvement works to revenue, that they came to a different conclusion.

766. Apart altogether from the interest-payment which would be involved, if this work was to provided for out of loan funds would you still be favourable? Certainly.

767. You think the end would justify it? I do, in view of the growth of traffic which is almost certain to come from the Western district. I may say that I was very much influenced, shortly after I arrived in the State, by the large amount of coal for shipment which was being conveyed from Eskbank to Sydney. That traffic has fallen off temporarily, for reasons which are perfectly well known to the Committee, but I do not think that affects the principle generally. Although in one particular direction the traffic may have fallen off, it is increasing very largely in other directions; and if we have a favourable wheat harvest—of which apparently there is every probability—we may expect a very heavy traffic over the mountains during the coming six months.

768. Why have you come to the conclusion that this is a work which should be carried out with money voted from the Public Works Fund? Simply because, although looked upon as capital works, no interest is charged upon money provided from that source.

769. Would we be justified in carrying out a new line on that principle? I do not think that would be a sound financial proposition. The proposal we are now considering is purely a deviation—to substitute a line for an existing line of railway. You have an existing line, when you finish the deviation you have no more; consequently, to my mind, that work is not fairly chargeable to loan money, or if it be chargeable to loan money and it be so charged, then the cost of the original railway should be written off out of revenue, which, of course, comes to the same thing. That principle has already been recognised. The Sodwalls deviation was dealt with in that way, very properly, and the old cable tramways in Sydney have been dealt with in that way, and very properly; therefore, if this were charged to loan vote, the cost of the original piece of line should be written off out of revenue. That is the only sound financial way of dealing with it, to my mind.

770. I suppose the proposal we are now considering could be called a betterment? Yes, a betterment distinctly.

771. Seeing that the Public Works Fund is made up of moneys other than those which are contributed from the railway and tramway surplus, do you think it justifiable to take such a large amount of money from that fund for this work? I really am not acquainted with the way in which the Public Works Fund is formed, but I should think a very large proportion of it comes from surplus revenue from railways and tramways.

772. In that regard, do you think it would be sound public policy to ear-mark the surplus revenue from railways and tramways as a special fund for such purposes as the carrying out of the railway policy generally? That is impossible under the Railway Act as it stands at present.

773. As a matter of policy would it be sound? I have already expressed that to the Treasurer. I consider it most important that a certain portion of the surplus revenue should be devoted to these betterments, in which case it would not be necessary to draw upon the Public Works fund at all.

774. Do you think it would be possible to build lines of railway for example, if such a fund as you speak of were in existence, without raising loan votes at all? I do not think that would be fair, nor do I think it would be sound. Presumably new lines are opening up new districts. Anything which comes from the revenue should be used entirely for the betterment of existing lines of railway.

775. Have you ever read a report, prepared by your predecessors in office, Messrs. Eddy, Fehon, and Oliver, with reference to the utilising of revenue from the sale of land for railway extension purposes? I do not think I have read the report, but I have heard of it.

776. The report I allude to was prepared on 14th June, 1892, and these paragraphs appear in it:—

Along the route of the railway, and within 10 miles of it on either side, there are Crown lands to the extent of 622,000 acres, at present valued at £761,000; and, undoubtedly, if the line is made, this land, if sold judiciously, would realise to the State quite if not more than double this amount. And as the cost of making the railway will be very heavy, owing to the numerous waterways to be crossed, and the broken character of the country, we would suggest for the consideration of the Government that the railway capital should be credited with one-half the money realised from the sale of this land, from the time it is decided to make the railway, the Railway Commissioners to be allowed to have a voice in the arrangements for the subdivisions and mode of sales of the land, which could otherwise be sold in accordance with the provisions of the law relating to Crown lands.

Witness—T. R. Johnson, 19 October, 1908.

We are aware that our proposal is one having no precedent in this country, but it is doubtless within the knowledge of the Government that to a large extent lines have been made in America on the land grant system, the railway companies in that country having had conveyed to them the alternate blocks of land to a depth of twenty miles back from the railway on either side; and the sale of these lands has enabled railways to be pushed forward into districts which could not otherwise have had such communication.

This district, in being isolated from the trunk line, cannot contribute any additional traffic thereto; and, in consequence of this, and also because of its great richness, we think, in the interests of the State, we are justified in making this proposal for consideration.

To some extent portion of that suggestion has been embodied in the Act of Parliament, which creates the fund from which you are drawing money for the purpose of carrying out section "A" of this deviation? Yes.

777. Do you think the principle could be extended in the direction suggested here? It seems to me to be a perfectly fair thing that land, the value of which is increased by the construction of a railway, should be made to contribute towards the cost of construction.

778. That is as a principle? Yes.

779. But in this case, whether the money has to come from a fund free of interest so far as the charge on the railways is concerned, or whether it comes from a loan fund on which interest is charged, the needs of the work would justify the expenditure? In my opinion, yes.

780. The Chief Traffic Manager (Mr. Harper), when giving evidence in 1902, made some remarks with regard to the danger of tunnels, on which we should like you to express an opinion;—the evidence to which I refer is to be found on page 26 of the former inquiry:—

As between the easier grade of 1 in 90 and the other grade of 1 in 50 requiring a push-up engine, have you considered the question of the safety of the passengers? The grade of 1 in 50 from the passenger point of view, is probably better than a 1 in 90 grade, because they will pass through no tunnels. Tunnels are always regarded as possessing an element of danger, especially on a double road.

Mr. Harper, to a lesser degree, reiterated that evidence the other day;—do you see any danger from tunnels in the proposal now before the Committee? No, I do not.

781. You have had a large experience in the old country where tunnels of great length are common? Yes; tunnels in Yorkshire on curves are exceedingly common.

782. Can you speak of any element of danger? I am bound to say that I cannot. I do not know what was in Mr. Harper's mind when he gave that evidence.

783. So far as the railway world is concerned there is an exceptional freedom from accidents in tunnels? That is so. The principal difficulty experienced is in the ventilation of tunnels, and that, of course, mostly occurs in single-line tunnels. Both of these will be double-line tunnels, and I do not anticipate that any difficulty will arise.

784. You cannot conceive of any element of danger in connection with the tunnels, associated either with the proposal before this Committee, or the proposal before the Committee in 1902? I cannot.

785. What steps are you taking generally on section "A" of the deviation to ventilate the tunnels;—are you introducing any new methods? No, because they will all be double-line tunnels.

786. Apart from any question of danger, do you anticipate any discomfort to the passengers? Absolutely none.

787. With regard to the last paragraph of your report, in which you say:—

In regard to both proposals it is highly desirable that the work should be undertaken by this Department.

You refer there to the Department under your immediate control? Yes.

788. Why do you say that;—do you think you are in a better position to carry out the work than the Department of Public Works which originally drew up the plans? Yes, works of this nature.

789. Will you tell the Committee why? It is somewhat difficult, without appearing egotistical, to explain to the Committee, but having had a great deal to do both with construction and maintenance works, I think that perhaps our railway staff are really in a better position to push this work than even the Works Department officers are. I do not wish to say a single word reflecting in any way upon the Works Department officers, but it stands to reason that when deviations of this sort are being carried out by the Department which is going to work them, there is a natural anxiety to get them through as quickly as possible. Then again the officers of the Railway Department have the Chief Commissioner behind them, and occasionally he urges them on, and he takes the trouble to walk over the work itself. I have already walked over section "A" once, and, as I told the Engineer-in Chief for Existing Lines personally, I propose to walk over the work every two months, because I am determined to get the work completed at the earliest possible moment. For that reason I think it well that works of this nature should always be carried out by the Railway Department.

790. Do you think you are in a position to carry out such works more economically than the Works Department, which after all is a great consideration? I do not know why the Works Department should not carry out the work as economically as the Railway Department. At the same time, I think we can carry out work of this nature somewhat more cheaply than they can. In the first place, they do a great deal more by contract than the Railway Department does. I am a very strong believer out here in doing work by what is known as day labour. As Mr. Fraser has already said in his evidence, we stand at nothing with regard to plant, and plant of the most modern description.

791. Why do you say "out here?" Because in the old country we have so many more contractors to fall back upon. There is far keener competition, and no railway company in the old country would think of constructing a big work by what is called "day labour." They would certainly put the work up to tender, and they would probably get from twenty to thirty tenders if they chose, but in any case they could always select ten reputable contractors, who would willingly give them a tender for any work running into from £20,000 to £50,000. There is very keen competition, and these men, who, because there is a very large mileage of railway in the old country are constantly employed doing work of that kind, can afford to keep a plant suitable for that work, whereas contractors out here, so far as I can ascertain, cannot afford it.

792. Am I to take it from the expressions you have used that contractors out here are not quite as reliable as they are in the old country so far as regards their power to carry out a contract? "Reliable"—does that suggest financial stability.

793. Probably, yes? I have no means of judging. I have really come across very few of them.

794. Have you had any experience at all over here with a contractor? No, because no similar work which has been done since I have been Chief Commissioner has been done by contract.

795. How can you contrast the methods which obtain here with those in operation in the old country? I can only judge by what I have been told and from work done under contract for the Public Works Department.

796. You contrast the work you have done by day labour with that done for the Works Department by contract? Yes. Only last year we had a short piece of duplication between Cowan and Boronia on the Main Northern line. The price at which that worked out was lower even than the Engineer-in-Chief's own estimate. It was done very cheaply indeed, in fact it came as a surprise to me.

797. By day labour? Yes, and it was also done very rapidly.

798. The estimate of the cost of section "A," as placed before the previous Committee, was £256,872;—do you think you will be able to carry out the work within that estimate? It is dangerous to prophesy so early, but so far as I can see at present the cost will certainly come within the estimate.

799. Have you read Mr. Fraser's evidence on that point? Yes.

800. As the officer-in-charge, he told the Committee he thought the ultimate cost would be considerably below the estimate? That is his hope; but of course a good many things may happen during the next eighteen months.

801. Do you think the estimate for section "B," which shows an increase of £29,000 as compared with that put before the previous Committee, will be sufficient to enable you to carry out the work? It seems to me to be an unnecessarily large estimate. I believe Mr. Fraser will give you some further evidence on that fact; I understand the Committee have asked for it.

802. With regard to the principle of grades generally—when you assumed the position of Chief Commissioner, were you in any way surprised at the steepness of the grades ruling on our lines as compared with those ruling in other parts of the world? Indeed I was.

803. Have those grades proved a hindrance to the development of the country or to the economical working of our railway system? It seems to me it would have been better if easier grades had been provided originally.

804. Do you think the best thing was done in those days from a pioneer point of view? If it was an absolute necessity for the railways to be constructed along the existing routes, I do not see how the heavy grades could have been avoided.

805. Does that mean that on almost every main and branch line a considerable amount of money will sooner or later have to be spent in flattening the grades? Yes, to bring about economical working.

806. How do the grades on our railways compare with those of Great Britain? In Great Britain all the main trunk lines have a ruling grade of about 1 in 200. The North-Western line—one of the oldest in the country—followed the old Grand Junction Canal, and has a ruling grade for the greater part of its length of 1 in 300. Nearing Carlisle, over what is called the Shap, they get to a steeper grade—I believe it is 1 in 70; but they run 250 miles from London before they arrive at that point, and it is only a certain amount of traffic going through to Scotland which has to traverse that grade. But grades of 1 in 33 and 1 in 40 are almost unknown in the old country, except perhaps in one or two places in Yorkshire where the country is very hilly, and then they only occur on comparatively unimportant lines. None of the main trunk lines have anything like the grades we have here.

807. I suppose the grades that are to be found on our Western line would be considered most unusual in Great Britain? The grades of the existing line from Emu Plains to the Blue Mountains are most unusual. I think that all railway men with modern ideas would consider it very desirable to flatten those grades as far as possible.

808. How long would grades so steep as 1 in 33 be tolerated in any part of Great Britain? They would not be tolerated at all on main lines.

809. On the score of expense of working, no matter what it involved to carry out the work, the money would be spent to flatten the grades? Certainly. I do not think any private company in Great Britain would think of bringing forward a railway scheme with a gradient of 1 in 33 on a main line where heavy traffic was to be dealt with.

810. What grades would you suggest for any future lines which you may have to recommend? I have already ventured to suggest to the Works Department that we ought not to have anything steeper than 1 in 100.

811. Do you think such a grade is obtainable under our present pioneering conditions in some parts of the territory? Of course in difficult country it may be impossible to get a grade of that kind; but, as I understand it, we are now talking about trunk lines.

812. I am referring to any new lines which may be dealt with—lines of through communication? I think it is very desirable to go for the flattest possible grade—1 in 100 if possible.

813. Take the North Coast line—what will be the ruling grade? Speaking from memory, 1 in 80.

814. Do you call that a reasonably flat grade? Reasonably flat, although, as I have already said, I should like to see it a bit flatter.

815. Does that mean that as trade improves and the country develops, more money will have to be spent in getting a flatter grade? I have no doubt that if the population along the coast increases to any great extent it will be necessary to flatten even that grade.

816. Have you any idea of the amount of money which has been spent, say between Penrith and Lithgow, in flattening the grade, apart altogether from the proposal before us? That would of course include the cutting out of the eastern zigzag. I cannot tell you what the cost of that work was.

817. A considerable amount has been expended? Yes.

818. Have you done anything to flatten the grade between Lithgow and the terminus of the Western line at Bourke? We have carried out the Sodwalls deviation.

819. Was that your work? No, it was practically finished before I came.

820. Have you carried out any deviation since your arrival? No deviations, duplications.

821. I suppose you have in mind a number of deviations in various parts of the country, the effect of which will be to flatten the existing grades somewhat? Yes.

822. Can you give us any idea of the extent of them? There is one on the Main Southern line between Picton and Hilltop. The present grade is 1 in 40, but there is a perfectly feasible route which will give a grade of about 1 in 100.

823. As a matter of fact, there is hardly a line but in connection with which some expenditure is needed to flatten the grade? That is so.

824. In the early stages of railway construction the question of grade was not the main consideration? In the early days I do not think the development which has since taken place was contemplated. The great desideratum at that time was railway communication, and, of course, the question of money was a very important one.

825. Latterly the question of grade has assumed considerable importance in connection with railway control and management? Yes, in order to bring about economical working.

826. And, in this case, you think that if a uniform grade were adopted on sections "A" and "B" of the deviation it would, practically, pay for itself? I have no doubt whatever about it, given, of course, a sufficient time.

827. The benefits would arise from economy in working, saving of time, and so on? Certainly.

828. I suppose you have given consideration to the possibilities of increased traffic from the West, in view of the developments in recent years? I have.

829. You anticipate developments at Lithgow and at Cobar, and, possibly in the mineral country beyond? Yes. I hope that the line to Condobolin will be extended still further westwards.

830. If the line is taken through to Broken Hill there is the probability of increasing trade from that direction? I think there is every reason to believe that such would be the case.

831. We may also look for some development of the land beyond Bourke, from a pastoral and agricultural standpoint? The development of the Western lands between Condobolin and Broken Hill will, I think, bring considerabl extra traffic over the Western line.

832. That line bids fair to become, if not the busiest, certainly one of the most important trunk lines we have? I think there is no doubt whatever about that.

833. How does the Western line compare with the Southern line from a traffic point of view? I have no data with me, nor did I anticipate that you would ask me that question, but the information can easily be obtained if you wish it. Of course, there is a very large business done with the West and it is increasing. The business done with Cobar has increased considerably of recent years.

Witness—T. R. Johnson, 19 October, 1908.

834. You have not the slightest doubt that the development which may take place in the West will amply justify the adoption of a grade of 1 in 90 right through this deviation? That is my strong opinion.

835. *Mr. Ball.*] I understood you to say, in answer to the Chairman, that you were prepared to recommend this proposal for a 1 in 90 grade in section "B," even if the cost has to be met out of loan votes? Yes, because I should immediately proceed to write off the cost of the original line out of revenue, so that I should not get an annual interest charge, other than the difference, perhaps, between the cost of the deviation and the cost of the original line. There might be that, but there would be nothing more.

836. In that respect you differ from the Engineer-in-Chief, Mr. Fraser? I do not think he for one moment contemplated that the cost of the original line would be written off out of revenue. I do not think those are questions which railway officials would consider. They are questions of principle dealing with financial matters, which would not come under their purview at all. If I had to bear both interest charges I would agree with Mr. Fraser.

837. Under those conditions you would prefer a 1 in 50 grade? I should not prefer it, I should have to accept it. I think it is wrong in principle, but if I have to be saddled with the two interest charges it might be a further question for consideration. Even then, my own opinion would be that it would be better to adopt the flatter grade, but I should get rid of that difficulty by writing off the original cost of the railway.

838. Do you know of any case where a deviation or duplication has been paid for from loan votes? I think there have been several such cases

839. Can you say whether the cost of the original line was wiped out in those cases? I cannot be quite certain. I can speak positively with regard to the Sodwalls deviation; the principle of writing off the original cost was adopted in that case. I think I now have the privilege of writing off periodically a certain amount of the old capital cost.

840. As a matter of fact, the principle has already been adopted? Yes, and it is a very sound one. I also gave you an illustration in connection with the old cable tramways—Ocean-street and North Shore.

841. You also expressed the opinion that it would not be good finance to pay for new railways out of revenue? I do not think it would.

842. Anything in the shape of a betterment, on the other hand, should be paid for from revenue? I hold that opinion very strongly.

843. With regard to the provision of rolling-stock, would you look upon that as a betterment which should be paid for from revenue? It all depends. If it is replacement it is paid for out of revenue.

844. What do you mean by replacement? If a waggon is to be broken up and a new waggon substituted, it is charged to revenue.

845. You always have to maintain the number of waggons which have been paid for out of loan vote? That is so. That is what is called the capital stock, paid for originally out of capital.

846. Does that apply to locomotives? Yes.

847. You pay for the upkeep of locomotives from revenue? That is so.

848. The replacement of locomotives, is that work done in your own shops at the present time? No; but if you remember a contract was placed with the Clyde Company for sixty engines, the delivery of which was to be spread over a certain number of years. It was decided long before I came to the State that the whole of those engines were to be charged to revenue, because they were looked upon as being intended to replace engines which in that period would become obsolete and probably be broken up.

849. Can you say whether locomotives have been obtained from any other source—from England or America, and paid for out of revenue? I cannot say; I do not think so; I have not heard of any. All the additional engines required since I have been in the State—and there have been two contracts placed with Beyer, Peacock—are being charged to loans.

850. Can you say whether the number of engines paid for from loan money is being fully maintained by engines provided for out of revenue? Engines that have become worn out, have all been replaced by modern engines paid for out of revenue.

851. Can you say whether any of the engines paid for out of revenue have been imported from America or from England? It is difficult to say.

852. Has the number been maintained by engines built in the State in your own works? I have already said that we have a contract now running with the Clyde Works. Three or four of those engines have been delivered during the current year. They will go as replacements of some of the old engines, and will be charged to revenue.

853. You are also building locomotives at Eveleigh? Yes, but they are being charged to capital account, because they are additional engine stock.

854. You say positively that all locomotives and rolling-stock which were paid for, in the first instance, from loan account have been maintained from revenue? Certainly. The principle goes much further than that. Many of the engines substituted for the original engines are of far higher capacity; but it is engine for engine, and therefore the policy which is adopted—and it is the policy of English railway companies—is absolutely sound. The same thing applies to waggons. We are now building 15-ton "S" waggons to replace the old "D" waggons, which had a capacity of 7 tons. Those "S" waggons, which are being substituted, are being provided out of revenue. It has been contended that some portion of the cost should be charged to capital, but it has always been held that it is desirable to keep the maintenance of the fabric at the highest possible state of efficiency, and I think the principle is absolutely sound.

855. If you had too much revenue you might have an agitation for a reduction in freight? No doubt; we do hear suggestions in that direction even now.

856. You have given your reasons to the Chairman for your contention that these deviation works should be undertaken by the Railway Department;—would you go so far as to say that your Department should have control of the construction of new lines of railways? I do not think you should ask me that question.

857. Seeing that you have to control the working of the lines afterwards, and possibly might object to the grades or curves, do you not think it would be a wise policy to give your Department some say in the construction? If you ask me to suppose such a case, I do not mind giving you an answer in the affirmative. I hold very strong views on the point, and, therefore, I do not want to trench on a matter that does not belong to me. I have nothing to do with the construction of railways at present. That, broadly, is my position, and I suggest that as regards section "B" of the Zigzag deviation the question you have raised hardly comes in.

858. You have made a recommendation yourself? Yes, as regards these two specific deviations.

859. *Mr. Dick.*] You said, in reply to one question by the Chairman, that the use of push-up engines in this year of grace 1908, was an absurdity? Yes, in my opinion.

860. You realise that that is a fairly strong statement? I do.

861. In what respect is it an absurdity;—is it an absurdity, taking into consideration the present condition of the general development of New South Wales, and the present state of the railways? Kindly understand that we are now dealing with a proposal to carry out a deviation and make an alteration. I quite recognise that we shall probably have to use push-up engines in New South Wales for a considerable number of years.

862. Whilst on that point we are also considering whether we should recommend a grade of 1 in 50 or a grade of 1 in 90, which would do away with the use of push-up engines;—under those circumstances do you still adhere to your statement that in view of the present

development of the State and the condition of our railways the use of push-up engines is an absurdity? I do most strongly. I go further and say that, as far as possible, I shall discontinue the use of push-up engines in the State of New South Wales.

863. Later on you said you founded your opinion on the ground that it would be more economical to have a 1 in 90 than a 1 in 50 grade? More economical, more convenient, and would afford greater facilities in working.

864. Take the question of economy first;—would it be more economical, under present conditions of traffic, if this were not paid for out of revenue? Certainly.

865. Then the information placed before us by Mr. Harper, as to the cost of push-up engines as compared with the interest charges, is not correct? I do not say it is not correct in Mr. Harper's opinion.

866. In your opinion? In my opinion it is not correct, because, as I have already explained, I should not be content to charge the cost of this deviation to loan account, without writing off the cost of the original line.

867. Have you gone into figures in order to absolutely satisfy yourself that it would be more economical even if you had to provide annually a certain amount of interest on the capital cost? When the original cost of the existing line is written off, what will be the annual charge for interest.

868. That is what I want you to tell us? I have not gone into the original cost of the existing line, but I think I may say that, in all probability, it was rather more than £170,000 as compared with £150,000, which is the amended estimate of cost of the proposed deviation. If we write off £170,000 out of revenue there will be no additional cost for interest, whilst the cost of your push-up engine will be an additional working expense; therefore, on that ground alone it would be more economical to adopt the 1 in 90 grade.

869. Can you tell us over what period of years you would carry the writing-off? It would altogether depend upon the revenue.

870. Under those circumstances, if it depended on the revenue, you are not in a position to say whether for some years, at any rate, the substitution of a 1 in 90 for a 1 in 50 grade would be more economical? Of course, you are now assuming that with the present traffic one push-up engine would do the work.

871. I am not assuming that at all;—Mr. Harper says in his evidence that in all probability two push-up engines will be required? Even that is not the whole of it. If the traffic goes on increasing as it has been increasing, in all probability two push-up engines will not cope with the traffic, in which event you are approaching an annual cost of something like £3,000.

872. I want to make it clear that for some years it would be more economical for us to recommend a 1 in 90 grade as against the 1 in 50, which is the alternative? If you put it on a monetary basis, I cannot say that we could show from the outset that money would be saved; but in the matter of convenience of working and general facilities, it would be well worth the extra money.

873. Would the use of two push-up engines in that district lead to any confusion in dealing with the traffic over the Western line? You have to get the push-up engine back again to Eskbank, which means occupying the line. It is not required for hauling loads, because it is a falling gradient. If you have two push-up engines employed, you are occupying the line still more.

874. I take it that your reply is in the affirmative? I do not put it as you put it; I do not say that the use of a push-up engine would lead to confusion. Things can be managed on a railway so as not to lead to confusion.

875. Your reply to my question is that the use of push up engines means, that for part of the time at any rate you lose the services of two engines, and that no confusion is, under ordinary circumstances, likely to arise? If the line is properly worked on the block system, there need be no confusion. There may be delay, because the section between the bottom points and Eskbank is occupied by a light engine when it might just as well be occupied by a full train. I am taking exception to the word "confusion." I do not know where it comes from.

876. You say that if the railway is worked on the block system confusion is not likely to arise? Not if the regulations are complied with.

877. Is the Zigzag worked at present on the block system? Not on the block but on the electric staff system, because it is a single line from the top to the bottom. The double line commences at the bottom points and goes on to Eskbank.

878. Would the use of push-up engines on a 1 in 50 grade be likely at certain times to dislocate the traffic? It is quite possible with two heavy engines on a train. I agree with Mr. Thow's evidence on that point as to the possibility of danger. Say you have two heavy engines attached to a long train. The leading driver shuts off steam for some reason—perhaps he sees a signal. The other driver at the tail of the train does not see the signal and he goes on. Something has to give way. If it is on a curve you may get a derailment, and possibly a train on the opposite line may run into the *debris*.

879. Can you call to mind accidents of that character in the old country? Push up engines are seldom used in the old country.

880. Do you know of cases here? Yes, on the Zigzag itself. I do not say cases exactly parallel, but cases where the push-up engine has run into the rear of the train somewhat too rapidly and caused damage. We have had several cases of that sort.

881. *Chairman.*] Have you had any cases of buffer-locking? Yes.

882. Has serious results followed? There have been one or two such cases, but no serious results have followed.

883. Are serious results likely to follow? A serious result might have taken place.

884. Did those accidents arise from the use of a push-up engine? Speaking from memory, yes.

885. That is one of the elements of danger? Whenever you use a heavy push-up engine, particularly on a curved line, an element of danger is always introduced.

886. *Mr. Davidson.*] Reverting to the question of charging these works to revenue instead of to loan, do you realise how much would be saved to the Railway Department by the adoption of a 1 in 90 as opposed to a 1 in 50 grade? It is very difficult, of course, to give these things a monetary value, and I appreciate the difficulty.

887. You recognise that advantages will arise, apart altogether from the saving of the cost of push-up engines? I do—advantages in regard to facilities and working.

888. Do you think it fair that the whole cost of such an improvement should be met out of revenue, when the Railway Department would be saving at least £2,000 a year, the cost of maintenance of two push-up engines, by the carrying out of this work? Certainly I do.

889. You admit that you would be making a profit of £2,000 a year by the construction of this deviation? Certainly; I should be saving the cost of two push-up engines.

890. Besides gaining other advantages which are immeasurable? Advantages which are difficult to estimate.

891. Is it advisable, under those circumstances, to pay the whole cost of the work out of revenue? Certainly. It would bring about a saving in working expenses, of which the revenue would get the benefit.

892. You say that no matter how this work is paid for, it will eventually come out of revenue? Yes, because, as a matter of sound financial policy, I should write off the original cost of the existing line if the deviation were charged to loan votes.

893. Can you tell us how the cost of section "A" of the deviation, which you are now carrying out, compares with the cost of the original line from Clarence Siding to the bottom points? No, I do not know what the cost of the original line was, between those two points.

894. It is to be presumed that the Zigzag, together with the existing line, cost a great deal more than the deviation which is now being carried out? I should think it very likely, because work was more expensive in those days.

895. The effect of your method of writing off the cost of sections "A" and "B" will be practically to give you a new line at less cost than the old line on which you are now paying interest? Yes, and there would be a consequent reduction of the capital liability.

896. And the cost would be met from the profits from the whole railway system of the country, and not particularly from the profits from the Western railway line? It would be from the surplus revenue generally.

897. Do you not consider that the Western railway system should alone bear the cost of that deviation? It would be very difficult to separate the profitable lines from the unprofitable; some lines would fare very badly if that were done.

898. With regard to the prospective trade from the west, what developments do you rely upon;—do you look forward to any increase of wheat production? Yes, to a certain extent.

899. Has not wheat production already reached its limit westward in the rainless country? In the direction of Dubbo and Nyngan I rather think, in all probability, it has; but large developments are contemplated for wheat in other directions. For instance, the line between Cowra and Canowindra, which has already been before the Committee, passes through some very fine wheat country.

900. There is room for development there as elsewhere? Undoubtedly.

901. Do you look for any development in wool production? Yes.

902. How will that be brought about? If the line were extended from Condobolin as far as Ivanhoe, in all probability a great deal of the wool which now goes to Victoria would come into New South Wales by rail.

903. How does it go from Ivanhoe at present? It is carted to the Hay line and then goes to the Murray.

904. Would that new railway line be likely to intercept some of the wool traffic at present going down the Darling? At Menindie, possibly; I should not be surprised.

905. Do you also look for any development in mineral production west? I should think to a very considerable extent. If the line was extended from Condobolin to Mount Hope, there is a copper industry which would be set going almost immediately. It is alive now. Only the other day I was away in the country between Hermidale and Nymagee. I think it probable that, some of these days, there will be a cross country line between Mount Hope and Nymagee, along the copper belt, which will, in all probability, to a large extent, assist a number of propositions which at the present time are non-paying. In fact, I think it is very difficult to set any limit to the mineral development which may take place in those particular localities.

906. It is because of the prospective developments you contemplate in the west that you strongly advise the adoption of a 1 in 90 as opposed to a 1 in 50 grade? Yes.

907. *Mr. Latimer.*] How is the money being provided for the construction of section "A"? So far out of the Public Works Fund.

908. Has any arrangement been made with the Treasurer for the payment of the balance? Not at present. That will come in the next financial year.

909. Do you anticipate that the balance will be paid out of revenue? I hope so. Having recognised the principle, I shall press it very strongly on the Treasurer.

910. Do you hope that the whole of the money required for section "B" will be paid out of revenue? I do.

911. In view of the fact that the existing line is a single line, whereas, under the deviations, you will have a double line, ought not part of the cost to be charged to Capital Account? Section "B," I might point out, is a double line at present.

912. Section "A" is a single line? It is all a single line on the middle road of the Zigzag. I tried to make it a double line some months ago, but failed.

913. In view of the fact that section "A" of the deviation will provide you with a double line, as compared with the existing single line, would it not be fair to charge portion of the work to Capital Account? You will, of course, have additional facilities for working the traffic; still you have only one line railway after all. You are only enabled to take trains in the other direction.

914. Are the improved facilities which will be gained of an economical value? They are, because the capacity is very much greater, and, to that extent, the charging of some portion of the cost to Loan Vote can be amply justified.

915. I think you also referred to the desirableness of your Department carrying out these alterations? Yes, carrying out deviations such as this.

916. You are influenced in that opinion by the fact that your officers are better able to link up the deviations than would the officers of the Public Works Department, who, if they constructed the deviation, would leave it to your men to link up afterwards, necessitating loss of both time and money? That is only a matter of small consideration so far as section "A" is concerned; it simply affects the junction at Dargan's. In the case of section "B" it is an important consideration, because the deviation runs close alongside the existing line, and will affect it to a considerable extent.

917. Mr. Thow, in giving evidence, spoke of the radius of the curves, pointing out that an 8-chain curve for the old engines was about the equivalent of a 14-chain curve for the present engines;—are you aware that any element of danger existed on section "B" of the deviation, owing to the existence of curves of 8 chains radius and the employment of larger engines? As Mr. Thow said, there is always a greater element of danger on 8-chain curves with one of the "T" class engines, which has rather a long wheel base. But you endeavour to get over that by increasing the super-elevation, or by limiting the speed.

918. The use of larger engines on curves of 8-chain radius would increase the danger by something like 75 per cent., would it not? It is difficult to put it in exact terms of proportion, but engines of the "T" class have been running over the 8-chain curves, and, as a consequence, the super-elevation of the outer rail has had to be increased.

919. Have you made that alteration? The engines were in use long before I came to this State.

920. Can you say whether the super-elevation of the outer rail has been increased on that part of the line? I cannot say that I know it of my own knowledge, but I have no doubt that it has, to meet the exigencies of traffic. Either that or a speed limit has been fixed. I might be allowed to vary my answer, and say there is another way in which the difficulty is very often overcome, and that is by what is technically known as laying the road "wide to gauge." What I really was referring to was not so much the increase of the super-elevation as the width of the gauge itself. It is quite a common thing, when you have engines with a long wheel base passing round sharp curves, to increase the gauge (say) from 4 ft. 8½ in. to 5 ft. ½ in. or 5 ft. 1 in. That is technically called laying it an inch or an inch and a half wide to gauge; and then, if you have a check-rail on the inside, the space between the running-rail and the check-rail is increased to suit.

921. The object of that is to increase the margin of safety in the employment of larger engines on the sharp curves? Yes. I have done it dozens of times myself in England.

922. *Mr. Ball.*] You say you tried to get some duplication of the middle section of the Zigzag? Yes. During last year, when the shipment coal traffic from Lithgow was very heavy, it was obvious that it would enormously assist us if we could get a double line on the middle road, but owing to the viaducts originally having been made to carry a single line, I could not do it, and, therefore, I had to fall back on the expedient of lengthening the wings, to avoid dividing the trains, which had been the case previously. We spent something like £10,000 in lengthening the top and bottom wings.

923. Do you recognise the necessity that exists for duplicating other portions of existing lines? I am glad to say that I am doing considerable work of that kind at present. I hope to do a great deal with the Northern line,

as far as Singleton, in the next year or two. On the Southern line we are more advanced; but I think we ought to go to Moss Vale, and then to Goulburn, and, as regards the Western line, certainly we should go to Bathurst.

924. If those duplications were carried out, would it enable you to overcome the difficulty with regard to the supply of trucks? Enormously. I have already said so.

925. *Mr. Latimer.*] With regard to the cost of lengthening the wings on the Zigzag, has that been charged to revenue? No, to loan account; but the moment this work is completed it will be written off from revenue. Eventually the cost will have to be paid from revenue, because when the deviation is completed it will be an unproductive work, and it must be written off. Directly sections "A" and "B" of the deviation are opened, the cost of the extended wings will have to be written off, and in addition the cost of the existing Zigzag will also have to be written off.

926. Can you say whether the cost of the deviation which took place between Dargan's and Clarence Siding was paid for out of revenue? I cannot say; it was done some years ago; I have not inquired into it.

927. No doubt it will be under consideration when the readjustment of capital takes place? I have no doubt that the original cost has already been written off. I do not claim credit for writing off the value of old works. It is a sound policy which I found in operation when I came, and it is one to which I had been accustomed in the old country for years.

928. *Chairman.*] As a matter of fact, all the duplications you have carried out have been paid for out of revenue? Oh, no.

929. What duplications have been paid for out of loans? The piece between Cowan and Boronia. That was finished some time ago.

930. Is there any work in progress at present which is being paid for out of revenue? No. The duplication r ferred to was one which provided increased facilities; it is a parallel case with the provision of a double line on section "A" as compared with an existing double line on section "B."

931. *Mr. Dick.*] Is it the custom in England to compensate the grade;—in other words, is it recognised that a grade of 1 in 90 on a curve is not equal to 1 in 90 on a straight line—that there is greater resistance? Yes, there is greater resistance, and for that reason a 1 in 90 grade on a curve is more difficult to negotiate than 1 in 90 on the straight.

932. Do you make any compensation for that? As a matter of fact it is always done. It has been the practice here; apparently the policy of the Works Department has been to compensate curves on a grade, and I think it is a very good thing.

933. In view of the greater resistance going round a curve, do you think it necessary to make the gradient a little better than 1 in 90 in order to secure a 1 in 90 right through? The equivalent of 1 in 90 on the straight. It would be very much better, and would help the engine to that extent.

934. *Chairman.*] Suppose the modification recommended by the late Commissioners was carried out, it could only be viewed as a temporary expedient? That is my view, and that is why I so strongly pressed the present suggestion when I first came to the State.

935. If we judge the increase of traffic in the future from the increase experienced during the last seven years, the probabilities are that in less than ten years there will be need for a 1 in 90 grade? I think there is very little doubt of it.

936. That would mean the expenditure of £30,000 on flattening the grade to 1 in 50 as compared with the present grade, which at the most would only be of use for, say, ten years? Which would eventually have to be written off as being unproductive expenditure.

937. It could only be viewed as a temporary expedient in any case? I should say that if we could not have a 1 in 90 grade, we would go on for a year or two longer with the existing 1 in 40.

938. It would be better to leave the grade as it is? Yes; it is only a case of a push-up engine, or two or three, much as I dislike push-up engines.

939. Could a push-up engine do the same amount of work on the present grade as it is expected to do on the 1 in 50? No, it could only do four-fifths of the work.

940. That would probably mean the employment of an additional engine? In that event the load would have to be reduced to the capacity of the additional engines on that grade.

941. If you had your choice between leaving things as they are, a 1 in 50 grade, or carrying out the work at some subsequent date at a 1 in 90 grade, would you prefer to leave things as they are? Undoubtedly. It struck me as being strange that, when we were spending £250,000 in order to get a 1 in 90 gradient over the greater part of the deviation, we should agree to accept a 1 in 50 grade at the bottom end.

942. The position presented itself to your mind as practically spoiling the ship for a ha'porth of tar? That is so.

943. You consider that the proper and economical working of the Western line demanded that the grade shall be continued right through the deviation at 1 in 90? I feel that very strongly.

WEDNESDAY, 21 *OCTOBER*, 1908.

Present:—

THE HON. FREDERICK FLOWERS (CHAIRMAN).

The Hon. WILLIAM FERGUS HURLEY.	ROBERT DAVIDSON, Esq.
The Hon. WILLIAM THOMAS DICK.	JOHN ROWLAND DACEY, Esq.
RICHARD THOMAS BALL, Esq.	WILLIAM FLEMING LATIMER, Esq.

The Committee further considered the expediency of constructing a Deviation of the Great Western Railway Line to avoid that portion of the Lithgow Zigzag between the Bottom Points and the Coal Stage at Eskbank, Section "B."

John Harper, Chief Traffic Manager, Department of Railways, sworn, and further examined:—

944. *Chairman.*] You were requested to supply the Committee with some further information with regard to the proposal before us? Yes, I have got together as much as I could.

CUTTING OUT THE LITHGOW ZIGZAG.

In 1902, the Public Works Committee considered the following schemes in connection with the proposal to cut out the Lithgow Zigzag, viz.:—

Public Works Scheme "B."

The deviation, leaving the existing line at bottom points and proceeding to the coal stage at Eskbank, a distance of 3 miles 46 chains (1 mile 25 chains longer than the existing line), with a ruling gradient of 1 in 90, at an estimated cost of £120,881 19s.

Witness—J. Harper, 21 October, 1908.

Modification submitted by Railway Commissioners.

To provide a grade of 1 in 50 from bottom points to Eskbank coal stage (approximately the same distance as the existing line), at an estimated cost of £30,000, and the cost of a bank engine (estimated then at £925 per annum).

A return has been prepared, and is attached hereto, showing the extent of the traffic hauled over the Zigzag in the down and up direction each year during the seven years ending 30th June, 1908.

Comparing the total number of goods trains hauled over the Zigzag in the down and up direction, and the aggregate tonnage of goods traffic, during the twelve months ending 30th June, 1908, with the same information for the twelve months ending 30th June, 1902, the following results are obtained :—

Year ending 30th June.	Goods Trains—Down and Up.	Aggregate tonnage of goods.	Average tonnage per train.
	No.	Tons.	
1908	7,181	2,585,080	359
1902	5,929	1,776,108	299
Increase in 1908 ...	1,250	808,972	60
,, per cent. ..	21·0	45·5	20

If the proposed deviation with a ruling grade of 1 in 50 between bottom points and Eskbank coal stage were carried out, one bank engine would still be sufficient to assist Up trains between Eskbank coal stage and bottom points.

The following statement shows the number of Up Goods Trains which passed over the Zigzag during the year ending 30th June, 1908, as compared with the year ending 30th June, 1902 :—

Year ending 30th June—	Up Goods Trains.
1908	3,672
1902	2,762
Increase	910

In view of the increase in the number of trains requiring assistance, and the increased weight of the trains now taken, the cost of the bank engine would necessarily be increased, and it is now estimated at £1,234. Capitalised at 3½ per cent. that amount (£1,234) would represent a capital of, approximately, £35,260.

With regard to the further request by the Committee to be supplied with a comparative statement showing the amount of traffic, passenger and goods, on the Western, Southern, and Northern Main Railway Lines for the last seven (7) years, the following figures, taken from the Chief Commissioner's report for the year ending 30th June, 1908, give the information for all lines :—

Year.	Miles of Line.	Number of Passengers.	Tonnage of Goods and Live Stock.	Earnings from Coaching, Rents, &c.	Earnings from Goods and Live Stock Traffic.	Total Earnings.	Working Expenses.	Train Mileage.	Earnings per Train Mile.	Working Expenses per Train Mile.	Percentage of Working expenses to Gross Earnings.	Earnings, after paying Working Expenses.	Total Capital expended on Lines open.	Percentage of profit to Total Capital Invested.
	Miles.	No.	Tons.	£	£	£	£	No.	d.	d.	%	£	£	%
1901-1902	3,025¾	30,885,214	6,467,552	1,403,744	2,264,942	3,668,686	2,267,369	11,649,059	75·58	46·71	61·80	1,401,317	40,565,073	3·48
1902-1903	3,138½	32,384,138	6,596,241	1,405,888	1,909,005	3,314,893	2,266,299	11,548,338	68·89	47·10	68·37	1,048,594	41,654,977	2·53
1903-1904	3,280¾	33,792,689	6,656,759	1,442,733	1,993,680	3,436,413	2,258,940	10,400,503	79·30	52·13	65·74	1,177,473	42,288,517	2·80
1904-1905	3,280¾	35,158,150	6,724,215	1,469,018	2,214,998	3,684,016	2,192,147	10,467,886	84·46	50·26	59·50	1,491,869	43,062,550	3·46
1905-1906	3,390	37,500,531	7,629,492	1,604,349	2,630,442	4,234,791	2,308,384	11,863,682	85·67	46·70	54·51	1,926,407	43,626,063	4·42
1906-1907	3,452¾	41,413,084	8,793,832	1,782,907	2,926,499	4,709,406	2,499,741	12,949,068	87·28	46·33	53·08	2,209,665	44,700,230	4·96
1907-1908	3,472½	47,487,030	10,175,389	1,896,720	3,047,414	4,944,134	2,714,839	14,251,052	83·26	45·72	54·91	2,229,295	45,683,484	4·83

The information is not kept separately for *each* main line, and to obtain the particulars now would mean an enormous amount of work, as the goods and coaching abstracts and the passenger classification for every station throughout the lines would have to be gone through and summarised for each main line.

NEW SOUTH WALES RAILWAYS.

STATEMENT showing Passenger Trains, also Goods Trains and Tonnage, passing over the Zigzag for each twelve months ending 30th June, 1902, to 30th June, 1908, inclusive.

Year ending 30th June.	Down Transit.				Up Transit.				Total.		
	Trains.		Tonnage.		Trains.		Tonnage.		Trains.		Tonnage.
	Pass.	Goods.	General Goods.	Live Stock.	Pass.	Goods.	General Goods.	Live Stock.	Pass.	Goods.	
1902	1,108	3,167	671,102	84,190	1,166	2,762	883,469	137,347	2,274	5,929	1,776,108
1903	1,147	2,655	595,695	51,883	1,201	2,000	631,257	70,126	2,348	4,655	1,348,961
1904	1,167	2,966	652,644	84,546	1,215	2,631	880,258	128,102	2,382	5,597	1,745,550
1905	1,144	2,753	615,050	60,024	1,187	2,779	935,289	93,286	2,331	5,532	1,703,649
1906	1,184	2,950	608,241	110,544	1,220	2,811	901,520	167,482	2,404	5,761	1,787,787
1907	1,205	3,585	864,116	138,905	1,248	3,648	1,343,331	190,688	2,453	7,233	2,537,040
1908	1,261	3,509	899,555	103,596	1,220	3,672	1,415,161	166,768	2,481	7,181	2,585,080

NOTE.—A record is not kept of the number of passengers carried over the Zigzag, nor of the revenue derived from the carriage of passengers and goods traffic over same.

945. *Mr. Dick.*] I notice from the first part of the statement that there is an increase of 60 tons per train ; is that due to the use of heavier engines? It is due to the more general adoption of "T" class engines.

946. You say that something like 2,585,000 tons were taken over the line during the last completed year? Up and down, yes.

947. Do you make any calculation, in the general returns, of the cost per ton of haulage? No, you cannot.

948. You cannot say what improvement the substitution of a 1 in 90 grade for the existing grade would make in the cost? No, we cannot do that.

949. Would you not be able to carry larger loads? We would not be able to take a bigger load than we could with a push-up engine.

950. The only economy, practically, is the doing away with the push-up engine? That is all.

James Fraser, Engineer-in-Chief for Existing Lines, Department of Railways, sworn, and further examined :—

951. *Chairman.*] You were requested by the Committee to go into particulars with respect to the estimate supplied by Mr. Hutchinson? Yes, I have done that. I hand you the estimate I have made.

ZIGZAG DEVIATION.

"B" Section—Bottom points to Eskbank.—Grade, 1 in 90. Length, 3 miles 46 chains.

Part I—91 miles 70 chains—94 miles 6 chains.

Estimate of cost.—	£	s.	d.
Excavation from cuttings on line of way, 110,000 cubic yards at 2s. 3d.	12,375	0	0
Excavation, widening of cuttings to make up embankments, 66,000 cubic yards at 1s. 9d.	5,775	0	0
Side ditches and stream diversions (say)	1,000	0	0
Culverts (say)	2,500	0	0
Fencing, 2½ miles at £50	112	10	0
Tunnelling, 1,240 lineal yards at £50	62,000	0	0
Tunnel fronts, 4, each at £180	720	0	0
Permanent-way, 4·4 miles, at £2,000	8,800	0	0
Contingencies and supervision	5,000	0	0
	£98,282	10	0

I might mention, before I give you the estimate for Part II of section "B" of the deviation that when the survey was nearly completed Mr. Deane and I walked over the ground together, and I then suggested an alteration which, I thought, would materially reduce the cost of the work. Instead of running from Eskbank parallel with the existing line and at a distance of something like a chain away, I suggested that the deviation should come right on to the alignment of the existing line, thus enabling us to make use of the earthworks already there. Apparently Mr. Deane did not follow that suggestion, because I find from the plans that the original alignment is maintained. This is not merely a question of opinion; figures prove that my suggestion would have been a good one to adopt, because by so doing the earthworks are practically halved. We have on that portion of the line a fairly big embankment starting right from Eskbank, and by utilising that existing embankment as a core for the new one, the quantity to be made up would be reduced to a very great extent. Consequently the estimate I am now submitting is not for the line as surveyed by Mr. Deane, but for the modified alignment I suggest.

Part II.—Parallel with, and partially on alignment of existing line, 94 miles 6 chains to 95 miles 36 chains.

Estimate of cost—	£	s.	d.
Earthworks, mainly embankment, 90,000 cubic yards at 2s.	9,000	0	0
Side ditches, &c.	50	0	0
Culverts	900	0	0
Level crossing	50	0	0
Permanent-way, 2·75 miles at £2,000	5,500	0	0
Deviation, Oakey Park Siding	250	0	0
Contingencies	1,500	0	0
	£17,250	0	0

Part 1, as above	£98,282	10	0
Part 2, as above	17,250	0	0
Total	£115,532	10	0

952. As compared with Mr. Hutchinson's estimate, which stands at £149,000, your estimate shows a saving of practically over £34,000? Yes.

953. Your estimate is based upon the result of work carried out on section "A"? That is so, with, as I stated before, some slight modifications as to quantity. For instance, in the item "tunnelling" you will find I make provision for 1,240 yards. The plan shows the length of tunnels to be 1,313 yards. I propose to shorten the tunnels advisedly, because by increasing the amount of cutting slightly I can reduce the length of tunnelling by a little over 3 chains at an estimated saving of over £500 per chain. The cost of a double tunnel per chain runs into about £1,100. The cost of the excavation in cutting, which will be involved by shortening the tunnels, only represents about £500 per chain; so that by shortening the tunnels the way I have suggested I save a matter of something like £1,500.

954. Mr. Hutchinson's estimates for tunnels is £79,255; your estimate shows an actual saving on that item? Yes, I shorten the tunnels, and I believe that I also carry out the work at a less price. I base my price on the cost of the work we are carrying out at the present moment.

955. Practically there is a difference of about £17,000 in the two estimates? About that.

956. *Mr. Dick.*] With respect to what you stated about utilising the existing embankment from Eskbank for some distance up, could that be done without interference with the traffic? We have done so much of that sort of work that we could manage quite well without interfering with the traffic; in fact, traffic would not be interfered with in the slightest degree.

957. *Mr. Hurley.*] I understand that in preparing your estimate you anticipate adopting the suggestion you made to Mr. Deane with regard to utilising the present line near Eskbank? My estimate is based on that assumption, but I cannot say positively that it will be adopted. I put forward the suggestion now that the work should be carried out in that way, but of course it depends upon which Department carries out the work whether it would be done in that way or not. If the work is carried out by the Construction Branch I do not think we could allow them to come on our line; we could not allow people who know nothing about our rules or our methods of working to come on to the line and do work there—it is a thing which is never done.

958. Is your suggestion indicated in any way on the plan before the Committee? Hardly, but I think I can illustrate what the suggestion means. Take the point on the line at 94 miles 6 chains; I should propose to cross the existing line there to the south. The grade of the existing line and the grade of the new line are much the same at that point. By crossing over the line in the way I suggest we should be able to take advantage not only of the existing embankment but of higher ground.

959. We are not bound to follow the route indicated on the north side of the existing line? That is the suggested route of the deviation. It is proposed to keep the work all on the north side of the existing line, but in my opinion it would be very much cheaper to cross over and take advantage of the higher ground on the south side as well as of the work already in existence.

960. *Mr. Davidson.*] Is not the present line on a higher level than the proposed line? Not wholly. The present line starts away from Eskbank on a grade of 1 in 150. The proposed line with a grade of 1 in 90 would rise above it. But when you change from 1 in 150 to 1 in 40 there is a point at which the proposed 1 in 90 grade will gradually meet it, and that point is at 94 miles 6 chains. The altered grade is a good deal higher than the existing line where the large embankment has been made.

961. Can you explain the difference in the cost of the permanent-way as shown in your estimate and in Mr. Hutchinson's estimate? I do not know that I can. I am giving you figures based on what that class of work costs us.

962. Mr. Hutchinson estimates the cost of the permanent-way at £12,395 18s. 9d.; your estimate, as now placed before us, is £14,300? That is for the whole thing right through.

963. Your estimate would appear to be about £2,000 in excess of that prepared by Mr. Hutchinson? I do not think my estimate is really in excess of his. To the £12,395 you must add £7,796 representing the cost of the permanent-way from 94 miles 6 chains to 95 miles 36 chains. Mr. Hutchinson's estimate is divided into two parts just as my estimate is. Mr. Hutchinson's estimate for Part II, that is the line from 94 miles 6 chains to 95 miles 36 chains is £30,550 10s. 9d.; my estimate for the same part is £17,250.

964. You contemplate utilising existing earthworks on that section? Yes. My estimate of £17,250 includes £5,500 for the permanent-way in that section. Mr. Hutchinson for the permanent-way in the same section makes an allowance of £7,796, as appears from the details, so that the total of his estimate for permanent-way is £20,191 as against my estimate of £14,300. I further notice that Mr. Hutchin- takes credit for materials on existing lines in each case, the

amounts being £2,985 and £2,448. I have not allowed any credit for materials on the existing line because I do not think we shall get any, that is to say, the materials in the existing line, by the time they come out, will only have scrap value.

965. Then we may take it that, if the materials on the existing line are found to have only such value when they are taken out, Mr. Hutchinson's estimate for the proposed deviation must be increased by the amount represented by those credits? Yes.

966. I notice that in your estimate for Part I, you make provision for 2¼ miles of fencing at £50 a mile; does that include both sides of the line? There is a good deal of that country which you cannot fence. I provide for fencing simply in those places which are not inaccessible. The estimate is for 2¼ miles of single fencing.

967. What does the specification require? A six-wire fence, two wires being barbed.

968. How many feet apart are the posts? 33 feet, with from five to six droppers in between.

969. Are they to be of timber or iron? We use three timber droppers and three wire droppers.

THURSDAY, 22 OCTOBER, 1908.

Present:—

THE HON. FREDERICK FLOWERS (CHAIRMAN).

The Hon. WILLIAM FERGUS HURLEY.	ROBERT DAVIDSON, Esq.
The Hon. WILLIAM THOMAS DICK.	JOHN ROWLAND DACEY, Esq.
RICHARD THOMAS BALL, Esq.	WILLIAM FLEMING LATIMER, Esq.

The Committee further considered the expediency of constructing a Deviation of the Great Western Railway Line to avoid that portion of the Lithgow Zigzag between the Bottom Points and the Coal Stage at Eskbank, Section "B."

Thomas Talbot Wilton, Managing Director, Lithgow Valley Colliery Company, sworn, and examined:—

970. *Chairman.*] What are you? Managing director of the Lithgow Valley Colliery Company. We own two of the five working collieries in the Lithgow Valley.

971. You have an acquaintance with, and a previous knowledge of the proposal now before the Committee which is to make a deviation with a 1 in 90 grade between the bottom points and the coal stage at Eskbank? Yes.

972. You gave evidence in 1902 with respect to a more comprehensive scheme, which included section "A" now under construction, and section "B," now under consideration? I recollect giving evidence, but I do not remember what I said.

973. Can you recall that, with regard to section "B," the Commissioners of the time proposed a modification in the shape of a 1 in 50 grade, as against a 1 in 90 grade, saving something like £90,000 in outlay? My recollection is that the engineers connected with the railways at the time wished to make the grade 1 in 90 instead of 1 in 50.

974. Was it not the other way about—the engineers were favourable to a 1 in 50 as opposed to a 1 in 90 grade for section "B"? I do not know the sections you refer to.

975. Section "B" is the proposal now before us to make a deviation from the bottom points to the coal stage;—the Railway Commissioners in 1902 suggested a modified grade of 1 in 50? My impression was that the engineers went for the easier grade.

976. To what engineers do you refer? The engineers who were giving evidence. My recollection is that one of the members of the committee said that the engineers were supporting the easier grade, and I think I answered that I was not an engineer and I could not put my opinion against theirs.

977. When you gave evidence on the previous occasion you first of all told the Committee that you were strongly in favour of a 1 in 90 grade right through; then you modified your views, and later on stated that you approved of the Commissioners' suggestion, seeing that a saving of £90,000 would be effected? I have no recollection of that now.

978. When you were before the Committee in 1902 you were asked, "Are you now prepared to fall in with the view expressed by the Commissioners that it is better to save interest on £90,000?" and you answered, "Yes";—you approved of the proposal placed before the then Committee for a 1 in 50 grade, believing that it was all that was needed for the time being? I do not remember that. I suppose that is what happened. I was under the impression that I advocated the easier grade.

979. What are your views, now? I think that what the Commissioners propose is the right thing to do. They want a gradient of 1 in 90, I understand. Let me tell you that Mr. Patrick Higgins, who constructed the Zigzag was a partner of mine in the collieries, and he told me that each of the limbs of the Zigzag was a mile in length, and that the grade was 1 in 42. Having negotiated the three limbs of the Zigzag, the run thence to Bowenfels has a grade of 1 in 200.

980. Do you understand what is really before the Committee;—section "A" was endorsed by a previous Committee, and the work is now being carried out, the grade being 1 in 90; section "B," which is that section from the bottom points to the coal stage, is the portion of the deviation now under consideration, and I want your opinion as to whether it would be a wise thing to have a uniform grade right through of 1 in 90 instead of carrying out the recommendation of the Committee of 1902 for a grade of 1 in 50? Most decidedly, I think it would be wise. You must remember that the Zigzag is the cause of great delay. Under present conditions a train with 38 trucks has to be divided at the bottom points, and there is a loss of quite half-an-hour before they can get the run from the top points.

981. Presuming the modification of 1 in 50 were carried out, and that instead of dividing the trains a push-up engine was utilised to help the load to the 1 in 90 grade, would it meet all that is needed? No, I think you would do much better to adopt the 1 in 90 right through.

982. Do you think the trade of Lithgow and of the West generally would justify the expenditure of over £149,000 in order to get a grade of 1 in 90 on this section? Yes. If you do not do it now you will have to do it by-and-by.

983. When before the Committee in 1902 you gave some evidence with regard to the development of the trade of the district, more particularly with regard to the coal trade;—can you say what the development has been in the meantime? I can give you some figures to show the development of trade for the last two years. I have particulars of the output of our two collieries in connection with the shipping trade. From 1st July, 1906, to 31st December, the total output of large coal was 87,290 tons 13 cwt. The quantity of small coal—all of which is charged the same freight—sent away during the same period, was 11,494 tons 4 cwt. The total output from our two collieries for the period mentioned was 210,606 tons. The following half-year, from 1st January to 30th June, 1907, the figures were 210,600 tons, and from 1st July to 31st December, 1907, the output increased to 258,048 tons, making the gross output for the two years from our two collieries alone 468,648 tons. There are three other working collieries, but I have no figures relating to their output. I have a statement showing the total output of coal from the five collieries of the Lithgow Coal Association each year for the two years

ending 30th June, 1908. We paid to the Railway Commissioners in the first year on account of freight, on shipping only, no less a sum than £43,348 4s. 5d., and in the next year, £52,880 8s. 10d. I may tell you that, owing to the delay in getting coal through to Darling Harbour, we have suffered considerable loss from demurrage on ships waiting for coal, and I think the Zigzag is the principal cause of the trouble. You see, there is only a single line from the bottom points right up to Mount Victoria. No doubt, in time, all that will be altered. The deviation at present being carried out, will not only considerably reduce the grade, but will provide a double line, where trains can pass each other. It is a matter of no importance on a double line, whether you meet another train or not, but it is a matter of great importance when you are on a single line.

984. The coal trade in 1902 was 390,000 tons? Yes.

985. Has there been a striking advance on that? Not since 1902. We knew nothing about the shipping trade at that time. We now have a shipping rate from the Commissioners, which enables us to compete, and as I have just pointed out, in two years we paid in freights on shipping coal only, no less a sum than £96,000. In one month, we were paying them at the rate of £75,000 a year.

986. Has there been any slackening off in the output recently? There is a slump in the shipping trade at present, which is being felt everywhere, both north, south, and west. We have no doubt whatever that the trade will come again, but you must remember that if there had been no coal-seam in Lithgow Valley, there never would have been anything else there.

987. So far as the coal trade is concerned, instead of there being an expansion which would justify the contemplated outlay, there has really been a slump? Trade has slackened a little. We are not doing quite so much as we were doing. We are still getting shipping orders, but not to the same extent.

988. What are the present prospects? They are favourable for an increase. We have no doubt about it ourselves.

989. Is the coal there? Yes, there is any quantity.

990. You entertain no doubt on that score? Not so far as we are concerned.

991. In what direction do you look for any expansion of the coal trade, so far as Lithgow is concerned? Mr. Eddy, when he was Chief Commissioner, promised that when the cutting out of the Zigzag was accomplished, he would reduce the freight for the land coal trade from 6s. to 5s. At one time, there was no rate for the carriage of coal over the Western line, but after a prolonged fight, a rate of 1½d. per ton was fixed upon, or 12s. from Lithgow to Sydney, a distance of 95 miles. Ultimately, we obtained a reduction to 1d. per ton, and it remained at that amount until Mr. Eddy came. Mr. Eddy sent for me, and said: "If I give you 1s. per ton, what increase of traffic may we look forward to." My reply was "I cannot tell you to-day, but I will let you know to-morrow morning." We put the increase at 50 per cent., and as a matter of fact, we exceeded that estimate. Seven or eight months later, Mr. Eddy again said to me: "Suppose I give you another shilling; what increase shall we get." I told Mr. Eddy I could not promise another 50 per cent. increase, but that on the following day I would be able to give him some idea. I did that, and Mr. Eddy undertook to reduce the rate to 6s. Subsequently, he promised to reduce it from 6s. to 5s. That would have increased our trade with Sydney by at least 50 per cent.

992. Suppose you obtained that further reduction, what would your output be? I should say that the land trade alone would show a 50 per cent. increase. We could supply a lot of people round about the harbour, but the Commissioners keep the freight at 6s. per ton. If we were allowed to carry the coal down in hopper waggons, empty it into barges, and carry it to the great works on the foreshores of the harbour, we could increase our trade very largely.

993. You would look for an increase of 50 per cent. in the output? Yes, if we got a further reduction of 1s. in freight—that is quite irrespective of the shipping trade.

994. What, under those conditions, would be the life of your collieries? I do not know. We commenced in 1874 with 1,138 acres. I suppose we now have close upon 3,000 acres of coal land. We have struggled against these heavy freights. It is only within the last two or three years that we have really made any advance. The particular merit of the Lithgow coal is that it contains no dangerous gases. In all the years we have been working there has never been an instance of gas being found in the mines.

995. From your knowledge of the coal measures of Lithgow, would you say that they are of a permanent character? I entertain no doubt about it personally. We cannot see the end of them.

996. Have you any idea of their extent? We know that there is no coal below the Zigzag, but we do not know how far the seam extends to the north-east.

997. How do you know that there is no coal beyond the Zigzag? Years ago a trial drill was put down in the locality of Dargan's Creek. They went below the roof and floor and found the seam to be only from 4 to 6 inches thick.

998. All your trade, I suppose, is in the direction of Sydney? No, we have considerable trade westwards. We do a good deal with Cobar.

999. What is the extent of your dealings with Cobar? We are supplying the Cobar Company, and we supply a good deal of loco. coal. For instance, between 1st July, 1906, and 30th June, 1907, we supplied 190,739 tons of loco. coal, and in the following year 194,306 tons. Private trade during the same periods accounted for 113,623 tons and 100,815 tons respectively, whilst on shipping account the output was 147,896 tons and 211,589 tons. Small coal during the same periods totalled 49,056 tons and 79,274 tons. The total trade for the year 1906-7 was 501,316 tons, and for the year 1907-8, 585,985 tons.

1000. From your knowledge of Lithgow, what would you say its industrial prospects were? I cannot tell you.

1001. Do you look forward to any development? There would be no iron-works if there were no coal-seam. If there were no iron-works, and no other industries, the collieries would go on just the same, because they are the basis of everything.

1002. What are the possibilities of Lithgow as an industrial centre? I should say they were very large.

1003. Is the outlook brighter now than it was some years ago? Yes, because you now have a blast furnace. The whole iron industry is being remodelled. The iron industry, like every other great industry, has to develop gradually. As the industry grows it is found necessary to increase the plant. Some special piece of machinery is required; it is obtained, and put down. Additions are made in this way year after year, and when a big trade developes it is seen that if only the machinery could be rearranged and put in such a position as would return the best results, it would be possible to make more money. It seems to me that this is what the Messrs. Hoskins are doing. They are stripping and dismantling the whole works and altering everything. I should say that an immense trade will be done there, and as the works develop I think they will be found to employ more labour than the whole of the collieries.

1004. When you gave evidence before the previous Committee you were asked: "Is there any tendency to increase in the trade from Lithgow westwards with regard to minerals." Your reply was, "No. Coal is sent up to some of the copper companies, but it is a fluctuating trade. The slump in copper has shut up a lot of the mines. We look to Sydney as our great market." Do you at this stage look forward to any permanent and growing trade with the west? If, as has been suggested, the line is carried through to Broken Hill, I think the whole of the coal supplies for that important centre will go from Lithgow Valley.

1005. *Mr. Hurley.*] Have you tested the coal-seams in order to find out what you have in front of you? We know that we are the two furthest mines to the west, and we know that there are other collieries round about us. You can see the seam exposed on the cliffs as you go from Bowenfels to Hartley. There is no doubt that, so far as these five collieries are concerned, they have the coal-seam right over their areas. The dip is to the north-east, and we are working out the higher ground so as to avoid the water, which naturally drifts to the lowest

point. We have a considerable area of land yet to touch, and in addition there is all the second working to come. No doubt you are acquainted with the ordinary plan of colliery workings, and you know that about one-third of the coal is taken out during the first working, the pillars being removed at a later stage.

1006. What method do you adopt to test the land in order to ascertain whether the coal is there—shaft or bores? We have two adits. Ours are the only two mines worked from adits. We go right in underneath the mountain.

1007. You stated that the seam pinches under the Zigzag? We know that it does not go under the Zigzag. In the New Vale Colliery it was found that the roof came down and cut the whole seam out.

1008. Did you put down a shaft or put in a level to prove that the seam had pinched? It was not necessary to do that. On the other side, in the Dargan's Creek direction, a drill was put down. It was thought that it might be possible to recover the seam, but it was so much waste of time. Again, at Hartley Vale, where the first kerosene shale was worked, a shaft was put down close by the station in the hope of cutting the Lithgow seam, but they got nothing.

1009. How many seams are there in your property? The seam we are working is 10 ft. 6 in., and it is pretty even right through the valley. That is known as the Lithgow seam. Above that is a 20-foot seam, which is utterly valueless, because every 2 or 3 inches a band comes in. Above that, and just on top of the mountains there are little seams of 2 ft. 6 in. and 3 ft. at varying distances. In the annual reports of the Department of Mines you will see sections showing where these little seams come in.

1010. I suppose you are guided by the geologists of the Mines Department? No. We knew the seam was there years before the railway came through. It was laid bare at Farmer's Creek. The outcrop is pretty well defined. It has been washed away from there to Bowenfels. There is no coal beyond us. We got the line of outcrop and took up land accordingly.

1011. How much of your land have you worked out? None as yet. We still have all the pillars to take out, and they represent more than half the coal.

1012. You have sent a tremendous lot of coal away? Yes.

1013. Practically half, I understand? I did not say so. I do not consider that with the bords and the different headings they put in they take out half the coal. It is impossible to say exactly what quantity of coal is left in the mine. I do not think that anything like half has gone, and that only applies to the present workings. We have still virgin lands.

1014. If the average width of the seam is maintained it ought to be possible to estimate within a few thousand tons what coal you still have to win? I would not care to express an opinion. We opened that mine somewhere about thirty-four years ago, and to the present we have only touched a few blocks. It has been a constant struggle up to now. For nine years we never took a farthing out of the mines.

1015. If you have been at work for thirty-four years, and you have not mined half the coal from the ground in which your workings are, it is a safe computation that the life of the mines is another thirty-four years? I cannot say. Whatever the period is that has passed we have not gone through the land yet. For a number of years we made very little hole in the coal. As I told you, for nine years my company got no dividends. Whatever profits were made had to be devoted to development work. You can imagine how small the output was, for all the other colliery districts were against us.

1016. Under any circumstances we may take it that the life of your mines is likely to be many years? No doubt. We have not taken anything like as much out of one colliery as we have out of the other. A good deal of coal has been taken out of the Lithgow Valley. It was the only mine of ours working up to within a few years ago. The Hermitage is a comparatively new mine, and we have a larger area on that side than we have at the Lithgow pit.

1017. Have you tested below the foot wall to ascertain if there are any other seams? There is nothing below us. The late Mr. Alexander Brown thought he might pick up a coal seam by sinking in the country below us. He went down for about 200 feet, but came to nothing except granite. That confirms our opinion that there is no lower seam. Ours must be the oldest seam in the country, because it is right above the granite.

1018. You have coke works, have you not? No. Mr. Bragg owns those works, and he has spent a considerable amount of money. I think he has put down forty-eight retorts lately, and in addition there are from eighteen to twenty beehive ovens.

1019. Do you know the analysis of your coal? In a general way. I cannot give you the information now; I did not anticipate that you would put the question. I remember that we sent a truck of coal from the Hermitage Mine to Bathurst, and it was found to give a better average than English coal. But of course in making gas you may do all sorts of things; you may get a very bad or very good result from the same class of coal.

1020. Do you remember what the tar product was? No, we wanted to know what the result was for gas.

1021. *Mr. Dick.*] You speak of shipments of coal being delayed under present circumstances—can you give any specific instances of that delay? It is constant with us. About eight years ago I published a paragraph which I had written in 1884. I have always been complaining about the want of trucks. We still experience the same trouble.

1022. I am asking you about the delay;—if you had a sufficiency of trucks would there then be any delay? Not with us.

1023. Then the trouble is want of trucks? Whenever the wool season comes on, and whenever stock is being moved about, there is trouble. Last week we had a shocking experience. We did not work half our time. It is always so; every year brings the same trouble.

1024. It all arises from the want of trucks? Yes.

1025. It is not owing to the fact that you have a heavy grade? The grade does not affect it. We only keep sufficient men on the mine to put out the output. It is no use having a lot of men about who are earning half wages. We keep just enough to do the work, and if we do not get the trucks we want, how is it possible for us to pull it up next day. We are in that mess now, particularly with regard to some small coal which is wanted. We cannot get the trucks—what are we to do.

1026. Your trouble is really want of trucks? Yes. But see what happens. The wool season lasts for two or three months; agricultural produce comes along for about the same period, and they both come together, or nearly together, Then we may go to blazes.

1027. Have you any trucks of your own? Not now. We tried that experiment in Mr. Goodchap's time. In those days the Department had only 600 "D" trucks. We sent home and got out fifty—we thought that would be enough for us. I asked Mr. Goodchap what he would allow us for them. He said he must have a trial made; that it would not do to allow us to make money out of the Department. Mr. Goodchap promised to find out how many trips could be done within a given time, and when an order is given by the Chief Commissioner it stands to reason that great attention is paid to it. The report was that it would be possible to do five trips in a fortnight. We kept those trucks for about eighteen months or two years, and our experience was that a truck which left us one day we did not see again until eight or nine days later; and in those days the line did not go beyond Goulburn in one direction or beyond Bathurst in the other. The waggons we introduced were 8-ton trucks built in Bristol. They cost us £6,000, but the Engineer-in-Chief for Existing Lines would not allow them to run on the line; he said the line was not built for carrying coal. First of all the authorities insisted on our taking the top plank off the trucks. Then they wanted another plank to be removed. At that time they were only carrying 5 tons in the "D" trucks. Our trucks had a closer wheel base, and were better suited for going round curves than the Departmental rolling stock. Another thing we had to do was to alter

the brakes—they do not seem to need brakes on the railway trucks at home, where no line has a steeper grade than about 1 in 200. So much trouble arose over the use of our own trucks that we were glad to ask the Railway Commissioner to take them over. We ultimately disposed of them for £4,000.

1028. You spoke about having to pay certain charges for demurrage on ships—was that due to the fact that you were not able to execute the order as speedily as the shippers desired? No.

1029. You know that often happens amongst collieries? They may have a breakdown. I am supposing that they are working properly. We have had no such failure as that. The reason we have had to pay demurrage is the delay we have experienced in getting trucks.

1030. It has never happened that you have not had enough men on to execute the orders speedily? No.

1031. You also referred to the recent slump in the coal trade;—that is pretty well common to all mining centres? Yes, all coal districts are suffering from it.

1032. Can you suggest in what way any increase in trade is going to be brought about? No, no more than it is possible to account for the recent great unemployment in England. A change takes place; no one understands why, and everyone is working again.

1033. Do you know whether collieries in other parts of the world are now competing for trade which this State held for many years? Yes, and they have been competing all along. The time will come when they will all be busy. There is a certain shipping trade, which must be done here. All the great collieries of Newcastle and the South have agencies in every important port seeking orders.

1034. What royalty do you pay to the Government on your coal? We pay no royalty at all at our Lithgow pit, which is freehold with the exception of about 40 acres. We pay some royalty at the Hermitage.

1035. The Chairman put a number of questions to you as to the possible life of your collieries in order to find out how long we may anticipate traffic? It is a proper question to consider, but I cannot give you that information offhand.

1036. Can you tell us what percentage of the coal lands you now hold has been worked out? I do not suppose, in the case of the Lithgow pit, that we have run over half the area in the first working, and in the case of the Hermitage certainly not one-third.

1037. Presuming that, in years to come, the output is maintained at what it has been in the past, it practically means that you have four times the life you have already had? I cannot answer that; it would be mere guesswork. I should say that we have fully fifty years' work ahead of us, that is, with the seam we are now working. There are other seams above.

1038. I understood you to say that they were valueless? No; that is the 20-foot seam which is to be found on both sides of the valley.

1039. What are the other seams on top? We have never examined them; we merely go on the dictum of the professional men, the examiners of coal-fields.

1040. You have no definite information on that point? No.

FRIDAY, 30 *OCTOBER*, 1908.

Present:—

THE HON. FREDERICK FLOWERS (CHAIRMAN).

The Hon. WILLIAM FERGUS HURLEY.	ROBERT DAVIDSON, Esq.
The Hon. WILLIAM THOMAS DICK.	JOHN ROWLAND DACEY, Esq.
RICHARD THOMAS BALL, Esq.	WILLIAM FLEMING LATIMER, Esq.

The Committee further considered the expediency of constructing a Deviation of the Great Western Railway Line to avoid that portion of the Lithgow Zigzag between the Bottom Points and the Coal Stage at Eskbank, Section "B."

William Hutchinson, Chief Engineer, Railway and Tramway Construction Branch, Department of Public Works, sworn, and further examined:—

1041. *Chairman.*] The original estimate for the work now under consideration was, roughly, £120,000;—the estimate you placed before the Committee was £149,000. Since then Mr. Fraser, Engineer-in-Chief for Existing Lines, who is in charge of section "A" of the deviation now being carried out, has submitted an estimate of £115,000, showing a saving of £34,000 as compared with your estimate;—can you give the Committee the reasons for that difference? Dealing with Part I of Mr. Fraser's estimate—that is, for 91 miles 70 chains to 94 miles 6 chains—Mr. Fraser in his evidence states that he would shorten the tunnels in order to get some extra material. He makes the excavation from cutting 110,000 yards as against my 97,550 yards, and the excavation from the widening of cuttings 66,000 yards as against my 94,200 yards. I agree with Mr. Fraser as to the desirableness of shortening the tunnels on two ends only; I think it would be a wise thing to do, and I know that by doing that it would be possible to save about £1,000. But in regard to the two other ends of tunnels, I would not, if I were carrying out the work, contemplate any shortening of them. I think it would be unwise to touch the existing cliff. It is very steep, and has a height of over 70 feet. I would not care to cut a shallow strip off that. No doubt if Mr. Fraser did that, he would obtain the advantage of slightly shortening the tunnel, and in that way he might cheapen the work. Personally I would not undertake it. Mr. Fraser estimates the excavation and widening of cuttings at 176,000 yards, as against my 191,750 yards, and I understand he proposes to use the material he obtains from lengthening the wing of the bottom Zigzag, for filling in a bank. In addition there will be a balance. Further, I understand, Mr. Fraser has allowed—and this again is a wise thing, and something I have not provided for—a percentage for swelling. I mean by allowing a percentage for swelling, that he makes allowance for a yard in cutting making more than a yard in bank. Those items explain the difference in the contents of about 19,000 yards. Mr. Fraser estimates the cost of excavation from cutting at 2s. 3d., as against my 2s. 6d. I previously told the Committee that my estimate was for a contract job, and I am firmly of opinion that no contractor would take the work at a price less than 2s. 6d. I cannot reduce the estimate for that work at all.

1042. The Committee understood that Mr. Fraser's estimate was based on actual results obtained in the work now being carried out? Quite so; that is, the work so far as it has gone. I would point out that they have adopted the day-work system. There is always a lot of trimming up to be done, which possibly Mr. Fraser has not gone into, and for which he has made no allowance in his estimate of 2s. 3d. In my judgment no contractor would undertake that work for less than 2s. 6d. He might want even more than that. That explains some of the difference in the monetary amounts. Then I have put down 2s. for widening cuttings, as against Mr. Fraser's 1s. 9d. I cannot see my way to alter that.

1043. Do you attribute Mr. Fraser's lower estimate to the fact that the work is being done by day labour as opposed to the contract system? Certainly; I must do so. He says

Witness—W. Hutchinson, 30 October, 1908.

he is carrying out the work at those figures. I feel satisfied that no contractor would take on the job at anything under my figures.

1044. *Mr. Davidson.*] Is there anything else brought into consideration besides the question of day labour as against contract? There is the question of running power. I do not know what charge, if any, they have made for the haulage of materials. I cannot say if they have charged themselves with everything a contractor would be charged; I do not think they have. I think they convey material without charging freight.

1045. *Chairman.*] That should be a set off? Yes, distinctly.

1046. The Railway Department is in a position, under a system of day labour, to carry out the work much better than any other Department? I think so, because they have their running regulations, whereas a contractor would not be allowed to interfere or come in on the line at all.

1047. And the Department possess certain facilities which no one else is possessed of? If they want to run materials, and if they charge anything at all, they only charge themselves with the actual cost. The contractor, on the other hand, would be charged certain freights. That is the only explanation I can offer for the difference in certain of these items. In regard to side ditches and diversions, Mr. Fraser estimates the cost at £1,000. I estimate the work to cost £1,075. There is no difference there worth speaking of. For culverts, Mr. Fraser allows £2,500; I allow £2,268 1s. 3d. That estimate again is practically the same; his is a little more than mine, but there is very little difference one way or the other. For fencing Mr. Fraser puts down £112 as against my £157 10s. He takes 2¼ miles at £50 a mile; I take 700 rods—practically the same length—at 4s. 6d. per rod, which works out at a little more than £50 per mile. The most noticeable difference in the two estimates occurs in the item, "tunnelling." Mr. Fraser estimates the tunnelling at 1,240 yards, as against my 1,313 yards, or if you allow for the shortening of two tunnel ends, about 1,270 yards. The real difference between us is in cost. I have allowed £59 12s. 6d. per lineal yard, as against Mr. Fraser's £50. I should like to go into details as to how I arrive at that figure. The details for tunnelling are these: Taking the tunnels per lineal yard, the excavation I put down at 63 cubic yards, at 12s. 6d. per cubic yard—£39 7s. 6d.; concrete lining, 11 cubic yards, at 35s.—£19 5s.; centre drain, for cutting out of rock, £1 per yard. That makes the total of £59 12s. 6d. I cannot reduce those items. I think the prices are already sufficiently low for any contractor to undertake the work. The difference between £50 and £59 12s. 6d., carried over the total length of tunnels, accounts for some thousands of pounds. In addition to that I have provided for sanctuaries at £8 10s. 8d. each, whilst the tunnel fronts I put down at £195 each. I see no reference to either of those in Mr. Fraser's estimate.

1048. I suppose Mr. Fraser must contemplate both sanctuaries and tunnel fronts? Yes; and if so he must have included them in his £50.

1049. You would not think of building a tunnel without sanctuaries? No. It is Mr. Fraser's estimate of £50 as against my £59 12s. 6d. which makes the price of tunnelling work out so much lower. The last tunnels we built were on the Milson's Point line. They cost us 15s. 6d. in excavation per cubic yard, and it was on the strength of that that I made the estimate 12s. 6d. for these tunnels. We come now to the permanent way. Here again there is a large difference between us. Mr. Fraser allows £2,000 per mile as against my £2,817 5s. 3d. I have no details showing how Mr. Fraser makes up his estimate, but I would like to put before the Committee the details of how I arrive at it. We have rails, 125·714 tons per mile, at the price we paid recently for those, £9 0s. 7d. per ton—£1,134 19s. Fastenings per mile, under a seven years' contract, £159 8s. 6d. and sleepers, 2,112 per mile, at 5s.—£528. Ballast 3¼ cubic yards to the lineal yard of double track, at 5s. 6d. per cubic yard, equals 17s. 6d. per lineal yard, or £770 per mile. Plate laying, 1,760 lineal yards, at 1s. 9d., £154. Freight on permanent-way material, £70 17s. 9d. In that estimate per mile, freight on sleepers, which is included in the price I have given you, would be £85 7s. 3d., and on the permanent way, £70 17s. 9d., or a total of £156 5s. per mile for freight alone. How Mr. Fraser arrives at his £2,000 per mile I cannot understand. Even assuming that rails are cheaper now—and the price is certainly falling: only yesterday we had quotations for 60 lb. rails—showing a marked decrease—assuming that the price to-day is £1 per ton less than when we compiled the estimate, it would only make a difference of £130 per mile. I cannot see my way to reduce the amount of my estimate for the permanent way. I have given you the details from which I have worked out my estimate and I cannot see my way to cut down any of the items with the exception, perhaps, of the price of rails.

1050. Your estimate I presume is based on the experience you have gained with contractors;—it represents what you anticipate you would have to pay a contractor? Yes.

1051. You have not contemplated carrying out the work under the system followed by Mr. Fraser? Not at all.

1052. The work on section "B" of the deviation is, I take it, very similar to that now being done on section "A"? Section "A" would probably be a little easier because the cliffs overhang. There is one very big cliff on section "B," but I think there are a number on section "A," where it would be possible to put in big shots.

1053. Are there any difficulties of construction likely to be met with in connection with section "B" which will not arise in the case of section "A"? No.

1054. Then the method of calculating the estimate would be very much the same in each case? Practically the same; I do not think there would be any material difference.

1055. *Mr. Dick.*] Did you notice that Mr. Fraser proposes to cross the existing line at a point a little over a mile from the coal stage, and to construct the new line on higher ground than is proposed on the plan before the Committee? Yes; Mr. Fraser puts forward quite a different proposal in connection with Part 2 of the project—from 94 miles 6 chains to 95 miles 36 chains. And he submits it by reason of the fact that he could regulate the traffic. He can only construct the line in the way he proposes by reason of the fact that he can completely regulate the traffic, a thing which, of course, we cannot do. Our plans and estimates were made for running on the north side of the existing line all the way. Mr. Fraser proposes to cross the present line at 94 miles 6 chains, where the two grades practically come to the same level, and he utilises the existing bank. If he can do that, and at the same time regulate the traffic, I must say I entirely agree with him that it is a proper thing to do. But we cannot do it.

1056. Would the adoption of Mr. Fraser's suggestion mean any material decrease in cost? A large decrease. It would mean the difference practically between the two estimates. I presume the Committee understand what Mr. Fraser proposes to do. He would first of all run one road through at the higher level, and when that road was through he would utilise it. Then he would take out the other road and gradually widen it until he got the full width of his bank for the double road.

1057. This is the evidence Mr. Fraser gave us on that particular point:

> I might mention before I give you the estimates for Part 2 of section "B" of the deviation, that when the survey was nearly completed Mr. Deane and I walked over the ground together, and I then suggested an alteration which I thought would materially reduce the cost of the work. Instead of running from Eskbank parallel with the existing line, and at a distance of something like a chain away, I suggested that the deviation should come right on to the alignment of the existing line, thus enabling us to make use of the earthworks already there. Apparently Mr. Deane did not follow that suggestion, because I find from the plans that the original alignment is maintained. This is not merely a question of opinion; figures prove that my suggestion would have been a good one to adopt, because by so doing the earthworks are practically halved.

I ask you again, if the difference in your estimates of Part 2 of the proposed deviation would be very largely accounted for by that suggestion put forward by Mr. Fraser? I should say that it would practically explain the difference

in quantities. The difference in price of 2s. 6d. as against 2s. 3d. would still remain. If Mr. Fraser could do that, and at the same time regulate traffic whilst it was being done, I admit that it would be the right thing to do.

1058. In comparing the estimates for tunnelling you pointed out that you could find no allowance in Mr. Fraser's estimate for either sanctuaries or tunnel fronts;—what would those omissions amount to in the total? The sanctuaries in my estimate amount to £187 14s. 8d., and the tunnel fronts to £780.

1059. Have you taken any credits in your estimate for existing materials? Yes.

1060. Did you notice if Mr. Fraser had done that? I am surprised to see that Mr. Fraser says that the material when it came out would only be fit for the scrap heap. We are at the present time paying the Commissioners under a recent arrangement £4 a ton for material recovered from existing lines which we are using in sidings. In my estimate I take credit for this material at £5. If, as Mr. Fraser says, the material when it comes out of the road is only fit for scrap, the implication is that the material is no good.

1061. Can you say, roughly, where the difference arises in your estimate for Part 1 of section "B" as compared with Mr. Fraser's estimate? Yes; in the excavation and chiefly in the tunnel. The difference there runs into something like £12,000. That, in conjunction with the difference in the cost of permanent-way, will practically account for the whole of the difference.

1062. If you were not taking credit for permanent way materials your estimate would require to be increased by something like £5,300? Yes. In my estimate for Part 1 I take credit for £2,985, and in Part 2 £2,448. I assume that, if the rails are no good the sleepers will be no good.

1063. What has been your experience with regard to similar credits;—have you recovered them? We have never experienced a case like this before.

1064. I suppose you have some idea of the value of these permanent way materials? We are utilising permanent way material obtained in this way on the North Coast railway. I have arranged with the contractor that all sidings shall be laid with second-hand rails, which we are providing, and which we get from the Railway Commissioner. The Commissioner charges us £4 per ton for those rails. That is quite a recent arrangement.

1065. Do you also utilise any second-hand sleepers? No.

1066. *Mr. Latimer.*] Can you say whether Mr. Fraser is using machinery for the excavation of rock in tunnels which would not be available to an ordinary contractor? He is using pneumatic drills. He has a very good plant, or if he has not, he contemplates getting one. I think he is using those improved drills at the present time. Whether a contractor would use them or not I cannot say. I think an up-to-date contractor would.

1067. Do you know of any contractor who has as up to date a plant as that now used by the Railway Commissioners? No; but contractors have used steam drills for drilling tunnels and cuttings.

1068. Mr. Fraser in his evidence says that he is using a much more powerful drill than any which was in existence at the time Mr. Deane made his estimate? I presume he is correct.

1069. Would machinery of that type be within reach of a contractor? It would altogether depend upon the contractor himself. Some contractors are up-to-date men and would go in for these things. Other contractors would not get anything at all; they would go on in the old way.

1070. Would it be worth the while of any contractor here, for all the railway work he might get, to introduce plant of that kind? I think so. We are letting a contract for the North Coast railway, which is of greater magnitude than the "A" and "B" sections together. The contractor will have to get a large plant for that.

1071. Can you say whether the fact of the Railway Commissioners having up-to-date machinery of that kind at their command would account for the lowness of Mr. Fraser's estimate as compared with yours which is practically a contractor's price? I think so. Further than that a contractor wants a profit. Mr. Fraser's estimate is the net cost. The contractor must necessarily get something out of it.

1072. *Mr. Dacey.*] Have you read the evidence given by the Chief Commissioner for Railways? Only what I saw in the newspaper. I have had no means of seeing his evidence.

1073. Are you aware he stated that he was astounded at the cheapness at which work is carried out here by day labour? I cannot say that I am. But I might point out that we have had considerable experience of day labour ourselves. For ten years we built railways by day labour.

1074. Did you make a great saving? I consider that we did.

1075. Is there any particular reason why that saving should not be made in all cases? It is entirely a question of policy, and the policy of the present Government is that everything, with very few exceptions, shall be done by contract. The policy of the late Government, on the other hand, was that everything should be done by day labour, and for ten years we did all our work under that system with highly satisfactory results.

1076. You had an efficient plant? Yes, an efficient plant, and good men.

1077. Have any of the contractors a plant equal to yours? Our experience of contractors at the present time is that they have not.

1078. *Mr. Ball.*] I understand you to say that you prepared your estimate on the assumption that the work would be carried out by contract, whereas Mr. Fraser has assumed that it will be done by day labour, and that largely accounts for the difference in the two estimates? What I infer is this: Mr. Fraser comes here and says that he is carrying out similar work at the prices he has quoted. That being so, all I can say is that the difference in the two estimates is largely due to the difference in the two methods employed.

1079. You consider that the method, just as much as the cost, would account for the difference? Yes; having a good plant would make a considerable difference, and I think the Commissioners have facilities which neither we nor any contractor would have.

1080. From your experience of contract work, I presume you are aware that the contractor has to take certain risks, and that he generally allows something for those risks? Yes.

1081. What risk do you take under the day-labour system? We take no risk at all. If the cost exceeds the estimate the Government have to find the money.

1082. What happens in the case of the contractor? He has to bear the loss.

1083. The contractor always has to provide a margin of safety in his estimate? Yes; it is his business, and naturally he must make something out of it; and if he makes something he must allow for it in the estimate.

1084. With regard to the difference in the cost of permanent-way material, does not the Department find the rails for the contractor? Yes. I have given you the price which we are actually paying here for the rails in our own store. We issue the rails at that price to the contractor; and he takes delivery, but he does not pay us anything at all. I do not know what guided Mr. Fraser in adopting this lower price for rails. If he has taken a recent quotation, the price probably would be less; but it could not possibly account for anything like the difference between us.

1085. Any difference in the cost of rails does not affect the matter whether it is carried out by day labour or by contract? Not in the slightest.

1086. The Chief Commissioner, when giving evidence, told us that in the old country he would prefer to do work by contract, seeing that there is more competition, and that the contracting firms have a better equipment;—has that been your experience? I have not had any experience in the old country of the two systems, and therefore I cannot say. But I might say that we have not the same large works here as are to be found in the old country to justify contractors equipping themselves with large plants.

1087. *Mr. Davidson.*] Had you any experience of contract work on the railways prior to the ten years when the day-labour system was in operation? I was a contractor's engineer before I joined the Government.

1088. How long ago was that? Twenty-six years. I was contractor's engineer on the Uralla to Glen Innes railway.

1089. Had you any experience with the Public Works Department, as a railway engineer, at a time in the history of the State when the work in connection with our railways was carried out by contract? Yes, I had charge of several large contracts carried out by contractors. In those days everything in the Railway Department was done by contract.

1090. Were the contractors of that time men of larger capacity than they are to-day? Yes, very much larger and very much better.

1091. Had they better plants? Better plants and more means.

1092. I presume that the ten years' operation of the day-labour system threw those large contractors out of work, and that would tend to make the contractors of to-day less capable of carrying out large works of this character? Yes. Most of the contractors of those days are dead. We now have an entirely new class.

1093. Have they plants similar to those which the old contractors had? No.

1094. Then that is one reason why the day-labour system under the Public Works Department with a good plant is better than the contract system with a poor plant? Yes, that is one reason.

1095. *Mr. Ball.*] To carry out work by day labour successfully you would require to have everything with which a contractor would be equipped, and you would require a free hand? I had no cause to complain of that during the time we were doing this day-labour work. I was first of all Engineer-in-Charge and then I was Inspecting Engineer for all lines, and I had a great deal to do with the men who were employed on day labour. The Minister may at times have asked us to put on certain men, and we may have put them on, but if, after giving them a fair trial, we found them unsuitable we put them off. So far as I know we had a free hand, and if we did not make a success of the system it was our own fault. I think we did make a success.

1096. Do you consider that the Railway Commissioners have a freer hand to-day than you had when you adopted the day-labour system? I am not in a position to say.

Joseph Edmund Carne, Assistant Government Geologist, Department of Mines, sworn, and examined:—

1097. *Chairman.*] We want you to give the Committee all the information you possess with regard to the Lithgow Valley coal seams—their character, dimensions, and probable life? I have just brought out a memoir on the western coal field which deals exhaustively with the subject, and which can be referred to by the Committee. I shall be glad to answer any direct questions.

1098. *Mr. Hurley.*] The Committee are anxious to ascertain the possible life of the workable coal seams at Lithgow;—we understand that there are some seams which are absolutely no good? That is so. I think that in the Lithgow series at Lithgow there are only two seams workable. The top seam, which is or which was worked at Katoomba, is not workable just at Lithgow. It is the Lithgow or the lowest seam which is worked. There is another seam about 60 feet above. I do not know whether the Committee wish me to confine my evidence to the immediate surroundings at Lithgow, or whether they desire me to pass some distance away, because at Piper's Flat or Wallerawang the seam is worked in the Irondale Colliery. The top seam is practically denuded at that point. So far as I have examined it the top seam is of no value at Lithgow, but it is of value about Katoomba and Main Camp; and as you pass over to the Grose, especially to the north and north-west, it shows a tendency to thicken. The Lithgow seam itself, at Lithgow, is about 10 feet thick, and it is worked in varying thickness in the lower part from 5 to 6 feet. In one colliery the full depth is worked. Going east from Lithgow that seam certainly pinches out in the Grose Valley—it is not a foot thick. Going north, at a considerable distance away, you get a section in the Wolgan, which shows the seam to be of no thickness and of no value. Going north-west, right away from Lithgow, to Wallerawang and as far as the Cumber Melon Mountain, the seam remains true and good. But of course the whole of the Capertee Valley has been denuded out of it, which very much reduces the area. Further than that, to the north, I am not prepared to say if the seam is workable, but in the Wolgan Valley, in the neighbourhood of the Commonwealth Oil property, the Lithgow seam is certainly of no commercial value. It is split up by earthy or shale bands.

1099. What is that splitting up caused by? By the influx of muddy matter during the deposition of the material which forms the coal.

1100. Can you point out to the Committee the limits of the coal formation? The lighter coloured area on the plan before the Committee represents the sandstone which overlies the coal, and it is the same class of stone as is to be found about Sydney. The slate-coloured area all round the edge of the sandstone represents the outcrop of the coal measures. The area tinted blue indicates the rocks immediately below the coal. Practically the edge of the lighter coloured area gives you the margin of the coal basin in the Western District from south of Blackheath right out to beyond Lue, on the Mudgee line. Extending in a north-westerly direction the Lithgow seam is very good. It remains thick and of good quality. Coming due east from the Lithgow Valley, where natural sections are available, as in the Grose Valley and Evans' Lookout, the Lithgow seam is shown to be practically of no value; in fact, the bore recently put down at Mount Victoria by Mr. John Hurley proved that there was practically no coal of any value below the top seam. Going due north to the Wolgan there is a long stretch in which the seam no doubt gradually thins out; but north from Lithgow there must be a very large area of good coal, though in the only places where natural sections are available, and it is possible to examine the strata (Wolgan and Capertee Rivers), the coal is certainly no good.

1101. I presume the value of the coal can be pretty well determined along the outcrop? Not along the outcrop. The coal at that point is mostly weathered to black dirt, except under exceptional circumstances where there is a strong roof, as under a waterfall. There the coal may be sufficiently preserved to indicate its character, but where the outcrop is without sufficient cover, the coal has mostly weathered to black dirt, and you may have to go in a considerable distance before you meet with sound coal.

1102. Your plan does not indicate the quantity or the quality of the coal available in the district? No, the plan only shows where coal exists or may exist. Whether it is workable in any particular part where it has not been proved or exposed is a matter I cannot say. But I should infer that a great deal of this area would be coal-bearing.

1103. So far as you have been able to ascertain, would you say that the Lithgow coal seam is in the form of a basin? Yes, on a large scale. We call all these coal measures basins, but in this case it is immense; it undoubtedly stretches as far as Newcastle, Wollongong, and Gunnedah, and we prefer to call it a large bed, though practically it is a basin. The Lithgow coal measures correlate with those at Wollongong, Newcastle, and Gunnedah. They are practically continuous.

1104. Have you been through the Lithgow mines? Yes.

1105. There are five collieries, are there not? Five working. There may be more. There are some smaller ones. There are Oakey Park, Zigzag, Vale of Clwydd, Lithgow Valley, Ironworks, Copper Colliery, and the Hermidale. Then there are two smaller collieries worked by Mr. Brown, of Coerwull.

1106. Do you know that the coal seam has pinched under the Zigzag? The coal seam has pinched going to the south-east towards the eastern side of the Vale of Clwydd. It does pinch in that direction just as to the east. It has pinched in the Grose Valley to less than a foot thick.

1107. Do you know the thickness of the seam under Dargan's Creek? We can only judge from the thickness at the nearest point where it is open, and that is at a point near Reedy Flat, between Mount Clarence and Dargan's Creek. At that point the seam is 5 or 6 feet thick, but it is split by a band. Coming to the south-west, on the track from Hartley Vale over the mountain to Lithgow, I measured a section of the Lithgow seam visible on the side of the road, and found it to be 5 or 6 feet thick.

1108. Have you heard that a bore has been put down at Dargan's Creek, and that the seam is only 4 inches thick? Yes. That bore was put down by the Government, and it found no seam practically.

1109. Do you know of any other bores in the district, put down to test the thickness of the seam, which would enable you to calculate the quantity of coal in a given area? No; I only know of the Clarence bore in that particular area.

1110. You are familiar with the mines? I have sampled them and examined them.

1111. You have seen what they have taken out? Approximately. I have not been through all the old workings.

1112. Do you care to express an opinion as to the probable life of the Lithgow mines, assuming that the output is maintained at what it has been for the last few years? I have not gone into the question as a matter of actual calculation.

1113. If the seam was of an unvarying thickness it would be a simple matter of calculation, but are you in a position to know where the coal has pinched and where there is no coal? From my knowledge of the district I should say that driving out from the collieries on the northern side side of the railway—that would be from Oakey Park or any of the collieries on that side to north and north-west—there is unquestionably a very large area of unworked, and, I should say, good coal land. Going the other way out to the south-west you are running to the edge of the coal basin, and the seam which is 10 feet thick at Lithgow, thins out to a foot near Old Bowenfels. It is naturally thinning out in that direction. Going east it pinches, but north-west, and no doubt considerably north from Lithgow, there is a large amount of good coal, though 20 miles due north in the Wolgan Valley it is of no value. That, however, must be a gradual change, and there must be miles of good coal-bearing country before that change for the worse takes place.

1114. Is the quality of the coal good? It is very good. It averages about 12 per cent. of ash. The best of it contains about 11 per cent.

1115. It contains no dangerous gases? No.

1116. *Chairman.*] What we as a Committee are interested in is the permanency of the field, especially in view of the large expenditure of money involved in the work now under consideration? I think there is no doubt whatever about the permanency of the field.

1117. A development of the coal trade would be one justification for this work, and we want to know whether the Lithgow coal measures are of a permanent character? At Lithgow, as I have already explained, it is the lower seam you are dependent on. The next seam above will probably be also workable in places, as it is now at Piper's Flat. The Irondale and Ivanhoe collieries have it nearly 6 feet thick.

1118. Accepting the probabilities of development of the iron trade at Lithgow, of the copper industry at Cobar, and the increasing demand for coal for Broken Hill, what life would you give to the Lithgow mines? I would not like to fix any time limit. But I will say that it is a permanent field. It would be very difficult to compute the duration of the field, but it is certainly very great, judging by the large area yet to be developed.

1119. Would it be possible from that source to meet all the demands that I have indicated for many years to come? I think so, undoubtedly. There is no question that the upper measures at Newcastle and Wollongong are identical with those of the western field. Going towards Newcastle the coal measures thicken and the seams split. Where we have seven or eight seams in the western field they have, with these splits, perhaps thirteen in the Newcastle district, but I do not think there is any doubt that they correlate. The top seam at Katoomba undoubtedly correlates with the Bulli seam on the South Coast, and, I believe, with the Wallarh seam of the northern field. I should not be surprised if the Lithgow seam was found to coincide with the Bore-hole. The point I wish to emphasise is that unquestionably some of these seams correlate with those of Newcastle where they are thick and good, and, whilst they may have thinned out at Lithgow, as you travel north-east towards the thicker measures it is possible that some of these seams which are unworkable at Lithgow would further on become workable.

1120. Is there any coal between Clarence Siding and Penrith? Undoubtedly. There is coal showing. It has been proved as far as Woodford by natural sections and a bore; but going in that direction, it is the top seam which is the best. The Lithgow seam, going east for a considerable distance, is no good. What it is beyond that we do not know. The top seam at Katoomba is the seam which is being worked in the Balmain Colliery, and, as I have already explained, the Katoomba seam undoubtedly correlates with the Bulli seam.

1121. *Mr. Hurley.*] Was the splitting of a seam caused by a volcanic disturbance? No. The splitting simply represents influxes of mud. Instead of a solid bed of coal, 10 feet thick, part of it is made up of muddy or shaly matter.

1122. Will you tell the Committee whether, in your opinion, the Lithgow coal will give the Broken Hill people the quality of coke they require? That is a difficult point, because of the comparatively high ash contents of the coal. If you have an average of 12 per cent. of ash, when you drive off the volatile matters, you have the same relative proportion left in the coke. The coke is the ash and the fixed carbon, and the quantity of ash in the coke is increased to 17 or 18 per cent. when the volatile is removed. At the Commonwealth Oil Company's works they are producing a coke which carries not more than 10 per cent. of ash. They are working a very thin seam which, I think, corresponds with the seam just above the Lithgow. They take out about 2 ft. 3 in. of the seam, which does not carry more than 5 or 6 per cent. of ash, and they can turn out a coke with not more than 10 per cent. of ash.

1123. Do they wash and crush it? No. The seam is about 2 ft. 6 in., and they are taking out 2 ft. or 2 ft. 3 in. for coking alone.

TUESDAY, 3 NOVEMBER, 1908.

Present:—

THE HON. FREDERICK FLOWERS (CHAIRMAN).

The Hon. WILLIAM FERGUS HURLEY.	ROBERT DAVIDSON, Esq.
The Hon. WILLIAM THOMAS DICK.	JOHN ROWLAND DACEY, Esq.
RICHARD THOMAS BALL, Esq.	WILLIAM FLEMING LATIMER, Esq.

The Committee further considered the expediency of constructing a Deviation of the Great Western Railway Line to avoid that portion of the Lithgow Zigzag between the Bottom Points and the Coal Stage at Eskbank, Section "B."

James Fraser, Engineer-in-Chief for Existing lines, Department of Railways, sworn, and further examined :—

1124. *Chairman.*] Since you were here last, Mr. Hutchinson, Chief Engineer, Railway and Tramway Construction Branch, has given some evidence by way of criticism of the estimate you supplied to this Committee;—have you had an opportunity to see Mr. Hutchinson's evidence? Yes. The secretary was good enough to let me have a copy on Saturday morning, when I was able to peruse it.

1125. In the course of his evidence, question 1041, Mr. Hutchinson says :

I agree with Mr. Fraser as to the desirableness of shortening the tunnels on two ends only ; I think it would be a wise thing to do, and I know by doing that it would be possible to save about £1,000. But in regard to the two other ends of tunnels, I would not, if I were carrying out the work, contemplate any shortening of them. I think it would be unwise to touch the existing cliff.

What have you to say to that? Of course, it is purely a matter of opinion. I would not suggest shortening the tunnels but for the fact that I am quite confident the work can be done without any trouble whatever, and that it will have the effect of saving a considerable amount of money. On the work we are carrying out at present we shall have, in fact we have got some tunnel faces cleared up to a height of 120 feet over the arch at the entrance, and that is a good deal higher than the cliff I propose to blow away on the No. 2 section.

1126. Mr. Hutchinson says he thinks it would be unwise—where would be the unwisdom? I do not know on what grounds he says it would be unwise. I know it will be absolutely safe, and I know it will be cheap.

1127. Does Mr. Hutchinson imply that there will be risk to the men working, or that there will be a possible risk when the tunnel is completed? There cannot possibly be any risk to the men working, nor can there possibly be any risk when the work is completed.

1128. Then how could it be unwise? I do not know. You will have to ask Mr. Hutchinson in what respect the proposal is unwise.

1129. Mr. Hutchinson goes on to say :—

Mr. Fraser estimates the excavation and widening of cuttings at 176,000 yards, as against my 191,750 yards, and I understand he proposes to use the material he obtains from lengthening the wing of the bottom Zigzag for filling in a bank.

What have you to say to that? That work has already been done ; as a matter of fact one bank has been made up, so that there is a good deal of saving as against, say, Mr. Hutchinson's original estimate. The work has been done, and it has cost nothing for this deviation.

1130. In answer to the following question, "The Committee understood Mr. Fraser's estimate was based on actual results obtained in the work now being carried out." Mr. Hutchinson replied :—

Quite so ; that is, the work so far as it has gone. I would point out that they have adopted the day-work system. There is always a lot of trimming up to be done, which possibly Mr. Fraser has not gone into, and for which he has made no allowance in his estimate of 2s. 3d.

? I certainly should be stupid if I did not make allowance for all work to be done. As a matter of fact, a great deal of the work done already on the deviation we have on hand is trimmed right up and finished ready for platelaying.

1131. Mr. Hutchinson apparently presupposes that you have not made an allowance in your estimate for trimming up as he calls it, in other words, that your 2s. 3d. is for removal of material only? I would not be quite so stupid as to come before this Committee with an estimate without having made allowance for everything to be done.

1132. Your estimate of 2s. 3d. includes everything? Absolutely everything ; it is a liberal price.

1133. The witness went on to say :—

In my judgment no contractor would undertake that work for less than 2s. 6d. He might want even more than that.

Do you think a contractor would undertake the work for less than 2s. 6d.? I am a little doubtful on that point. I might be inclined to put it at a shade lower than 2s. 6d., but it would be very little. The work is of a very heavy character, and a contractor might not care to take the risk at less than 2s. 6d.

1134. Mr. Hutchinson is right in saying that his estimate has been compiled with the idea that the work would be undertaken by a contractor? Yes.

1135. Suppose you were in the same position, and were asked to submit an estimate, having in view the possibility of the work being done by contract, would you accept Mr. Hutchinson's figures as being reasonable? Yes ; I think under those circumstances his estimate might be accepted as fairly reasonable.

1136. After all, the estimate is based on that understanding? I believe so.

1137. On the understanding that a contractor might be called in, and not, upon the actual working results obtained under the day-labour system by your Department? Quite so. He could not base his estimate on the results obtained from the day-labour system, because he would not have the facts.

1138. With respect to the work done by day-labour, Mr. Hutchinson was asked this question by a member of the Committee :—

Is there anything else brought into consideration besides the question of day-labour as against contract?

To which he answered :—

There is the question of running power. I do not know what charge, if any, they have made for the haulage of materials. I cannot say if they have charged themselves with everything a contractor would be charged ; I do not think they have. I think they convey material without charging freight.

In question 1047 there is a further allusion to the same system :—

The contractor, on the other hand, would be charged certain freights. That is the only explanation I can offer for the difference in certain of these items.

Mr. Hutchinson is there contrasting your estimate with his. We, as a Committee, would like to know what cost would have to be borne by a contractor, in connection with the work actually carried out by your Department on section "A" of the deviation, in order to ascertain how it would compare with the results? I should say that it would amount to very little. If you take the contract as a whole it is mainly earthwork and labour. Tunnelling and excavation form by far the larger part of the work, and a contractor's charges in connection with that particular class of work would be confined to the carriage of explosives. You do not need more than half-a-pound of explosive to the ton of rock, and the prime cost of that, bought in Sydney, would amount to 2½d. or 3d. You could hardly put the charges down in fractions of a penny. To put something on the earthwork prices, whether for tunnel excavation or excavation in cutting, to cover the cost of explosives would be extremely difficult. I should think it would run into tenths of a penny.

1139. Are there any other privileges such as are suggested in the answer to question 1046 :—

The Railway Department is in a position under a system of day-labour, to carry out the work much better than any other Department? I think so, because they have their running regulations, whereas a contractor would not be allowed to interfere or come in on the line at all.

? Mr. Hutchinson is quite right in what he says.

1140. What is the value of that advantage by way of set-off? It is worth something to us in the case of carriage of sleepers and ballast, those being the biggest items in connection with the contract. Apart from sleepers, ballast, and some bricks, the cost of carriage would be almost nil. We have this advantage then: if we require to carry ballast I hire an engine from the locomotive branch of my Department, and pay so much an hour for it. That cost would be less probably than a contractor's cost, because we would not allow a contractor's engine on our main line. I have the advantage of being able to hire an engine and run it on our lines at a little over cost price.

1141. Suppose you were a contractor, and you had to meet these necessary expenses, what would they amount to in round figures? I think it might mean roughly a difference of, perhaps, £1,000 on the job; I do not think more than that.

1142. The advantages which you as the constructing authority would possess, as compared with a contractor, in that particular matter, would have a monetary value of about £1,000? Yes; I daresay it would cost a contractor somewhere about £1,000 more than I should have to pay.

1143. Is all the clerical work, and everything else in conjunction and connection with day-labour, debited to the work now in progress on section "A"? Yes. A fairly considerable portion of the expenses of my office is debited.

1144. How do you manage that? The charges are apportioned in proportion to the cost. If I am carrying out half a million pound's worth of capital work, and half a million pounds of maintenace work, the cost of my office is pretty nearly halved between the two. The cost is debited in proportion to the amount of work being done.

1145. The greatest care is exercised to see that the work is kept separate, that everything is charged, and that proper accounts are kept? Every cent that should properly be charged is charged; there is no doubt about that.

1146. The ultimate result is one that could be relied upon? Absolutely.

1147. I notice in to-day's *Sydney Morning Herald* an account of what is termed "a big blast";—can you give the Committee an idea of what that means? It means a great deal. I think I mentioned in my previous evidence—I am not sure—that the Chief Commissioner had fired one blast which shifted 30,000 tons of rock. In other words, it blew out the whole cutting approaching one tunnel, and, in fact, shortened the tunnel by ½ a chain. The cost of that was about 4d. In the case which is described in to day's paper the shot was fired in a place where I decided to cut out a tunnel altogether, and make an open cutting.

1148. *Mr. Hurley.*] When you speak of the cost as 4d., do you mean per ton or per yard? Per ton, which would really mean about 6d. per cube yard. In the present case, to which the Chairman has referred, we shifted in a smaller place about 16,000 tons. That was a cliff, 120 feet high, and very narrow, through which a short tunnel was designed to go. I thought when I walked over it that we could blow the whole thing out very cheaply. We fired one shot the other day which, as I say, shifted 16,000 tons, at a cost of about four-fifths of a penny per ton of rock shifted. In those two shots we shifted altogether about 46,000 tons. The average cost would be somewhere about 3d. per ton, or a little less.

1149. *Chairman.*] Is that the work you estimate to cost 2s. 3d.? No; the work I estimate at 2s. 3d. is on the section now before the Committee. I am telling you the cost of certain work on the deviation we are at present carrying out; and that cost, of course, will help to bring down the average of the whole work to a very great extent.

1150. *Mr. Davidson.*] What was your estimate of the cost of those two portions where you fired the two shots? The estimate originally was made up by Mr. Deane. I think his estimate for cutting was 2s. 3d.

1151. What was the estimate of the cost of the tunnel which you saved by the second blast? I fancy Mr. Deane's estimate would be 10s. per cube yard, but he would not have had to shift the same quantity.

1152. *Chairman.*] That blast, you say, obviates the need of a tunnel? Yes; and it is an advantage to us to have it out.

1153. Instead of eleven tunnels you will only have ten? Yes; and we have shortened a number of others. I think I have taken altogether 13 chains off the length of tunnelling designed by Mr. Deane.

1154. Do you anticipate that section "B" will offer the same favourable opportunity for removing large quantities of material at a minimum cost? Yes; I think we shall be able to put in some shots which will enable us blow out considerable quantities of rock at a very small cost, and in that way save expense even on my estimate.

1155. Mr. Hutchinson, in traversing the evidence with respect to the cost of tunnelling, said he could not reduce certain items? If he was carrying out the work by contract, it is very probable that he could not possibly reduce those items; at the same time, I think I told the Committee on a previous occasion that tunnel excavations so far had cost us about 7s. 4d. The cost does vary, because we have not as yet a length sufficiently long to enable us to say that it is the absolute cost per cubic yard for a tunnel completed. I have one tunnel completed, and the cost works out at 7s. 4⅛d. per cubic yard.

1156. As against Mr. Hutchinsons estimate of 12s. 6d? Yes.

1157. Now with reference to the permanent-way estimate, have you anything to say with respect to the estimate you previously put before this Committee, in view of Mr. Hutchinson's evidence? Yes. You see he is providing for rails at a price which represents, practically, the highest price we have ever paid for rails in the State. During the last two years or so, owing to the unexampled prosperity in other parts of the Empire, rails advanced to a higher price than we have ever known at any time in the last fifteen or twenty years. Fifteen years ago it was possible to buy rails as low as £4 7s. 6d. and £5. They kept from £5 to £6 until comparatively recently, when the tide of prosperity throughout the world caused prices to advance to something abnormal. These conditions, of course, cannot last. As a matter of fact, since I prepared that estimate, within the last week or two we obtained quotations for rails—one for delivery f.o.b. on the other side of the water at £4 17s. 6d., the other, c.i.f. in the ship's slings Sydney Harbour at £5 17s. 6d. Adding the duty we have to pay, three-fourths of which is returned to the Government, would bring the price of rails landed out of bond at about £6 8s. Landed on our works, all costs paid, the price would represent about £6 15s. The Committee will see I base my estimate not on the recent abnormal prices we have been paying, but on what I reckon we can buy rails for. Some months ago we received advices that the price of rails was coming down, and we took the precaution to lay in a fairly large stock. So that the price I shall have to pay for rails coming in on that work will be about £6 15s. per ton landed on the job, or a little over £2 5s. per ton less than Mr. Hutchinson estimates. That difference represents about £300 on rails. There is a difference between us altogether of a little over £800, and if the Committee will allow me, I will point out how the balance is accounted for. Take sleepers. Mr. Hutchinson provides for 2,112 sleepers at 5s. each. I provide for 2,376, rather more per mile, but at 4s. each. I buy them at 3s. 5d. and I can put them in the truck for 3s. 6d.—than is 1d. per sleeper, adzed and bored ready to go into the road. For another 6d. I can run them to the work. That raises the price to me to 4s. My total price for sleepers is £475, as against Mr. Hutchinson's £528. There is a difference of £50 between us there. The great difference between us is in regard

to the item of ballast. No doubt Mr. Hutchinson is right in putting down the price at 5s. per cubic yard, because it would be absolutely impossible for any contractor to obtain a suitable hard ballast in that locality. We, on the other hand, are fortunately situated in that respect, in that we have a quarry at Tarana, where we can put crushed ballast into the trucks at about 1s. 3d. per cubic yard. Allowing for running I could land that on the job for about 2s. 6d. We use sandstone for the bottom ballast to a depth of 4 or 5 inches; then we put on a hard metal top ballast to a depth of 5 inches. The bottom ballast, or a great deal of it, we can get from the job itself. We have some thousands of yards of surplus sandstone which can be used for bottom ballast, and which only wants picking up.

1158. You have it right alongside where you are making the line? Yes; it is there now ready to be gathered up. It would not cost us more than 1s. 6d. a yard. I estimate that the bottom ballast we should require would cost us about £67 10s. per mile, whilst the top ballast would represent about £300 per mile. That is £367 as against Mr. Hutchinson's £770 per mile. That alone accounts for a difference of £400 per mile between us. As a matter of fact, for years past we have been obtaining ballast from Tarana and several other quarries of a similar character at 1s. 3d. or 1s. 4d. per cubic yard in the trucks.

1159. *Mr. Latimer.*] What kind of stone is that? Basalt—the best ballast you can get. I do not think that anywhere in the world ballast is produced cheaper than we are producing it, although we pay a fairly high price for our labour.

1160. *Chairman.*] I suppose that is accounted for by the facilities you enjoy? We certainly do enjoy natural advantages, but the cheapness is mainly due to the way in which the quarries are laid out. Everything is so designed that it shall gravitate. We spent a good deal of money in that direction both at Tarana and at Bombo.

1161. What have you to say with regard to the £5,000 for old material Mr. Hutchinson credits himself with? I am sorry that Mr. Hutchinson should have taken so much credit, and I am sorry he should have taken exception to our not allowing it, because if he had gone to look at the rails in the road I do not think he would be inclined to criticise our action. As a matter of fact, we have been nursing those rails for a long time, trying to make them last the job out. It is a double road, and one line is laid with double-headed steel rails, which I do not think Mr. Hutchinson would buy under any circumstances. We have some thousands of tons of them, and we find it very difficult to obtain a purchaser at any price. I cannot see how we could give him credit for £4 per ton to take those rails into our stock and bear the burden of them.

1162. Your opinion is that Mr. Hutchinson is not justified in crediting himself with £5,000? We could get some credit, but it is such a small amount that I thought it better to put it altogether on one side and not bother about it. We should get some credit, even at scrap value. We can dispose of some of the rails to Lithgow at from 24s. to 25s. per ton. They use the steel; they billet it and work it into bars.

1163. Is any re-rolling done for the Department now? Some of these sections are re-rolled into smaller sections for mining purposes.

1164. Have you made provisions for sanctuaries in the tunnels? Yes, ample provision. The cost of sanctuaries on the whole comes to about £400. There will only be about fifty of them, and they are worth about £8 a piece.

1165. Can you give any instances of a deviation carried out by day labour which has shown a saving on the original estimate? Yes; I think I can give you an almost exactly analogous case. There is the case of the deviation at Locksley. The survey of it was made by Mr. Deane, the estimate was made by Mr. Deane, and the work was carried out by my Department. To a great extent it was under my own personal control; I used to visit the work very frequently. The estimated cost of that job was £47,500. The actual cost of the work complete, all charges, was £34,528, a difference of very nearly 30 per cent.

1166. That work was before a previous Committee? Yes. It was inquired into in 1895, and the work was started early in 1896.

1167. Can you submit any other examples? That is the only work I can think of which was surveyed and estimated for by the Works Department.

1168. Was that work carried out under conditions similar to those which exist in the case of the section of the deviation now being constructed? Identically.

1169. And everything which should be charged was charged? Every shilling which could properly be charged was charged in that case.

1170. The machinery used in connection with that work;—was the whole of it charged? The Locksley deviation had to bear a pretty heavy debt for machinery, and it got little or no credit after the work was done.

1171. I presume you are using the same machinery in the present case? Some of it. A lot of it has worn out.

1172. I presume that whatever new machinery was necessary has been charged against section "A"? Yes. As a matter of fact, against the work I have in hand at the present time there will be debits almost immediately for machinery amounting, I suppose, to between £12,000 and £14,000.

1173. *Mr. Davidson.*] With regard to the two blasts you mentioned, was the work done so completely that the line is ready for laying the ballast? No.

1174. Does your cost of four-fifths of a penny and 4d. per ton include the clearing of the line after the blast? No, it does not. You can hardly expect a big blast to go off like that, and leave the floor perfectly true, as we shall have it before we put our ballast down.

1175. It will be necessary to provide something over and above the charges you have mentioned for work which remains to be done, before we can compare your price with Mr. Hutchinson's average of 10s. or 12s. 6d.? Yes; there will be something to add. The main advantage of these big blasts is that we get rid of a large quantity of stuff. It goes straight away into the valley. In the case of the last blast we fired, the stuff went all one way, and just the way we wanted it. The stuff has to be tipped into the bank to make it up, and this stuff simply went over right into position.

1176. In answer to the Chairman, you pointed out some of the advantages which would accrue to your Department as compared with the contractor in connection with the carriage of bricks, sleepers, and ballast;—would a contractor have to pay for the use of your line to carry his rolling-stock to the locality of the work? We would not allow him to run his rolling-stock on our main line.

1177. How, then, would a contractor get his trucks and locomotive on to such a job as the one you are now carrying out, for example? We should haul his rolling-stock dead, and we should haul his engine dead if he wanted to work one there.

1178. Would it cost him anything to do that? Yes, he would have to pay.

1179. Would it cost him anything to have his trucks hauled? Yes, he would have to pay the ordinary tonnage freight.

1180. Would he have to pay for his rails? No. They would be provided in either case, whether the work was carried out by contract or by day-labour. The Government would provide the rails.

1181. How long have you been connected with the constructional work of railways? I had twelve years experience in the construction branch before I went to the Railway Commissioners.

1182. You were in the Public Works Department? Yes; I was under Mr. Whitton for twelve years.

1183. Going back ten years from now, to a time when railway construction was very brisk in this State, can you say whether the contractors of that time were more numerous, and more capable of entering on big jobs than they are to-day? I think you would have to go further back than ten years to find such men.

1184. Go back to the time when the work of railway construction was most active under the contracting system? That was from about 1880 up to about 1888 or 1889. That was the end of the period.

1185. Were the contractors of those days, owing to the plant they possessed, better able to carry out a big job than the contractors of to-day? Yes; they were much better men in those days.

1186. Were they able to carry out a contract more cheaply because of their equipment? Yes, for that reason, and the fact that they were better administrators than the majority of the contractors of to-day.

1187. I presume that during the last eighteen years a great number of railway contractors in this State have gone out of business? There are very few railway contractors now in business in this State.

1188. They have been compelled to relinquish business owing to want of work? That is so.

1189. Would a contractor of to-day, in view of his insufficient plant and more limited experience, be capable of carrying out a job at the present time as well as your Department or the Department of Public Works? I do not think that any contractor could have the experience possessed by my Department of work no matter of what character. You see my Department carries out more work of this character than is carried out by any other Department in Australasia, and it has done so for many years past.

1190. What would be the value of the machinery you have installed on section "A" of this deviation of which an ordinary contractor would not be possessed? At the present moment we have not got all our plant, but we shall have it within the next two or three weeks. Our plant will be worth anything from £20,000 up to £25,000.

1191. Without that plant, would you be able to carry out section "B" of the deviation at the amount of your estimate? It would be a pretty tight job to do it without plant.

1192. Could you do it without that extra plant? I could not do it without plant; no one could do it.

1193. Could you do it without the extra plant which you have obtained, as the result of experience as to the class of machinery required for work of this character—say machinery for excavating tunnels for example? I could hardly carry out that work at my estimate without having a really good plant.

1194. Can you tell us where you get your sleepers at 3s. 5d.? We buy them pretty well all over the State. I refer to 8-foot sleepers—not 9-foot.

1195. 9-foot sleepers are those generally used, are they not? No, we use twice as many 8-foot as 9-foot sleepers.

1196. Why do you require 9-foot sleepers? That is rather a difficult question to answer. The 9-foot sleepers came here with the first English Engineer, who was brought out by the Commissioners. That was the size of the sleepers usually employed on the English railways, and he introduced them here, though we had never used them previously. We have continued to use them simply as a matter of habit. Not long ago I proposed to the present Chief Commissioner that we should abandon the use of the 9-foot sleepers. I pointed out that we could save a little over £100 per mile by using 8-foot instead of 9-foot sleepers, though we should require to use more of those of shorter length. Instead of 2,112 sleepers to the mile, I propose to use 2,376—a difference of 260 per mile. When we get them at 1s. each cheaper, you see I save 1s. on 2,112; that is over £100, and I pay 3s. 5d. for a matter of a couple of hundred. I save considerably on the whole deal.

1197. How is it you manage to save 1s. per sleeper on what is practically one-ninth less of sleeper? It is entirely a question of price. We have to pay 1s. extra for 9-foot sleepers, and we have paid that price for years.

1198. Apart from extra freight? That is the difference in the purchase price.

1199. Do you propose to use ironbark sleepers? Ironbark mainly.

1200. Have you given consideration to sleepers of any other class of timber? Yes, we have to use them. We cannot get all ironbark. We get as many as we possibly can. There are some places where we cannot get anything else but ironbark.

1201. What other timbers do you use for sleepers? Tallow-wood, white mahogany, grey gum—those are about what we are using.

1202. Would it not be possible to make a better track with 9-foot sleepers than with 8-foot? I do not think so. The bearing area—and that is the most important thing—is exactly the same with 8-foot sleepers (eighteen to the rail) as it is with sixteen 9-foots, and the frictional resistance (which is mostly due to the resistance on the bed) to lateral movement is proportionate to the area. Those are the two things you have to look to. The sleepers are there to carry the weight and transmit it to the ballast, and to prevent the vertical and lateral displacement of the track.

1203. Do you lay down your 8-foot sleepers in the proportion of eighteen to sixteen 9-foots? Yes.

1204. So that you have the same bearing area on the mile? Yes.

1205. *Mr. Dick.*] In the event of the Committee recommending and Parliament approving this work, will the Railway Commissioners take steps to decide who shall carry it out? I think it is very probable, if the Committee cannot see their way to make any recommendation on that point, that the Chief Commissioner will take immediate steps, as soon as the work is passed by Parliament, to get it put in hand.

1206. What took place after the construction of section "A" was approved of? Parliament approved of that work being carried out. Some time afterwards—a considerable time, as a matter of fact—the Treasurer of the day had a sum of £25,000 placed on the Estimates in order to get the work started. That amount of £25,000 was included in a larger amount allocated to the Commissioners of the day for carrying out additional work. The Commissioners were not made the constructing authority at the outset, although that sum was included in their vote. But some time afterwards steps were taken to get the Commissioners made the constructing authority, and, after some little delay, the matter was arranged.

1207. Is it not usual to definitely nominate the constructing authority in the Bill authorising the construction of the work? I believe that is so. I rather think it was done in the case of the Locksley deviation, to which I have referred—that is to say, the Railway Commissioners of the day were made the constructing authorities.

1208. Do you remember who was nominated constructing authority for section "A" of this deviation in the original Bill? I believe the Minister was the Secretary for Public Works, and that afterwards he transferred his powers to the Commissioners.

1209. Would you care to indicate in what way this matter, if it is to go to Parliament, should be referred to them from this Committee? If it were possible for this Committee to make the recommendation, I personally should be glad if they recommended it to be carried out by the Chief Commissioner, for more than one reason. Since I made my estimate I find that we shall have a greater surplus of material from the No. 1 deviation than I originally expected, and I think it is quite possible that we shall be able to save, by using that, about £1,000 even on my estimate—it may be £1,000 or £2,000, and that is a matter of some moment. Apart from that, we could not allow a contractor to encroach on our existing line anywhere in the way that I suggest that the lower part of this deviation should be carried out.

1210. Mr. Hutchinson admitted that his Department could not adopt your suggestion for that particular portion of the deviation? We could not control the contractor in the way we could control our own men, and it is necessary that work of that sort should be carried out by our own men. There is a saving to be effected in that part of several thousand pounds.

Witness—J. Fraser, 3 November, 1908.

1211. In the event of this work being carried out by the Public Works Department under a system of day-labour, would it lead to any duplication of officers? Yes; engineers, supervising men, riding gangers—in fact, a duplication of everything.

1212. Would that duplication result in any confusion? It would result in a good deal of unnecessary expense.

1213. If it were found desirable for the Public Works Department to carry out this work, could you not make arrangements to allow them to do what you propose to do at the point of intersection? No; we could not control them. If any of our men were doing anything wrong we could stop them in an instant, but we could not stop a body of men controlled by another Department.

1214. In view of the considerable saving which would be brought about by the adoption of your suggestion, do you think that element of want of control by your Department would be a deciding element as to which Department should carry out the work? Yes.

1215. Mr. Hutchinson informed us that there would be some danger in shortening the tunnels as you suggested;—would that danger arise from the fact that the blown-out material would render it more expensive to construct the portion of the line immediately in front of the tunnel? I do not think that could have been his idea. There is no question of danger. My object in suggesting the shortening was to save expense, not to create it. By adopting my suggestion, it would be possible to save a certain amount of tunnelling, and at the same time get the filling that is required for embankments.

1216. *Mr. Ball.*] Do you hold that an 8-foot sleeper is an advantage, even on a single track? I think the 8-foot sleeper has many advantages on any track, single or double.

1217. What is the reason of the great difference in cost between the two? I do not know. I suppose it is a cutter's reason. We have always had to pay a difference of 1s. in all our existing contracts.

1218. Does it not arise from the fact that a lot of timber has to be passed over when 9-foot sleepers are required? Yes. You can get more 8-foot sleepers out of a tree than you can get 9-foot.

1219. That may explain the difference in price? Probably it does to some extent.

1220. Seeing the difference in price, and that 8-foot sleepers are as useful as 9-foot sleepers, do you not think it advisable that representations should be made to the constructing authorities to use 8-foot sleepers in preference to 9-foot? The railway construction department has never used anything else but 8-foot sleepers.

1221. Were not 9-foot sleepers specified in this contract? I do not know what Mr. Hutchinson provided for, but I do know that, with the exception, perhaps, of the North Shore and, possibly, the Belmore lines, they have always used 8-foot and not 9-foot sleepers.

1222. You are not substituting 8-foot for 9-foot sleepers in your estimate? I do not know what Mr. Hutchinson has provided for, but I do know that he put down a certain price and a certain number of sleepers. If he contemplates 8-foot sleepers, then he has not provided enough. As a matter of fact, I do not know what sleepers he has provided for. I know what I have provided for.

1223. You have provided a greater number of sleepers per length of rail? Yes, eighteen as against his sixteen. I do not think we ought to have less than eighteen to the rail on the main line track.

1224. You have assumed that Mr. Hutchinson proposes to use 9-foot sleepers? I must assume that.

1225. *Mr. Davidson.*] Mr. Hutchinson's estimate would be correct if he has provided for 9-foot sleepers? Yes.

1226. With regard to the construction of new lines, do I understand you to say that Mr. Hutchinson only provides for 8-foot sleepers? All new lines in the country are built with 8-foot sleepers, and properly so.

1227. *Mr. Hurley.*] Do you care to express any opinion to the Committee upon the question of prohibiting the export of sleepers from this State? I should like to prohibit it absolutely. I told the Forestry Commission that some time ago, when giving evidence before them on the same point.

1228. *Mr. Latimer.*] Are 8-foot sleepers equally as good as 9-foot sleepers on curves? Yes, quite as good. You have to trust for the bed resistance—that is the resistance against movement—more than anything else to the frictional resistance of the sleeper on the ballast, and if you have the same area in eighteen beds of 8-foot as you have in sixteen beds of 9-foot, then the resistance is the same. The area to counteract the lateral movement is the same in one case as in the other; if anything, I think it is a little in favour of the 8-foot.

1229. *Mr. Davidson.*] Would not there be more resistance in the case of the 8-foot sleepers because of the ends of them? We do not count the ends for much.

1230. Are they always uncovered? No, they are partially covered; but there is so little resistance in the amount of ballast at the end that it is easy to push in that direction.

1231. From the evidence you gave before the Forestry Commission it would appear that you are altogether opposed to the export of sleepers from this country;—during the last seven or eight years has there not been a very large export of sleepers cut out of timbers which you, as a constructing authority, would reject? No. There has been an export of timbers some of which I should hesitate to use; but, unfortunately, there has been an export of a great number of sleepers that I would use.

1232. Would you use blackbutt in your railway-sleepers? I have used some sleepers of that class.

1233. Have you been forced to use them? Yes.

1234. Would you use them if you could get other timbers? No. They are free-grained, and do not hold the fastenings very well.

1235. Are they more liable than any other timbers to white ant? No, we have no trouble whatever with white ant in the sleepers.

1236. Not throughout the State? I have only known of about 3,000 or 4,000 sleepers in the whole State in the last twenty years being affected by white ant.

1237. Where was that? On the Bogan Gate line, where trains ran infrequently. So long as trains run with anything like frequency the vibration keeps the white ant out of the sleepers.

1238. Have you ever tried bloodwood? No, it is worse than blackbutt in respect to its softness. We buy all our sleepers green. Bloodwood, when cut out, is very soft, and the spike has no adhesion in it.

1239. Is that because of the blood-veins in it? Partly that, but the timber is a soft timber. The Queenslanders have used a good deal of it, but they probably get it fairly well seasoned before they put it in the road.

1240. Have you tried brush box? Yes; it is very poor timber. It decays rapidly. I should give it a life of about seven years.

1241. *Mr. Dick.*] Going back to the question of the constructing authority, I find that the Public Works Act gives the construction authority, "and all persons acting under that authority, power to do all acts necessary for constructing, reconstructing, making, maintaining, altering, repairing, adding to and extending," a particular work—they are clothed with full power to carry out this work in the way they deem most advisable;—has any conflict arisen between your Department, or any other constructing authority out of any interference with the running or working of your lines? No.

1242. I think I understood you to say you would not allow any outside authority to interfere with your lines? We certainly would not allow them to interfere with the safety of our lines. There are such works as sewer-works and other works of a like character, which affect our lines, and in such cases the operations are safeguarded by my Department.

1243. You have never had any serious conflict with any other Department? No. The Water and Sewerage Department, several gas companies, and other Departments work, adjacent to or underneath our railways, but our arrangement with them simply is that we provide all the means required for ensuring the safety of the line, and they pay all the expense.

1244. Even if the Public Works Department could carry out this work, there would still have to be considerable supervision by your Department which would involve expense? Yes.

1245. *Mr. Dacey.*] When was the Dargan's Creek line abandoned? About eleven years ago.

1246. Was not section "A" of the present deviation taken into consideration at that time? No. I think I mentioned previously in evidence that a deviation scheme somewhat similar in form to the "A" deviation was submitted by Mr. Deane. That proposal was before the Works Committee in 1894, but it was rejected. Then the other deviation was carried out. It was necessary to do something; we could hardly get the traffic through under conditions as they existed. The original proposal was for a 1 in 60 grade.

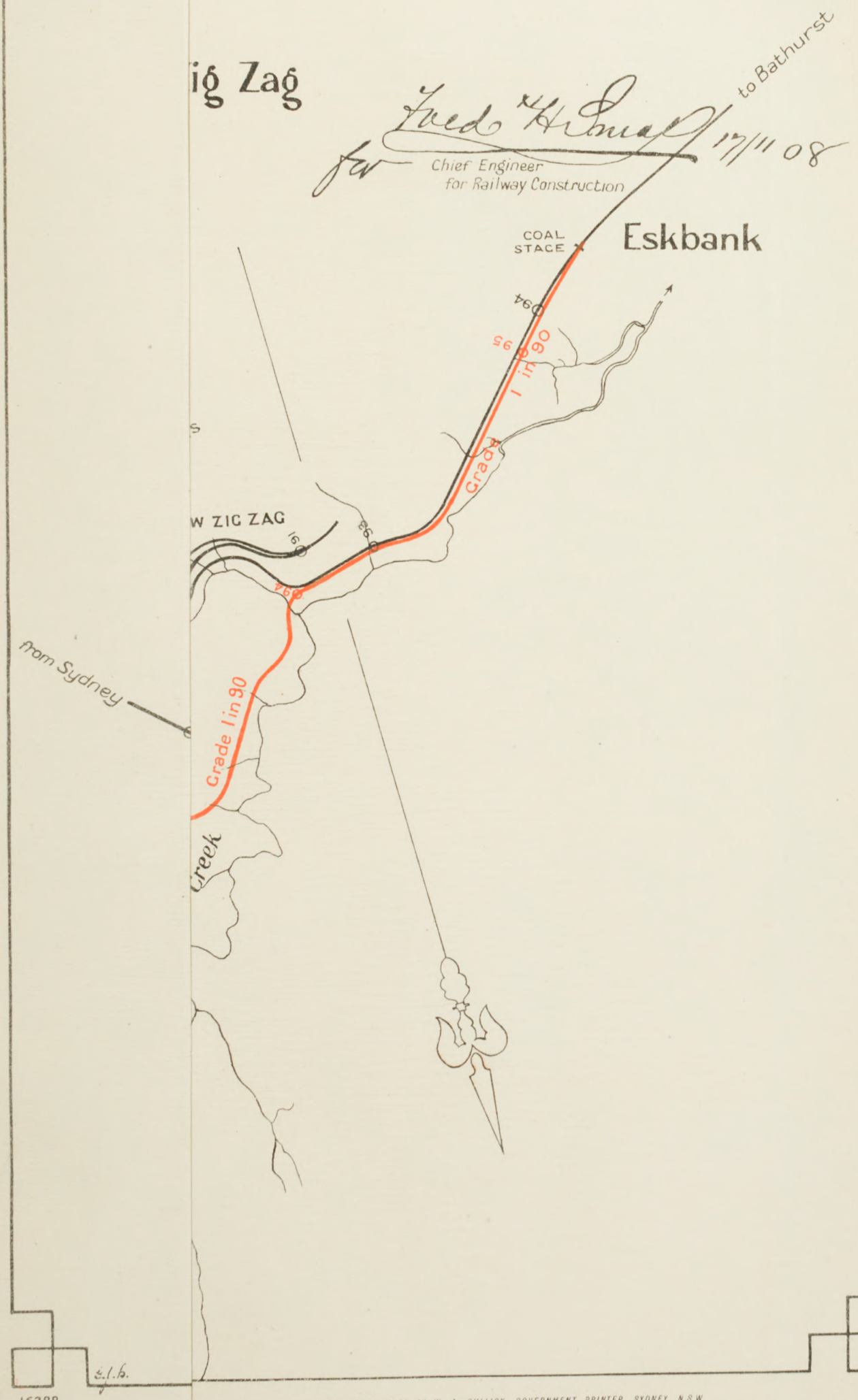
1247. What will be the grade at that particular point when section "A" of the deviation is constructed? 1 in 90.

1248. What will be the ruling grade over the mountains when this work is completed? 1 in 90.; that will be the ruling grade from, say, Bowenfells up to Lithgow. Then we shall have a rising grade of 1 in 90, which will take us right on to Bell, Hartley, and Mount Victoria. Between Mount Victoria and Blackheath we have 1 in 80, and then 1 in 100 is the heaviest grade to Katoomba. You might say that 1 in 90 will be the ruling grade from Marrangaroo to Katoomba, and then we have a falling grade to Sydney.

1249. The proposed deviation will materially affect the haulage on that line? Yes, we shall be able to haul about 120 per cent. more per engine than we can do to-day between Eskbank and Clarence.

[One Plan.]

Sydney: William Applegate Gullick, Government Printer.—1908.



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C.W.R.

Proposed deviation to avoid the Lithgow Zig Zag

SCALE

0 10 20 30 40 50 60 70 80 90 100 110 120 CHAINS

"B" SECTION

Fred H. Lamb for Chief Engineer for Railway Construction 17/11 08

to Bathurst

Eskbank

COAL STAGE

Grade 1 in 90

LITHGOW ZIG ZAG

BOTTOM POINTS

Under Construction

"A" SECTION

"B" SECTION

Tunnel 1021yds

T.293yds

Grade 1 in 90

Grade 1 in 90

from Sydney

C.W.R.

C.W.R.

Dargans Ck.

Creek

Farmers

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