(No. 61.)

1901.

PARLIAMENT OF TASMANIA.

TASMANIAN GOVERNMENT RAILWAY ROLLING-STOCK AND PERMANENT WAY INQUIRY:

REPORT OF SELECT COMMITTEE, WITH MINUTES OF PROCEEDINGS, EVIDENCE, AND APPENDICES.

Brought up by Mr. Guesdon, November 22, 1901, and ordered by the House of Assembly to be printed.

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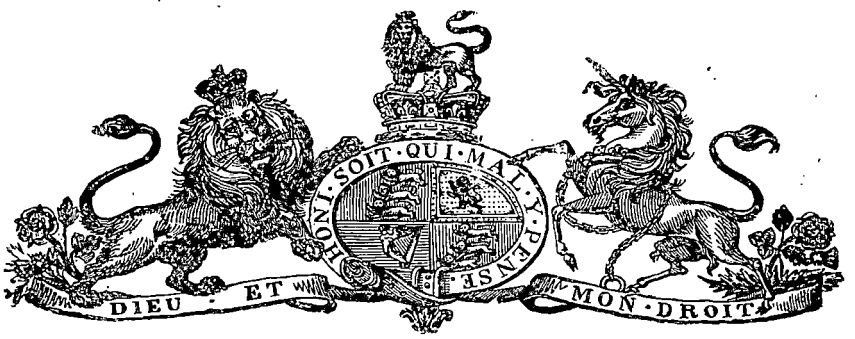

SELECT COMMITTEE appointed on the 25th October, 1901, *with power to send for Persons and Papers to inquire into the expenditure on Automatic Brakes, and to obtain evidence as to the condition of the Tasmanian Government Railway Rolling-stock and Permanent Way.*

MEMBERS OF THE COMMITTEE.

Mr. Minister of Lands and Works.
Mr. Patterson.
Mr. Dumaresq.
Mr. Nicholls.
Mr. Hartnoll.
Mr. Hope.
Mr. Guesdon. *(Mover.)*

DAYS OF MEETING.

Wednesday, October 30; Thursday, October 31; Friday, November 1; Thursday, November 7; Friday, November 8; Wednesday, November 13; Thursday, November 14; Wednesday, November 20; Thursday, November 21; Friday, November 22.

WITNESSES EXAMINED.

Mr. Charles Hudson, General Manager of Tasmanian Government Railways; Mr. John M. M'Cormick, Engineer-in-Chief Tasmanian Government Railways; Mr. W. R. Deeble, Locomotive Superintendent Tasmanian Government Railways; Mr. James Fincham, C.E.; Mr. C. C. Nairn, Engineer of Existing Lines Tasmanian Government Railways; Mr. Frank Grove, Chief Engineer in Tasmania for Great Western Railway Company; Mr. G. E. Moore, C.E.; Mr. William Cundy, Queenstown; Mr. W. E. Batchelor, Mechanical Engineer, Launceston; Mr. E. C. Driffield, Superintending Engineer, Mount Lyell Company.

REPORT.

The Select Committee appointed by your Honourable House to inquire into the question of the Brake Equipment of the Tasmanian Government Railway Rolling-stock, and the condition of the Permanent Way, has the honour to submit the following Report:—

The Committee has held several meetings, examined the principal officers of the Railway Department, and other expert witnesses, and has carefully deliberated on the evidence and all information obtainable.

The Committee finds that the weight of evidence determines that improvement in the stability of the permanent way by taking up the 46-lb. rails, and relaying with 60-lb. rails those portions of the Main Line upon which a high rate of speed is attained is a matter of necessity which is now engaging the attention of the Railway Department.

The discrepancy between the cost of the vacuum brake equipment of the Mount Lyell four-wheeled wagons and the estimates supplied to Parliament of the cost of equipment of Government Rolling-Stock of a similar character is thus explained:—

1st. The Government Estimate of the cost of equipping the Rolling-stock, framed on the advice of the Consulting Engineer, in London, was much higher than the actual cost as per tenders accepted by the Agent-General for the supply of such equipment, with all charges, including cost of erection added.

2nd. The Mt. Lyell Railway Company has utilised the existing hand-brake fittings on its wagons, and only imported the patented portions of the vacuum gear, and the Chief Mechanical Engineer of Tasmanian Government Railways has submitted to the Committee an amended Estimate showing that, by applying this method to the Government Stock, a saving or £7 15*s*. per truck can be effected.

The Government, after the item of £20,000 for vacuum brakes was postponed on the 12th September, 1901, directed the Railway Department to reconsider its proposals, and fresh estimates were prepared reducing the vote for the whole scheme.

The evidence of the Chief Mechanical Engineer is to the effect that the application of automatic brake gear to all the Government rolling-stock, except the four-wheeled goods wagons, and to only 50 per cent. of these, piping the remainder, would be sufficient for economic working of the train service, and to provide for the public safety.

A return based on this standard of brake equipment, and based on the actual cost to the Government as now revised (including all charges and cost of erection), reduces the estimate from the original £55,188 5*s*. to £33,642.

In view of the fact that the Tasmanian Railways do not pay interest on the capital expended for construction, the Committee thinks it doubtful if the proposed expenditure on vacuum brakes would be justifiable but for the fact that the State is already committed to a large expenditure under the vote passed in 1900, which renders a further expenditure necessary to properly utilise the equipment already ordered, by extending it to a safe proportion of the rolling-stock used in mixed trains.

1. The Committee recommends the equipment of a sufficient proportion of all vehicles running in mixed trains, except those in use on the Sorell Railway, with the automatic vacuum brake.

2. That the Minister of Railways be requested, before any order is sent to England, to communicate with the Government of South Australia, in order to ascertain if the automatic vacuum brake gear formerly used in its service is for sale, and at what price.

3. The Committee recommends to the consideration of your Honourable House a reduction of the item for automatic vacuum brakes from £20,000 to £15,000.

WILLIAM A. GUESDON, *Chairman.*

Committee Room, House of Assembly,
22*nd November*, 1901.

V

MINUTES OF PROCEEDINGS.

WEDNESDAY, OCTOBER 30, 1901.

The Committee met at 11 o'clock.

Members present.—Mr. Minister of Lands and Works, Mr. Patterson, Mr. Nicholls, Mr. Hartnoll, Mr. Hope, and Mr. Guesdon.

Mr. Guesdon took the Chair

The Clerk read the Order of the House appointing the Committee.

The Committee deliberated.

Motion made, and Question put—That Mr. W. E. Batchelor be summoned to give evidence before the Committee. (Mr. Nicholls.)

Committee divided.

Ayes.	No.
Mr. Hartnoll.	Mr. Minister of Lands and Works.
Mr. Hope.	
Mr. Nicholls.	
Mr. Patterson.	

So it was resolved in the Affirmative.

Mr. Charles Hudson, General Manager of Tasmanian Government Railways, was called, made the declaration prescribed by Act 35 Vict. No. 11, and was examined.

During the examination of Mr. Hudson, Mr. Minister of Lands and Works laid upon the Table the following papers :—

1. Extracts from Inspection Report, by Colonel Gracey, C.S.I., R.E., on the Uganda Railway, dated 25th March, 1901. (Appendix A.)
2. Extract from Report (dated 22nd May, 1901) by Sir Guilford Molesworth on Colonel Gracey's Inspection Report on the Uganda Railway (Appendix B.)
3. Tasmanian Government Railways : Prices of Metals.
4. Copies of Correspondence and Schedules of Tenders relating to Orders for Vacuum Brake Gear, Tasmanian Government Railways.
5. Copy of Cablegram from Hon. E. Mulcahy, Minister of Railways, to Hon. Minister of Railways, Queensland, with reply. (Appendix C.)

The examination of Mr. Hudson was concluded.

At 1 o'clock the Committee adjourned till half-past 2.

The Committee met again at half-past 2.

Members present.—Mr. Guesdon (Chairman), Mr. Minister of Lands and Works, Mr. Patterson, Mr. Nicholls, Mr. Hope, and Mr. Hartnoll.

Mr. John Macneill M'Cormick, Engineer-in-Chief, Tasmania, was called, made the declaration, and was examined.

Mr. M'Cormick withdrew.

Ordered, That the following witnesses be summoned to give evidence to-morrow :—

Mr. W. R. Deeble, Locomotive Superintendent, at 11 o'clock ; Mr. C. C. Nairn, Engineer of Existing Lines, at 12 o'clock ; and Mr. Frank Grove, Engineer, Great Western Railway, at 2·30 o'clock.

At 3·50 o'clock the Committee adjourned till 11 o'clock to-morrow.

THURSDAY, OCTOBER 31, 1901.

The Committee met at 11 o'clock.

Members present.—Mr. Guesdon (Chairman), Mr. Minister of Lands and Works, Mr. Hartnoll, Mr. Dumaresq, Mr. Hope, and Mr. Patterson.

The Minutes of the last Meeting were read and confirmed.

Mr. William Rufus Deeble, Chief Mechanical Engineer, Tasmanian Government Railways, was called, made the declaration, and was examined.

Mr. Deeble withdrew.

Mr. Charles Cameron Nairn, Engineer of Existing Lines, Tasmanian Government Railways, was called, made the declaration, and was examined.

Mr. Nairn withdrew.

At 12·50 o'clock the Committee adjourned till half-past 2.

The Committee met again at half-past 2.

Members present.—Mr. Guesdon (Chairman), Mr. Minister of Lands and Works, Mr. Patterson, Mr. Hartnoll Mr. Dumaresq, and Mr. Hope.

Mr. Frank Grove, Chief Engineer in Tasmania for Great Western Railway Company, was called, made the declaration prescribed, and was examined.

Mr. Nicholls took his seat.

Mr. Grove withdrew.

Ordered, That Mr. E. C. Driffield, Superintending Engineer Mount Lyell Railway, be requested to prepare information for the Committee on the following points :—

1. The number of goods wagons working on the 3-ft. 6-in. line, Mount Lyell Railway, both 4-wheeled standard wagons and bogie wagons.
2. The number of carriages andthe number of brake vans.
3. The cost of the automatic-brake gear used on that line, f.o.b., London, for every class of stock.
4. The cost of freight, agency, and charges in each instance.
5. The amount of duty paid to the Government of Tasmania in respect of each of the foregoing classes of vehicles.
6. The cost of labour of fixing the gear in the State, if fitted in the State ; and, if not, the cost in England, if fitted there.
7. Specify the various years in which the automatic-brake gear was purchased.

8. Examine carefully the construction of the vacuum-brake in use on the Mount Lyell lines, with the view of subsequently examining the brake-gear imported by the Government, and thereafter reporting to the Committee whatever difference may exist between the two gears in the design and the patents employed.

Ordered, That the following be summoned to give evidence to-morrow :—Mr. James Fincham, C.E., late Engineer-in-Chief, Tasmania, for 11 o'clock, and Mr. G. E. Moore, C.E., for 11·30 o'clock.

At 3·55 o'clock the Committee adjourned till 11 o'clock to-morrow.

FRIDAY, NOVEMBER 1, 1901.

The Committee met at 11 o'clock.

Members present.—Mr. Guesdon (Chairman), Mr. Dumaresq, Mr. Hope, Mr. Minister of Lands and Works, and Mr. Nicholls.

The Minutes of the last Meeting were read and confirmed.

Mr. W. R. Deeble was recalled and further examined.

Mr. Deeble withdrew.

The Chairman laid upon the Table a letter from Mr. W. R. Deeble, dated 31st October, 1901. (Appendix D.)

Mr. James Fincham, C.E., late Engineer-in-Chief, Tasmania, was called, made the declaration, and was examined.

Mr. Fincham withdrew.

Mr. George Edward Moore, C.E., was called, made the declaration prescribed, and was examined.

Mr. Moore withdrew.

Ordered, That the following witnesses be summoned to give evidence before the Committee:—Mr. William Cundy, Queenstown; Mr. W. E. Batchelor, Launceston; and Mr. E. C. Driffield, Superintending Engineer, Mount Lyell Railway.

At 1 o'clock the Committee adjourned *sine die*.

THURSDAY, NOVEMBER 7, 1901.

The Committee met at half-past 2 o'clock.

Members present.—Mr. Guesdon (Chairman), Mr. Dumaresq, Mr. Hartnoll, and Mr. Hope.

The Minutes of the last Meeting were read and confirmed.

The Minister of Lands and Works took his seat.

Mr. William Cundy, Mechanical Engineer, Mount Lyell Railway, Queenstown, was called, made the declaration, and was examined.

Mr. Cundy withdrew.

At 4 o'clock the Committee adjourned till 11 o'clock to-morrow.

FRIDAY, NOVEMBER, 8, 1901.

The Committee met at 11 o'clock.

Members present.—Mr. Guesdon (Chairman), Mr. Hope, Mr. Hartnoll, and Mr. Minister of Lands and Works.

The Minutes of the last meeting were read and confirmed.

Mr. William Eastgate Batchelor, Mechanical Engineer, was called, made the declaration prescribed, and was examined.

Mr. Batchelor withdrew.

The Chairman laid upon the Table the following Papers:—

1. Letter, dated 1st November, 1901, from the General Manager, Tasmanian Government Railways, forwarding extracts from Austrian Newspapers, relating to the trials of continuous quick-acting brakes in Austria.
2. Letter, dated 1st November, 1901, from Mr. W. R. Deeble, Chief Mechanical Engineer, Tasmanian Government Railways, on question of accidents to rolling-stock or passengers from breakage of carriage or wagon couplings.
3. Letter, dated 5th November, 1901, from Mr. W. R. Deeble, Chief Mechanical Engineer, Tasmanian Government Railways, forwarding estimates of cost of vacuum brake-gear, cost of equipping rolling-stock with same, &c.
4. Letter, dated 5th November, 1901, from Mr. W. R. Deeble, Chief Mechanical Engineer, Tasmanian Government Railways, forwarding information with reference to the parting of trains for past 25 years.

The following Papers were ordered to be printed:—

1. Letter to Chairman from W. R. Deeble, dated 31st October, 1901, *re* brake levers on both sides of wagons. (Appendix D.)
2. Estimated cost of equipping all passenger stock, engines, bogie-wagons, and 50 per cent. of 4-wheeled wagons and piping-balance. (Appendix E.)
3. List of couplings, &c., broken. (Appendix F.)

At 12·30 o'clock the Committee adjourned till 11 o'clock on Wednesday next.

WEDNESDAY, NOVEMBER 13, 1901.

The Committee met at 11 o'clock.

Members present.—Mr. Guesdon (Chairman), Mr. Hope, Mr. Hartnoll, Mr. Dumaresq, and Mr. Patterson.

The Minutes of the last Meeting were read and confirmed.

Mr. Minister of Lands and Works took his seat.

Mr. Edward Carus Driffield, Superintending Engineer, Mount Lyell Railway, was called, made the declaratio and was examined,

During his examination Mr. Driffield submitted to the Committee the following Papers:—

1. Cost of rolling-stock, April, 1896, to January, 1901; cost of fitting vacuum-brake to stock; lists of brake-work parts on standard four-wheeled trucks; cost of materials, &c., for Mount Lyell Mining and Railway Company, Limited.
2. Stock-sheets, 30th September, 1901, of Mount Lyell Mining and Railway Department.

Mr. Driffield withdrew.

Ordered, That Mr. M'Cormick be summoned to give further evidence for 11 o'clock to-morrow.

At 1·10 o'clock the Committee adjourned till 11 o'clock to-morrow.

THURSDAY, NOVEMBER 14, 1901.

The Committee met at 11 o'clock.

Members present.—Mr. Guesdon (Chairman), Mr. Hope, Mr. Patterson, Mr. Dumaresq, and Mr. Hartnoll.

The Minutes of the last Meeting were read and confirmed.

Mr. Minister of Lands and Works took his seat.

The Chairman laid upon the Table a letter, dated 9th November, 1901, from Mr. George E. Moore, C.E. (Appendix G.).

Mr. McCormick, Engineer-in-Chief, was recalled and further examined.

Mr. M'Cormick withdrew.

Mr. W. R. Deeble, Locomotive Superintendent Tasmanian Government Railways, was recalled and further examined.

Mr. Deeble withdrew.

The Chairman laid upon the Table a letter dated 13th November, 1901, from Mr. E. C. Driffield. (Appendix H.)

At 12·30 o'clock the Committee adjourned till 11 o'clock on Wednesday next.

WEDNESDAY, NOVEMBER 20, 1901.

The Committee met at 11 o'clock.

Members present.—Mr. Guesdon (Chairman), Mr. Patterson, Mr. Hope, Mr. Dumaresq, Mr. Hartnoll, and Mr. Nicholls.

The Minutes of the last Meeting were read and confirmed.

The Minister of Lands and Works took his seat.

The Committee deliberated on the question of preparing the Report.

The Chairman brought up a Draft Report, which was ordered to be printed.

At 12·20 o'clock the Committee adjourned till 11 o'clock to-morrow.

THURSDAY, NOVEMBER 21, 1901.

The Committee met at 11 o'clock.

Members present.—Mr. Guesdon (Chairman), Mr. Hope, Mr. Dumaresq, Mr. Nicholls, Mr. Hartnoll, and Mr. Patterson.

The Minutes of the last Meeting were read and confirmed.

At 11·15 the Committee adjourned till 12 o'clock.

The Committee met again at 12 o'clock.

Mr. Minister of Lands and Works took his seat.

The Committee considered the Draft Report.

Ordered, That Mr. W. R. Deeble to recalled, to give further evidence, for 10 o'clock to-morrow.

At 1·10 o'clock the Committee adjourned till 10 o'clock to-morrow.

FRIDAY, NOVEMBER 22, 1901.

The Committee met at 10 o'clock.

Members present—Mr. Guesdon (Chairman), Mr. Hope, Mr. Dumaresq, Mr. Hartnoll, Mr. Patterson, and Mr. Minister of Lands and Works.

The Minutes of the last Meeting were read and confirmed.

Mr. Nicholls took his seat.

Mr. W. R. Deeble was recalled, and questioned as to certain points in his evidence.

Mr. Deeble submitted to the Committee the following Paper:—

Estimated cost of equipping 4-wheel wagons with combined hand and automatic continuous brake, other than patent parts, utilising as far as possible material of old side-lever brake, and manufactured in the workshops of the Department. (Appexdix I.)

Mr. Deeble withdrew.

The Draft Report was further considered, and agreed to.

At 12 o'clock the Committee adjourned *sine die*.

EVIDENCE.

WEDNESDAY, OCTOBER 30, 1901.

CHARLES HUDSON, *called and examined.*

Mr. Hudson made the statutory declaration.

1. *By the Chairman (Mr. Guesdon).*—Your name, Mr. Hudson? Charles Hudson.

2. And you are the General Manager of the Tasmanian Government Railways? Yes.

3. *By Mr. Patterson.*—Do you know, Mr. Hudson, whether the automatic brake is in use on goods stock on the South Australian Railways? No; I am not aware.

4. Nor whether, at the present time, it is in use on mixed goods and passenger trains? No; I am not aware.

5. Do you know whether these automatic brakes are in use now in Western Australia on passenger or goods trains? No; but all I can tell you is, that I have received a telegram from Mr. Rotherham, in which he states that he has made a recommendation to apply the brake to the whole of the rolling-stock of Western Australia.

6. But it is not in use there to-day? Well, yes, it is, partially. But, as I say, there is a recommendation now to apply it to the whole of the rolling-stock.

7. Do you know whether the automatic brake is in use on Queensland goods trains? There, I believe, the position is exactly the same as it is in Western Australia. It is partially applied there; but with the intention of applying it altogether, or else partly piped and partly with the brake. It is in process of being applied in Queensland.

8. Supposing our railway system here was the property of a private company, and you were general manager of the company, would you ask your directors—in view of the fact that the running for the last year showed a loss of £110,000—to apply the brake—would you recommend the use of the automatic brake on the goods stock in this State? Well, that is a very difficult question to answer, because there are so many interests involved in it. If the railway company could not afford to put the brake on, naturally it would result in a consultation between the principal officers and the directors, and it would then be decided whether the risk of running without the brake should or should not be taken under such circumstances. I can only tell you that the New Zealand Government having decided to adopt the brake, the Wellington Manawatu Railway Company has also decided to adopt it on its private line.

9. Of course you know we differ from New Zealand? In what way?

10. Well, we have had a practical immunity from accidents for twenty-five years—you know that? Well, almost the same remark would apply to New Zealand.

11. What about the accident last year? Well, they had an accident last year, but it is the only accident, during my time, I remember, attended with any loss of life—not last year, the year before. With the exception of that one accident, so far as accidents to running trains on the Government railways are concerned, I do not remember any one ever being killed.

12. Well, let me take you now in detail. Take the Sorell Railway, for instance. That railway is 14¾ miles long, and the train takes an hour to accomplish that journey. The line is disassociated from any and all other lines; there are no junctions on it; and one engine—with one driver, one fireman, and one guard—does the whole of the work. Would you seriously recommend the Government to put the automatic brake to these mixed trains that are running on that Sorell Line? Yes, I would. There is a very heavy grade on that line.

13. I know all about that; I built this line. Then, if you come here entirely unfettered, and if you had been the General Manager of Railways from the outset, you would have made this recommendation yourself? I would; certainly, I would; most decidedly.

14. Have you had any experience of the vacuum brake? You mean as compared with the Westinghouse?

15. Not comparing it with anything—I am talking of it entirely on its own merits—have you had any experience of it? You mean the automatic vacuum?

16. The automatic vacuum—yes? No; I have had no actual experience of it; but, of course, I know a good deal about it.

17. It is very effective? Yes; very efficient. Perhaps, if I were to tell you what Sir Gilbert Molesworth says of it, it would not be out of place.

18. I know all about that; I want your personal opinion? Probably, for a slow speed, it is preferable to the Westinghouse.

19. The difference between the Westinghouse brake and the vacuum, is that the Westinghouse is more quickly applied, and has a power 33 per cent. greater? Yes, that is so.

20. And it is a more costly brake? Yes, that is so.

21. *By Mr. Hartnoll.*—Now, looking at our system of railways—taking the western portion of our railway service, say from Burnie to Launceston, where you have to throw off a truck

here and there as occasion arises, one at one station, two at another, three at another, and so on, pretty well all down the line—would it not be to some extent an interference with the time that the train would take to do the journey, uncoupling the trucks, and so on, if the brake were applied to all trains? I think it would be inappreciable.

22. Is there any knowledge in your office as to when these vacuum brake patents will expire? I could not say.

23. Is that knowledge obtainable here, do you know? I have no doubt it could be obtained from the agents of the brake, in Sydney; W. Adams & Co., of Clarence-street, Sydney, are, I think, the agents for the vacuum brake, and they would be able to give you that information.

24. Of course that knowledge we could really obtain from our own office—from the record of patents in the State? Yes.

25. Had you any previous knowledge of the cost of these brakes, Mr. Hudson? No. The only thing I can tell you is that we let a contract in New Zealand, just as I left—that is, some eight or nine months before I left—to apply the brake to all the stock in the North Island of New Zealand. Of course, all the details were attended to by the Chief Mechanical Engineer.

26. What was the cost? Two hundred and thirty-five thousand—speaking from memory.

27. But at what rate did that work out? I could not tell you; all those details, as I say, were attended to by the Chief Mechanical Engineer. I could get the information for you, quite easily. They did not advertise for tenders.

28. But it is no use getting what the Westinghouse brake costs, and applying that to the vacuum brake? No.

29. *By the Chairman.*—Mr. Hudson, what class of brake are your mixed trains equipped with now? Here?

30. Yes? They have got the hand brake, and, so far as the passenger carriages are concerned, they have got the chain brake—Clarke's chain brake, I presume.

31. And the engines? The steam brake. Of course, you are aware that a very large proportion of the carriages are already fitted with the vacuum brake, and sufficient engines to deal with them are also fitted with the vacuum.

32. But as a general rule—I am asking you what the equipment is generally for your mixed trains and goods trains? Hand brakes on the goods trains, and the chain brakes on the cars.

33. And the steam brake on the engines? The steam brake on the engines—yes.

34. Are these brakes efficient; that is, for the service you have, at the rate of speed at which you run your mixed and goods trains—are they sufficient for the public safety? Well, that is a very difficult question to answer. I could answer it in this way: that they are not as safe in any instance as if the train were fitted with the automatic continuous vacuum brake—certainly not. Because, you see, if you set up a certain state of conditions, they would not be efficient, the only question being whether these conditions happen. If your train parted on a bank, they would not be sufficient.

35. Of course, you are a recent arrival here, Mr. Hudson; but are you aware, from your own knowledge of the department, whether the conditions of the train service—that is, as to any increase of traffic, the rates of speed, or the loads drawn—have altered during the last ten years? Oh, I could not speak of that, of course; but I may tell you that I have seen, myself, on several occasions, a condition of affairs that is positively alarming, which would not have been alarming with the automatic brake. For instance, I saw, myself, a train carrying 700 people, drawn by two engines on a 1-in-40 grade: I saw that train part, and the carriages set back on the down-grade. If it had not been for the fact that there were a number of railway men about, who boarded the carriages and put on the hand brakes, there would have been a frightful disaster. That is where the value of the automatic brake comes in.

36. Then you do not consider the present conditions safe? Not according to modern ideas—certainly not.

37. Then, had you been in charge of the Tasmanian railways ten years ago, and the conditions were as they are to-day, would you have considered it your duty ten years ago to order the application of those automatic brakes? It is very difficult to say what one would have done ten years ago, because ten years ago one had not the same knowledge as to-day. Ten years ago the brakes were not so generally in use as they are now. A manager of railways must be guided by what is being done and accepted as necessary by railway men all over the world. Since ten years ago the progress of all rolling-stock, as to the application of continuous brakes, has taken a very great stride—an enormous stride. For instance, the Board of Trade regulations now include a provision to the effect that no train that carries passengers must run unless it is fitted with the continuous automatic brake. That is a Board of Trade regulation.

38. Has not the Westinghouse brake been largely in use in Tasmania during the whole of the last ten years? Well, it is only during the last two years that it has been completely applied on the New South Wales railways. Victoria has had it a long time.

39. *By Mr. Nicholls.*—Is the chain brake a continuous brake? The chain brake is a continuous brake as far as it goes; but it does not go right through from engine to van.

40. How far does it go? Through the coaches.

41. I understand from you that, at present, we have on all our engines the steam brake? Yes; practically all. I think there are five that are not so fitted. But, practically, all are.

42. Does the steam brake operate on the engine and tender both? No.

43. Only on the engine? Only on the engine.

44. The main object of a continuous brake, I suppose—(I am asking you for information; I have no skill in these matters)—is to save a train, if anything breaks away? It is for the purpose of applying the brake automatically in case the train parts; and to give both the driver and the guard power to apply the brake to the whole train, should it be necessary to do so—to every vehicle simultaneously.

45. Just the fact that it is automatic is the advantage, in the case of breaking away, is it not? Yes.

46. And the fact that it is continuous is the advantage in applying it to the whole train? Yes; quite so.

47. Well, I suppose you know all the Tasmanian lines now pretty well? Fairly well—yes.

48. Assuming that trucks laden with coal, or minerals, or anything of the sort, break away—say on the Sorell line, at the highest point—what would be the probable result? Well, it largely depends, of course, upon the weight of the train. With a light train, it is quite possible that the guard might be able to bring it up; with a very heavy train, the chances would be less. It entirely depends on the conditions: whether it is a heavy train or a light train.

49. In the absence of any sharp curve, is it likely that that train would go off the line? That depends on where it breaks off. I think it has largely to do with the length of the grade, and the speed that would be attained. Of course, it would go off any line—even a straight run, as far as that goes—if there were sufficient distance to acquire the speed.

50. Tell me. The object of the automatic brake is largely for the purpose of preventing accidents where trains are following one another rapidly on the same line, is it not? And also to prevent accidents when trains part.

51. Oh, yes; but I mean, an important part of the object in having an automatic brake is, if a train break away to enable it to bring up suddenly, on account of the danger to trains coming behind it? Of course, the principle object of the automatic brake is to enable the train to pull up as speedily as possible. When you speak of the danger to trains following, there is another safety appliance that does away with the danger; that is, the block telegraph, which provides an interval of space, instead of an interval of time. You provide against rear-collisions by block telegraph, and against break-aways by the automatic brake. With the automatic brake you can pull up as speedily as possible, no matter what happens. May be, you are running into a station, and need to stop, or, you may be running up to a danger-signal, and, if you have the automatic brake, you have your train under control. The state of the road, too, is another matter as to which the automatic brake may be of use.

52. The quantity of traffic, of course, largely affects the necessity for pulling up suddenly—What I mean is this: with a line where there is a train coming along every five minutes, the chances of danger are infinitely greater than where you only have a train every twenty-four hours? I would not like to say that—not so far as the percentage is concerned. Of course, with ten thousand trains you are likely to have more accidents than with one train.

53. I was not talking of the percentage of accidents.—Of course on a line where you have ten thousand trains running there is greater probability of accident than on a line where only one train runs? It entirely depends on the way the lines are worked.

54. Still, you know, a train cannot collide with itself? That is so; but modern appliances provide wonderful safety, even with crowded traffic.

55. I notice you say that the Board of Trade regulations provide that the automatic brake must be fitted to every train containing passengers? Yes.

56. It is not required, then, that the automatic brake should be fitted to purely goods trains? No; there is no regulation compelling it.

57. Now, can you tell us, please, what trains running in Tasmania are fitted with automatic brakes? The express trains between here and Launceston; and those excursion-trains we run out to New Norfolk are generally made up so as to provide an automatic brake on the coaches.

58. Now, I want you to give us an example, please, Mr. Hudson: take, for instance, a train starting from here for Sorell; can you show us in detail what the objects would be in having an automatic brake fitted on that train? Well, the advantage of having an automatic brake on that train would be in the event of the train parting while going up a grade, or in the event of the train meeting with any obstructions and leaving the road, coming down a grade; it would be an advantage to have an automatic brake in either case. The train would be brought up, and the result of the accident would be much less serious than it would be without the brakes.

59. And in the absence of these or similar occurrences, then, the automatic brake would not be necessary? I do not mean to say that the risks run on the Sorell line to-day for the want of an automatic brake are of a very serious and alarming character. I do not mean to say that the magnitude of any disaster occurring on the Sorell line for want of the brake would be the same as it would be likely to be on the Main line, for instance. But, at the same time, the automatic brake is a safeguard. It is undoubtedly necessary, in the interests of the public safety, wherever you are carrying passengers.

60. Now, Mr. Hudson, we have had three accidents of any importance in Tasmania; in one of them, a train was going at high speed on the Main line, round a curve at the other side of Brighton, and the brake seems to have been applied somewhat suddenly, and the train came off the line and smashed up—came off the line immediately—would the automatic brake have lessened the effect of that accident? You have not given me sufficient details to offer an opinion upon.

61. The train was going at a very high speed round a sharp curve, and the brake—the brake now in use—was applied suddenly, and the train suddenly left the line—went straight off; do you consider that the automatic brake would have prevented or lessened the effect of that accident? There are many things to be considered before that question could be answered. Would the driver have time to apply the brake?—did the couplings break?—I could not answer it on the information you give me.

62. *By Mr. Patterson.*—Perhaps I had better explain—the facts were these, Mr. Hudson: This train was a special passenger train, coming back from the opening of a railway—a very convivial occasion—and some of the members of Parliament or the guests had given the driver of the train too much to drink, and he was coming round a sharp curve at very great speed; then the fireman become agitated, and thought the speed of the train was too great, and he suddenly applied the engine brake and derailed the train—what do you think? Well, in such circumstances I should think no safety-appliances would assist you. If you make the driver of a train drunk, you might as well throw all your safety appliances overboard, and take the consequences. My opinion is that no man who is on an engine should be allowed to touch drink under any circumstances. I don't think that any safety appliances—signals, brakes, or anything else—would be of any good to you in such a case.

63. I think you missed the point. As a matter of fact, the other man—not the driver—did apply the brake, and the accident happened? Yes; but he applied it too quickly.

64. But not half so quickly as if it had been an automatic brake? Oh, excuse me! The automatic brake has a great advantage over the other. You see, it would be on every vehicle of the train; the other was only on the engine, and when it was put on suddenly it buckled the train.

65. We cannot say that it buckled; one part came off and ——? That would be due to the tram buckling, and the back part of it coming in on the engine.

66. Take another accident: you know the swing-bridge at Bridgewater? Yes.

67. It was apparently left unlocked one night, and the express came along and left the rails, the engine falling on the buttress of the causeway, and one or two lives were lost—would the automatic brake have made any difference there? Well, of course, you give me very little information on which to answer a question of that sort properly. One would require to know how the train left the road, what vehicles left the road, and what vehicles did not. But the probability is that, under such circumstances, the automatic brake would be an advantage; because it would bring the train up quicker, and put on a retarding force in the rear quicker than if you had not got it.

68. As a matter of fact, I find that that train had the automatic brake; what do you think now? Well, I should say it would probably be an advantage.

69. Well, take the third serious accident we have had in Tasmania; the permanent way was obstructed by some person or persons unknown, just as the train came on a trestle-bridge that used to be between Bridgewater and Brighton, with the result that the train left the rails when half-way across the bridge; there again the train went over, but was held up by the timber of the bridge.—Would the automatic brake have been an advantage there? I can only answer you in the same way as I did in the previous case, that it probably would have been an advantage; but I should not be able to say definitely without much fuller knowledge of the circumstances? It probably would have been an advantage.

70. How many times in your New Zealand experience have you known trains (I am not referring to trucks in the course of shunting) to absolutely break away? Oh, a great many times. I could not tell you how many, but a great number of times. I gave you one case just now.

71. *By Mr. Patterson.*—Oh, that case was in New Zealand? Yes; the very night that the Dunedin Exhibition closed there was a very heavy passenger train going from Dunedin south. There is a very heavy grade from the south of Dunedin up to Caversham. When they arrived at Caversham with this heavy train, the surge-back of the train caused by the engines stopping broke the couplings, and there was a very narrow escape of the train breaking away down the bank; the flat portion of the road on which the station is built being very short. There have been many cases of trains breaking away in New Zealand due to couplings parting. The longer you have your trains, and the heavier the weight, the more liable, of course, you are to have such accidents.

72. *By Mr. Nicholls.*—Are you acquainted with the Queensland lines? Well, no. I should not like to say I am. I have visited Queensland: I have been to Brisbane and to Morecombe Bay, but only for two or three days.

73. Do you think there is any necessity for putting this automatic brake on to trains in Tasmania that are not carrying passengers? Yes; for this reason: the goods-trucks for economical working must be interchangeable; you cannot confine your rolling-stock to one particular class of traffic. With traffic such as you have in Tasmania you must be able to load your trucks from the point of destination, where they went loaded. It would not do to be running too much empty mileage with your trucks. If you were to confine your trucks to a certain class of traffic, you would have, of course, to return them empty at times. It is necessary to fit the whole of the rolling-stock with the brakes, so that the stock shall be interchangeable.

74. Then, the proposal is to fit it to every wagon? Yes; that must be done.

75. *By the Minister of Lands and Works.*—Not the full appliance? Of course, the proposal is to put pipes when that is permissible.

76. *By Mr. Nicholls.*—Yes; the proportion is one in four, is it not? That is what it is in England, if the train stops once in ten miles. If the train runs a greater distance than that without stoppage, the proportion is less.

77. You say that most of your carriages are equipped with the vacuum brake? Yes.

78. When the carriages are running in mixed trains at present, how does the brake operate? Oh, it does not operate at all: it is no use.

79. By reason of the fact that the trucks are not connected? Just so. You have not got a continuous brake in such cases.

80. *By Mr. Hope.*—You are fairly well acquainted with the Western Line, between Dunorlan and Burnie? Well, I have been over it three times, Mr. Hope.

81. Well, along that line there are a number of crossings for bullock teams with heavy loads, and once or twice when the train has been coming along, a team has been at the crossing. In cases of that kind the automatic brake would be one of the best to deal with it? Anywhere where you have to pull up as quickly as possible, it would be a great advantage.

82. Then along there, between C———— and G————: the train I was on when I was along there recently had to pull up, and every now and then she kept jerking. If a train parted under such circumstances, with automatic brakes on it, it would be much safer than with the present brakes? Yes.

83. And the jerking would have a tendency to part the train? Yes; the surging back, as I described it in the case of the train between Dunedin and Caversham. The engine stops suddenly, and the train runs into the engine, then rebounds, and this is very hard on the couplings.

84. The automatic brake, when the train parts, has the power to stop it? Yes; directly there is a fracture in the communication, all the brakes are on.

85. Then, a good deal of discussion has taken place, and it has been said that our engines are perfectly safe with the steam brakes: is that so? Yes; except that you have only a hand-brake on the tender.

86. Then, if we did not apply the automatic brake to the rest of our rolling-stock, there is no use applying it to our engines? No; it would be quite unnecessary.

87. *By the Minister of Lands and Works.*—Have you received a report from your Locomotive Superintendent, Mr. Hudson? Yes.

88. Does that report contain copies of the opinions of Colonel Gracey and Sir Guilford Molesworth? No.

89. You have those opinions? Yes; that is, on the Uganda Railway.

90. Are these copies of those opinions [documents handed to witness]? Yes; this is an extract from a Parliamentary Report on the Uganda Railway presented to the House of Commons.

91. Who are these authorities? Colonel Gracey, R.E., was deputed to inspect the Uganda Railway, and Sir Guilford Molesworth is a well-known authority on Civil Engineering—His remark is this: "I quite agree with Colonel Gracey, that it would be advantageous to adopt an automatic brake on the Uganda Railway, but, in the event of its adoption, I would strongly recommend the use of the automatic vacuum brake. The Westinghouse brake may be suitable for the English high-speed railways on which great rapidity of action is all important, but I consider it is eminently unsuited, and very dangerous, for heavy and continuous gradients, such as exist on the Uganda Railway. The automatic vacuum brake is much more under control, and far safer under those conditions in which the Uganda Railway is exposed." And Colonel Gracey says, in speaking of the Uganda Railway, which has long continuous grades, "My opinion is that the working of the Uganda Railway without automatic brakes is extremely dangerous," and he adds, "and I doubt if it is even economical." He goes on to show why he considers it dangerous. That is dated this year, 1901.

92. You have read Mr. Deeble's report, before submitting it to the Minister? Yes.

93. May I ask, Mr. Hudson, if you agree with that report? Yes; with the exception that I think the number of wagons proposed to be piped is rather in excess of what I should consider desirable. I think that to pipe 55 per cent. or 60 per cent. is rather high.

94. Have you received this wire from Mr. Rotherham, Chief Mechanical Engineer of the Western Australian Government Railways: "Partially, stock is fitted with automatic continuous brake"? No; I think Mr. Deeble received that; my telegram was a shorter one than that, in which he said that he had recommended that the whole of the rolling-stock should be fitted.

95. What is the plan adopted by the department in ordering appliances of this kind from England? I believe the usual plan is to write to the Minister, asking him to request the Premier to communicate with the Agent-General, and to instruct him to order the material. The Agent-General employs—I think his name is Mr. Meilbek; and after consultation with him, and after calling for tenders, a tender is accepted in England by the Agent-General, on the recommendation of the consulting engineer—whichever tender is considered best in the interests of the State. That is the process.

96. Has that plan been followed in this case? In this case it certainly has. I have got a *précis*; that is, a copy of all the documents in connection with the material ordered. There is every letter there, and the tenders as they were received, and the communications from the Railway Department, from the Minister to the Premier, and from the Premier to the Agent-General. [Documents put in.]

97. Have tenders been invited for such automatic brake-gear as has, as yet, been ordered? That I could not answer you; we do not know.

98. But so far as we have been advised? Those papers I have given you contain the information. There are the orders that have been sent Home, and there are the replies that we have received. There is a part of the material that we are not advised has yet been purchased.

99. But as to that part of it that is purchased, what has been the practice? Tenders have been invited, and, on the recommendation of the consulting engineer, certain tenders have been accepted.

100. Have you any reason to believe that we are paying more than the market price? No. Of course, in connection with that, I might give you this [document produced and put in]. We have got out a few of the prices of metals, from 1895 till now; and you will observe that the prices have gone up enormously of late years. If you take copper, for instance, you will see the difference between the price in 1895 and the price now.

101. You have read the list of competing firms for such gear as you know has already been purchased? Yes.

102. Do they comprise leading firms? Yes; very well known firms: leading firms, as you say. There is the Oldbury Railway Carriage Company, for one; that is a very old company—a very old and well-established carriage-building firm.

103. Is there any ground whatever for believing that this State has, in any way, been committed to pay more for this gear than it ought to have paid? I have no evidence, either directly or indirectly, which would lead me to arrive at such a conclusion—none whatever.

104. You have the names of ten competing firms here? Yes.

105. Take the price of the Oldbury Railway Carriage Company: gear for timber-wagons, per cent., £51 net? Those are double-bogie wagons.

106. How does that correspond with the amount set down in our Estimates? These prices only apply to f.o.b., London. The estimate of the Chief Mechanical Engineer is £70. That is rather high, no doubt; but still, you have to allow a margin between £51 and £70, for freight, insurance, inspection, and other items. Probably, it will be found that the £70 is higher than will turn out in actual practice. I think, myself, the estimates are slightly high.

107. Have you any experience of couplings breaking in our own system here, Mr. Hudson, so far? No.

108. You have not yourself? No.

109. Do you contemplate, as one of the economies in the service, doing away with a number of gatekeepers and gates? Yes, I do; and they are doing the same thing in Victoria, too.

110. Will it be desirable, in doing that, that you shall have a better system of brakes, to give you control over your trains? Undoubtedly.

111. Will it be essential? Well, the word "essential" goes farther than I would like to say. But in the interests of the safety both of the public travelling in the trains and the public using the roads, it is necessary to have a continuous automatic brake, undoubtedly.

112. I suppose you have in the office the Board of Trade regulations? Yes.

113. I would be glad if you would look out the particular regulation bearing on this, and let the Committee have it? Yes, I will.

114. I will ask your attention, further, to the extract read in the House, from which it would appear that the Board of Trade does not require with regard to wagons anything beyond a double-lever brake; that is, a lever available to be worked from each side of the truck? Yes; that is for goods trains.

Mr. Hartnoll: Yes.

115. *By the Minister of Lands and Works.*—In case of a coupling breaking on an up train, say, just before entering the tunnel going up from Colebrook—an ordinary mixed train—whatever brake could be applied by the guard would be at the rear end of the train, would it not? Yes.

116. And the carriages are generally there? Yes.

117. In the case of a train breaking in that way, would that brake be as effective as if it were at the other end, or would it be rather dangerous? I should say, that going up an incline, the safest thing would be to have it in the rear.

118. But it would be in the front in such a case as I am suggesting—in the front of the broken train coming down? Yes. You are speaking of the engine, of course, being the principal brake?

119. I do not think that you quite follow me. I am supposing that a train about to enter the tunnel on the up-incline parted. When parted, the engine brake would no longer operate on the detached portion of the train? No.

120. And the brake, unless somebody could jump on a truck and apply it then, would only be such as the guard could apply? Precisely.

121. On what would then be the front end of the train running down? Yes.

122. Would a brake in that position be likely to be an element of danger? It depends on whether it would be able to control the train. If it were able to control the train, of course it would be all right. The application of the brake there at that end would be right enough, because all the couplings would be close together. The weight of the train would be on the buffers, of course. The danger of parting is when your couplings are stretched.

123. You spoke awhile ago about the trains buckling. Is that sort of thing likely to happen if a train broke away in the circumstances I speak of? No, I do not think so.

124. Are there any other advantages besides safety in connection with the use of the automatic brake? The rolling-stock does not get knocked about to the same extent.

125. Cannot you utilise, also, the momentum of a train going down one hill in order to assist you up the other side, with greater safety? Yes, you could; but I don't count very much on that. I should say that, on the whole, the economic side of the question, apart from considerations of

safety, is in connection with the shunting and knocking about of the tracks on gradients, and running into hollows, and so on.

126. Now, as to the application of the brake gear that you have ordered—I will quote from your own letter: "57 sets for locomotives, 42 for carriages and vans, 90 for trucks." It is the question of the usefulness or the uselessness of those we have ordered that I want to get at. These numbers I have quoted are from your own letter of 7th August, 1901. You say in that letter—"I think that to defer the work of applying the automatic vacuum brake would be a great mistake and it would render the expenditure already incurred, or about to be incurred, to a large extent inoperative"? Yes.

127. Will you give the Committee some fuller information upon that point? In the first place, we have already 19 engines fitted with the vacuum brake. I would not advise fitting 57 more engines if we are to go no further. Therefore, apart from this, 57 sets would be largely useless.

128. Why would the 57 sets be largely useless? Because the intention is to apply them in such a way that they can operate a brake throughout a train; and if you have already sufficient engines to supply all the trains you are likely to have fitted with the continuous brake, there is no necessity to go to the cost of applying the brake to the remainder of the locomotives.

129. But, simply for brake purposes, would there be any advantage gained by putting them on the engines in place of the steam brakes? Well, only for supplying the tenders; the present steam brake is sufficient for the engine alone. To put on the vacuum brake in addition to the steam brake for the sole purpose of providing brake-power on the engine would be extravagant and quite unnecessary.

130. It has been stated that the Westinghouse brake has been imported in Queensland, simply for the engines and tenders; do you know if that is so? I do not think that is the case. I should say that they are fitting up the engines with automatic brakes with the object of providing automatic brakes through the trains.

131. Have you any information from Queensland on that point, yourself? No, I have not; but I have information, in this letter, from our Chief Mechanical Engineer, who has the information, and supplied it to me.

132. That I intend asking him about; we will defer it till later.—Then, you think, Mr. Hudson, that as a means of simply giving additional brake-power to the engines, there is no good purpose to be served by replacing the old steam brakes by this new gear? Most decidedly, I think there is no good purpose to be served.

133. As an alternative—supposing the House decided to disapprove of the expenditure of further money in this direction, which would you recommend: the selling of the gear already ordered, or the placing of it on the various locomotives? You mean the locomotive gear?

134. Yes? I should certainly recommend selling it; that is, if we could get any reasonable price for it. The engines are going to cost £200 apiece to fit up with the brakes.

135. There are various kinds of vacuum gear, are there not? I do not understand your question.

136. There are various patents, are there not? I could not say.

137. The other question considered in the House was as to the sufficiency of the £20,000 now asked for to equip the stock, by using a percentage of pipes to the rolling-stock—to equip it that is, so that we could use it, so that we could proceed without further expense henceforward. Would 20,000 suffice for that? I think, roughly speaking, that, probably, it would. You might require £3000 or £4000 more; but I think that, with the vote last year, and the vote on the Estimates this year, you could do it with that addition. I do not think it would take more than £3000 or £4000, in addition to the sum now proposed, to equip all the stock by using pipes only to a proportion.

138. And you say there would possibly be a saving? The saving between these estimates and the actual cost at Home; taking that into consideration, I think £3000 or £4000 more than the amount now on the estimates would suffice for the equipment.

139. And, as responsible General Manager of railways of the State, what is your recommendation with regard to these brakes, at the present time? Oh, I should certainly recommend that the work be gone on with. Most decidedly.

140. *By Mr. Patterson.*—Mr. Hudson, I omitted to ask you a question as to the Victorian railways, when I was questioning you just now;—you know the Victorian railways pretty well, I suppose? I have been on them a number of times. I should not say that I know the Victorian railways very well. I have visited Victoria on two occasions.

141. Are you aware whether all the goods trucks on the Victorian railways are equipped with the automatic brake? I believe they are.

142. Well, as a matter of fact, I can tell you that they are not; but we can get that from someone else? I have an idea that Mr. Allison Smith told me in 1893, that they were to be.

143. I have a letter saying that twenty-five per cent. of the trucks are piped; what do you think? Oh, I did not understand your question before.

144. Well, I will repeat it.—My question is: Do you know whether all the goods-trucks on the Victorian railways are equipped with the automatic brake? Well, practically they are so fitted—with the exception, that is, that a portion of the trucks are piped.

145. That is not what is proposed here? Not the original proposal, no. I think I suggested to the Minister myself that the expenditure might be cut down by piping a portion of the trucks.

146. Now, on the mixed trains running in this State, is it not a fact that in every instance the goods trucks are placed in the front of the trains? Yes.

147. And is it not a fact that the whole of the coaches are now fitted with a continuous brake? Yes, Clark's.

148. A brake that has been acting twenty-five years on these very carriages? It may be so. I could not say how long the brakes have been on.

149. Anyhow, you propose to supersede that brake altogether? Yes.

150. Well now, in the event of a train parting, would not that continuous brake on these carriages, acting with the van, be sufficient to bring that train to a standstill, with the loads we have in this State? I could not say. I could not guarantee it; certainly not.

151. Do you know, as a matter of fact, whether we have had accidents through couplings breaking and trains parting in this State in the past? I could not say.

152. You put in a report just now from Sir Guilford Molesworth, where he states that, under the circumstances, on a railway in Uganda, in consequence of the quantity of couplings breaking and draw-bars parting, he would advise the use of the automatic brake? I think he mentions the steep gradients and long banks, also.

153. He states here that the draw-bars are continually breaking; that alone, of course, is sufficient to demand the use of the brakes? I read it that the reason advanced for the necessity of continuous brakes is on account of the long banks of 1-in-50 and 1-in-60. The fact of the couplings breaking is due, I should think, largely to these long banks.

154. We have long banks here, you know, of 1-in-45? Still, we know that couplings do break on long banks.

155. Well this applies to a railway in Uganda—and it does not apply at all, you see, to our conditions; we never hear of draw-bars breaking, therefore this does not apply to us; is not that so? Of course, I have not had sufficient experience of your railways to give you an account of couplings breaking here during the last ten years. But, later on, evidence will be given, and can be given.

156 Now, you have referred to an improvement you are going to make in doing away with gatekeepers on the line? I will not say it is an improvement; it is an economy.

157. And that is an additional reason for using an automatic brake? I don't think I said that, Mr. Patterson. I said it would be an advantage.

158. I suppose you know that in South Australia we have never had gate-keepers? Yes. We have not in New Zealand, either; except in a very few places, in connection with very important crossings. You have them, of course, in South Australia, where your lines cross crowded streets, and so on. We have no more than one crossing-keeper in fifty crossings in New Zealand.

159. We have not one in five hundred in South Australia, and even there we do not have an automatic brake? Still, I suppose you kill a good many people on the crossings in South Australia; we do in New Zealand.

160. We have killed a few. You say you do not think the vacuum brake is any great improvement on the steam brake on engines. No. Of course you have the advantage of a quick brake on the tender.

161. Is not that an enormous advantage? Only a matter of ten tons.

162. But surely it is a very great advantage? I would not call it an enormous advantage. It is certainly not worth spending £200 on a locomotive for.

163. But I think, if you refer to that schedule, you will find that you are not going to spend £200 on every locomotive—only on seven of them. Will you read out what the costs of them are? there are thirty-nine sets complete here at £200 each, four sets at £165, two sets, with cylinder only, at £45, and four other sets at £165. Speaking generally, it is about £200 apiece.

164. And what you have told us is really your well-considered opinion? Oh, certainly. I would not think of importing the brake for the sole purpose of putting it on the engine: certainly not; having already, of course, an efficient steam-brake on the engine.

165. *By the Chairman.*—Mr. Hudson, did I understand you to say that you had recommended to the Minister a material modification of the original scheme? No; what I said was this: I told the Minister that if there was a real desire and necessity to reduce the estimate to as low a point as possible, it would be possible to pipe a certain proportion of the trucks, instead of equipping them fully.

166. When did you make that suggestion to the Minister? Oh, I think, some time ago. Is it not six weeks ago, Mr. Mulcahy?

167. Was it before, or after, the question was raised in the House? Probably after.

168. *By the Minister of Lands and Works.*—As a matter of fact, you recommended me to put £40,000 down for brakes this year? Oh no, no! What happened was this, Mr. Mulcahy: £40,000 was put down for the Locomotive Department, in connection with building rolling-stock, and for the automatic brakes; not £40,000 for the automatic brakes,

169. I think you are wrong, Mr. Hudson? I am perfectly right, sir.

170. However, the amount was cut down to £20,000? That is so. I have the proposal here, and can show it to you.

171. *By the Chairman.*—In your capacity as General Manager of Railways, Mr. Hudson, have you acquainted yourself with the powers that you have to deal with—the system of brakes to be used on private companies' railways in this country? I cannot say that I have.

172. You do not know that you possess any power? No; I don't think so.

173. *By Mr. Hope.*—Mr. Hudson, I observe a report there that the number of contractors tendering was ten? Yes.

174. Have you any reason to believe that those gentlemen were in collusion with the patentee of the brake? No. I think that as to that it is only necessary to read out the names of the tenderers. There is the Oldbury Railway Carriage Company, the Bristol Railway Carriage Company, the Birmingham Wagon Company. These are all well-established companies; and I do not think for a moment that they would lend themselves to anything of the kind. These are people who have supplied rolling-stock to all the great English railway companies.

175. *By Mr. Patterson.*—I suppose, Mr. Hudson, you are going in for additional rolling-stock here, are you not? If we can get it.

176. And that would want fitting with the brake, too? Oh, yes. Of course, with regard to rolling-stock, I might say this, because it may be useful in the future: there is always a busy season on a railway, and always a slack season; and I would not advocate the providing of sufficient rolling-stock to meet the requirements of the busiest day in the year; that is where pressure is brought by the public always. That is one of the reasons why you always hear so many complaints in the produce season of the shortness of trucks. That will always go on, no matter how much rolling-stock we have.

The witness withdrew.

JOHN M. McCORMICK *called and examined.*

[Mr. McCormick made the statutory declaration.]

177. *By the Chairman.*—Your name is ——? John Macneill McCormick.

178. And you are the Engineer-in-Chief? For the Tasmanian Government Railways.

179. *By Mr. Patterson.*—You have a considerable and intimate knowledge of the railway system of this State, Mr. M'Cormick? Of what?

180. You have a good general knowledge of all the details connected with the working of the Tasmanian railways? I have a fair knowledge of my own branch.

181. Have you, in your experiences as Engineer of Existing Lines in the past, discovered or come to the conclusion that the present brakes in use on rolling-stock in this state are insufficient for the public safety? I suppose you mean the hand-brakes—what do you mean by the present brakes in use?—because we have the vacuum-brakes in use, and also the hand brakes.

182. I will put my question in another way. Have you found, in your experience, that the brakes at present in use on mixed trains have proved insufficient or ineffective to secure the safety of the travelling public? That is rather a difficult question, Mr. Patterson. They may not have proved inefficient to my knowledge, so far; but there is always the danger that there may be an accident.

183. But that is not my question; I will come to that presently. Has the result of your experience in the past been to demonstrate to you, as an engineer, that they are inefficient? If you mean to ask whether I have any knowledge of their failing to pull the train up, I cannot at present recollect any such case. But I won't say—you must not ask me to say—that the trains have always been under perfect control.

184. Have the brakes always, so far, proved efficient in securing the safety of the travelling public? I cannot say. Of my own knowledge, I know of a serious failure in that respect. I have known a chain-brake to get out of order, but that has been rectified at the next station. I cannot say that at present I recollect any failures of the brakes more than that.

185. Of course, all brakes get out of order; the Westinghouse gets out of order, and the vacuum too? Yes, quite so.

186. Now, in your opinion, viewing the facts and circumstances of the financial aspects of our railway working, do you think that we are justified in this expenditure—remembering, that is, that last year we had a deficiency of £110,000, which had to be paid by the general taxpayer, and remembering also that in Tasmania we have had a practical immunity from accidents for many years?—Do you, as an engineer, those things being so, think it is necessary to spend £60,000 or £80,000 in equipping all our stock with the automatic brakes? Well, I——

Mr. Minister of Lands and Works: I do not think you should put a question, Mr. Patterson, based on a sum that it was never proposed to spend. That "£80,000" is your own. The amount we propose is £55,000.

187. *By Mr. Patterson.*—That is a trivial detail; I want to get to the principle at issue—Mr. McCormick, do you think, under these circumstances, that we are justified in spending £60,000 on a brake that is not demanded by the public? That is a financial question; it is not for me.

188. Yes, I am asking you, as an engineer? It is not a fair question to ask me; that matter is for Parliament. You must take into consideration the fact that Parliament has already voted a portion of that sum. You are not looking at it now in the same way as if you were going to launch out in a fresh expenditure of £60,000. Parliament has already practically approved the expenditure by voting a certain portion of it, and that portion cannot be made applicable to the work without the further expenditure.

189. But quite apart from all that, I want your own opinion on the subject? I do not think it is a fair question, in the way you put it.

190. Would you rather not answer that question? No. I tell you plainly, it is not a fair question. If you ask me my opinion as a Manager, I have fully considered it; as an engineer, it does not come under me in any way. It is dealt with as a mechanical appliance in the Mechanical Engineer's Department, as is done in the other States. I have knowledge as an engineer of the questions that affect me—the questions of roads and so forth. The brake comes under another department; it is a question of working the trains and goods-stock.

191. *By Mr. Hartnoll.*—But if you have a knowledge of these matters, you can surely give us the benefit of your knowledge? I am giving you the information as well as I can; I am not going to be put in an unfair position. If you ask me whether—as Manager—I would have adopted the automatic brake, it would depend on what conditions were in my mind. Mr. Back, I believe, was the authority for adopting it, and probably I would have done the same if I had had the same conditions in my mind as he had.

192. *By Mr. Patterson.*—Were you consulted in the matter? No, not officially at all.

193. But I mean, were you consulted any how? I have had private conversations with Mr. Back. That matter is between myself and Mr. Back.

194. Would you rather not answer the question? I believe the General Manager is the custodian of the safety of the public in the matter, and I believe that Mr. Back had strong grounds for thinking it was not safe to continue running without the brake. He considered the want of the brake, with our grades, an existing danger.

195. *By Mr. Hartnoll.*—Surely the Engineer-in-Chief is also the custodian of the safety of the public travelling on the line, is he not? He is the custodian of their safety in a way—yes; but I have nothing to do with the brakes, unless I see something wrong in them. I deal particularly with the maintenance of the roads.

196. But the brake system all forms a part of what affects the safety of the public, does it not? Yes, it forms a part, certainly; but the working of the brakes does not come before me. It was dealt with—this question of the automatic brake—first of all, by Mr. Bachelor and Mr. Back.

197. *By Mr. Patterson.*—Now, Mr. McCormick, we will pass from that. Will you ———? Understand, that I consider the want of the automatic brake an existing danger. I think that is a sufficient answer to your question, for your purpose. It is an existing danger on goods trains and mixed trains. Of course, on the express it is removed; but on mixed trains it exists.

198. Is that the only existing danger on the Tasmanian Government Railways? No. Of course, there are always dangers; but that is a danger we can prevent.

199. Are there no other existing dangers we could prevent? There are dangers we could prevent—of course there are.

200. Is there no more pressing danger than that caused by the lack of these brakes? I don't think that at present there is.

201. Now, I will ask you a question that is certainly within your own province: I suppose you are aware that on certain portions of the Main line the express travels at thirty-five miles an hour, on a light 46-lb. rail—is that a source of danger? No; I do not think so. I would prefer a heavier rail—not merely on account of considerations of the weight, but largely on account of the cost of maintenance.

202. Do you know that on some of the engines on the express you have a load of ten tons on the axle? Yes.

203. And you think that is safe, on these light rails? Well, to cope with that, we place the sleepers closer together.

204. You see no necessity for relaying the light parts of this line with a heavier rail? I said before, that I should like a heavier rail.

205. But there is no necessity for it, you say? I did not say so; I say there is no danger.

206. Then why re-lay it at all? Well, we would save a large number of sleepers to start with, and fully one man to each length. As I say, the difficulty of the rails being light is now met by placing the sleepers closer. The rails have a good running top, and our breakages of rails—which is the test of strength—are not in excess of those of the other States, but rather less.

207. You have a large acquaintance with the South Australian railways? I was there, yes.

208. Do you know if they have an automatic brake there on mixed trains and goods trains? Not to my knowledge.

209. I suppose you know the present Commissioner of Railways in South Australia, the late General Manager, Mr. Pendleton? I knew Mr. Pendleton, yes.

210. Do you think he is a highly qualified man? Certainly.

211. And yet he does not consider the automatic brake necessary on mixed trains and goods trains? That may be his opinion, there.

212. You were Resident Engineer in South Australia? Yes.

213. You made the survey of several lines there? Yes.

214. Notably, the Port Augusta and Northern Railway, which has 5-chain reverse curves and steep gradients? That is so—yes.

215. And the Port Pirie and the Jamestown line, also with 5-chain reverse curves and steep gradients? Yes.

216. And you also know Mr. Roberts, the Chief Mechanical Engineer of South Australia? Yes.

217. Now, if I told you that I have had a wire from Mr. Roberts, in which he tells me that not only on the 3 ft. 6 in. lines is there no automatic brake on goods stock, but that also on the 5 ft. 3 in. lines there are also no such brakes on goods wagons, except on live stock carriages—would that surprise you? No, it would not surprise me; because these brakes are only being introduced everywhere gradually. But we cannot escape the fact that there are many conditions which cannot be overlooked, and which render it unsafe to run without the automatic brake: notably breaking of couplings.

218. I am coming to that now; in your personal experience in Tasmania, have you known many instances of the breaking of couplings? Well, I was only a short time Acting Manager here, and during that time an instance of the breaking of a coupling came before me. But talking unofficially, I am under the impression that there were some breakages of couplings while Mr. Back had charge. Anyhow, as I say, there was a breakage while I was acting as General Manager. If that had happened on a mixed train, or on a heavy goods train running up a heavy grade, the probability is that the side-chains would have parted, and we would have had the train running goodness knows where.

219. Now, taking mixed trains: is it not a fact that the goods wagons are placed immediately behind the engines, and the passenger carriages in the rear? Yes.

220. And is it not a fact that all these carriages have a continuous brake connecting with the guard's van? I cannot say that. Mr. Hudson would give you that evidence. I cannot say positively that it is so in all cases.

221. Now, may I ask you what you think in view of these facts; in view of the slow speed at which mixed trains travel; in view of the fact that we already have a continuous brake—the chain brake; in view of the fact that we have worked with this brake for twenty-five years without serious accident caused by the breaking of couplings or draw-bars—do you still think it is necessary to remove and abandon that chain brake, throwing it on to the scrap heap, for the sake of adopting this costly and complicated automatic appliance? I should still consider it dangerous to do without the automatic brake, for various reasons. For instance, if a goods train parted coming down a grade, behind the carriages, and the engine got away (I am quoting now from actual facts)—in such a case the probability is that the train behind would run into and telescope passenger-carriages. The engine always jumps away. There are instances when an engine has jumped away, and the other carriages coming behind have telescoped. The engine-driver has slacked his engine, and the train behind—which would have stopped within its own length if it had been fitted with the automatic brake— has rushed down and telescoped.

222. We have been working the present system for goods trains and mixed trains for twenty-five years? Yes.

223. In the whole of that twenty-five years, has any accident of that character occurred in Tasmania? No, I do not know that one has occurred. I am pointing out that the possibility has always existed.

224. Then, you think that, in spite of our experience of twenty-five years in the working of the present system, as applied to goods and passenger trains, you argue that that experience should be no guide to us, and we should embark on this large expenditure for vacuum brakes as a further safeguard to the public? Taking the responsible officer's position into consideration, and assuming that I was in the same position, I think so.

225. But will you give me your answer from your own point of view as an engineer? If I were in the General Manager's position, I should require you to get me that brake, or I should require Parliament to take the responsibility. If you don't give me the money to do what is needed, you must relieve me of the responsibility: that is what I should say.

226. Then, if the late General Manager had consulted you on this question, you would have heartily agreed with the proposal to spend this money in this way? I have told you that I do not know what was in his mind, but, I believe that if I had been consulted, I should have endorsed the necessity for the brakes. Of course, if the funds were not forthcoming to put the brakes on——

227. *By the Minister of Lands and Works.*—That, of course, you would have to leave to Parliament? Yes; I think it would be my duty, as the custodian of public safety, to provide anything that would protect the public.

228. *By Mr. Patterson.*—Now I have another question to ask you, Mr. M'Cormick. You remember that accident at Bridgewater, where a train was derailed through the swing-bridge being left ajar? I do not know what the cause was.

229. It happened in the dock? Yes.

230. And the swing-bridge was not properly shut? That, is a supposition. It was never decided what the cause of the accident was.

231. But that express train was fitted with the automatic brake? Yes.

232. And the brake did not save the train in the case of that accident? No; because they could not see. Had there been an electric head light there, they might have seen it in time; but I doubt it.

233. But, in any case, you would have endorsed the General Manager's recommendation in this matter? I think so. I have not considered the matter, as it had not come before me officially.

234. *By the Chairman.*—Of course, Mr. M'Cormick, this chain-brake has been in use, as you say, for very many years on your mixed and goods trains? Yes.

235. Of your own knowledge, can you say when the matter was first discussed in the department as to the necessity of getting a more effective brake? You mean before it was supplied to the express?

236. No; it was supplied to the express in 1892, I think? About 1892.

237. Can you tell us what was the first time when the system of brakes now in use on the mixed trains and the goods trains began to be regarded as insecure and insufficient? No, I could not tell you that; of course, I imagine that it is a question that has been constantly before engineers in all the colonies for years, and so was gradually drawn attention to.

238. Did it ever come before you in any form until last year, when it was recommended by the General Manager to the Minister? No; it did not come before me officially then. I think Mr. Back had had it in his mind sometime before then, had the finances warranted it. I know, at any rate, that he had always been anxious about the risk of accident on the railways. I must say that he was a man always most anxious to guard the public in any way in his power.

239. I suppose the conditions of the railway service have not altered during the last nine years—I mean, you have not increased the speed of your trains; you have not increased the weight of the loads you carry on your goods trains; and you have not increased the train service materially in any way? We have heavier rails in places. I may say that one of the objects in getting rid of the light rails on the Main Line was to get rid of the old 40-pound iron rail. There have been no material alterations in the service that I know of.

240. So that the same necessity for the equipment of this stock with the vacuum brake existed in 1892 as exists to-day? Quite so.

241. *By Mr. Nicholls.*—You say, Mr. M'Cormick, that you would leave the question of responsibility to be settled by Parliament? Yes.

242. The question, that is, of supplying the money? Yes.

243. And, of course, the question of increasing the expense is, necessarily, dependent upon the necessity for adopting this particular brake, is it not? Yes.

244. And do you expect Parliament to settle the question as to the necessity of having the brake or not? No; the General Manager brought that before you himself; but what I do think is, that if you are not prepared to spend the money, the General Manager should be relieved of responsibility.

245. But if the necessity for the new brake was trifling, you could not expect Parliament to incur a large expense to provide it? I do not think the necessity is trifling.

246. I want to know what degree of necessity there is. Can you tell me? Well, I have pointed out to Mr. Patterson that there is a danger with the present goods and mixed trains, both going up and coming down grades. And there are accidents that have occurred and are occurring now on other lines, from the same cause.

247. But we want you to give us some idea as to the probability of such an accident here? Well, the best way for you will be to get a return of what breakages we have had here.

248. You have not that information yourself? No, I have not; but during the short time that I was Acting General Manager, a coupling broke, as I said just now. That is a thing we cannot guard against, because, owing to the straining and jerking that takes place, there is always a danger. The special danger is that a coupling might break on a steep grade. Then there is another point, too. There is another advantage in the automatic brake; and that is, that if there was any obstruction to face when the train parted, the automatic brake would largely minimise the effects of the accident.

249. I want you to understand the difficulty I find myself in—and I suppose it is a difficulty other Members find themselves in, not merely about brakes. We find that for twenty-five years we have worked with these present brakes, and there have only been three serious accidents in that time; apparently, none of which would have happened any differently if we had had automatic brakes—in fact, in two cases there were automatic brakes. What is the necessity, these things being so, for a large expenditure to alter the brake system? Well, it only happens that we have been extremely fortunate. We have to take into consideration what is going on in other States, where other railway accidents are happening on lines very similar to our own. On some new lines—notably the Uganda Line—accidents have been frequent; break-aways, through the couplings breaking, and trains getting away.

250. You see, we want some justification for the vote we give on this matter. To say there is a danger does not help us much. There is always a danger that somebody may lay a stray rail across the track? But I am trying to specify important matters in which there is danger. I have pointed out actual accidents that have taken place. There are accidents on up-grades and down-grades. In one instance the automatic brake will prevent a serious accident by bringing the train to a standstill; in the other, it will prevent the carriages telescoping when coming down hill. A brake

of this kind—not this brake, but the Westinghouse—has been adopted almost universally in America. This vacuum automatic brake has been adopted largely on English railways.

251. You are not able, then, to give us some idea of the degree of danger that exists on account of our not having this brake on all the trains? I daresay I could make out a list that would help you; but I have told you the dangers that may occur. Couplings may break. In case of obstruction, a disastrous accident may be saved by pulling the train up rapidly.

252. Of course, we know that, at any time, travelling on a railway is generally more dangerous than walking across a paddock? Yes; but where you can avoid accident, don't you think you should adopt the latest and most improved means of doing it.

253. Well, of course, Parliament can only be guided by the evidence of experts; and that is why I am trying to get evidence from you as to the degree of danger we incur by not having the automatic brake. To say that there is some danger does not get us any further forward. There is some danger in going out to row on the river in a dingey on a calm day? That is so. Well, I have given you an account of some of the dangers you run by not having these brakes. You have not relied on your experts, allow me to say, with all due respect to this Committee. Your experts advised you in the matter, and you disregarded their advice.

254. Well, I want information before I go to a vote on this matter, and I shall get it. You cannot help me further? I have given you the examples that have occurred, and are occurring. If the probability of accidents is according to the law of chances, we ought to have an accident pretty soon now, as we have escaped so far. I may say that every year, I have seen—some times twice a year— an account of the accidents, as between the two automatic brakes—the Westinghouse and the vacuum. Perhaps such a record might help you.

255. We are satisfied as to that. What we did want to know is, what is the likelihood of there being an accident owing to our lack of these brakes: You have shown us that very grave accidents might happen—Well, a very grave accident might also happen from an engine blowing up, and going over a bridge—We want to know what are the chances? We take all the precautions we can to guard against an engine blowing up, going over a bridge, or anywhere else. We desire to guard against all risks. That is why we want to get these brakes on. If you have not the money to do it, that is another question.

256. Well, the State has some money, of course. The question is, whether the danger existing in this case justifies the expense proposed? I do not think that is it altogether. You have already involved us in an expenditure, which we want to see utilised. The question is whether you will throw aside that money previously voted, whether you will use it, or, practically, waste it.

257. *By Mr. Hope.*—I understood you to say that you were in favour of the automatic brake because it would reduce the danger? Because it would reduce the danger—yes.

258. *By the Minister of Lands and Works.*—You have already told us of your acquaintance with the South Australian railways, Mr. M'Cormick. Would you regard the South Australian general system as being on the same plane as the Tasmanian general system of railways, apart from individual lines? That is very hard to say. A good many lines there are on very easy-running country; ours are frequently on difficult country. Though I am aware that they run without the automatic brake in South Australia, I know of lines there where it would be very desirable to put it on.

259. What is the ruling gradient in South Australia? One in forty. Their curves, as a rule, are not so sharp as ours. I think eight chains is their minimum.

260. *By Mr. Patterson.*—Instead of putting automatic brakes on the Pichi-Richi line, they preferred to take those curves out, and lessen the gradients? I know. I surveyed a lot of that line, and I would not put in 5-chain curves, although I had my instructions to do so. I put in nothing less than 8-chains.

261. *By the Minister of Lands and Works.*—Their lines are not to be compared with ours, so far as their curves are concerned? Their minimum curves are, I think, 8 chains, as a rule. But they have long grades of 1 in 40.

262. You had experience of couplings breaking while you were Acting General Manager here? In one case.

263. Did you know of any other cases of couplings breaking and trucks parting while in a station-yard? Not from my own knowledge.

264. Have you heard of other such cases? I have heard that other couplings have broken.

265. On our lines? On our lines, yes. Mr. Deeble will be able to give you that information better than I can.

266. Now, I want to ask you a question that is quite within your power as a professional man—First of all, however, do you remember making a recommendation to me to go in for a policy of laying all our main line with 61-lb. rails? Yes.

257. You recommended that? Yes.

268. Do you remember what reply was made to your recommendation? I think you expressed yourself favourable, as far as I remember. You expressed yourself favourable to moving the existing rails to lines where 60-lb. rails were not required.

269. Do you remember when that was, Mr. M'Cormick—it came up, I think, in connection with the proposals for the Wilmot line, not long ago, did it not? I don't think so; I think the question of laying down 61-lb. rails is older than that. I proposed it years ago, when I had in view the idea of getting rid of the old 40-lb. iron rails on the main line.

270. Do you remember my telling you that we would lay the Wilmot line with rails taken up from the main line and re-laid with 61-lb. rails? Yes.

271. That was the intention of the department at the time? Yes.

272. Have you ever recommended to me or to any other previous Minister a project to straighten the curves—or flatten them, or whatever you call it—on the Main line? No.

273. Have you ever been called upon for a report in connection with such a proposal? Oh, yes; the question has been mooted, and I was officially called upon for a report as to the putting in of what is known as the proposed Tin-dish deviation from Antill Ponds, coming in somewhere near Parattah.

274. Did you recommend it? No.

275. Why not? I do not think the traffic warranted it. The deviation would have cost a lot of money, and the loss at Antill Ponds for want of that deviation was very small indeed, when it came to be analysed. The extra cost of putting on two engines to take the trucks up the gradient was trivial by comparison with the cost of the deviation. I think the cost of the work would have been from £60,000 to £70,000; but my report on that, I think, went before the House.

276. Now, as an engineer, and as the engineer responsible for the maintenance of our lines, do you think there is any element of danger with the curves we have, and the weight of traffic, on the light rails, at the rate at which our express travels along that line? Any special element of danger, you mean?

277. Yes? No. I would rather have easier curves, of course; but the line is thoroughly well maintained, and we run those curves without danger.

278. I will read you an extract from a speech in the House:—"The real danger in working the Main Line railway lay in the weakness of a great portion of the permanent way. Something like 80 miles of the line were laid with light 46-lb. rails, and on these rails were engines with 10 tons on an axle running, in places, at 35 miles an hour. Such a condition of things, to his knowledge, had no parallel in the railway world"—is that a correct statement, in your opinion? As to our running any special danger, you mean?

279. Yes? I do not think we are running any special danger.

280. Then your recommendation that 61-lb. rails should be tried on the Main Line was rather as to economy in maintenance, and general stability? Yes; the 61-lb. rail provides an excessive margin of safety with our present stock. In that recommendation I am allowing not only for our present stock, but also for future engines of a heavier type.

281. I think that you have been practically asked this question already, but I will ask it again: If you had an alternative put to you as to whether you would recommend, in the interests of the safety of the public, the flattening of these curves and the reduction of the grades, or, as against that, the introduction of the automatic brakes, which would you recommend? Under our existing traffic conditions, I should recommend the brakes. I do not think the traffic warrants any alteration of the curves and grades.

282. And you do not think it is so necessary as the brakes, in the interests of safety? I do not think it is so necessary as the brake—no.

283. Mr. Nicholls was asking you awhile ago as to the degree of danger run with regard to the present brakes, Mr. M'Cormick? Yes.

284. Would you qualify that in any way—would you say our present running is highly dangerous, or very dangerous, or dangerous in a very light degree, or what? I simply say it is an ever-present danger that we can minimise by the application of the automatic brake.

285. From your reading, do you know whether the automatic brake is very generally adopted or not? Yes, it is very generally adopted. In England, it is a Board of Trade rule that every railway vehicle should have it.

286. Is it to be put on every vehicle? It is to be applied to every vehicle on the railway.

287. On all trains, mixed or otherwise? That I am not quite positive about. Every vehicle, I think, of trains on which passengers are carried.

288. *By Mr. Hartnoll.*—On goods trains, too? No; I take it that it applies only to trains in which passengers are carried.

289. *By Mr. Nicholls.*—Does anybody out here attach great importance to the Board of Trade rules? Yes, I think they are of great importance as a guide. The words of the regulation are, "Continuous brakes on all passenger trains to be controlled by driver and guard; instantaneous in action; automatic; on every vehicle of train; in daily use, and durable." Wherever passengers are carried it applies.

290. *By Mr. Patterson.*—The question is—does this regulation apply to goods-trains? Evidently it does not apply to goods-trains.

291. *By the Minister of Lands and Works.*—Have we many goods trains in Tasmania? We have special goods trains running in the season.

292. Many? I would not like to say how many. There are a good number put on for taking away produce in the busy time. Of course, we have mixed trains running regularly, and I take it the regulation would apply to them.

293. Have we a sufficient percentage of purely goods traffic to justify us in keeping a set of rolling-stock that would not be interchangeable? No, I do not think so. Our rolling-stock is very limited in quantity, and often some of the goods wagons would have to be put on the mixed trains.

294. *By the Chairman.*—Do you understand your powers as Engineer-in-Chief, under the North Lyell, Mount Lyell, and other syndicate railway Acts? I know them.

295. Have you ever insisted upon any form of brake being used on the rolling-stock of the North Lyell, or the Mount Lyell, or the Emu Bay railways? That matter has never been dealt with by me.

296. But you have the power here in the North Lyell Act? Yes, I or any other officer appointed by the Minister. Other officers have been appointed. Of course, as a matter of fact, the Emu Bay, the North Mount Lyell, and the North Lyell railways have the automatic brake.

297. Have they those brakes by the instruction or permission of the officials of this state; or have they fixed them of their own accord? That I cannot say.

298. Is it not through your instructions that they have been fixed, if all counts? No, it is not through my instructions.

299. *By Mr. Hartnoll.*—Now, have you personally given instructions to any of our private lines that they should adopt that brake? No.

300. *By the Chairman.*—Would you consider yourself justified in compelling the adoption of the automatic brake on these private lines, if they were running with brakes such as we have now on the Government Railways? I think in a country such as the West Coast, where there are dangerous slips, I should certainly compel them to use the automatic brake.

301. That is a much more dangerous country than the country over which the Government Railways run? Yes; they have heavy slips there. Just the other day, after this last rain, a train was caught between two slips. It is a great advantage in a difficult country where slips occur to have the automatic brake.

302. I should like to ask you, Mr. M'Cormick, do you know who is the officer appointed by the Government under these Acts? Different officers on different lines.

303. Do you know who was appointed on the different lines we have been referring to? Mr. Hales has been acting on the North Mount Lyell line.

304. And he would have authority in this matter? He would have authority under that Act.

305. What I would like to know is this, if you can give me the information: Do you know who were the officers empowered to compel these companies to use the automatic brake on their private lines? Mr. Hales acted as inspecting officer on the North Mount Lyell, and he would have power under that Act. He was appointed by the Minister.

306. Who else was appointed on the other lines? On the Emu Bay line I was Inspecting Officer.

307. And you did not compel the use of the automatic brakes there? I did not do it; it was already dealt with. I knew they were putting the automatic brake in; that matter was discussed between the late General Manager and their manager. Besides, I knew the brake must go on, because their vehicles had to be interchangeable with ours. There was no need of me to compel them; if they were not adopting the automatic brakes our stock could not run on their lines.

308. But you have not got the automatic brake? We have it on the carriages, and it was intended at the time to apply it to all our stock. But I do not think there was any need to bring pressure. I think they were prepared to adopt the break themselves.

309. That is just the point we want to know? Well, that I cannot tell you more definitely.

310. *By Mr. Patterson.*—Now, Mr. M'Cormick, I want you to go through these enabling Acts of the North Mount Lyell, the Mount Lyell, and the Emu Bay railways, and at a subsequent period to show the Committee where the Acts allow any officer appointed by the Minister to compel the use of the automatic brake.—I have stated publicly that there is no such power in any one of those Acts, and I want you to show the Committee where it is—will you do that? I can tell you where we have the power in other Acts. The Minister, or the officer appointed by him, has the power under the Great Western Act. In the North Mount Lyell Act I do not think there is anything of that. All the officer has to see, I think, is that the rolling-stock is in good repair.

311. This is what is provided in the Mount Lyell Railway Act: "No part of the said railway shall be opened for passenger traffic until the Engineer-in-Chief or such officer as the Minister may appoint, has certified that such railway has been efficiently constructed, and all the rolling-stock to be used thereon for such traffic is in good and efficient repair and condition, and may be safely used for public passenger traffic thereon." Is there anything in that compelling the company to use automatic brakes? No.

312. If you turn to the North Mount Lyell, you will find————I have not got it here; but I do not think there is any provision for brakes in the case of these earlier lines? It is in the more recent ones.

313. Now, before we leave this subject, may I ask you if you were consulted in the latest legislation dealing with railways, as to a Bill intituled "The Railway Clauses Consolidation Bill"—were you consulted as to the further power given there, with regards to brakes? I do not think I was. I do not recollect bring consulted about it at all.

314. Have you seen that Bill? Oh, I have probably gone through the Bill, if you call that being consulted.

315. Did you there recommend the compulsory use of automatic brakes in the construction of any future private lines or Government lines? I am not aware that I made any special recommendation. I do not remember being applied to in the matter. I think I went through the Bill.

316. I want you to go back now to a question I asked you before; because I may say with the utmost frankness that your evidence on that point fairly astounded me.—I asked you whether you

did not think there was an element of danger in running trains with engines ten tons on the axles, at a speed of thirty-five miles an hour, over 46-lb. rails, and you said you thought not; are you still of that opinion? Of course, there is an element of danger; but the trains do not run thirty-five miles an hour on the curves.

317. I am talking of running on the straight? I say we minimise the element of danger by the closer spacing of our sleepers at such points, and by the perfection of our maintenance. Our maintenance is excellent. Of course there is an element of danger. I did not mean to say there was no element of danger. There is no special element of danger.

318. Are those conditions I have described in accordance with the best modern practice? The weight of rails, you mean?

319. Yes, taken with the weight on the axle and the other circumstances? I have told you that the difficulty has been met by placing the sleepers closer at those points, and by good maintenance.

320. Still, an accident might happen? An accident might happen whatever precautions were taken; it might happen with 61-lb. rails.

321. An accident has not happened so far, has it? There has been no accident, that I know of, from any defect in the rails.

322. But it might happen to-morrow; you might have a breakage at any time? An engine might go off the road, but it would not be owing to the 46-lb. rails. Our annual breakages are proportionately less, if anything, than the breakages are anywhere else throughout the States.

323. You have the Board of Trade regulations, I believe, in the office, have you not? Yes, they are in the office.

324. Now, I will ask you this question: Do you think for one moment that the British Board of Trade would allow a 10-ton axle for a 46-lb. rail? The position in England is different; nor would they space their sleepers as we do. The Board of Trade would not allow them to deal with railways in the same way as we do.

325. I suppose you know that the Board of Trade regulations were framed in England because of the infinitely complicated system of lines there, the immense traffic, the numerous junctions and crossings, the frequency with which one railway crosses the line of another company, and so on? Yes.

326. Could those regulations be taken reasonably to apply to this country? Well, I think——

327. Excuse me.—Take the case, say, of the Fingal line or the Sorell line, where a train starts on its leisurely way in the morning with one engine, one driver, one fireman, and one guard—goes one way in the morning, and returns in the afternoon, the only train on the line—no junctions, no other traffic, no novel systems of railway crossings—do the Board of Trade regulations, designed to meet an immensely different set of circumstances, come in here? You mean, there is no likelihood of a collision?

328. No, there is not. But, otherwise, do they reasonably apply? Well, there is the likelihood of a break-away and the train leaving the line altogether.

329. All things are possible? That is an every-day possibility. It might happen at any time. You are trying to make me out to say that the brake is only introduced to meet the possibility of collisions. That is not so.

330. What is the chief idea for adopting the automatic brake in England? Is not the chief use of the brake in England to pull up the train almost instantaneously in case of an approaching danger? The conditions are different here. I have given the Committee my opinion. This cross-examination does not place me in a fair position.

331. I am only asking you whether the chief reason for the adoption of this brake in England is not to meet conditions due to the complexity of railway systems where there are numerous junctions and other complicating factors, including very high rates of speed? Yes, it may be that; and there may be many other reasons.

332. But, in your opinion, is that largely the reason why the brake has been adopted there? Yes.

333. Now, coming back to the West Coast Railway for a moment—could they possibly have worked the Mount Lyell Railway, with a ruling grade of 1-in-17, in a country which has no less than 10 feet of rainfall in one year, without they used an automatic brake? The ruling adhesive grade at Mt. Lyell is 1-in-40. When you refer to 1-in-17, you are speaking of the Abt.

334. What is the ruling grade on the Mt. Lyell Railway, Mr. McCormick—is it not as I have stated? Well, the grade of the Abt system, which is on the railway, is (speaking from memory) 1-in-17 on the one side, and 1-in-18 or 1-in-20 on the other. But the Abt section is dealt with by the Abt system, altogether apart from the ordinary railway and the automatic brake.

335. Well, there are 1 in 40 grades on the railway? Yes, there are 1 in 40 grades.

336. And very heavy earthworks? Yes.

337. And there is an enormous rainfall? Yes.

338. Could they have worked the line safely without adopting the automatic brake? I will not say that. What I do say is that the automatic brake is very necessary there.

339. Not essential? Oh, I think, myself, that they should have the automatic brake there.

340. They could not do without it? I think I have said that before.

341. I do not think you did; but the point I want to bring out for the information of this Committee is this: we have three private railways running on the West Coast, authorised by Act

of Parliament—Mount Lyell, North Mt. Lyell, and Emu Bay. You have been over the North Lyell, I think? No, I have never been on the North Lyell.

342. Well, recently we passed a measure called the Railway Clauses Consolidation Act, of which there is a subsection referring to brakes, and there it distinctly sets forth the character in the brake to be used, but it is not an automatic brake—it is a continuous brake. Did you know that? I would like to see the Act you refer to.

343. *By Mr. Minister of Lands and Works.*—With regard to the statutory requirements for automatic brakes, are you aware that subsequent Railway Acts to those referred to just now contain these requirements; I mean, that the brakes are mentioned specifically in subsequent Acts? I am not quite sure that it says "automatic;" I think it merely says "continuous."

344. In the Great Midland and Rocky River Railway Acts they both say "automatic," I think? Yes. The Great Western Act simply says "brakes," but that covers it as well.

The witness withdrew.

THURSDAY, OCTOBER 31, 1901.

WILLIAM R. DEEBLE, *called and examined.*

Mr. Deeble made the statutory declaration.

345. *By the Chairman.*—Your name is ———? William Rufus Deeble.

346. And you are Locomotive Superintendent for the Government of Tasmania? I am Chief Mechanical Engineer.

347. *By Mr. Patterson*—Can you give us, Mr. Deeble, the cost of the automatic brake, free on board in London, for the different classes of stock, so far as you have gone? So far as we have gone, Mr. Patterson?—yes, I can give you that.

348. That is what I want—f.o.b. in England. Will you give us the figures, please? F.o.b. in London, the prices are: four-wheeled wagons, £30 10*s.*; bogie wagons, £51; bogie vans, £32; bogie cars, £47.

349. And locomotives? Well, there are three B-cross engines £360; that is for the three.

350. I want the price each? That is £120 each: that is the tender by each contracting firm. And there are six other engines—which include four C-cross and two D-cross engines—£800. They were tendered for altogether in that way. The C-cross and D-cross engines are by Dubbs and Co., and the B-cross by the Hunslet Engineering Co.

351. Can you give us the cost of freight and charges in the case of each class of stock? I have estimated the cost, Mr. Patterson. I have estimated the cost of freight, insurance, inspection, and erection. The total cost for four-wheeled wagons, thus estimated, would now be £35 9*s.* 4*d.*

352. *By the Minister of Lands and Works.*—Against your estimate of———? There is an estimated saving of 15*s.* 8*d.* each on that, as against my original estimate. That is a saving on four-wheeled wagons, altogether, of £37 12*s.*

353. *By Mr. Patterson.*—Well, will you now take the bogie stock? The bogie wagons, sir, including freight, charges, and erection at our works—which is an item to be considered—cost £58 13*s.* 9*d.*

354. *By the Chairman.*—That is, including the cost in England? That is including everything—and equipped ready for the road.

355. *By the Minister of Lands and Works.*—What was your estimate for bogie wagons? My estimate was £70. There is a saving of £11 6*s.* 3*d.* each upon that estimate.

356. *By Mr. Patterson.*—Does the Government debit the Railway Department with the cost of duty? Oh, no; I do not think so, sir; I would not be positive. I don't think that any duty is charged against the Railway Department.

357. What do private railway companies pay in the way of duty? They pay, I presume, the ordinary duty; I am not in a position to say.

358. You have had a long experience, I think, Mr. Deeble, on this railway? Yes, sir; I have had twenty-three years' experience, altogether, on the Main Line Railway.

359. You run, I suppose, special goods trains occasionally—such as trains for coal and produce—carrying no passengers? Yes.

360. Do you think that on these slow-running trains, getting along at twelve or fifteen miles an hour, it is necessary to go to the expense of fitting the automatic brake? I think so, in this way: take our Fingal line, for instance. We have a line there of an undulating nature, and if we have to confine ourselves to the loads our engines can haul up the 1 in 40, we would only be able to haul, say, twelve trucks; but if we make use of the undulating nature of the country, by keeping our speed up, and not have to stop at the bottom of the hills to take off the brakes, we can take a heavier load, because we can make use of the momentum of the train to help us from one grade to another.

361. Have you had many accidents resulting from the breaking of draw-bars or couplings of trains ascending banks? No serious accidents.

362. During the last twenty-five years has any portion of a train ever broken away, while ascending a heavy bank, through couplings parting? We have known of one or two instances; but I could not recount them. I could not give you the dates, and so forth.

363. Will you make it a part of your duty to get that information for the Committee? I will endeavour to do so. I don't know that it can be found, you know; but I will endeavour to get you that information.

364. Because, you see, the trend of the evidence given here, so far, has been to show that this automatic brake has been adopted in this State principally to safe-guard the travelling public from accidents caused by the breaking-away of a train in that way, while ascending a grade. You follow me? Yes.

365. I suppose you know that in England, with its enormous and complicated ramification of lines and its large number of complicated crossings, the automatic brake is used not so much for that reason—because the grades are easier there, and the curves wider—but rather in order that when, say, an approaching train is seen crossing a junction, the train can be brought to a standstill speedily?—you know that is the reason? I don't quite follow you.

366. I will try to make myself clear. In England there is a great railway system and an enormous traffic? Yes.

367. It frequently happens that one line crosses the line of another company, and there are numberless complicated crossings? Yes.

368. And for these reasons it is essential, in England, to have the automatic brake? Exactly.

369. And it is necessary to be able to pull up suddenly—that is the reason why the automatic brake is used in England? Largely.

370. That is not the reason why the brake is used here, is it? The principal reason here is, I presume, to secure the safety of the public. We have here very long grades of 1 in 40.

371. Exactly. And that is the reason for the adoption of the automatic brake? That is the reason, I take it.

372. So that in case of couplings parting or draw-bars breaking, the train could be brought to an immediate standstill? Yes. And, in addition to that, the automatic brake gives you facilities for working heavier loads.

373. What's that—I beg your pardon? I say that if you have the automatic brake, you can more safely work a heavier load.

374. Do you say a heavier load? Yes.

375. Now, I will ask you a question as to that. At what pressure to the square inch do you ordinarily work your engines, on these trains? At a pressure of 140; and, in the case of some engines, 135.

376. You do not like that pressure to go down to 125, do you? Oh, no; we keep as near the maximum as possible.

377. Now, what pressure does it take to work these automatic brakes? To work the vacuum brakes?

378. Yes? Oh, we could work them at any pressure between 100 and 120.

379. You do not understand my question—what is the lowest pressure you require to keep as a reserve to work the automatic brake; or, in other words, what expenditure of power does it take to keep the brake going? Oh, it is very trifling.

380. Fifteen Pounds? You are speaking of atmospheric pressure?

381. Yes? Well, the atmosphere supplies that pressure for us. We simply have to keep a vacuum.

382. And that is where the power is expended, is it not? It means a few more ounces of coal to keep the steam in our boiler.

383. Well, as a matter of fact, it takes a pressure of 15 pounds to work the brake? It takes 15 pounds atmospheric pressure.

384. In other words, this not being an air-brake, but a vacuum brake, you do not have to pump compressed air into the reservoir, but to exhaust the reservoir? Yes.

385. And to do that takes a pressure of 15 pounds to the square inch? Yes.

386. And is it not a fact, now, that you have many engines by which, if you had to use that pressure to apply a brake throughout the train, you would not be able to pull such a heavy load as you do now? I do not think that is so, sir.

387. You say, no? I think we would pull heavier loads, if we had the automatic brake.

388. Very well. Now, Mr. Deeble, if there has been such a general immunity from accidents in this State—if, as you say, there has been no accident that you can remember in the last twenty-five years, arising from the parting of couplings, or anything of that sort—and taking into consideration also the fact that last year, and for may years, we have had to face a serious deficit in our railway working, amounting last year to £110,000 ———

Mr. Minister of Lands and Works: That is a financial question; and you are questioning a mechanical expert.

The Chairman: There is no reason why the question should not be asked; it is a perfectly legitimate question.

389. *By Mr. Patterson.*—I will repeat the question, Mr. Deeble. Taking into consideration the facts I mentioned to you just now—the fact that the working of the railway shows an annual deficiency, last year of £110,000, which has to be paid, not by the department, but by the

general taxpayer—do you think it is an advisable thing, bearing in mind our absolute immunity from accidents, so far, to go to the expense of £60,000 to equip goods stock with this brake, when the present appliances are proved to be sufficient without it? Well, of course, with the re-estimate now made, it is not going to cost anything like £60,000. It will not cost much more than £40,000.

390. How do you make that out? With respect to the tenders already received, there is a reduction of 25 per cent. on our original estimate. The estimate now shows a saving of a little under 25 per cent. on the original estimate.

391. That is new evidence? That is positive evidence.

392. Is that a saving on the original estimate? On the original estimate. Roughly, I should say, now, that the total expenditure would be from £9000 to £10,000 less than the original estimate.

393. *By the Minister of Lands and Works.*—The original estimate? The original estimate——

394. *By Mr. Patterson.*—I think, now, it will be better if I take you item by item, Mr. Deeble, if you will excuse me. The chief item, I believe, is the wagon stock? Yes, sir.

395. You have in this State 1184 wagons? Yes. I am not positive about the number. If you have that, I suppose it is so.

396. *By the Minister of Lands and Works.*—This is your original report to Mr. Back? [Witness examines document.] Yes, sir; that is right. There are 1128 wagons, Mr. Patterson.

397. Well, the saving on those wagons is—how much? Fifteen shillings and eight pence each.

398. What does that come to? Well, I will have to work that out. I have the facts as to tenders already received, and I have given you the saving on the original estimate.

399. Have you the schedule showing the saving in each case? Yes. On the four-wheeled wagons, my estimated cost was £36 5*s.*, Mr. Patterson. The tender is—f.o.b. London, four-wheeled wagons, £30 10*s.*; with all charges, erected on our own road (as re-estimated), £35 9*s.* 4*d.* Difference between the estimate and tender, say, 15*s.* 8*d.* Forty-eight sets were ordered, leaving a saving of £37 12*s.* On the bogie wagons, my estimate was £70; tender, f.o.b. London, £51; after all charges, erected here ready for the road, £58 13*s.* 9*d.*

400. How many bogie wagons have you in the whole State? Bogie wagons?—thirty. Well, as I say, the cost, erected, as re-estimated, is £58 13*s.* 9*d.*, a saving of £11 6*s.* 3*d.* per wagon. Twelve were ordered; making a total saving of £135 15*s.* Bogie vans—Tender, f.o.b., London, £32. Erected ready for the road, after payment of all charges, £58 0*s.* 4*d.* My estimate for bogie vans was £53.

401. There is no saving there? Oh, yes; there is a great saving.

402. But you said the cost was £58 odd? I beg your pardon. I should have said £38 0*s.* 4*d.* Nineteen bogie vans were ordered. Difference between tender and estimate, £14 19*s.* 8*d.* per van. No—I beg your pardon again—there are thirty-two vans, and so far we have twenty-two ordered.

403. And what is the saving? On the 22 ordered the saving is £14 9*s.* 8*d.* per van. Total saving on the 22 vans, £329 12*s.* 8*d.*

404. *By the Chairman.*—That is, on the order so far as it is executed? Yes, that is on the tenders that have come in. I am giving you the facts exactly on such sets as have been ordered.

405. *By Mr. Patterson.*—What I am trying to arrive at is this: you said just now that there would be a saving of £10,000? I can only assume that on the indication of those tenders received thus far.

406. *By the Minister of Lands and Works.*—If you will give us the saving on each individual item, and Mr. Patterson takes the whole number, we can check the whole saving. Will you do that? Well, will you allow me to give you the saving on each article first, going on with the list, as I started. Bogie cars, I think, come next. Tender, f.o.b., London, £47. With freight and all charges paid erected, here ready for the road, £54 11*s.* That is a saving on my estimate of £15 9*s.* per vehicle. The three B-cross engines come next. Tender for the three, f.o.b., London, £360. After payment of freight, insurance, and all charges, erected, ready for the road, £439 13*s.* That is a saving on my estimate of £160 7*s.* on the whole three. They were all in one tender. Then six engines of Dubs' manufacture, which include four C-cross engines and two D-Cross engines. The tender was £800. Total cost, after payment of all charges, erected ready for the road, £959 6*s.* There is a saving there of £340 14*s.**

407. On how many engines? On six engines. That, sir, is all the tenders, so far, to hand, and it works out at a saving of a little under 25 per cent. I may state as to that, that the task of estimating was very difficult indeed at the time when we had to make the estimates. The metal market was in a very high state indeed, and on 6th April, 1900, I received an intimation from our consulting engineer in London, Mr. Meilbek, containing this statement:—"Prices of materials are still rising, and it is difficult to say when the top will be reached." So that you can quite understand how difficult it was to estimate under the conditions then existing.

408. *By Mr, Patterson.*—Well now, Mr. Deeble, if the Minister debited the Railway Department with the amount of duty payable, it would bring the price of these wagons, fitted up and ready for the road, to £43? Yes.

409. And can you suggest to this committee any explanation which would account for the fact, that on the Mount Lyell railway the automatic vacuum brake equipped, all charges paid, costs £28 per wagon? For what, sir?

410. In four-wheeled wagons. How do you explain that? One large consideration is this: that on the Mount Lyell the vacuum-brake is fitted to the wagons at Home, which is very much

* I should have said £170 14*s.*

cheaper than fitting the brakes to the wagons out here. Our wagons were not originally designed for the vacuum-brake, and we have a certain amount of work to do to the wagons when the brakes are fitted.

411. What does that extra work cost? The cost of erection for the four-wheeled wagons I put down here at thirty shillings.

412. Well, that does not account for a difference of £15, does it? Then their stuff, I presume, was purchased in 1895 or 1896. Now the prices of all materials have gone up considerably since that time. I am taking the price I quote now from the only available lists I have—from Jones, Burton & Company's list; October 1896 to 1900, just the loose sheets they send out to us as to market prices. I have taken out here just the material that would be used in the manufacture of the brake. The price of Scotch pig-iron for 1896, was £2 11*s.* per ton; and in 1900 it was £4: a difference per cent. of about 56·86. Copper in 1896 was £53; in 1900, £78: a difference of £25, or a difference per cent of 47·16.

413. *By the Minister of Lands and Works.*—Is copper used in the manufacture of these brakes? Oh, yes; copper is used for all the valves; and copper and tin is largely used in all the mountings for the brakes on the engines. Soft steel, which is used for working up and making the vacuum chambers for the vacuum brakes, in 1896, was £8 5*s.*; and in 1900 it was £11 10*s.*: a difference of over £3 per ton, or a percentage of 39·39. In 1896, tin ingots were £66 per ton; in 1900, they were £153 per ton.

414. *By Mr. Patterson.*—How much tin is used in the manufacture of these automatic brakes? Of course, all the valves and brasswork contain a mixture of tin.

415. Very small, is it not? And in all the mountings, where they have a constant strain of steam-pressure—especially the boiler mounts, where the strain is very heavy—there is a good deal of tin used. Well, as I said just now, tin was £66 in 1896, and £153 in 1900: a difference of £87 per ton, or 131·8 per cent.

416. Now, do you seriously put forward that statement, Mr. Deeble, as showing that it is in any way a serious factor in accounting for this difference of £15 between the cost of the Mt. Lyell brakes and the Government brakes? I should say it would count.

417. As a factor? Oh, it must be a factor.

418. Very well; let me ask you, now, what is the total weight of metal in one set of automatic brakes? I do not know that I could give you that; but I will get it for you—but, wait a moment: I think I have got it here—Yes, I have it. The approximate weight of a complete set of vacuum automatic brakes, carriage, and double wagon, is 13 cwts. 2 qrs.

419. We are discussing, now, four-wheeled wagons, not the bogie? Approximately, a set of brakes for a four-wheeled wagon weighs 8¼ cwts.

420. Of which the enormously greater part of the weight is iron and steel? Oh, yes. Of course, the fitting beneath, and the release-valve and casing, are brass.

421. Well, would that increase in the price of metal account for the difference of £15? Oh, I am not prepared to say so.

422. I may tell you that the reason I am pressing you more particularly on this point is this: if that is a serious answer you have given me, it is a complete answer as to the discrepancy in price as between the Mount Lyell Company and the Government. Is that so? That is the only answer, Mr. Patterson, that I can put forward. There is, however, one other, I think. I do not know whether it is so, but it may be so, that in erecting the brake at Mount Lyell the work would possibly be charged to the erection of the wagon. It would naturally be so, I suppose, since it is erected with the wagon, and comes out with it. But we should charge the work to the erection of the brake, and not to the wagon at all. That might make a difference.

423. Of course, we should be able to get that evidence from Mr. Driffield? Quite so.

424. *By Mr. Hope.*—There is one question I would like to ask, with regard to the cost per truck of maintaining the automatic brake. Is it greater than the cost of maintaining the chain-brake and hand-brake? I do not think so. Still, the cost may be a little more; but I think the advantages derived from the use of the automatic brake will largely compensate for the expense.

425. Another question I want to ask you. You have been asked a question by Mr. Patterson, and you said that for twenty-five years there had been no accidents to speak of—no loss of life? Oh, yes, we have had loss of life—

426. Not through couplings parting? No, we have not had any loss of life through couplings parting.

427. Of course, that question was asked you because we have been led to believe that that is one reason why we have no use for the automatic brakes. Is it not a fact that all rolling-stock and engines have improved on the general run of railways during the last twenty-five years? Certainly, there has been a very great improvement.

428. *By Mr. Hartnoll.*—I would like to ask you one question Mr. Deeble. You are aware that in the train service, we will say from Burnie to Launceston, the usual practice is for trucks to be thrown off at a variety of stations; if you have this continuous vacuum brake running through all the carriages, in such a case, would it not entail some loss of time in uncoupling the automatic brake between the various cars or trucks at each station, where you have to throw off your trucks? No, I do not think it would entail a loss of time. In this way: that, in uncoupling the brake, the man has nothing to do but follow out his ordinary practice; he simply has to pull out his coupling, and the brake separates itself. When he couples again, he simply has to take up the ends and drop

them. That is the whole motion; it is a matter of a second or two. In addition to that, as to the question of time, with the automatic brake an advantage is gained by pulling up and getting away more quickly. That would be a very great advantage on the Burnie Line. We are continually losing time now on the Burnie section.

429. *By the Chairman.*—How long have you been in the service, Mr. Deeble? I have been 23 years; that is, in the service of the Government and the Main Line Railway Company.

430. And what various positions have you held? I came over under engagement to the Main Line Company. I cannot give you the exact date; but it is about 23 years ago. When I came over they had got their engines and rolling-stock into a very bad way; and I came, in the first place, under engagement to stay twelve months to put their stock right, but I have been here ever since. I came as leading fitter, and I have gone through all the grades—foreman, leading foreman, and so on—up to my present position.

431. You have been purely a mechanical engineer all the time? Purely a mechanical engineer, as you say.

432. I will not go back as far as the initial point of your engagement with the Main Line Company, Mr. Deeble; but I will go back, say, ten years. Have the conditions of the train service here altered very materially during the last ten years. [No reply.]

433. I will put it to you in this way: do you haul bigger loads now than you did ten years ago? I believe we are hauling heavier individual loads.

434. Materially so? Well, as an example, I may say that ten years ago, on the Fingal line, we used to haul about 12 trucks; we are now hauling 21; and, at times, in the case of additional trains—purely coal trains—we are hauling 23, and we have hauled 25.

435. Then, would that increased load on the train necessitate a more effective system of brake? Well, as I told you before, on the Fingal line we use the undulating nature of the country to help us over the line; but supposing anything happens while we are going down one of those grades—say a broken rail is seen ahead—we have no means of pulling-up sharply; we could not pull-up under, perhaps, four hundred or five hundred yards. According to the last Railway Conference in Melbourne, broken rails occur pretty frequently throughout Australia. They approximate one rail in 25,000,* and ours are about the same—that is, neglecting considerations of weight, size, weakness, or strength of rail, altogether. If a man in charge of a train has an automatic brake at his hand, he has a better chance of preserving his own life and our stock from destruction.

436. It is a more powerful brake than ours? Yes.

437. Have you increased the speed of your trains in any way during the last ten years? Not to my knowledge, Mr. Guesdon.

438. Have your ever received any notification from the driving staff of the Railway Department to the fact that the brake that is now in use is inefficient? Yes; that is, not that it is inefficient, but I have had drivers come to me and say, "With the loads we are taking now, sir, we could not pull up within a reasonable distance." Of course, that is on a part of the line where there are gradual down-grades, and they are using the brake-power they have, to get between the stations on schedule time. If they were called upon to pull-up within a hundred or a hundred and fifty yards, they would not be able to do it.

439. How long have you been Locomotive Superintendent? Three years; that is, I have been Chief Mechanical Engineer for three years.

440. At what date, can you tell us, did the driving staff begin to complain of the inefficiency of the present brakes—was it before you were appointed Locomotive Superintendent, or since? Oh, I think it would be since—Oh, yes. Because, you see, it would be improper—it would be *infra dig.*—for them to come and complain to me before I was appointed. Before that, it would be the old Locomotive Superintendent's business.

441. Could you give us, approximately, the dates when these complaints were made? No, I could not give you the dates.

442. Have they been made frequently? No, not frequently.

443. Would you say that, generally, the driving-staff is dissatisfied with the present brake; or are the complaints that have been made to you only isolated cases? The drivers did not make any complaint on account of the inefficiency or deficiency of brake power. Their statement was, that the loads were too heavy for them to run to time with the safety they would like. It just brings up the old question and the old difficulty: starting away from a station running down-hill, and putting down four or five side-brakes, and then just managing to work everything in schedule time, and only just. They trust to the momentum, as it is, to get up the next grade. If they did not do that, they would have to put the side-brakes on, and they would have to stop at the bottom of the hill to take them off again, and then only be able to get up the next grade with a light load.

444. You infer that if you put on your present brakes—you lose the value of your momentum coming down? Yes.

445. *By Mr. Hartnoll.*—Have you with you the last regulations of the Board of Trade? Yes, I have that, Mr. Hartnoll. In reference to what?

446. In reference to brakes on goods trains? Yes, I have the regulations for 1900 here. I only received the book last night; or, I only got it this morning, as a matter of fact.

447. *By the Chairman.*—You recollect the original recommendation that was made to your department with regard to brakes, do you not—that was, that you were to equip every vehicle with the brake? Yes.

* I should have said 35,000.

448. Well, since that was made, the department has reconsidered the position? Yes; and I decided that a modification of the original scheme could be adopted, and still secure the public safety.

449. Is that so? That is so.

450. Can you tell us when that modification was first recommended by the department? Well, I am not sure; I believe ———

451. Can you tell us, approximately, then—was it before or after the attention of Parliament was drawn to the matter? It was after the attention of Parliament was called to it.

452. And it was the fact of what took place in Parliament, I presume, that led to a reconsideration of the matter, and the modification of the scheme? Yes, sir. Of course, the modified scheme will not be as efficient.

453. But it will be as conducive to the public safety? Yes, for a few years; but ———

454. And it will save a considerable amount of money to the State? Yes.

455. *By the Minister of Lands and Works.*—When did you first recommend the use of the automatic brakes generally, Mr. Deeble? Well, the recommendation, Mr. Mulcahy, did not come from me directly. I think it was during 1899, when those two or three accidents occurred in New Zealand, and there were several deaths. The late General Manager and myself had a number of discussions over it, and Mr. Back adopted the position, that he considered it was unsafe to go on as we were going, seeing that the use of the automatic brake was being extended throughout the Colonies and throughout the world.

456. Did you concur in that opinion? I did.

457. Did you consider the automatic brakes in the light of being merely desirable, or as being necessary? Well, I think they are necessary; because, with our present brakes, it would only take one accident, and it would cost more than the whole equipment of the automatic brakes—or, at any rate, it would cost as much.

458. You have communicated with the other States at my request, have you not, with regard to what is being done elsewhere in this matter? I did it prior to your request, Mr. Mulcahy.

459. Can you tell us what is being done in Queensland? In Queensland they are equipping all engines, all carriages, and fifty per cent. of their waggon-stock with the brake.

460. And in Western Australia? In Western Australia they intend to adopt the brake upon all their equipment. But I will give you just exactly what they have done, in that State, up to date. From the Chief Mechanical Engineer of the Western Australian Railways, I have received this telegram: "Town Hall, Fremantle, 25-10-1901. Following stock is fitted with automatic continuous brake: 224 locos., 248 cars, 89 brake-vans, 140 wagons. New stock ordered and to be fitted with brakes, yet undelivered: 72 locos., 25 brake-vans, 366 bogie-wagons, and 687 four-wheeled-wagons." That is the position to date, sir, in Western Australia. The telegram is signed by T. F. Rotherham, Chief Mechanical Engineer of Western Australia.

461. Have you any more detailed information from Queensland? I have here a copy of a wire received from Mr. George Nutt, recently appointed from London, Chief Mechanical Engineer, Queensland Government Railways: "17th September, 1901. Fitting all carriage stock, and, say, fifty per cent. of wagons: remainder with through pipes only."

462. What do you take to be the meaning of that telegram, Mr. Deeble, with regard to the adoption of the automatic brake in Queensland? Well, I presume that eventually they will equip the whole of their stock with the brake.

463. And at the present time they are making the whole of their stock interchangeable by piping a portion of it? They are making it interchangeable in that way—yes.

464. And that is virtually what you are recommending here? In the last proposals, sir—yes.

465. You have made a proposal here, have you not, to equip with complete brakes forty per cent. of the wagons? Yes, sir; and, in my second proposal, forty-five per cent.—which is the most desirable course.

466. You have worked the figures out for the proposal to equip forty-five per cent. of the wagons, as requiring an additional expenditure of £21,604? That is so, sir.

467. Is that calculation based upon the later information you have as to actual prices, or is it based on your original estimate of prices? It is based on the original estimate.

468. And according to what you have told us, it will be largely reduced then? Yes, it will be largely reduced.

469. And for the total sum of £40,000, the £20,000 previously voted for the purpose, and the £20,000 it is now proposed to vote, you could, I presume, taking this reduction of the estimate into consideration, fit rather a larger number of vehicles? Well, speaking roughly, we would be able to fit fifty per cent. of the trucks.

470. Now, I want to ask you a question as a professional man, Mr. Deeble, with regard to the uselessness or otherwise of the stock now ordered, supposing that Parliament did not authorise the further expenditure required? Well, I think that, unless you were going further with the matter of applying automatic brakes than we have yet gone, the expenditure has been unwarranted.

471. What kinds of brakes are your engines fitted with now? Our engines are fitted with steam-brakes, with hand brakes on the tenders. But allow me to modify that statement. Among the old Main Line engines we have one sort that is simply fitted with hand-brakes, with hand-brakes on the tenders; I think, about ten of them altogether. All the rest have steam-brakes on the engine and hand-brakes on the tender.

472. Have you any economic advantage to be gained of any kind by exchanging the steam-brakes for the vacuum-brakes, if the vacuum-brake is to be applied to the locomotives alone? No; no advantage whatever.

473. In other words, as a brake, and merely as a brake, is your steam brake on the locomotives as effective as a vacuum-brake would be? Yes; so far as the locomotive itself is concerned. The only advantage of having the automatic-brake on the engine is that you have simultaneous application of the brakes throughout the train.

474. I am questioning you now purely with regard to the engine and tender, as to whether it would be expedient, supposing that Parliament refused to vote any further money for this purpose, to import and apply the engine appliances to the engines alone? No; it would be no advantage whatever, sir. It would not warrant the expense of putting the brakes on.

475. As a matter of fact, you say in your memorandum on the matter, that the expense already incurred would be practically useless unless further supplemented as proposed—these are your own words? Yes, sir.

476. Of your own knowledge, what do you know of the other States with regard to the general application of this vacuum-brake, or a similar brake? Well, during the various conferences that there have been over there, I have, in an unofficial way, made enquiries as to the working on that side; and I find that the general opinion there is—that is, in Victoria and New South Wales—that they could not possibly handle the freight and passenger vehicles they are handling now, without automatic brakes.

477. *By Mr. Patterson.*—What about South Australia? In South Australia they have equipped their 5 ft. 3 in. stock with the automatic brake—their carriage stock and their live-stock wagons are fitted with it.

478. And their goods stock? Not their goods stock.

479. *By the Minister of Lands and Works.*—With the exception of South Australia, are the whole of the Australian States universally adopting the automatic brake at the present time? They have adopted the principle, and, so far as my knowledge goes, are applying it to all their stock—or it is their intention to apply it to all their stock.

480. Do you think Mr. Back told a deliberate falsehood when he wrote this memorandum to me last year: "The whole of the rolling-stock of Australia is either fitted, or in the course of being fitted, with automatic brakes. The New Zealand Government have issued an order that the whole of their stock shall be forthwith provided with these appliances . . . . Thus, to the best of my belief, in England and the Colonies the Tasmanian Government Railways are the only railways which have not applied automatic brakes to the whole of their rolling-stock, or who are not in the course of doing so"—do you think that could be characterised as a deliberate falsehood? Oh, no; I should not say so, sir.

481. To the best of your belief, at that time were the Colonies going in for a general application of these brakes, with the exception of South Australia? To the best of my belief, they had affirmed the principle.

482. Do you know something of a General Managers' Conference, which took place on the 27th September, 1900? Yes, sir.

483. You have got some quotation from its proceedings, I think: will you read it? "General Manager's Conference, 27th September, 1900. Minute 966. Continuous brakes for goods stock. With reference to Minute 1119 of Commissioners' Conference, a report from Chief Mechanical Engineer was submitted. This showed that the stock of goods wagons to be fitted comprised 1524 bogie vehicles, 9 six-wheelers, and 3262 four-wheelers. The approximate estimated cost was £210,000. It was suggested that the work should be spread over a period of three years, though, if possible, a shorter period (say one year only) would be desirable. Attention was drawn to the undulating nature of certain parts of the line, which necessitated either extreme and dangerous speed down hills, or else stopping at the top to put down brakes, and, again, at the bottom, to release same. The result of the latter operation was that the next ascent had to be approached from a standstill, instead of with a certain amount of impetus. It was decided to strongly press the matter, with a view of funds being placed at the disposal of the department to effect the necessary improvement." Then there is a reference to conferences held in Western Australia.

484. Have you any knowledge of the details of that estimate? None whatever, sir.

485. The approximate estimate is given as £210,000? I have no knowledge of it whatever.

486. *By the Chairman.*—But, as far as your own estimate is concerned, what does your estimate show for the class of equipment mentioned here? Well, their bogie-wagons are 20-ton wagons—not the same class as ours at all. Ours are only 12-ton wagons.

487. *By the Minister of Lands and Works.*—Now, Mr. Deeble, you have been asked a good number of questions with relation to the cost of these appliances to the Government, as compared with a statement that similar appliances were purchased at twenty-four, thirty, and, in some cases, fifty per cent. less in some other cases. What does the Government do in order to procure these appliances from Home—By whom are they ordered? They are ordered by the General Manager, through the Agent-General in London; and then public tenders are called for.

488. The order is sent through the Minister first, is it not? Yes; from the General Manager to the Minister, from the Minister to the Agent-General. The Agent-General then calls for public tenders for the work.

489. Have public tenders been invited for these appliances? Yes, sir.

490. Have you any reason to believe that we are paying more than the market price? No, I have no reason to believe that.

491. Are the firms who have tendered firms of repute? Oh, yes, sir; every one of them are firms doing business in a very large way.

492. Is there any reason at all for any suspicion in your mind that we are paying more than others for these appliances? There is nothing of the sort in my mind—nothing whatever.

493. Can you give us any idea at all why any such suspicion should exist? No; I cannot imagine anything at all.

494. As a matter of opinion only, do you think it is really probable that exactly similar appliances were bought within the last five years for half the money you estimated these would cost? Well——

495. I know your own experience now shows your own estimates to be excessive; but, as a matter of opinion, do you believe that bogie-wagon sets similar to these were purchased within the last five years at a cost of £35? There is a misconception about these bogie-wagons, altogether. The bogie-wagons on the Mount Lyell line have only one cylinder and one tumbling shaft; our bogie-wagons are to have two cylinders and two tumbling shafts.

496. And that counts? Oh, yes; certainly. The Mount Lyell, to the best of my knowledge, has 18-inch cylinders, one to each bogie-wagon, and a simpler type of brake gear. Mr. Meilbek had to design our gear to suit existing bogies and existing side-brake gear; and to do that to the best advantage, he adopted a similar method to that on the bogie-carriages, and utilised two 15-inch cylinders, with consequent double parts, practically. Not exactly double parts; but two tumbler-rods, anyhow, and two cylinders—complete vacuum chambers—cylinder release-valves, and so forth, complete—double the appliances, excepting that the Mt. Lyell gear has its one cylinder three inches larger.

497. Is any similar reason existing, do you know, with regard to other rolling-stock in which your estimates were in excess of Mount Lyell? No, I do not know of any. I am not very familiar with their rolling-stock. But the other day, as you may remember, a Mount Lyell bogie-wagon came through to Launceston to load its bridge; and seeing that this question was uppermost at the time, I went over to have a look at that wagon, and I saw that it only had one cylinder, as I say. That is how I came to know about it.

498. Are there varieties of vacuum brakes? There are varieties of ways of applying it. The brake is the same.

499. Are there methods of application differing in cost? Yes. The method of application in our wagons, I should say, is much more costly than the Mount Lyell method.

500. And you think that, for the method of application we have adopted, the appliances are more costly? They are more costly than the Mount Lyell, in this way: that we have double appliances, practically, where they have single ones. We have two cylinders in place of their one.

501. Can you give us a reason for the adoption of the more costly method? The reason, I should say, is this: Mr. Meilbek drew up all the specifications, and he had to make the automatic brakes work in with our present side-brakes on our wagons. That is simpler for the shunters, and they are accustomed to that. So that we had to work in the vacuum brake to suit our existing side-brakes; and to do that, I presume, he has adopted the lowest and cheapest method possible, and he has adopted the method of using two cylinders in place of one.

502. What is Mr. Meilbek? He is consulting engineer to the Tasmanian Government—all departments, I believe; not only the railways.

503. Does he hold any other positions, to your knowledge? I believe that he has a number of responsible positions.

504. You do not know? No.

505. Is he a man who is likely to compromise himself or this State with regard to the price he pays for stock? Oh, certainly not, sir; I could not think so for one moment. I may say, that the same gentleman is Consulting Engineer for the Mount Lyell and the Emu Bay railway companies.

506. Now, you need not answer this question unless you please—If you were chief mechanical engineer for a private company, instead of for the Government, would you recommend the private company to adopt the automatic brake? If I were starting out advising for new rolling-stock—say, take the case of the Mount Lyell or the Emu Bay, or even the Tasmanian Government Railways—I certainly should.

507. You would? I think it would be economical if we started off with the automatic brake as an initial movement.

508. Have you had knowledge of breaks in coupling-gears occurring in station-yards at any time? Yes.

509. Do you remember the occasions? I cannot remember them, but I can give you the number of broken couplings that have taken place on the road. Number of broken couplings on the road: 6. That would mean, that those couplings were broken in stations or on trains *en route*, as to which, reports have come in through the drivers and guards. Then, found broken in our various depôts: 11. Number taken off stock for repairs—that is, worn beyond the safe limit; all for this year—318 couplings, and 39 draw-bars.

510. And you have had seventeen broken then, altogether? Yes; six broken on the road; and eleven found broken in the depots, as per train examiners' reports? 318 worn beyond safety.

511. Did the breaks occur at dangerous parts of the road? No; I think they have mostly been discovered in station-yards. There were one or two at Conara, and one or two at Evandale Junction.

512. What would happen if such a break occurred on a train going up hill, say, between Colebrook and the tunnel? Well, that would largely depend upon the weight of the train. For instance, in some cases we are running up goods trains, or mixed trains, with two engine loads and——

513. Two engines pulling up the grade, that is? Yes, two engines pulling them up. Supposing we had such a train—say, of eighteen or twenty trucks—and it parted on that grade. The couplings usually break next to the engine, or close to the engine.

514. Where the greatest strain is? Where the greatest strain is, as you say—if it were a mixed train. Our mixed trains are generally made up with one brake-van and one carriage; that usually meets all our requirements. But, in addition to that, we might have twelve heavy open trucks unbraked. I feel almost certain that the chain-break on the van and carriage would not be able to hold that lot on a 1-in-40 grade. The consequences would be either a serious run off the line, or the risk of running back and colliding with other stock at the station.

515. Mr. Hartnoll read a Board of Trade regulation in the House the other night, which seemed to imply that all that was required with regard to goods wagons was that they should have two side-brakes ———

Mr. Hartnoll.—Lever brakes.

516. *Mr. Minister of Lands and Works.*—It is the same thing. Do you know anything of that regulation, Mr. Deeble? No. I know that such a regulation exists.

517. What is the object of it? The object of it is simply to provide facilities for shunting, so that a shunter can work from either side of the wagon.

518. In the station-yards, that is? In the station-yards, exactly. The great difficulty of imposing automatic brakes upon wagon stock in England is this—that such a large proportion of the wagon stock is owned by outside companies, and not by the railway companies at all. The trouble in any case of that kind is the proper up-keep and repair of the brakes. The trucks are owned by outside companies, and, for the most part, chiefly used for coal; and they stand about on sidings or in station-yards for long periods, when they are not actually in use, with no responsible person to look after them and keep them in repair. It would be very difficult to enforce the use of automatic brakes on such trucks.

519. Is it convenient to use the automatic brake in shunting—is it generally done? It is not generally done. When you start to shunt you can undo your couplings, and go on with your side lever brakes. That is one of the advantages of the side brakes; you can shunt about the yard, and so on, with them.

520. And you think that that is the object of the Board of Trade regulation I referred to just now? I think the object of the regulation was to have a brake available on either side of the vehicle, so that a man can shunt from either side of the train.

521. Well, I would be glad if you would look that matter up, and be in a position to advise this Committee whether that regulation has any sort of reference to the automatic continuous brake, or whether it is put in to provide for convenience of shunting about the station yards.

522. *By Mr. Patterson.*—I believe you have something like ten tons on an axle on some of your engines? Yes, 9 tons 18 cwts., to be exact.

523. And you run at very high speed at certain points of the Main Line—with your express trains, that is? Yes, sir.

524. What is the highest speed you attain? I suppose that in some parts of the line we run up to 38.

525. Do you think there is any element of danger in running at that speed over so light a rail with an engine of ten tons on the axle? Well, I think, it is rather out of my province to answer that question. I believe provision is made to overcome the difficulty by placing the sleepers closer together. But that does not come within my department.

526. One more question, and I have done. I suppose you are aware that there are a number of trains running in the United Kingdom without the use of a continuous brake? Well, I suppose——

527. I find, in this Board of Trade document you have handed in, that in Britain and Ireland there are twelve or fifteen companies running without the use of a continuous brake such as you have in your mixed trains. There are the Cambrian railways, on which 21,914 miles were run by purely passenger trains in the previous six months without the use of a continuous brake. During the same period passenger trains on the Manchester and Milford Railway ran 30,958 miles without the use of the automatic brake. On the North Wales narrow-gauge railways 17,131 miles were run similarly. On the Southwold railways, 17,064 miles. In Ireland, the Ballycastle Railway ran 22,846 miles. On the Bessbrook and Newry Railway, 11,826 miles. On the Sligo, Leitrim, and Northern Counties Railway, 46,704 miles; and on the Waterford and Tramore Railway, 21,960 miles. All the foregoing mileage was run by passenger trains without the use of an automatic or any other form of continuous brake; so that, you see, the automatic or continuous brake is not in universal use to-day, even on passenger trains? No; well, here is an extract from the Board of Trade returns for continuous brakes for 1900. You will see there what is being done with the automatic, vacuum, and Westinghouse brakes.

528. I am talking, you see, as to what is the fact, up to the 31st December, 1900? Well, that document you are quoting from, I only received at 9 o'clock this morning, and, as yet, I have had no time to peruse it. But you will note the restrictions imposed there on mixed trains that carry passengers.

529. *By the Chairman.*—This document you read just now, dated 27th September, 1900: do you know the bogie vehicles referred to there? I do not know them at all. I understood that they

were 20-ton wagons, but I have no knowledge of the matter. That Minute is simply taken from the Report of the General Manager of the Western Australian Railways.

530. But your impression is that these wagons would be more expensive to equip than your own wagons? Well, I would not say that, because they would be equipped at home at the builder's place. When you equip a brake at home a lot of work is done by machines that we have to do by hand when the brakes are equipped on their arrival here.

531. What is a six-wheeler? A three-axled vehicle.

532. A bogie vehicle? No, it is not a bogie vehicle.

533. Then, these figures here would give you no guide as to what the equipment of your stock ought to cost you? No; no guide whatever, sir.

534. *By the Minister of Lands and Works.*—Mr. Deeble, will you look at that? [Document handed to witness.] That is a comparison between the vacuum and the Westinghouse brakes. It gives some parts, I think, from which you can form an opinion as to which is the better brake of the two? Yes, I have here, sir, extracts from the Board of Trade returns on continuous brakes for the half-year ending 31st December, 1900.

535. Will you give the total mileages in each case? This is published by the Vacuum Brake Company, Limited, 32, Queen Victoria-street, London. The mileage running by the Westinghouse automatic brake is 33,870,572, for 301 faults; the automatic vacuum brake ran 76,965,394 miles, for 273 faults. This shows for the Westinghouse automatic brake one fault per 112,526 miles run, and for the automatic vaccum brake, one fault per 281,924 miles run.

536. What does that indicate as a comparison between the two? Oh, it is over two to one in favour of the automatic vacuum brake.

537 *By Mr. Hartnoll.*—That is a trade circular published by the Vacuum Brake Company? No, it is a Board of Trade return re-printed. In connection with that, I will read you something here. Some little time ago, when I was looking up particulars, and so forth, as to the upkeep of the automatic brake, I wrote to the Chief Mechanical Engineer of the London and North-Western Railway Company, Mr. F. W. Webb, asking him for particulars of their brake. I also wrote to Mr. Johnson, of the Midland Railway. Mr. Webb forwarded me this memorandum:—"London and North Western Railway, Locomotive Department, Crewe, September 14th, 1900.—Automatic Vacuum Brake: Replying to your letter of the 30th July, we have no printed instructions especially relative to the inspection and upkeep of the vacuum brake; but I send you the enclosed prints, that deal with the matter." And he adds this statement, which I had not asked for:—"According to the returns of the Vacuum Brake Company, Limited, for the half-year ending December 31st, 1899, our engines ran 12,728,826 miles, with thirty faults; none of which, however, caused the brakes not to act."

The witness withdrew.

FRANK GROVE, *called and examined.*

Mr. Grove made the statutory declaration.

538. *By the Chairman.*—Your name is——? Frank Grove.

539. And you are a Civil Engineer? Yes.

540. You are here representing Messrs. Pauling & Co. in connection with the Great Western Railway Company? Yes; and Mr. Brunlees.

541. *By Mr. Patterson.*—You will understand, Mr. Grove, that you are not called here at my instance, but at the instance of the Chairman. We have had departmental evidence, and we thought it advisable to go outside the Department to get evidence from gentlemen without bias. I shall ask you very few questions. You are Chief Engineer of the Great Western Railway Company in this State? Yes.

542. Will you tell us, briefly, what your experience has been in railway construction in the past? I was employed in England by T. A. Walker, the Contractor of the Manchester Ship Canal, for some years; and, after that, I had some experience on the Central Bahia Railway, in Brazil; and since then I have constructed a portion of the Assam-Bengal Railway, metre-gauge.

543. Do you know the railways of this State at all, as to their construction and the speed at which the trains travel? I have a general knowledge of them, having travelled on most of the lines; and I have noted the times of the trains and the appliances used, and so forth.

544. You know the Derwent Valley Railway? Yes.

545. Fairly well, I suppose? Yes, very well.

546. You know the speed at which trains travel on that line? Yes.

547. Well, I made that railway myself: and if I tell you that on that line there has never been a single accident of any sort from the opening of the line right up to the present moment—in short, that the brakes in work have hitherto proved efficient—do you think there is any justification for an expenditure of £36 each on all the wagons (that is the rolling-stock) for the fitting of automatic brakes—do you think that there is any sort of justification for that expenditure, when the railways are working at a loss—which amounted for last year to £110,000? No, sir, I do not.

548. And you speak with a full knowledge of that line? Yes—a full knowledge.

549. Well, of course you know that that line junctions at Bridgewater with the Main Line. But first of all I will ask you to give me your opinion as to the Sorell line. That line is 14¾ miles long, and is altogether isolated from the general railway system of the State. The speed of the mixed trains on that line is such that it takes an hour to make the journey—do you think that three

is any occasion to equip the carriages and wagons on that line with automatic brakes? Of course I have not any personal knowledge of the Sorell line; but I should say that the same argument would apply to it.

550. *By the Minister of Lands and Works.*—Why should you say that, without having any knowledge of the line, Mr. Grove? From the speed given by Mr. Patterson as that at which the train runs.

551. *By the Chairman.*—You are comparing it, really, with the Glenora line? I am assuming that it is of the same character.

552. *By Mr. Patterson.*—Well, I will come now to the Main Line—the most difficult line we have to work—where we attain an altitude of 1400 or 1500 feet. That line was opened some twenty-five years ago. It has been worked all those years with practical immunity from accident, the brake used being Clark and Webb's continuous chain-brake. No single accident has resulted from breaking couplings on a steep bank, or otherwise from the parting of trains. With such a record do you consider that there is any urgency or necessity for the adoption of an equipment for the whole of the stock—not only the passenger carriages, but also the goods-stock, including the coal trucks on the Fingal line—with the automatic brake—do you consider that there is any justification for a heavy expenditure—bearing in mind the fact that last year the railways were worked at a loss of £110,000—on the adoption of this expensive and complicated brake for our goods-stock? Certainly not.

553. *By Mr. Hartnoll.*—Mr. Grove, would not the fitting of this automatic brake to the stock cheapen the working of the line as to time, by enabling them to pull the trains up more quickly? I should think it would rather add to the cost of working the line, sir. In the first place, there would be the maintenance of the brakes themselves to be considered. Then there would be the additional work of coupling and uncoupling the wagons, through having the brake connections to attend to. It seems to me that as mixed trains are mostly run on this line that it would be rather a serious matter where—as I understand is generally the case—wagons are connected and disconnected at nearly every station.

554. You do not think the adoption of this brake would lessen the expenditure of time at these stations? I do not think it would, sir. As far as time went, it would probably come out about the same as at present; what they lost in one way would be gained in another. But I do not think the adoption of the automatic brake would reduce the cost of working the trains: I do not see how it could. It would rather add to it.

555. *By Mr. Hope*—Is not the automatic brake a better brake than the chain-brake, Mr. Grove? Yes, I should say that the automatic vacuum-brake is a better brake than the chain-brake.

556. Of course, I may tell you that an engineer told us this morning that the automatic brake would be a considerable help when a train was coming down a steep grade, and had to go up again on the other side. He said it would be a great advantage, because the momentum of the train coming down-hill would take it up the next grade—what do you say? I do not see how that could be so. Possibly the engineer who made that statement meant that you could throw the automatic brake off quicker in getting to the bottom of a decline than you could the chain-brake, or side-brake, or hand-brake.

557. *By the Chairman.*—What he did say, I think, was that by throwing off the brakes quickly you would get the advantage of the momentum? Quite so—I understand.

558.—*By Mr. Hope.*—You were talking about the time lost in uncoupling the automatic brake; is not the time lost in uncoupling the chain-brake greater? I should say not.

559. *By Mr. Nicholls.*—Do you know what the life of the automatic vacuum brake is, Mr. Grove—how long does a set last? Well, the connections—such as pipes and couplings, and so forth—would probably last, I should say, roughly—I have no exact knowledge—from 15 to 20 years without renewal. Probably the bulk of the fittings would last for at least that time, if not somewhat longer. Of course any of those parts of the brakes that are in actual contact during the running service would naturally require renewal. I have no exact information, but I believe the maintenance of the vacuum brake is rather expensive.

560. *By the Chairman.*—Have you had experience of the running of trains of similar character to those of ours in other parts of the world, on the 3 ft. 6 in. gauge, with curves and gradients such as ours are? I have had experience on the metre gauge, with similar curves and grades.

561. What is the metre gauge? That is 3 ft. $3\frac{3}{8}$ ins.

562. What brake have you seen used there? Well, on no line that I have been engaged on have I seen the vacuum brake, but I have seen the Westinghouse.

563. You have had experience of the Westinghouse? Yes, to a limited extent only; on the Central Bahia Line they used side brakes, break-van, and steam brakes on the engines—nothing more. On the Assam-Bengal Railway—the portion of the line which I had experience of—we worked the trains in the same way. But they were introducing the Westinghouse brake on other portions of the line.

564. Of course, the chain brake would be an additional security to that? It would have been; yes.

565. Have you had much experience of the running of goods trains in England? Not on open lines; only on construction works.

566. Are you able to say, of your own knowledge, whether the application of the automatic brake is general through the whole of the stock in the case of railway companies in England, or whether it is only partial? It is only partial.

567. It is not applied to the whole of the rolling-stock? No, not to goods traffic.

568. What brake do they use in their goods traffic there, then? Steam brake on the engine and side brakes and the brake-van.

569 Then, from your knowledge of the railway system here, would you consider it a matter of urgency in the public interest—supposing, say, that you were running these lines for a private company—to equip your rolling-stock with an automatic brake? No, I should not consider it a matter of urgency, seeing that in the past the present brakes have worked so satisfactorily.

570. Do you know that a portion of the permanent way is laid with 46-lb. rails? Yes, I have heard that that is so.

571. And do you know that the rate of speed at which the Express travels over those rails is thirty-eight miles an hour? Yes, I presume that between stations at certain points it would be something over thirty miles an hour.

572. Which, then, would you consider a matter of greater urgency, the relaying of that portion of the line over which the trains travel at that speed with 61-lb. rails, or the equipping of your stock with automatic brakes? Personally, I should have no hesitation in saying that it would be better to equip the road with the 60-lb. rails.

573. In the interests of the public safety it would be better? Yes, having regard to the public safety.

574. Is it within your knowledge that the automatic brake is more severe on the permanent way than the other brakes are? Yes, certainly.

575. And the application of an automatic brake to the stock on these lighter rails would increase the danger of a break in the permanent way? It would; but I understand the express trains are already fitted with the automatic brakes, are they not?

576. Yes? So that, being so, the rails are experiencing the extra strain at the present time, to a certain extent.

577. Do you know whether the automatic brake is universal in its application on the mixed trains in England? There are very few mixed trains running in England. I may say, that there the Westinghouse brake is more in favour than the automatic vacuum; in fact, I think it is almost in universal use in England.

578. But not on the goods trains? Not on the goods trains, as you say.

579. Have you ever heard of the Westinghouse or the vacuum brake being applied in England to the engine and tender, and the rest of the goods train being left with the side brakes? No.

580. What do they use—simply the steam brake and the side brakes? Yes; there would be no advantage in fitting the automatic brakes to the engine; because the steam-brake, with the ordinary screw brake in the brake-van, would do just as good work.

581. *By the Minister of Lands and Works.*—You are a civil engineer, are you not? Yes, sir.

582. Are you also a mechanical engineer? I commenced my experience in workshops, and worked among engines for three or four years.

583. Would you set your opinion on these matters against the opinion of the Chief Mechanical Engineer of the Government Railways? I should keep my opinion; I should be prepared to retain my opinion in face of any adverse criticisms he might make.

584. Do you think that trains generally ought to be fitted with continuous brakes of any kind? We are dealing with the Tasmanian railways, the generality of the trains on which are mixed trains.

585. Do you think they should be fitted with continuous brakes? I think it would certainly minimise the risk of any accident if you fitted the trains with some form of continuous brake.

586. In any continuous brake, at a station, in taking off the brake between carriages, would there not be some disconnection of the brake-gear to make? Yes, there would.

587. Would that take a longer or a shorter time than the disconnection or connection of the vacuum brake? Well, I do not know what other form of brake you are speaking of.

588. I am speaking of the vacuum brake now in use on our express trains, and the ordinary chain brake which has been spoken of as most effective, apart from the vacuum brake? I should say that the vacuum brake would take longer.

589. Have you ever seen it coupled? Yes.

590. And you say it would take longer than in the case of the chain brake? I should think so.

591. If the locomotive engineer said it would only take two seconds, would that be correct or incorrect? I could not say.

592. Will you describe the process of coupling the vacuum brake? There is a flange coupling.

593. How long does it take to connect it? A few seconds; say, half a minute.

594. What is the operation? You take the two ends of the pipes, and twist the flanges together.

595. How long does that take? It might be half a minute.

596. Would it take any longer than connecting or disconnecting a chain brake? I should say that it would.

597. Now we come to the question of the weight of rails. Will you venture, as a civil engineer, that we are running our trains presumably—at the rate of speed you have been informed of this afternoon—in safety, taking into account the weight of rails we are using? Well, I think

that I might venture to say—I think that I should be justified in saying—that there is a certain degree of risk.

598. Specially pertaining to the weight of rails? Yes, and the weight of the engines.

599. Did you not give us to understand a while ago that the immunity from accident for so long was a reason why we should not adopt the automatic brakes? I did.

600. Would not that immunity of accident also apply, in the same way, to the lighter weight of rails used during that time? Well, to a certain extent, it does apply, but not entirely, because the rail is of course, continually becoming weaker.

601. Is there any generally-adopted law or regulation among engineers that a certain weight of rail must be provided for a train with a certain weight on the axle, travelling at a certain speed? Yes; There is a combination of rules which have to be considered.

602. Very well. Now, we have a 43-lb. rail, engines 10 tons on the axle, travelling at a 28-mile speed at the limit. Well you say that those three conditions, taken together, are dangerous in running trains? You use the word "dangerous." I do not know that I should use quite such a strong term. There is a certain degree of risk.

603. Is there not a certain degree of risk in running any train over any weight of rails? Quite so; but the degree of risk varies.

604. Is the degree of risk in this case compensated for by putting in an extra number o sleepers? Yes.

605. It is? To a certain extent, it is.

606. Are you aware what number of sleepers is provided on those lines where the weight of rails and speed of trains are as stated? I have noticed the spacing of the sleepers, and I should say that, if anything, the spacing of the sleepers is rather too great.

607. As to what line would you say that? Well, on the Derwent Valley line, of course, I have noticed it more particularly than on the Main Line. But I have noticed it casually on the Main Line also. I take it to be the same right through.

608. Do you know whether the speed of trains on the Derwent Valley Line and the speed on the Main Line varies? Yes, it does.

609. You know that it does? I know that it does.

610. And, therefore, the conditions might vary? The conditions would vary—yes.

611. Can you say, of your own knowledge, whether, on those particular parts of the line where the high speed is attained, the sleepers are sufficiently close together to eliminate any possible element of danger beyond the ordinary risks of travel? I have never actually taken a measurement, sir; but from what I have heard is usual here in the spacing of the sleepers, I should say there is an element of risk.

612. You say that, not of your own knowledge, as to the spacing of the sleepers? Not of my own knowledge.

613. Do you know the portion of the Main Line where the speed attained by the express trains is highest? No, I do not.

614. You have travelled through frequently? Yes.

615. Where would you imagine that the highest speed attained would be? I suppose it would be running towards the end of the down grade going to Launceston, the other side of Parattah.

616. Along the top of the plateau? Yes.

617. Is there a longer straight run there than anywhere else on the line? Yes.

618. On a descending grade? Yes.

619. And you know that on such a line the train would be pulled up on a straight run on a down grade or along a level? Yes.

620. I suppose you imagine that the end of the straight run, where the quickest speed would be attained, would be along there at the other side of Antill Ponds? Yes.

621. Have you noticed the rails there, and the sleepers? No, I have not.

622. Now, Mr. Grove, you are engineer and representative of the Great Western Railway Company here—are you not? Yes.

623. Your company has a railway to construct, if it carries out the conditions of its Act? Yes.

624. Is it to the interests of your company to construct its railway as cheaply as possible? Yes, within certain limits.

625. Can they construct more cheaply without the automatic brakes than with them? I should say that we could construct more cheaply with them.

626. You are not quite sure about it? Well, it depends very much on the point of view from which you ask the question. You mean that the use of the automatic brakes or the other form of brakes would affect the grading of the line.

627. I say would it be much cheaper for your company to construct and equip that line with or without adopting the use of continuous automatic vacuum brakes? Do I understand you to mean——

Mr. Patterson.—He cannot answer a question put in that way. The automatic brake has nothing to do with the cost of construction of the railway.

628. *By the Minister of Lands and Works.*—It has something to do with the cost of equipment, which I referred to in my question just now. What do you say, Mr. Grove? I should say it would be cheaper for us to construct the line and equip it with automatic brakes.

629. Cheaper than it would be to equip it without automatic brakes? Yes. I should like to enlarge on that, and make it quite clear to you what I mean. It would be cheaper to construct

the line with a view of using automatic vacuum brakes, or some other approved form of automatic brake, than it would be to construct the line with the object of running trains without any form of automatic brake.

630. You have told us, awhile ago, have you not, that the effect of the use of automatic brakes upon a line was worse than the effect of the ordinary brakes? Yes.

631. Would, under these circumstances, your line have to be stronger if you used automatic brakes, or weaker—less costly if you used automatic brakes, or more costly? It would require to be made stronger.

632. Stronger if you used the automatic brakes? Yes.

633. And, in that case, can you show us how the line could be made more cheaply if these brakes are used than it could be if they were not used? Yes, I think I can. The line of the Great Western Railway, of which I am speaking, goes through very difficult country. There will have to be very long grades in that country, and, according to modern views, it would not be safe to work on those extremely long grades without automatic brakes; so that if it were determined not to use an automatic brake on our stock, the question of grading and protective works would have to be further considered. Instead of having 1-in-40 grades, we might have to lay 1-in-50 with more tunnelling; and so the construction would cost a great deal more were this line laid out with the view of dispensing with automatic brakes.

634. Then you would not, unless you decided to use the automatic brake, adopt a grade of 1-in-40? I should say not; not in such great lengths.

635. And all the trouble your company took to acquire the right of putting in 1-in-40 grades as it proved, independent of the will of the Government Engineer, was taken for nothing, I presume? Not at all, sir. The company had that right secured in an Act which contained, I believe, no mention of what form of brake was to be used.

636. Now, are you prepared to say whether the total cost of constructing your line, and equipping it with rolling-stock fully fitted with the automatic vacuum brake, or the total cost of constructing and equipping without the adoption of such brake, would be the greater? Well, taking up the point of view that I took up before, I say that a line constructed with long gradients, with a due regard for the safety of trains, on which the ordinary means of brake power—steam brakes on the engine, and side brakes—would be used, without any use whatever of the automatic brake on any of its trains, would have to be laid out in that regard, and it would cost more than if it were laid out with a view to the use of the automatic brake.

637. Do you think it probable that your company will adopt automatic brakes? On some of the trains, I should say, certainly.

638. Do you know anything of the continuous gradients of the Main Line? I have heard that there is in one place, I think it is, three miles of 1 in 40; but I have not seen a section of the whole line.

639. You do not know anything of the gradients between Colebrook and Rhyndaston, I suppose—nothing, that is, except what you have noticed coming along? No, I do not.

640. Have you had any experience of railway management at all, Mr. Grove? Not of maintenance; only of construction.

641. Only during construction? Only during construction.

642. Where the contractor would simply have the right to carry for the public temporarily? Yes.

643. Were you responsible? Yes.

644. You, yourself, was responsible as manager for the time being? Yes.

645. Do you think a mixed train—in which there would be, perhaps, twelve trucks, one carriage, and one brake-van—travelling up at three miles 1 in 40 grade, is sufficiently protected in case of a break of the train, by having a chain brake applying only to the brake-van and the adjoining carriage? [No reply.]

646. I will put that question in another way. Are you aware, Mr. Grove, that in a distance of six and a half miles, between Colebrook and Rhyndaston, there is an altitude of nearly 700 feet to be overcome—that the gradient mounts nearly 700 feet in that distance? Over six and a half miles?

647. Over six and a half miles—did you know that? I was not aware of that; but I should have supposed that between certain of the stations there would be about that rise.

648. I quote from the book. Colebrook is 694 feet, and Ryndaston is 1370: that is 676 feet difference? [No reply.] *By Mr. Patterson*: That is about 1-in-75.

649. I do not know that I said that the grade was spread out exactly over the six-and-a-half miles. As a matter of fact there is three miles of 1-in-40. Now, I want to ask you this, Mr. Grove, You are aware, at any rate, that there is a considerable distance, some three or four miles, of 1-in-40, about that part of the line are you not? Yes.

650. Would you consider a train adequately equipped with brake power, if it contained twelve trucks, one passenger carriage, and one brake van, with a chain brake only, applied to the van and the one carriage, supposing that the train parted company with the tender, close up to the engine? Yes.

651. You consider that is sufficient? Yes.

652. Would you consider it would be absolutely equipped as to safety, if it had a two-engine load, going up that gradient? Do you mean with a greater number of trucks than you have mentioned—double the train?

653. Yes, with a heavier load? Well, of course, there is certainly a limit, which should not be exceeded, in the length of the train, or you put too great a strain on your couplings.

654. Then, leaving the second engine out of it altogether, twelve heavily-loaded trucks, of six tons each, with the weight of the trucks, four tons odd, tare, would be sufficiently braked with the chain brake on a carriage and the van, at the top end of a gradient of 1 in 40, supposing that the couplings connecting the train and the tender went apart? You mean twelve loaded trucks to one brake van?

655. Twelve trucks, one carriage, one brake-van? Where does the train part?

656. I am assuming that it parts at the most dangerous part of the line, up near the top of the grade? I should say that the train would run back.

657. And that the brakes would not be adequate? And that the brakes would not be adequate; that is, if the train parted as you say—the train you are speaking of. You are imagining a train parting at its connection with the engine?

658. Yes. The train I described is a train we frequently have; only I am making it lighter for you—because we frequently have a two-engine train. You do not think it would be adequately braked? I do not think it would be.

659. Well, what would happen if such a break took place about half-way through the Tunnel, or just as the train was entering the Tunnel—supposing the break took place between the tender and the front truck? [No reply.]

660. Where would the breakage be most likely to take place? There—where there is the greatest strain.

661. And what would happen in the case of such a break? The train would run back; but the brake power on the train should be sufficient to retard the speed of the train, and prevent it leaving the rails when running back.

662. And, now, do you think that the Government of Tasmania—when four out of five of the Australian States, and the Colony of New Zealand have adopted these brakes—could defend an action for damages on the part of passengers in connection with an accident of that kind? I do not think I am prepared to give an opinion on that, sir.

663. *By Mr. Patterson.*—I am going to ask you now, not a general question, but a detailed question, Mr. Grove. I am giving you facts which I shall have to vouch for to this Committee afterwards. If I told you that we have run thirty-eight miles an hour over 46lb. steel rails—ten sleepers to the rail: the number of sleepers in existence in the days of the Main Line Company, and were never altered to this day—would you consider that safe with engines ten tons on the axle? I should think there would certainly be an element of risk, and it would not be safe.

664. Of course, if the sleepers had been put only a foot apart, that would reduce the risk? It would, considerably.

665. Reduce it by two? More.

666. And if I tell you that, in fact, the same conditions exist to-day that existed twenty-five years ago, you think there would be an element of risk? Undoubtedly I do.

667. Now here, Mr. Grove, we are running mixed trains, with a continuous brake at the rear of the trains. Taking into consideration your answer to the Minister just now, and taking into account the fact that for twenty-five years we have run these mixed trains so braked without a solitary accident, are you of opinion that we are justified in any degree in adopting these costly safety appliances for our slow-speed trains in this State? No, I do not, I think I have said that before.

668. You are quite clear about that? Quite.

669. If I tell you that in South Australia they have exactly the same system of railways, the same class of stock, the same grades and curves; that there they have four times the number of railways, with five times the cost of construction; that there they do not use the automatic brake on mixed trains in a single instance: do you think that we, in this impecunious State—bearing in mind that we are losing on our railways (a loss of £110,000 last year), while their railways pay a profit to the general revenue—are justified (I am on a financial question: you are a contractor's engineer) at the present moment, in undertaking a heavy outlay for the purchase of these brakes? No, I think not, sir. That point you raise is the greatest point against incurring the expenditure.

670. Now, coming back to that somewhat complicated question the Minister asked you just now. I will go into detail a little. He asked whether it would be cheaper to construct and equip your line with the automatic brake or the ordinary brake. I will put the matter more in detail. You have the right to use maximum grades and minimum curves as often as you please? Yes.

671. Does that, on your survey, involve the construction of banks of a greater length, of 1 in 40, than three miles? Yes.

672. And you have a rainfall of something like 120 inches in the worst part of that country? Yes.

673. As against 21 inches on the Main Line? Yes.

674. And is that rainfall a factor in any question of the use of the automatic brakes? Yes.

675. And you thought of that when the Minister asked you that rather puzzling question? That was what I was considering—yes; I was not puzzled. It naturally occurred to me that if a line had to be laid out with a view of using only side braking-power on any of its trains—simply a steam brake on the engine, and side brakes, and a brake-van—through that difficult country; then, if that line were built with regard to the safety of the travelling public, it would be impossible to lay the line out to advantage, and in that way it would certainly cost more.

676. On the West Coast railways—the North Mount Lyell, the Mount Lyell, and the Emu Bay—they have enormously heavy cuttings, with this extraordinary rainfall. Are those cuttings

more likely to slip than cuttings in a country with only 21 inches of rainfall? I should say so, certainly.

677. Is that another reason for your company demanding the right to put in those curves and grades as you choose? Yes, the fact that the nature of the country makes very heavy cuttings unavoidable.

The witness withdrew.

FRIDAY, NOVEMBER 1, 1901.

WILLIAM RUFUS DEEBLE, *recalled and further examined.*

678. *By the Chairman.*—You wish to be recalled to amend a portion of your evidence, do you not? Yes. When being examined by Mr. Patterson, yesterday, as to the maximum axle load that we were running on the Main line, I said it was 9 tons 18 cwt. That, I find, is incorrect; it should be 10 tons 7 cwt. I have had two or three engines weighed, and I am quite positive about it—that is the maximum axle load running on our Main line. And there is another question that I do not think I made clear to Mr. Patterson, or I did not clearly understand him: that was in reference to the engines and the application of the vacuum brake. All that we require for the application of the brake is atmospheric pressure—approximately, fifteen pounds to the square inch. Mr. Patterson, I understood, questioned the ability of the engine to exhaust the air from the brakes, that is, if we had additional loads.

679. Yes? Well, I wish to state that the ability of the engines is quite competent to exhaust the air from any number of brakes that our engines could possibly be called on to handle. If it were necessary, I could refer to experiments that took place in 1889, conducted by Mr. Douglas Galton, in reference to the hauling of long trains of troops. He made some experiments with fifty carriages, just to prove the efficiency of the brake with very long and heavy trains. That, as I say, was as early as 1889. In those trials they had forty vehicles, making a train 1463 feet 10 inches long, weighing a total weight of 573 tons 14 cwts. 2 lbs. And, so far as I know, in all cases where the Westinghouse or the automatic vacuum brakes have been applied to existing engines, there has never been any difficulty in maintaining sufficient steam to work them. At 100-lbs. pressure upon any of our boilers we could exhaust the brakes of any number of carriages that one of our engines could handle.

680. With regard to that question—and of course I am not an engineer—I look at it in this way. Mr. Patterson wanted to know what expenditure of steam you had available for hauling, and what pressure of steam would have to be applied to put the brakes in operation; and he asked if the power required to work the brakes would affect the hauling-power of the engine? It would not affect the hauling-power of the engine in the slightest. In would merely mean an almost imperceptible increase in our fuel consumption; but in all trials that have been made it has been proved that that is negligible. Speaking in an off-handed way, it means a few shovels more of coal during a trip; but it does not hamper the ability of the boiler for the hauling of extra loads.

681. But, you have to use a certain amount of steam? A certain amount of steam—yes. In the case of the vacuum brake we use less steam in our ejector than is used with the Westinghouse pump.

682. Another question I want to ask you—you may not be able to answer it here, but you might prepare a return—is this; In dealing with the questions of the original scheme for these brakes, as it was submitted to Parliament, you made certain statements. The original proposal was for the expenditure of some £50,000 or £60,000. You told us yesterday, I understood, that out of the first £20,000 granted you had saved twenty-five per cent. all round? No, that is not quite it. I think the actual tenders I have received amount to about £5000, and the saving upon that portion is a little under twenty-five per cent.

683. I do not want you to commit yourself to specific figures now. At all events, there has been a certain considerable saving, so far, on your original estimates? Yes; exactly.

684. Taking the actual cost of the stock you have ordered as a basis for calculation, could you let us know exactly how much, in addition to the £20,000 already voted, it would require to equip your stock according to your second or modified scheme? Yes, I will do that.

685. And you will prepare us such a return? Yes. It will be approximate, of course.

686. You have based your other calculation——

Mr. Minister of Lands and Works: Pardon me. You will remember that I yesterday asked Mr. Deeble if he had submitted another estimate to the department, in reply to my instructions given the other day, showing what it would cost to equip forty per cent. of the rolling-stock with the brake, and what it would cost to equip forty-five per cent. But his calculations were then based on his original estimates; and the question was put to him whether the £20,000 we have now on the Public Works Schedule would not exceed the cost of equipping forty-five per cent. of the stock; and Mr. Deeble replied that we would be able to equip fifty per cent.

Witness: Which I think would be a most desirable thing.

687. *By the Minister of Lands and Works.*—With the extra money now asked for we could equip fifty per cent. of the stock? Yes; I think it is most desirable.

688. *By the Chairman.*—Your reply to the Minister, then, as to the extra money required, was based on the original estimates? Yes, sir.

689. And the figures now show that the actual cost, so far, is 20 or 25 per cent. below those estimates? Yes.

690. I want you, if you will, to give us the particulars as to what will be the actual cost to equip 40 per cent., 45 per cent., and 50 per cent. of the trucks, taking as a basis of calculation the actual cost paid, so far. Will you do that? Yes, certainly; I will do that, Mr. Guesdon.

691. Your last suggestion was that 45 per cent. of the trucks should be equipped with the brake, I think? Yes, I simply did that because I wanted to work out what would come in within the £20,000 we are asking for. If they are hampered for money most companies consider that if they can equip 50 per cent. they can manage for a time with the other 50 per cent. piped. If you have less than 50 per cent. equipped, it hampers the traffic in getting the proportion of braked vehicles in a train; so that I would strongly recommend the equipment of 50 per cent.

692. Very well. Make your return on the 50 per cent. basis. That was recommended, I think, by the conference in Melbourne you referred to, 17th September, 1900. [Refers to document.] This is the paper—the General Managers' Conference, it was. No, I see that it does not show any percentage here? No. In Queensland, as Mr. Nutt informs me, they are initiating the system of automatic brakes. They started by fitting their engines with the brakes; and now they are fitting all their carriages and 50 per cent. of their goods stock.

693. *By the Minister of Lands and Works.*—Since you were here yesterday, Mr. Deeble, have you obtained any more information as to the general application of the automatic brake? Well, sir, as a matter of fact, I had some other information earlier than yesterday. I understand that the Natal railways and the Cape Colony railways have the continuous brake. But I have here extracts from *Engineering* on that. This is a letter that I submitted to the General Manager:—"*Re* Automatic Brakes.—I note by *Engineering*, of August 9th, 1901, some illustrations of bogie-wagons for the Rhodesian railways. I refer you to a condensed extract:—'We illustrate on page 181 some typical wagons also constructed by the Lancaster Car Company.' I might explain, before going further, that in the previous number they illustrated other cars which were all fitted with the vaccum-brakes:—'These also show that in this respect Mr. Cecil Rhodes and those associated with him—notably Sir Charles Metcalfe and Sir Douglas Fox, the engineers of the line—take a liberal view of the prospects and of the needs of the most modern conditions for coal and goods traffic. Figure 1 shows a 20-ton low-sided wagon, and Figure 2 shows a 30-ton high-sided coal-wagon, and Figure 3 illustrates a standard 20-ton covered goods-wagon, with guard's apartment. The automatic vacuum-brakes are applied in conjunction with Thomas's patent either-side hand-brake.' In commenting on Figure 2, 1 30-ton high-sided coal-wagon, the paper states that a large number have been constructed."

694. Now as to that question of the steam used in the working of the brake; there is no connection, really, between the fact that you get a fourteen or fifteen pound pressure from the atmosphere, through the vacuum, and the statement or suggestion that that involves the expenditure of the same pressure of steam? Oh, none at all. The brake is worked with anything from a hundred pounds pressure. Of course, we could not work trains at that pressure, but at a pressure even lower than that we can exhaust the air from any number of brakes likely to be in use on every train on our lines. From anything from a hundred pounds up to our working pressure—which in our engines, ranges from 135 lbs. to 150 lbs. to the square inch—we can work the brakes.

695. But the pressure you produce by exhausting the atmosphere, does not indicate that you are reducing your steam pressure to anything like the same extent? I would not say that, because as a matter of actual practice, the men do not feel it. It is inappreciable.

696. With regard to that Board of Trade regulation as to the side and lever brakes: have you been able to discover that regulation? I have not been able to discover that regulation, Mr. Mulcahy, but I have discovered in *Engineering*, an article stating that a Commission sat upon automatic couplings in England, and in the course of making their recommendations, as referred to in the letter I addressed to the Chairman this morning, they say ——. [Document read. See Appendix D.]

697. Can you give us any idea of the time generally taken to couple the automatic vacuum tube as compared with the time it takes to connect the ordinary chain brake, a continuous brake in each case? Well, sir, I should say that it is quicker to couple the automatic brake.

698. How long do you think it would take to couple the automatic brake? I think it ought to be coupled in from eight to ten seconds. The motion is simply taking hold of the two hoses and dropping them, and they are immediately locked. To uncouple, the man has not to touch it at all. He just uncouples in the usual way, and the train draws away. Then, there was a question I wanted to refer to, Mr. Mulcahy, as to the cost of the Mount Lyell stock.

699. Have you any further information as to the comparison of the Mount Lyell brake mechanism with ours? Well, the Mount Lyell bogie wagons I find are fitted with one cylinder—one 18-inch cylinder. As I explained yesterday, our bogie wagons are fitted with two cylinders, thus almost doubling the mechanism.

700. *By the Chairman.*—Is it necessary for us to incur that extra expense? It is necessary, on account of the present side-brake gear. The gear as attached to the Mount Lyell bogie wagons would more nearly approach the gear attached to our brake vans. We have one 18-inch cylinder, one tumbler, and one set of pull-rods for our vans. The tender for that set in London is £32;

total cost, after payment of freight, insurance, and all charges, erected ready for road, £38 0*s.* 4*d.* But, mind you, the cost of erecting it here is £2 5*s.*, because we have to lift the body of the van off here to erect our brake, and do certain other extra work. They do not have to do that to their wagons at all. I understand Mr. Driffield's price is £38. Ours, as I say, is £38 0*s.* 4*d.*, and we have to face the extra cost of erection here.

701. Then that would bring the price down to about his estimate? Yes.

702. *By Mr. Hartnoll.*—Except that he would have to pay duty on his stock, and you do not? Yes; but that would correspond to our cost of erection.

703. *By the Chairman.*—Well, to make that other thing quite clear—that question of the engine power, or steam power required to create the vacuum to work the brake. What Mr. Patterson meant by his question, I take it, was this: you have to create a pressure of fifteen pounds to the square inch? Yes.

704. In order to do that you have to exhaust through your pipes what represents a pressure of fifteen pounds to the square inch of your gear? Yes.

705. Is that the way you understood Mr. Patterson's question? No. Mr. Patterson's suggestion was, that we would not be able to do it. He contended, that if we could haul so many more wagons by using the vacuum brake, we should lose it in another way—we should put so much on our engine that we would not be able to it. That has never been proved to be th ecase on railways where either type of automatic brake has been used. The steam required for either the Westinghouse or the vacuum has never affected the capacity of the boiler.

706. But you have to create the power which is necessary to exhaust the atmosphere so as to create the 15-pound pressure on the brake gear? Yes; the atmosphere does that.

707. You have to draw from your gear, somehow, what is tantamount to a pressure of fifteen pounds to the square inch? Yes; but——

708. That is what Mr. Patterson meant; and he wanted to know what amount of boiler power it would require to create that vacuum? It is almost impossible to say. We know, in practice, that it has been the experience of all the companies that have used these brakes, that it has not hampered their boiler power, wherever applied. They have always had ample power for both the engine and the brakes.

709. *By Mr. Dumaresq.*—Then, the fact of the matter is, that the power of haulage is not lessened by the equivalent of fifteen pounds to the square inch? Oh, no; it simply means that we use a little more coal, and have to generate a little more steam. The power of haulage is not lessened in the minutest degree.

710. *By Mr. Hope.*—There is a general question I want to ask you. Has the general traffic increased on our railways to any great extent during the last twenty years—to such an extent as would warrant the change in our brake system? That is a question I could not answer. Our loads have increased, and our mileage has increased; but I could not speak as to the financial aspect of the matter.

711. *By the Chairman.*—Do you keep any record of the faults that occur in the chain brake—that is your principal brake, I think? That is our continuous brake.

712. Have you any record of the faults that have occurred in the working of that brake? I do not know that we have, but we have a very close system of examination. Our chains are examined every trip, and every twelve months our brake-chains are taken out and annealed—that is, they go through the fire and are softened, and every link is examined for fracture, and so forth. Then that is recorded.

713. Then you pretty well know what number of faults there have been in a chain. Oh, I dare say I could find that out.

714. Mr. McCormick says, in his evidence, "Of my own knowledge, I know of a serious failure in that respect." Can you give us any return, shown by any reports you have by you, of the mileage that you have run each year, and the reported failures of your chain brakes on the trains? Well, I do not know that I——

715. You gave us a return yesterday of the mileage run with the Westinghouse and vacuum brakes, and the number of faults? Yes.

716. And could you not, in the same way, give us, approximately, the mileage you have run, and the number of faults, in the case of the chain brake? I do not think I could.

717. You could not get such a return as would enable us to make a comparison between the chain brake and the Westinghouse and vacuum brakes, on this line? No, I am sure I could not. In the first place, we never kept a record as to brake chains, or anything of that sort, until the last three years.

718. Well, could you give us the return for the last three years? No.

719. Nor for the last year? No. We have not the same system that obtains in England of keeping a record of the mileage run by railway trucks and carriages. We could not keep it.

720. And you say that you could not even do it for this last year? I do not think so. I should be very pleased to meet your wishes, if I could possibly do it; but we have not the records I could take the information from.

The witness withdrew.

JAMES FINCHAM, *called and examined.*

Mr. Fincham made the statutory declaration.

721. *By the Chairman.*—Your name is ———— ? James Fincham.

722. And you are an engineer? A Member of the Institute of Civil Engineers.

723. And you were the Engineer-in-Chief of this State for many years? Yes, for many years.

724. You understand the general railway system of this State? Yes—seeing that I constructed most of it.

725. And you are fully acquainted with the brake system that has been in use on Tasmanian railways for many years? Well, I know that they had the old chain brake on the Western line, and that they have had the Westinghouse brake subsequently on some of the engines.

726. That is the only line you are referring to? Yes.

727. Of course, that was when they had the 4-ft. 8½-in. gauge? No, the 5-ft. 3-in.

728. You know the class of brake that has been in use on the Main Line and the Government 3-ft. 6-in. lines? I do not know what has been used lately; but I know what was used before.

729. Will you describe, from your own knowledge of the facts, what brakes were used? The Westinghouse was partly used on the engines.

730. On the 3-ft. 6-in. lines? On the 3-ft. 6-in. lines—yes. And the chain brake, to some extent.

731. And the hand brake—the lever brake? Well, that would be used in some places—in the guards' vans, for instance.

732. From your experience and your knowledge of the railway systems has that chain brake been, to your mind, an adequate and efficient brake to control the rolling-stock and to ensure the public safety? As far as I know—yes; for a great number of years.

733. Is there anything that has come within your knowledge in connection with the train service of this country that would, to your mind, justify a large expenditure at this time in equipping the whole of the train service of this State with the automatic brake? Never.

734. That is to say that, as far as your experience and your knowlege is concerned, the train service has been effective, and sufficient in all respects for the public safety? Yes: I do not recollect hearing of any accident at all, at any time, in connection with any defects in the brake system. Of course, if money were no object, I should prefer a brake like the automatic vacuum brake; but I take it that the duties of those who are responsible for the safety of traffic on the railway are limited by ordinary reasonable precautions. You can, as in the case of spending a large sum of money upon these automatic vacuum brakes, pay too high an insurance for safety. The number of trains, the weight of trains, the speed of trains in this State, are all, one might say, comparatively small, compared with same things in other countries. There are places, such as Great Britain and parts of the continent of Europe, where this vacuum brake is a necessity, on account of the very high speeds and the tremendous weights of the trains. Of course you can make this insurance for the public safety cost anything you like. You can go one beyond the vacuum brake, and to provide men to patrol the line and watch every inch of it, as is done in the case of Royal journeys; but that would really not be necessary in the case of ordinary traffic.

735. You are acquainted with the low rates of speed at which trains travel here—all except the express? Yes.

736. You know the speed at which the mixed and goods trains travel? Yes.

737. As a question of insurance, would you regard it as a wiser expenditure to reduce the grades and have more extended curves, and otherwise to improve this permanent way, or to introduce a better system of brake? Oh, what you are proposing now, sir, would cost enormously more than the introduction of any system of brake you might decide to adopt on the rolling stock—that is, if you propose to make the work on the permanent way effective.

738. But, as a question of insurance, the further safety would be better secured by lighter grades and easier curves than by the introduction of a new brake? Yes, giving the same rolling-stock and the same brake-power as at present.

739. And as a question of insurance—merely as a question of insurance—which means would you consider the best to adopt? I do not know whether I quite follow you. I want, if I can, to make the Committee understand that any effective reduction of this steepness of grades and the sharpness of curves on our railway system, in a mountainous country like this, would be equivalent to making an enormous proportion of the mileage of the railways over again. What I really wanted to explain a few questions ago was, that I thought, with the commonest ordinary precautions, very reasonable provision had already been made for the safety of the travelling public, by the appliances that have been in use now for so many years.

740. Have you ever had any experience in managing a railway? I was never managing—no.

741. I suppose you have a fair idea of how the departments of a railway would work. For instance, supposing a brake were defective, or not sufficient to control traffic, from whom would you expect to get a complaint as to the inefficiency of the brake? The Locomotive Superintendent.

742. From whom would he expect to get it? The drivers or the guards. One or both.

743. Would you regard it as a matter of duty on the part of these men to report the inefficiency of the brakes? Certainly.

744. And if no such report were made to the Locomotive Superintendent or the General Manager, would you regard those men as capable of saying whether the brake was efficient or not? Yes; any ordinary mechanic could say that.

745. The driver? Yes; any man in charge of an engine ought to have knowledge enough for that.

746. And if you were general manager of a railway company, and you received no complaints from your staff, you would consider the brakes in use sufficient? Yes; taking the absence of complaints, together with the absence of accidents.

747. Of course, you will understand, Mr. Fincham, that this is a lay committee. There are no engineering experts amongst us here. If I do not put any questions to you quite clearly, I hope you will not hesitate to ask me to put it in such a way that it may be perfectly intelligible to you. Now, in reference to the permanent-way of this railway, would you regard rolling-stock and engines with a weight of 10 tons 7 cwts. on the axle, running at the rate of thirty-eight miles an hour over a permanent way laid with 43-lb. rails, safe—would you regard that service as having an element of risk in it? Certainly, if, as you say, the weight on the driving-axle of the engine is over ten tons.

748. It is 10 tons 7 cwts? Then the sooner you put a 60-lb. rail under it the better.

749. I believe that the records show there have been no accidents in running over that portion of the line; so I put a proposition to you in this way: in running over that light rail with engines of that weight there has been immunity from accident? Yes.

750. The brakes in use have not been responsible for any accident, and the lightness of the rails has not caused any; so that the immunity from accident is equal in both cases? Quite so.

751. Well, then, on that, from an engineering point of view, which would you regard as the more urgently-needed expenditure: that necessary to relay that portion of the line with 61-lb. rails, or—taking all the conditions of the service into consideration in each case—that necessary to equip your stock with a superior brake? Decidedly, I should prefer the re-laying. Any engineer of experience would tell you that it is risky to run engines of ten tons and over on the driving axle on a 43-lb. rail.

752. And you regard that improvement as the more urgent? Far and away more urgent; because, as I have already explained, I think the insurance of the safety of the public with regard to brakes is sufficiently provided for by the appliances that are now in use, and that we know have acted perfectly well for so many years.

753. *By Mr. Nicholls.*—It has been said, Mr. Fincham, that we are running our railways with some danger to the public, on account of the absence of the automatic brake from our stock. I suppose that, theoretically, that must be correct: there is always some danger? Your question brings me back to what I said before. It is merely a question of extra and perhaps unnecessary insurance for the public safety.

754. Then, after all, it comes down to this: do you think, from your experience of these lines, you require an alteration of the brake system? No; candidly, I do not.

755. *By Mr. Hope.*—Are you aware, Mr. Fincham, that in some of the other States they are applying the automatic vacuum brake to their railway stock? Oh, yes; in several of the other States they are doing so. I don't think they are doing it in Victoria; but the brake is being adopted in Queensland, South Australia, Western Australia, and to an enormous extent on the Continent of Europe and in Great Britain.

756. Another question I would like to ask you. Do you consider that this automatic brake is a safer brake than our present chain brake? I think, as a brake, it is preferable. It is so safe, because if a train parts, or any part gets out of connection, the brake claps itself on at once, automatically.

757. Of course, the steep grade has been referred to, between Colebrook and the Tunnel, as to what would happen in the event of a train parting close up to the engine on that grade, with the chain-brake system. With the automatic vacuum brake the train would be almost perfectly safe? Yes, it would be pulled up at once.

758. And with the chain brake, if the train got a little momentum nothing would stop it? Well, you see, you have the engine brake.

759. But I am speaking of the train parting, and what might happen to the part that had left the engine? Well, with the automatic brake, the train would be pulled up at once.

760. Then you consider the automatic brake the best? The best brake going—if you require it.

761. You have given a good reply as to cutting down grades. You stick to that? Yes.

762. We have grades on the Western line that it would mean re-construction if we started to cut them down? Yes; and some of the other lines are worse than that.

763. You say that an engine-driver should have a knowledge of the requirements of the brake-power of the train he is driving? He is not fit to be on the train if he has not.

764. Is it not a fact, that the bulk of the engineers on our trains have no knowledge of any service outside the State? I do not know about that.

765. Well, my experience is that most of them have started as boys in the yard, and worked their way up. They could not have any actual experience outside. Would it be fair to expect these men to have a knowledge of the brakes? Yes; I think so, certainly.

766. And they should have experience of the vacuum brake? You did not ask me that.

The Chairman: I asked Mr. Fincham whether a driver should have sufficient knowledge of the brake on his train, to know whether it is able to control his train or not.

767. *By Mr. Hope.*—I understand you. Than the next point, Mr. Fincham, was as to our light rails. You said there was a possible danger with the light rails. If we put in extra sleepers, would not that overcome the difficulty of the light rails—I understand we have done that? Yes.

768. We have more sleepers to the chain with the light rails than with the heavy rails? Yes; I had the extra sleepers put in when I had charge. That would make some little difference, but not sufficient to eliminate the danger.

769. It would lessen the danger? To some extent, it would. In the same way that if it were practicable to lay the rails on a solid floor it would lessen the danger. But there are other forces when a train is in motion, in addition to the mere pressure downwards. There is the strain to right and left, and the surging. If your rails are too light, no quantity of sleepers will secure you against breakages.

770. *By Mr Dumaresq.*—We have had a good deal of evidence about this possible parting of trains, as to the steep grade from Colebrook up to the Tunnel; and the question was put, if a parting took place up at the top of the grade, would the present brake at the rear be sufficient to stop the disjointed train from running down to the bottom without danger. What do you think? I could not say positively, off-hand. I do not know what would happen with the present brake if a train did part. It is a thing that has never occurred, that I heard of. The parting, of course, would be going up the grade, not coming down.

771. In case of a parting at the top of the grade, would our present brake be sufficient to prevent the train getting to a dangerous speed and running off the lines? I am not prepared to say positively what would happen. But I will say this much, that if I had my choice, in such circumstances, of being in a train with the automatic brake, or one without it, I would sooner be in the one with the automatic vacuum.

772. *By Mr. Hope.*—I may tell you that the Mechanical Engineer stated that we have had seven breaks within the last twelve months, but not in bad places; and that they had discovered eleven other breaks at the various stations. Of course, that shows that there is always a great risk? Oh, couplings are always breaking, more or less.

773. *By the Chairman.*—Is the chain brake worked invariably from the guard's van or from the engine? Generally from the guard's van.

774. Mr. Nairn was explaining to us that when the old Main Line Railway Company was running here they used to separate their chain-brake, and make one half work continuously from the guard's van, and the other half from the engine. Well, if, in those circumstances, the train broke away, would you consider that the guard's van, with a brake over half the train, would be sufficient to hold the train in check? With the light trains we have, I think it would.

775. It is a steep grade from Colebrook up; I think 1-in-50? No, the ruling grade is 1-in-40.

776. And you think that with the loads we haul, in the event of a break taking place, with the train braked half from the engine and half from the guard's van, the guard would be able to hold his part of the train in check? Oh, certainly, he ought to be able to; because it is an understood thing among engineers that if you brake effectively one wheel in every three in your train it is braked enough.

777. I am sorry Mr. Patterson is not here. Is there any other information, now, that you could give us that you think would be of service, Mr. Fincham? I do not know that I can offer any other information, sir; it does not occur to me at this present time. Of course, I noticed what was reported in the newspapers as to the suggested improvement of these grades and curves as a substitute for providing this automatic brake; and I at once saw that the thing was out of the question. It would mean re-making the railways.

778. Would the use of the automatic brake generally increase the danger with these light rails? [No reply.]

779. Is not the automatic brake more severe on the permanent-way than the other brake is? I should say not. The automatic brake is a splendid brake in many ways. You can keep putting it on gently to take off the jars.

780. Then it would not increase the danger on the light rail? No; I do not think so.

[The witness withdrew.]

GEORGE E. MOORE, *called and examined.*

Mr. Moore made the statutory declaration.

781. *By the Chairman.*—Your name is George Edward Moore? Yes.

782. And you are a Member of the Institute of Civil Engineers? Yes.

783. Can you tell us what your experience has been in connection with railway engineering, Mr. Moore? Well, for the last thirty years or more—ever since 1863, in fact—I have been connected more or less with railways, in survey, construction, maintenance, and administration.

784. In what parts of the world? In England and in India.

785. And in what capacity? As an Engineer.

786. As manager at all? Not as manager.

787. As manager during construction? In India, as a rule, the engineer is perfectly separate from the manager—a separate department altogether.

788. I suppose you have had experience of most classes of brakes? Yes; I was in India at the time when the two automatic systems—the Westinghouse and the vacuum—were fighting it out for the precedence; and we decided in favour of the vacuum, after very complete experiments.

789. You know the railway system of Tasmania? I have been over it.

790. You know the curves and grades, roughly? I know, roughly, that the ruling grade is 1-in-40.

791. And you know, approximately, the rate of speed at which our goods, and mixed, and express trains travel? Well, judging by the mixed trains I have travelled in, I judge that the rate of the mixed trains is very slow.

792. Could any comparison be made between the train service in India and the train service in this country? Not very well; because the train service you have here would be only the train service of a branch in India.

793. Are the curves and grades in India similar to the curves and grades here? On some of the lines they are, but on very few. Generally, both in the case of the main lines and the branches, the broad gauge is used, with a ruling gradient of 1 in 100, and flatter curves. But there are hill railways and other lines in difficult country, where you have—I cannot remember the exact grades, but they are more severe.

794. But the rates of speed are much higher than they are here, I suppose? On the same lines, certainly.

795. Do you know the class of brakes they have in India? When I was there the vacuum brake was being completely fitted on to all the passenger trains; but the wagons for goods, merchandise, and minerals were not so fitted.

796. How long is it since you were in India? Oh, I suppose it must be six or seven years.

797. Do you know the class of brake with which our goods trains and rolling-stock are fitted? No, I do not know. Is it the vacuum?

798. No. Have you had any experience of the chain brake? No. The chain brake was never used on any railway with which I was connected.

799. Supposing that you had been connected with a railway system which had had a certain class of brake, and had enjoyed an immunity from accident with that brake in service for a period of twenty-five years, would you feel disposed to recommend this expenditure of a large sum of money to fit your rolling-stock with another brake? Well, it would depend upon the position I was in. If I were an executive officer I should like the best tools I could get to work my railway with; but, if I were an administrative officer I should, of course, have to consider the cost.

800. That would be a material factor? That would be a material factor.

801. And if you were the administrative officer of a line which was losing heavily on its working, year by year, you would not, I suppose, feel disposed to incur more expenditure? I certainly should not be disposed to incur more expenditure than I considered necessary for the working of the line, so long as I considered that things were safe.

802. And if twenty-five years' experience of working had proved to you that the line was safe, since no accident had resulted in all that time for which the brakes could be held responsible, would you regard that as sufficient proof that the brakes were safe? Yes; I say that if you are twenty-five years working safely, you may safely expect to go on so for another twenty-five.

803. But, of course, if you increased your rate of speed, or increased your loads, that would be justification for an increase of expenditure, if necessary? Many different factors come in.

804. But considering that your train service had not altered in any material degree, nor your rates of speed been increased, in that period—considering also that the loads you were hauling had not increased—you would not feel justified in incurring any further expenditure? I do not quite know why the vacuum brake is being asked for here, if that is what you mean. There are two reasons, I take it, for which the vacuum brake would be necessary. One reason is, that in case of a broken coupling in a bad place, the result of the break would be discounted or done away with, if you were using the vacuum brake. But there is another reason, taking the case of the metropolitan railways in other parts of the world, they could not do without the vacuum brake: they run heavy traffic at great speed. There you have trains every two minutes rushing into a station and stopping dead, and away again. Without a very powerful brake they could not work such a traffic. There is no question there of the risk of accident caused by couplings parting on heavy grades, because they have not got any heavy grades. Here, of course, although your traffic is light, you have heavy grades; in fact, that is the only excuse I can imagine that you could have for introducing the vacuum brake. But then, I say, prevention is better than cure; you should not have an accident to your couplings.

805. Can you prevent accidents to your couplings? Well, you tell me that you have been twenty-five years without an accident, which proves that your couplings are quite strong enough for your present weight of carriage. With proper inspection, under such conditions, there should be no accidents.

806. But you consider that there is an element of risk in running engines weighing 10 tons 7 cwts. on the driving axle over a permanent way with 43-lb. or 46-lb. rails, at a speed of thirty-eight miles an hour? In India, if I remember rightly, we limited ourselves to nine tons on the axle.

807. On what weight of rails? Practically, the same rails as yours—42-lb.

808. At what rate of speed? They used to run, on the lines I speak of, up to about thirty miles an hour. Of course, there is an element of danger in all railway travelling, as in all means of locomotion: it is only a question of the degree of risk.

809. Would the extra eight miles an hour we run increase the element of danger? It might do, to a certain extent. There are things one can hardly give a very precise answer about.

810. *By Mr. Hope.*—You are aware, I suppose, that in all our railways throughout this State we have got many very steep grades? Yes; 1-in-40 is the ruling grade, I believe.

811. On a line of that kind, would you consider an automatic brake a much safer brake for the travelling public than the common chain or hand brake? Oh, yes, certainly.

812. And if you were the Manager of the Railways—the same as Mr. Hudson is—would you recommend automatic brakes: did I understand you to say that? Well, I should call Mr. Hudson an executive officer. If I were in the position of Mr. McCormick, advising the Minister, it would be different. He has to discuss and consider the financial point of view when it comes in.

813. But you should leave the financial point of view to the Government, should you not? Oh, no. Why you might have a lot of safety appliances that you have not got, for that matter—means of ensuring safety that are applied in England—and an executive officer might say, "I want them all here." But in the circumstances, with a few trains running only, at a very slow speed, there is no absolute necessity for such appliances. I should call them luxuries, although, from the strict point of view of safety, you might have them all, interlocking points and signals, and everything else. But, as I said just now, in my opinion, considering the slow speed of your trains, and the small number of trains you run a day, it would be absolute waste of money to indulge in such things. There are many factors that come into the consideration of such a question.

814. Of course, we have some proofs that our couplings have already been broken on our trains? Well, that also is a factor to consider; that shows, apparently, that your couplings—unless it may be satisfactorily explained otherwise—could be improved.

815. Of course, I may tell you that some little time ago I had an experience of a train sliding back on frosted rails, and then jerking. We were on a piece of the line where there are three or four miles of 1-in-40 all the way. I had a feeling then of, "If anything broke, where would we be?"—and I felt that I would be much safer on a train with an automatic brake than with a chain-brake: I suppose you will admit that? Certainly.

816. *By the Chairman.*—In using any class of brakes, Mr. Moore, would you not expect that, if the brake were weak or defective and did not properly control the train, the first complaint as to its want of efficiency would come from your driving staff? Well, yes; you certainly would expect it.

817. It would be the driver's absolute duty to report the fact? Yes—the deficiency of the brake-power on his train.

818. And in the absence of such evidence, would you regard it as a luxury to go in for a large expenditure to fit a new brake to keep the trains under control? At any rate, you would first want proof that with your present brake, the train, in the case of couplings parting, would not be under control. That could be easily shown by experiments on one of your trains. You could detach a train, and see whether a guard's brake is sufficient to control it. If it would, no more need be said; it is perfectly safe.

The witness withdrew.

CHARLES C. NAIRN, *called and examined.*

Mr. Nairn made the statutory declaration.

819. *By the Chairman.*—Your name is—— ? Charles Cameron Nairn.

820. And you are an engineer? Yes; in the Government Railways Department.

821. *By Mr. Patterson.*—How long have you been engaged on the Main Line Railway, Mr. Nairn? About 29 years.

822. And I suppose that you have had a large experience of the running of that line, or as large an experience as that of any other officer in the service? Yes, probably as large as any one, so far as experience of the actual running is concerned.

823. Now, is the condition of the permanent way and rolling-stock better or worse than it was when the Government acquired the line by purchase from the Main Line Railway Company? Well, I should think it is decidedly better.

824. You have a heavier permanent way in places? Yes.

825. And better rolling-stock? Yes.

826. And better passenger-carriages? Better passenger-carriages, yes.

827. In addition to that you have adopted the automatic vacuum brake on all express trains? Yes, that is so.

828. Well, now, referring to the period previous to the purchase of the Main Line by the Government, can you tell us how the traffic was conducted, and the character of the brakes used on the stock? Do you mean as regards the style of carriages and brakes?

829. Simply as regards the brakes? The brakes in use were the Clark and Webb continuous chain-brake, which was, of course, a very excellent brake, applied by friction from a drum on the axle, and a loose drum under the van, which wound up the chain.

830. Did that chain-brake act efficiently? It was very successful on the Main Line. Of course, there was a difficulty soon after the start, and it was a cause of trouble that occurred in England, too; there was a liability of the chain breaking, and if the chain broke the train was not under proper control. But the company overcame that difficulty by fitting the tenders with the same brake; so that they braked five vehicles from the van forward and five from the engine back. By this means the difficulty and risk were overcome.

831. And these brakes worked satisfactorily on your passenger trains at that time? Oh, very satisfactorily. They are working now with the same brake.

832. Now, in the mixed trains at present running you have the same continuous brakes fitted to the passenger carriages? Yes. Of course I could not speak so positively as to these brakes now. Although it is still the Clark and Webb brake that they are using, I cannot say whether it is as effective as it was on the old Main Line. The conditions are not, perhaps, quite the same now. As a matter of fact, I understand, from what I have learned and what I have noticed in travelling, that they do not hold so well on the double-buffer stock as they did on the Main Line Railway at the time I spoke of just now.

833. Now, how many accidents have occurred on the Main Line during the past 25 years through the parting of trains—many? Speaking from what has come to my own knowledge, I have no recollection of any. Plenty of trains have parted, but I do not know of any accident.

834. Then, so far as the experience of the past is concerned, the parting of trains does not exist as a reason why the automatic brakes should be introduced? I should not think so; at any rate, not as far as my knowledge goes.

835. Now, I suppose that during the course of your experience you have had to bring down very heavy trains from the tunnel to Hobart? Oh, yes, frequently.

836. Can you tell the Committee how many trucks you have had in a train? Oh, up to 25 or 26.

837. With one engine? Yes; one engine and one van.

838. And you came down with safety and without trouble? Yes.

839. Then, basing your opinion on your own experience, you think that the experience of the past does not show such a state of things as amounts to an imperious demand or necessity for the use of automatic brakes on that stock? I do not know of any such matter coming up. I never heard of it.

840. Well now, from your knowledge of the line do you think it would be a real advantage to take out those 5-chain reverse curves and those steep grades, in the worst places? Well, of course, that involves a traffic question as to what the cost would be. There is no doubt that the improvement you speak of would be a decided acquisition to the line: both with regard to the saving of wear and tear on the way, and the stock, the comfort of the travelling public, and the extra freight that could be carried over that portion of the line if the difficult curves and grades were eliminated.

841. *By the Chairman.*—And it would be conducive to the safety of the general public too? Of course, if you get the curves out you increase the safety of the line.

842. *By Mr. Patterson.*—You have seventy or eighty miles of the Main line laid with 46-lb. steel rails? I suppose about seventy-eight miles, at the present time.

843. And you have express trains travelling at the rate of thirty-five miles an hour, with a weight of ten tons on the axle? Quite so.

844. Do you think that is a safe procedure? I should not like to say it is unsafe; but I think it would be desirable if there were a bigger margin of safety allowed in the weight of rails.

845. Which would you prefer, if you had the choice, and the alternative were afforded you, to equip the stock not equipped so far with the automatic brake or to re-lay this road with a 60-lb. rail? As an Engineer I should undoubtedly say re-lay the road; because the very fact that the use of the automatic brake increases the strain on the road would point to the necessity of that.

846. It is a fact, I believe, that the automatic brake has a much more destructive tendency on the rail than the ordinary brake has? I should say that there is no doubt about it.

847. Now, Mr. Nairn, I am going to ask you another question; but you need not answer it unless you like. Considering the financial position in Tasmania, with regard to the working of the railways—bearing in mind that for years we have been working at a loss, and that there was a deficit of £110,000; which amount has to be made up by the general taxpayer—do you consider that there is such a crying need for this automatic brake that it is imperative on us to adopt it? That is really a question for the management. I am not in a position to answer it.

848. I will take that answer. I have asked you to be summoned more particularly because of your experience in working these long brakes with ballast-trains, goods-trains, and others. For twenty-five years, or more, you have conducted that work without an accident? Yes; I do not know of any accident ever arising by reason of the absence of brakes, parting of trains, and so on, in the old days. I dare say trains have parted; but I never knew of a real accident.

849. *By Mr. Dumaresq.*—Mr. Nairn, were you in the Main Line Company's service? Yes, since the line started.

850. Do you not remember an accident happening through couplings breaking, at the other side of Conara, and the carriages being thrown off the line? That was the express, I think.

851. Yes? That accident was never proved to have been caused by anything breaking. The couplings were broken, but it was an open question whether the engine had not left the line before they broke.

852. But they did break? Yes; when the train was examined after the accident the couplings were found broken. But at the time, to the best of my belief, the accident was never put down to being caused by a coupling breaking.

853. *By Mr. Hope.*—Do you consider the automatic vacuum brake a safer brake than the old chain-brake? I think it is a very excellent brake.

854. But do you think it is a safer brake? Well, it would be a safer brake, because it would be applied to all the vehicles at once. I think it is undoubtedly a better brake than the chain-brake.

Mr. Minister of Lands and Works: I do not think I ought to ask Mr. Nairn anything. I have had his chief here, and I do not think I ought to ask him any questions on this matter after Mr. M'Cormick's evidence has been given.

The witness withdrew.

THURSDAY, NOVEMBER 7, 1901.

WILLIAM CUNDY, *called and examined.*

Mr. Cundy made the statutory declaration.

855. *By the Chairman.*—Your name is William Cundy? Yes.

856. And you are a mechanical engineer? A mechanical engineer—yes.

857. At present engaged by the Mount Lyell Railway Company? Yes—the Mount Lyell Mining and Railway Company.

858. And you were formerly connected, as Locomotive Superintendent, with the Main Line Railway Company? Yes.

859. For how long? From 1878 till the time we sold the line; December of 1890, I think it was—yes.

860. During that period what class of trains did you run? Oh, we ran the express trains, the mail trains, and the ordinary goods trains; and the coal traffic on the line from Fingal.

861. And what were the average rates of speed of those trains? Well, the express train was twenty-three miles an hour, and the other trains were practically fifteen. It takes nine hours to go from Hobart to Launceston by ordinary train. At least, that was our time-table.

862. And the coal trains? The coal trains were about the same.

863. Fifteen miles an hour? Yes.

864. You could not speak with any certainty, I suppose, as to whether those rates have been increased since you left the line? No, I could not.

865. What was the class of brake used by your company? We used Clark and Webb's frictional chain brake. It was reckoned the best brake in England up to the time of the Westinghouse and the vacuum brakes coming in. It was used right through by the whole of the railway companies in England, the London and North Western more especially.

866. Did it prove an effective brake on the Main line during your time? Yes. I never had a mishap with it—never had a chain break the whole time. Of course, the chains were properly examined and tested, and manufactured for the purpose.

867. Did you ever receive any complaints from your driving staff during the time you were Locomotive Superintendent, to the effect that they were unable to control the train with the brakes? No; but I did suggest to Mr. Grant on one occasion to put side-brakes on to the trucks, in addition to the chain brake, because in coming down heavy grades the guard could lower the side lever, and it would assist him. But Mr. Grant said he had no money; it would cost from £10 to £12 a truck to do that. Then I introduced an improvement in the use of the chain brake, by dividing the train—one half for the guard, and the other half under the control of the fireman, and that was the way the stock was fitted up when we sold it. But after the Government took the line over, Mr. Batchelor introduced the side brake, and took away the chain brake. I don't know what he did it for; that was his business.

868. Well, under that system of control—dividing the train into halves, and having one half braked from the van and one half from the engine—would you consider there was any undue risk if a coupling broke on the long bank going up from Colebrook to Rhyndaston—would you consider that the part of the train that was detached would be able to control itself? Certainly. The guard or the fireman could control either half of it. The brake was so adjusted that you could put a pressure on sufficient to skid the wheels. The same brake is being used yet on the Zeehan and Strahan line.

869. Then would you regard the equipment of the ordinary stock—that is, the mixed trains and the coal trains—with the automatic brake as unnecessary? If I were Locomotive Superintendent, and was asked the question if I would have the stock fitted up with the vacuum brake I should say, no. It is not good enough. The traffic is not sufficient.

870. And the express? On, I would have it on the express, certainly. I fitted the express myself with the Westinghouse.

871. You considered that necessary, I suppose, because there is a high rate of speed? Yes. We pulled up the express with the Westinghouse brake at Tunbridge in 125 yards.

872. What was the average mileage that you ran here in your trains, roughly? We used to run about 8000 a month.

873. About 100,000 miles a year? Yes.

874. And you were there twelve years? Yes; that is the time I was there.

875. That means 1,200,000 miles of railway service? Yes; and you must remember that it was on 40-lb. rails, too—the old ones.

876. Did you ever have a fault with your brakes? No.

877. You ran 1,200,000 miles during your period of service without a fault in the chain brake? I never had the chain break once, and I never had anything to happen to it.

878. Before coming here, you were requested to examine the brake equipment of the Mount Lyell stock? Oh, I see it every day.

879. And you thoroughly understand it? Oh, yes. Of course—you will excuse me—I do not compare the Mount Lyell Railway with these of yours. The Mount Lyell has a grade of 1 in 18 or 1 in 20, and they have to climb up with a rack and pinion. If anything happens to their motive power they rely entirely on the brake; and I quite agree with the need of the vacuum brake there. But they do not use it for the local traffic on the trains that bring in firewood and logs for the sawmill. They use the central-buffer stock they bought from the Government. They use it every day for local traffic. They have no vacuum brake on anything but the engine.

880. They do not use a brake, even on the guard's van? No, they depend entirely on the engine. But for the through traffic, where they have to go up the steep grade I have mentioned, I consider the vacuum brake necessary.

881. Are the class of trains you mention as being without the chain brake, or anything but the engine, practically used to convey passengers? Oh, no.

882. Purely goods? Firewood, and logs for the sawmill.

883. Do you consider that the difficulties of grade, and so forth, attending the traffic on the Mount Lyell Railway, involves more risk than any that is incurred by the trains now running on our Main Line? Yes.

884. I mean—outside of the 1-in-18 gradients you have spoken of—what are the general difficulties of traffic on the Mount Lyell Railway—how do they compare with ours? The general difficulties there are greater than they are here on the Main Line.

885. And the risk is greater on the Mount Lyell Railway than on the Main Line? Yes. I might tell you, for your information, that when Mr. Price Williams was here, going over the line and making a valuation of it, with a view to closing with the Government, this brake question came up, and he and I went out on the express one morning as far as Brighton. I had arranged for twenty-six wagons, Main Line wagons, to be loaded at the Tea Tree siding, with firewood, hay, straw, wheat, and general produce; just twenty-six wagons and a guards' van. There was 187 tons dead weight behind that engine, and we negotiated that train from Tea Tree siding to Hobart. She went down the bank from Brighton, and up the bank to the dip going down into Bridgewater—a grade of 1-in-40; and that engine—one of the new ones that I got built before I left—took those twenty-six wagons and the guards' van up that hill and down again with those brakes that I have told you of. That was for Mr. Price Williams' information, in order that he might be able to satisfy himself that it was an effective brake. Of course, he had seen it worked in England, but not under the same conditions; they have not the grades there.

886. You have examined the brake equipment, then, of the Mount Lyell Railway? Oh, yes; I know it well. Before now, I have had to repair it.

887. And I gave you a letter this morning, in which I asked Mr. Hudson to allow you to look at the brake equipment on the Government stock—did you do that? Yes; Mr. Hudson was not in, but Mr. Winterson sent a messenger along with me. There was only one truck they fitted with the brake.

888. Only one truck there had them—what was that? A four-wheeled truck.

889. Well, do you know whether the Mount Lyell bogie wagons are fitted in the same way—do you know how they are fitted? Oh, I——

890. I have some information here to the effect that they are fitted with one 18-inch cylinder—is that right? Yes; that is right.

891. That is quite correct? Yes.

892. Well, I asked one witness a question as to that, and it was stated that the Government bogie wagons have two cylinders, almost doubling the mechanism; and the question was asked as to whether it is necessary to incur that expense—do you, from your knowledge, consider that the extra cylinder is necessary or unnecessary, if the brake is adopted on the Government railways? I think one cylinder is sufficient—quite sufficient.

893. Of course, I am not a mechanic, and do not understand these things: what is the effect of having two cylinders—does it increase the safety of this brake? It gives more power to the brake. Of course, the area of 18 inches is doubled if you have two cylinders.

894. Then it doubles the power of the brake? Yes; it doubles the power of the brake. But, you know, when they apply the brake it is distributed through the whole of the train; it is not all given to one truck.

895. But the proposal is that each truck braked shall have two 18-inch cylinders? Yes.

896. And you think that one is quite sufficient? Yes.

897. They only use one 18-inch cylinder going up the steep grades you spoke of just now on the Mount Lyell Railway? Only one.

898. That is, up a grade of 1 in 18? Yes.

899. Have you anything like an idea of the loads they drag on the Main line here, in comparison with the loads they drag on the Mount Lyell Railway? Well, I know that the Mount Lyell bogie-trucks carry 15 tons.

900. But I am talking about the weight drawn on the Main line, in comparison with the Mount Lyell. Do you know anything about that? Oh, no, I could not tell you. I have been away three years.

901. Could you tell us what you consider a full load on the Mount Lyell? That I do not know. But you could not compare your railways, you see, with a line having a grade of 1 in 18. Of course, in the case of such a line, it all depends upon the rack.

902. But if the rack gives way you have to depend on your brakes? Yes. It may be outside the question here, but I should like to say something about the difference in the stock. On the Main line our wagons would carry six tons, and I could draw twelve with the same engine that I could only draw eight with when the Government took over the line. That was on account of the difference between the central buffers and the double buffers.

903. This is a question, you see, of the efficiency of brakes. But I will ask you this question: Do you think the chain-brake was more effective on the single-buffer stock than it is with the double buffers? Well, it would make very little difference. Whatever brake you apply it causes the friction to act on the buffers, and if you have a central buffer it moves that way [witness explains by gesture]; but, of course, when you have two buffers and come to go round a curve, it throws the friction of the wheels against the rails, but the brake has nothing to do with that.

904. The brake would be just as effective with double buffers? The brake would be just as effective with the one as with the other. I am merely remarking the difference between the buffers for the information of the Committee—the difference in the hauling of the stock; that is exactly the difference. You draw four wagons less with the same engine.

905. But that would not affect the question of brakes? No.

906. *By Mr. Hope.*—Do you consider this vacuum automatic brake a safer brake than the chain-brake? Safer?

907. Yes? I do not think it can be said to be safer, at all, because they are all liable to accident. If a truck goes off the road with the automatic brake and that breaks the levers underneath the truck, the brake is done. If a truck goes off the road with the chain-brake, the position is not a bit worse.

908. I suppose that, as an engineer, you are aware that the various other States are adopting the vacuum brake? No; they are not. The South Australian Government was asked to vote money for applying the vacuum brake to its 3-ft. 6-in. stock, and Parliament would not pass the vote; so that it has not got the brakes to this day.

909. But the other States have got it? Well, they may have; but I know, from Mr. Goode, who left the South Australian railways to come to Queenstown, that they are running their 3-ft. 6-in. stock without the brake in that State.

910. You will admit, I suppose, that the traffic has increased considerably since you had anything to do with the line? It may have increased a little; not very much.

911. There is more passenger traffic? There may be a few more passengers carried, but I question it.

912. You admit it is necessary to have the vacuum brake on the express trains? Yes; because there are more passengers, and more lives at stake.

913. But there are as many passengers on the Western Line, pretty well, are there not? Well, there may be; I do not know. It is a very serious question, this of brakes, and you will find that it will cost you a lot of money if you are going to put it through.

914. *By Mr. Hartnoll.*—Have you any knowledge, Mr. Cundy, as to the difference in price of these vacuum brakes fitted with a single 18-inch cylinder and with double cylinders? No; but I know this much: that the entire cost will be from £20 to £26 for a four-wheeled truck; that is to cover everything.

915. That is with a single cylinder? Yes. Well then, the extra price will be for four extra levers and four extra brake-blocks on a double truck. It should not run into more than an extra £10.

916. *By the Minister of Lands and Works.*—That is for double cylinders? No; I mean for a bogie truck, with one cylinder.

817. *By Mr. Hartnoll.*—Well now, is there any difficulty in the way of supplying composite stock—that is to say, if double cylinders were in use on a portion of your trucks, could you run such trucks in a train a portion of which was composed of trucks fitted with a single cylinder? Oh yes.

918. There would be no difficulty about that? Oh no. You know, I am speaking quite without any feeling in the matter. Of course, your automatic connection would have to go right through the train; but as a practical man I really would not put in two cylinders—it would be a waste of money. If you adopt the brake at all, one cylinder will be quite sufficient for all purposes, because you will not have a train composed entirely of bogie trucks; you must have some four-wheelers in with them, and the power would be equally distributed through the train.

919. Are you aware, from your reading, Mr. Cundy, whether they apply the vacuum brake on goods stock in England? Well, I do not know.

920. You are familiar with the latest Board of Trade rules with regard to that matter, are you? No, I am not. Of course you must remember that I have been out of the railway now for ten years.

921. Now I learn from what you have told us in your evidence, that you did inspect a four-wheeled wagon at the Government railway-yard this morning? Yes.

922. Now, as we know that you are familiar with the similar brake belonging to the Mount Lyell Railway, will you tell us what is the difference between the two? Well, I could not see any difference at all. I did not notice any difference.

923. You consider that the vacuum brake used on the Mount Lyell Railway is an equally effective one to that you saw on a similar wagon belonging to the Government stock? It is precisely the same, from anything I could see.

924. *By the Chairman.*—But had not the Government truck got two cylinders? No, only one.

925. *By Mr. Hartnoll.*—But had that truck not got double cylinders? No, only one cylinder; it was a four-wheeled truck.

926. And that truck you said, then, was precisely identical with yours? Yes—just the same.

927. You mentioned, Mr. Cundy, that you first of all applied the vacuum brake to the express here? No, that was the Westinghouse.

928. That is a vacuum brake, is it not? No, that is on a different principle: that is done by pressure.

929. And you applied that brake on account of the extra safety it gave—because there were more passengers travelling on that train? Yes.

930. And because the rate of speed was higher? Yes.

931. Mr. Hope put a question to you suggesting that there were just as many passengers, or nearly so, travelling on the western line. Admitting that there are the same number of passengers, or perhaps more, travelling on the Western line, as on the Main line, would the difference in the speed of trains on that line as compared with the express between Hobart and Launceston, make any difference as to the necessity of the vacuum brake? Yes; I should certainly recommend it in all cases where there are a large number of passengers.

932. The vacuum brake? Yes. I would not single out the express especially. If there are as many passengers in other trains, by all means apply it.

933. Whether they are mixed trains or not? Yes; but I should not go beyond fitting the passenger carriages.

934. How would you do it? You could have your ordinary brake on the trucks, just the same.

935. But, you know, we always run the trucks next to the engine, and the passenger carriages in the rear? Then, of course, it would be more complicated. You would want the carriages next to the engine.

936. And that would be exceedingly inconvenient, as far as shunting was concerned. You would have to shunt your passengers all over the shop, would you not? Yes.

937. That really does present a difficulty, does it not? It does—I must admit it does. Still, I think that the ordinary brake that they had before the vacuum brake came in would do for the trucks. I think that that, with the vacuum brake applied to the passenger carriages next to the engine, should be made to do.

938. What I want to get clear, Mr. Cundy, is this: that if the rate of speed on a mixed train is, say, twenty-five miles an hour, with a low speed like that do you think it is necessary to apply the vacuum brake? No, I do not think so.

939. At what rate of speed do you think it would be advisable to apply the vacuum brake Well, when I ran the express the actual running was thirty-five miles an hour—that is, taking the stoppages out.

940. And at that rate of speed you consider it necessary to apply the brake? Yes.

941. And at a speed of twenty-five miles an hour you do not consider it necessary? Well, I think the train could be controlled by the guard with the ordinary brake.

942. *By the Minister of Lands and Works.*—Was the chain brake you used a continuous brake, Mr. Cundy? Yes.

943. It went right through every vehicle on the train? Yes, right through the carriages and wagons of every train; the guard's van too.

944. It was applied to every carriage? Yes; never a train went out without it on.

945. Do you know anything of the brakes now used on our goods trains? They are using all side brakes.

946. That is not a continuous brake? No; but they use the chain brake on the Zeehan line, you know.

947. There is a mixed brake, really, is there not, on the ordinary goods train now? Where?

948. On the Tasmanian lines? Here?

949. Yes? I could not tell you. I do not know what they are using; I have not seen the trains lately.

950. At any rate, you know there is not a continuous brake? No, I do not believe there is, because I was told this morning that Mr. Batchelor had taken off the chain brakes and put on side levers.

951. Do you think the trains should have a continuous brake, on lines like the Tasmanian lines? Oh, it is possible to apply a continuous brake, outside the vacuum brake.

952. I am not asking you about vacuum brakes in particular. Do you think the brake, whatever kind it is, should be continuous? Oh, yes; certainly.

953. You should have a brake on every vehicle. Yes.

954. Why did you split the brake, so to speak, or divide it into parts, between the guard and the engine-driver? Well, that was because the question was raised that the chain might break, do you see; and the guard would lose control of the train if the chain broke at any place. That is why I divided responsibility between the guard and the engine-driver.

955. And you recognised, then, that there was a risk? Well, it was an imaginary risk, the same as this is.

956. Have not chain brakes been known to part? I never had one to break.

957. But have not they been known to break? They may have, but I never heard tell of one.

958. Do you consider that a mixed train, such as is now run, with a considerable number of vehicles—cars, wagons, and so on—running between, we will say, Colebrook and Rhyndaston—do you think it is safe, in case of a train parting on the upper portion of that 1-in-40 grade, to run without a continuous brake? Well, I have never seen it, Mr. Mulcahy. I don't know the country; but if it is anything more difficult than the Main Line——

959. But it is the Main Line I am speaking of? What did you say?

960. Do you consider it is safe to run long mixed trains between Jerusalem and Flat-top without a continuous brake? I think it is very dangerous.

961. You think it is very dangerous to run there without a continuous brake? Yes, certainly.

962. Supposing, in case of a chain breaking, that a train parted—say that a coupling parted on one curve of 1-in-40 of a considerable length, say three miles of it—what would happen? If it parted?

963. Yes, if the train separated, and broke away? Well, it just depends upon the weight of the train; but if it was an ordinarily loaded train, such as runs on that line, the guard would be able to hold his portion of it without doing any damage, and the engine would be able to hold the other portion of the train, so as to prevent the cars from running into each other. Either of them—the driver or the guard—ought to be able to hold his half

964. Where would the train be likely to break? It is impossible to tell.

965. Where is the greatest strain? Upon the fastening of the tender.

966. Is that not the most likely part to break? Yes.

967. Well, given a train with a van and a passenger carriage at the rear end of it, and several loaded trucks between that and the engine, and say that that train parts at the tender, where it would be most likely to part on a lengthy grade of 1 in 40——? I said it would be likely to part at the coupling with the tender.

968. Supposing such a thing happened, with only a brake on the guard's van and the passenger carriage at the rear of the train, would that be sufficient? Under my system the fireman could hold it.

969. With a continuous brake, you mean? With a continuous brake—yes.

970. But, you see, I am asking you as to a brake that only applies to the passenger carriages and the brake-van? They have a chain-brake now on all the passenger carriages.

971. Yes; but it goes no further? Well, the guard would hold that part of the train, you know.

972. With all the trucks? He would not be able to hold the trucks.

973. But they have the trucks next to the engine, and the carriages in the rear? Yes; but that is not my system. I——.

974. I am not asking you as to that now. I am asking you whether it is safe, the way the trains are now running? It is not safe, the way the trains are now running.

975. Would you, if you were now Locomotive Superintendent, recommend the application of a continuous brake of any kind? Yes, I would—the same as we had it before, with the chain, and central buffers. I worked the line a jolly sight cheaper than it is being worked now.

976. You were in the employment of the Main Line Railway Company the same time as Mr. Nairn, were you not? Yes.

977. Mr. Nairn has told us that in his experience the application of the chain brake is not as efficacious on the rolling-stock now used with the double buffers as it was previously with the single buffer. Do you think that is so? That is what I say.

978. It is not as efficacious with the double-buffer stock? No.

979. I thought you said it was. Then you think the chain brake is not so good with the double buffer as it was with the single buffer? No, it is not.

979. You have had no recent experience, I suppose, of the cost of vacuum automatic brakes, Mr. Cundy? Well, not directly, but I am on the works there, and since I have been up there I have done some portion of the work in repairing the brakes when they have had an accident, and I know from what I have gathered from Mr. Goode, that they run from £20 up to £26, as I stated just now.

980. For what appliances? For a four-wheeler.

981. For four-wheeled single cylinder appliances? Yes; but you will get all that from Mr. Driffield.

982. You have really had no personal experience of the cost—you have not seen any invoices? Oh no. Only I may tell you this: that when I went up there I gave Mr. Goode drawings and catalogues of the vacuum brake supplied to me by English firms while I was on the railway here. They were no good to me, and I gave them to him.

983. Old catalogues? Catalogues of the vacuum brake you are speaking of now.

984 But they would be old catalogues and prices? Old prices—yes.

985. And they would not necessarily indicate the prices ruling at the present time? Not now—no; but they got some in from London last week.

986. The Mount Lyell Company did? Yes.

987. *By the Chairman.*—Did you say they got in some vacuum brakes last week? They got some vacuum brake fittings.

988. *By the Minister of Lands and Works.*—Complete parts? Yes. I could have got the prices and all particulars; but knowing that Mr. Driffield was coming down, I did not bother with it.

989. Do you know the running of the North West Coast trains, Mr. Cundy? Well, I have not been to Zeehan for three years.

990. Not the West Coast—the North West Coast along from Launceston to Burnie? No, I have never been over it. I purpose going back that way; I will have to, because there is no steamer till next Friday. If there is anything I could do, I would be very pleased to do it.

991. *By the Chairman.*—I suppose the automatic brake is more powerful than the chain brake; Well, you can skid the wheels with the chain brake, and you can only do the same with the automatic brake.

992. Do you think there is less danger of a fault in the automatic brake than there is in the chain brake? I do not think there is any difference at all as to that. Of course, there is always a possibility of fault.

993. In either case? Yes.

994. A fault in the chain brake destroys the efficiency of the brake? Yes.

995. And a fault in the automatic brake: does that destroy its efficiency? It destroys its efficiency—yes.

996. *By the Minister of Lands and Works.*—If anything happens to an automatic brake, the brakes apply immediately, do they not? Yes; and the driver cannot take them off; that is what I mean.

997. But in the other case, if a breakage occurs he cannot put the brake on? He cannot put it on.

998. *By Mr. Hartnoll.*—Well, if he could not take it off, the train would be at a standstill? Yes. What I mean is that if the brake gets out of order it is beyond the control of the driver.

999. *By the Minister of Lands and Works.*—But the results in the two cases are the very opposite? Yes, quite so.

1000. *By the Chairman.*—On the Mount Lyell line, I suppose all the vehicles are equipped with the automatic brake? All the through train vehicles are. The local traffic stock is all central buffer, without brakes of any kind except side levers.

1001. Now, speaking from your knowledge of the automatic brake, if you had it applied to the engines and guards' vans, and all your passenger vehicles, and you had a mixed train with goods wagons in it, would you consider that the application of the brake to fifty per cent. of the goods wagons, with a continuous pipe through the other fifty per cent. of the wagons, would be amply sufficient to control the train? I should say——

1002. Let me make it clear. You see you would have a continuous automatic brake on the locomotive and the whole of the passenger vehicles, but the brakes would be equipped to only fifty per cent. of the goods wagons, the rest being continued by piping? I think that would be quite sufficient.

1003. Do you ever run goods wagons with your passenger trains on the Mount Lyell Railway? Yes, every train.

1004. Then, when you run a mixed train like that, have you got every vehicle equipped? Yes, every vehicle has the vacuum brake on, and the brakes are fixed to the engine, too.

1005. Every truck on the train is equipped with the brake, then? Yes, every truck is equipped.

1006. I would like to be quite clear on that one part of your evidence, Mr. Cundy; that by making the chain brake continuous one-half the length of the train, from the guard's van at the one end, and one-half the train from the engine at the other, the guard would have control, no matter where a coupling broke—even if it broke right next to the tender? You have perfect control of it—yes.

1007. Even supposing the coupling broke next to the tender? Yes.

1008. Say there were 24 trucks in the train, and a guard's van; 12 would be equipped with a continuous chain-brake from the guard's van? Yes.

1009. And 12 from the engine at the other end? Yes.

1010. Very well. Now, supposing the coupling broke next to the tender——? Yes.

1011. The guard's van, with a chain brake extending over the first 12 trucks, would be able to control not only that 12, but the next 12 also—you are considering all that? I am quite sure of it;

because if the coupling broke next to the tender, the chances are it would break the brake chain of the first half of the train; but the guard would have the other half under control. The chain might break with the jerk; you never can tell what causes these things.

1012. *Mr. Hartnoll.*—Arising out of the Minister's question, I would like to ask Mr. Cundy if he knows of instances where the coupling has broken next to the tender and the train parted under similar circumstances to those narrated by him just now?

Witness.—I only remember one case of the breakage of a coupling next to the tender; and that was at Bridgewater, when an engine took leave of the road, and nearly tumbled into the river. That was the only time I remember of a coupling breaking,

1013. *By Mr. Hartnoll.*—And what was the cause of that breakage? The weight of the engine.

1014. Because the engine left the road? Yes. It went upside down, wheels up, and twisted the coupling off.

1015. And that would be a quite dissimilar strain from that of the weight of a train in ordinary traffic? Certainly; that was not a fair strain.

1016. Then, during all your experience you never knew an instance of a coupling breaking under the circumstances mentioned by the Minister? Not to part a train.

1017. *By Mr. Dumaresq.*—Mr. Cundy, do you remember, before the Government took the railway over, an accident happening the other side of Conara—between Cleveland and Conara? Well, I think I remember something about it. I think there were cattle on the line, and they were run over.

1018. No, that was not it: the train parted from the engine? It was a frequent thing for cattle to be on the line.

1019. No, this was not a case of that sort. The train parted, and the engine ran away from the carriages: you do not remember that? It might not have been in my time.

Mr. Hartnoll: The train broke away while the locomotive was shunting, perhaps.

Mr. Dumaresq: No; this was a case where the engine broke away.

1020. *By Mr. Hope.*—How many years is it, Mr. Cundy, since you were Mechanical Engineer on our Main Line Railway? I think the Government took over the line eleven years ago.

1021. I think I understand, Mr. Cundy, that you never knew of a break? Well, I think I did hear of one, at Brighton, about seventeen years ago.

1022. *By the Minister of Lands and Works.*—Were you in charge of the railway sixteen or seventeen years ago, Mr. Cundy? Yes. I was here from the 20th of January, 1878.

1023. Do you know a driver named West? Yes.

1024. Well, West says, "I have had, on several occasions, trains part with me while I have been running on the Main line; I cannot exactly give the years they happened. About sixteen or seventeen years ago, a train parted while going down Brighton bank, which was caused by the jerk of the continuous brake worked from the guard's van." Did you hear anything of that? I do not remember it. It might have been caused by the jerk from his engine: that would be more like it.

1025. But it might have been caused by the jerk from the guard's van? Yes, it might have been.

1026. But you never heard of a train parting at all while you were there? I am speaking as if I were on my oath, and I never remember a continuous chain brake breaking while I was there.

1027. Nor a coupling parting? Oh, a coupling parting?—Well, you see, there are so many different parts of a coupling to get out of order; a cotter might come out, and not break at all. The draw bars, with the central buffer, meet in the centre, and there is a cotter put through the side of them. Sometimes these cotters have come out, but that is not a breakage.

1028. What do you understand by trains parting? Well, that would part a train—if a cotter came out.

1029. Well, it does not really matter what is broken, so long as one part of the train separates from the other? Well, I will not say that has not occurred, but it has been very rarely. I do not remember it more than once.

1030. And this man (West) says:—"I have had, on several occasions, trains part with me, while I have been running on the Main Line." Then he also says:—"About thirteen or fourteen years ago, a train parted at Eastern Marshes (Andover). It was a very dark night. Front part of train got some distance from the rear half, and when about half a mile from the top of bank, the latter portion ran into front half. The leading wheels of a box truck landed on top of another truck, which caused considerable damage to several of the trucks. This was caused by applying continuous brakes from guard's van." Do you remember anything of that? No, I do not remember anything of it. That might take place, and not be reported.

1031. And he also says, "On the same trip, early in the morning, the train parted between Campbell Town and Conara, the cause of which was the cotters of drawbars coming out, owing to the previous accident damaging them; another collision occurred there." Surely, you will remember that, Mr. Cundy? I do not remember it.

1032. He says, "Two damaged trucks were left at Eastern Marshes; two, which were not safe to take on, at Conara; some had headstocks and drawbars broken, which I brought on to Launceston, fastened with chains. There were five or six damaged altogether." Have you no

recollection of the incident? Well, I do not remember it; but I know the road was very bad in those days. For the first five or six years we had very little ballast, and the rails were light and very rotten. If you stood them on end, and dropped them to the ground, they would break in half a dozen places; and sometimes the rails being defective caused these things, you know.

1033. But you told us a while ago that you had no knowledge of any train parting while you were on the line? Well, I do not remember a case.

1034. Well, here is another incident: "On another occasion a train parted three times at Flat-top (Rhyndaston). There were several headstocks and drawbars broken." Have you no recollection of that? No, not under that heading. There might be some other cause for it.

1035. But under any heading, a train parting is a train parting? Yes; but the points might be foul while they were shunting, or something else of the kind might happen. I had to send two or three men to gaol for being drunk. You could never depend on the men doing their work properly at night-time. The points were often worked badly. When that happens while you are shunting a train a parting must take place on one side or the other.

1036. But you told us just now that you were not aware of a single case of a train parting? Well, I am not aware of one—not through ordinary working.

1037. Do you know anything of a driver named Harvey? No, not as driver.

1038. Well, he states: "About 13 or 14 years ago, while working the Midlands train from Parattah to Hobart, after shutting-off steam between Brighton and Bridgewater Junction, and brakes being applied, the train parted, and a passenger was thrown violently to the floor." Did you hear anything of that? I do not know the man.

1039. But did you hear anything of the incident? No.

1040. You were Locomotive Superintendent then, were you not? I suppose so, according to the year given there. He says about 13 years ago, I think you said.

1041. About 13 or 14 years ago? Well, that man never worked for me, to my knowledge.

1042. He says, "On another occasion, going from Bridgewater to Hobart, Guard Reynolds, the train parted in centre, and latter portion bumped into front half." No recollection of that? No.

1043. And he says, "When travelling between Tea Tree and Cleveland, on the way to Launceston, the train parted, owing to a broken cotter in drawbar." Do you remember that? Well, I said just now that there might be a case of that kind.

1044. And that is a case of a train parting, is it not? Well, of course it is; but the way you put it is that the train must smash and pull asunder.

1045. Well, what is a train parting but pulling asunder? Of course, it is not——

1046. Supposing a train parted through this particular cause given here. If a train parted for that reason, would not the effect be just the same as if it parted through pressure of work? The parting would be the same, certainly.

1047. And the trucks would be liable to run away down the hill just the same? Yes; but that has nothing to do with the brake.

1048. Pardon me, Mr. Cundy; I am not asking you now about brakes. You were asked a question in regard to the disconnection of the train itself. I asked you what part of the train had the greatest strain on it. You did not know which part, at first, and then you told me the greatest strain would be on the coupling with the tender? I beg your pardon, Mr. Mulcahy. I did know. I told you at first that the greatest strain would be at the tender.

1049. Driver Glendinning: do you know him? Yes.

1050. He says: "During Main Line time, when going between York Plains and Eastern Marshes, train ran over a dog, which hit a screw coupling, and the latter knocked a pin out of the buffer and parted train. When going down-hill into Bridgewater, about 1891, I heard a coupling drag. I gave guard signal to stop, and the train was parted coming down the hill." This was in your time, in 1891? Well, you see, when the Government wagons had to be coupled on with the Main Line stock they had a kind of fitting to put on to the Government stock, and if that rose when they were running it would become disconnected.

1051. You know Foreman Parkes, do you not? Yes; I put him on.

1052. A reliable man, is he? Yes.

1053. Well, Parkes reports: "On mail train, about twelve years ago, there were two engines, one E class and one F class. The latter was disabled, and was running with one side only. On coming down one of the banks the train parted—I presume, through the brake levers being dropped suddenly. The engine and part of the trucks got away without noticing the loss of the after-part of the train, and pulled up at the bottom of the bank, on a curve." About twelve years ago. That is before you left? I do not remember it—at least I am not sure that it was in my time, because we did not number our engines by letter. Ours were numbered from 1 to 16, and the engines referred to are lettered, are they not?

1054. Yes—E class and F class? That was in Mr. Batchelor's time, then.

1055. Do you know Driver Jones? Yes.

1056. He says, "About 1890, when travelling from Hobart to Launceston, the draw-bar between engine and tender broke between the Tunnel and Rhyndaston. The passengers were not aware of the occurrence. The tender and engine were lashed together with a brake chain, and the train proceeded to Evandale junction. On leaving there, the engine parted from the rest of the train, and we kept ahead of it until St. Leonards was reached." Did you ever hear of that? I do not remember it.

1057. He says, "On several occasions whilst using the chain brake, I have lost control of the train, and had to reverse the engine to get the speed down, so as to run with safety." Now, would it surprise you to hear, Mr. Cundy, that since June, 1897, up to June of this year, twenty-four breakages have been reported? [No reply.]

The Chairman.—And Mr. Deeble was not able, in his evidence, to notify us of one case. He had to go and look up his book.

1058. *By the Minister of Lands and Works.*—Between June, 1877, and June, 1901, there were twenty-four instances of couplings breaking. Does that surprise you, Mr. Cundy? What couplings?

1059. Well, instances of trains parting, couplings breaking on leaving Hobart, and so on? Well, I told you just now; when the Government stock had to be mixed with ours, Mr. Batchelor made a casting to couple them together, and the cotters were continually coming out of those castings. You have seen that thing, Mr. Hartnoll. Of course, iron couplings have broken repeatedly; but I will tell you how they have been broken. Porters, taking them off, have banged them on the ground and cracked them. Then when they were put on again, of course, the train parted. We could not be held responsible for that.

The witness withdrew.

FRIDAY, NOVEMBER 8, 1901.

WILLIAM E. BATCHELOR, *called and examined.*

Mr. Batchelor under the Statutory declaration.

1060. *By the Chairman.*—Your name is ——? William Eastgate Batchelor.

1061. You are by profession a mechanical engineer? Yes, that is so.

1062. And you were for some years Locomotive Superintendent of the Tasmanian Government Railways? Yes, for 29 years.

1063. You were Locomotive Superintendent all that time? Yes. That, of course, included the Launceston and Western Railway.

1064. You understand the object of this inquiry, Mr. Batchelor? Merely from what I have seen and noticed in the papers.

1065. Well, there is a proposal to equip the Government rolling-stock with the automatic brake: would you, if you were an officer of the Government, favour that equipment—that is to say, if you, as a matter of fact, now had the charge of the mechanical running of the railways for a certain time? No.

1066. Well, we thought you would be able to give us some information as to your experience of the brakes that were in use during the time when you were the officer in charge. Will you describe to us the class of brake that was in use when you were there? Part of the carriage stock was already equipped with the vacuum brake. That brake was fitted to the express stock, and to any carriages running in excursion trains.

1067. What about the guards' vans and bogie wagons? The guards' vans have the chain brake in addition to the hand brake, and the bogie wagons all have hand brakes.

1068. That is the side brake, I suppose? The side brake, yes, on wagons.

1069. Was that the complete equipment, or did you also use the chain brake? We did use the chain brake—the Clark and Webb's chain brake—as well, for mixed trains.

1070. And you had the automatic brakes for your express trains? Yes, for express trains and excursion trains.

1071. How did you find that brake equipment answer—was it sufficient? It was all that was necessary.

1072. I suppose you looked upon your driving staff as the responsible body of men who ought to know whether the brake equipment was sufficient? Oh yes—some of them; a few of them may not have been first-class.

1073. Did any of your driving staff ever represent to you that the brake equipment was insufficient to control all trains on any grade? No, never.

1074. During the time of your management was there ever an accident of any sort, resulting from the inefficiency of the brakes? No.

1075. Did you have many cases of couplings breaking while you were there? Only in cases caused by jerking and going up-hill.

1076. Well, supposing that, in going up a hill, the couplings were to break—going up, we will say, the longest bank of the Main line, from Colebrook to Rhyndaston or Flat Top—do you follow me? Yes.

1077. Supposing that the couplings were to break there, the break would possibly be in the couplings nearest the tender, would it not? No, as a rule, they break at the very end of the train, with the jerk.

1078. But supposing, for the sake of illustration, a coupling broke near the tender? Yes.

1079. Would the brake equipment of the rest of the train be sufficient to control the train? Oh, quite sufficient. The guards' van and the carriages have brakes sufficient to hold the train at any time, at the worst.

1080. The guard can apply the side-lever from the van? No, the "Clark & Webb"; and he has his hand brake besides.

1081. But then, supposing the coupling broke, would not your continuous chain brake be inoperative? Oh no, it would be likely to break before the van and the carriage. The van and the carriage are always at the tail end of the train.

1082. How far did you make the chain brake continuous in your time? It was attached simply to the van and the carriages.

1083. And of course you always carried your carriages next to the van? Yes, at the tail end of the train. The engine, I may tell you, has a steam brake, and a hand brake, everything she can pull up in 1-in-40 grade she can hold by herself going down the next grade. I have taken a double train down the Scottsdale line, with 20 to 28 wagons in it, and with only the engine brake; and she could stop anywhere.

1084. Is the automatic brake in general use in England and on the Continent? Well, there are two brakes in use there—the Westinghouse and the vacuum.

1085. Those two are rival brakes, are they not? Yes.

1086. Well are either of those two brakes in general use on the continent or in England? The vacuum is mostly in service in England. On the Continent they have both the brakes.

1087. Is the automatic brake in general use on the goods stock? Only on the carriages. Unless it is on the fish trains, they do not apply the automatic brakes to the trucks.

1088. What do they do in England in dealing with mixed trains? There are very few of them run in England; the trains there are simply goods trains or passenger trains.

1089. What do you call a Parliamentary train? That is simply a passenger train running slowly and stopping at all stations.

1090. And such a train would be equipped with the patent brake? Such trains would have the automatic brake—yes.

1091. I suppose the Westinghouse or the vacuum brake is really a more efficient brake than the chain brake? Oh yes, because it is worked from the engine.

1092. Is it more powerful than the chain brake? It is more powerful, and it acts quicker, but the other brake, as a mechanical brake, is a very good brake.

1093. Is the automatic brake less likely to prove ineffective than the chain brake through fault? No, it has a certain number of faults. In the Westinghouse the principal faults are through burst hoses.

1094. That would be through excessive pressure? Yes.

1095. But with the vacuum you have one standard pressure—you cannot get more than a certain pressure? No, of course you have to increase your levers, and get a larger area of cylinders when you want extra power.

1096. Supposing it were necessary—we will assume this, for purpose of illustration—to equip this stock for general purposes, with the automatic brake, would you consider the equipment of the whole of the engines and passenger vehicles, and 50 per cent. of the goods wagons, piping the 50 per cent., adequate for all purposes of public safety? As far as the public safety goes I don't think you want to equip the wagons at all.

1097. But supposing it were decided that it is necessary to equip the service with automatic brakes would you consider the complete equipment of all the locomotives and passenger vehicles, and 50 per cent. of the wagons, piping the other 50 per cent., so as to make the brake continuous right through, would you consider that ample for the public safety? Well you might get all these piped trucks in one train, so have no brakes at all.

1098. That would be a question of management, would it not? I can't see that there is any question at all about it. The trucks are left about on sidings, and taken up as they are wanted. You might pick up all the trucks with brakes on one journey, and the next time simply get piped trucks with no brakes at all.

1099. Then what you seem to say is, that if we must equip with the automatic brake, we must equip everything? You must equip everything.

1100. But would it not serve if a certain percentage of the trucks were piped? The piping is all right, if you could guarantee a certain number of trucks with brakes, and a certain number of trucks with pipes in every train; you cannot always do that.

1101. You do not think it is possible to work more than a certain percentage of the trucks piped? You see, a certain class of trucks is wanted at one station, and another class may be ordered for another station. On one side you may get your trucks all piped, and on another, all with brakes fitted, and so on.

1102. Do you know the comparative power of a brake with one cylinder, as against a brake with two cylinders? It all depends upon the way it is worked out. It would generally work out according to the weight of the vehicle. They generally brake 90 per cent. of the weight, so as to prevent skidding.

1103. We are told that the Mount Lyell stock is equipped with one 18-inch cylinder? Yes; that is the four-wheeled stock; and the double bogie stock has two cylinders.

1104. The evidence given to us is to the effect that the bogie wagons at Mount Lyell are fitted with one 18-inch cylinder—did you know that? I did not know that.

1105. What would be the effect of having two 18-inch cylinders? They would be too large; they would skid all the wheels. Two cylinders would be more satisfactory in working than one, but they would have to be smaller.

1106. In what way would the two be more satisfactory? In case anything went wrong with one cylinder, you would have the other one.

1107. *By the Minister of Lands and Works.*—With the two cylinders you brake both sides of the train? Yes; you have both bogies braked.

1108. *By Mr. Hartnoll.*—You say you have been 29 years in the service, Mr. Batchelor: I presume, from that, you were here at the very inception of our railway service? Yes.

1109. When were these vacuum brakes first introduced into the service? At the opening of the Parattah and Oatlands line. They ran the train there as an omnibus train, picking up passengers anywhere at the side of the road.

1110. Would that be in Mr. Lord's time? Yes, in Mr. Lord's time.

1111. Now, supposing the vacuum brake were introduced, what would be the effect of it, so far as putting off trucks at one station, and a variety of other trucks at other stations; that is, dropping or picking up one, two, or three here and there all along the line—would it cause any delay or loss of time with the train going, say, from Burnie to Launceston? Oh, considerably so.

1112. In what way, Mr. Batchelor? Well, in taking the brake off; and the mere fact of uncoupling the vehicle puts on the brake. The moment you uncouple, the brake goes on, and you cannot move the carriage till the brake is taken off again. It takes from 30 to 35 seconds to take the brake off each vehicle.

1113. We had evidence here that the uncoupling was a very simple matter; you say it is not? Uncoupling is simple enough if the train parts; you would have the brake on each vehicle, and you must take off the brake on each vehicle before you can move it on again. You could not shunt with the brake on; and you could not kick a truck off with the brake on.

1114. Then you think there would be a loss of time in this process, varying at different stations? Undoubtedly so.

1115. Have you any experience as to loss of time in such cases? I have seen them take two-and-a-half minutes to take the brakes off a vehicle. If any dust gets into the mechanism, it would take even longer. I have known them take fully three minutes to get the brakes off.

1116. We had some evidence given to this Committee, and I think some members of the Committee are still a bit doubtful on the matter, as to what are the recommendations of the Board of Trade in regard to automatic or side brakes for goods trains. You have lately been in England, have you not? Yes.

1117. Are you thoroughly familiar with the last recommendation of the Board of Trade? Oh, yes.

1118. What is it? It is merely designed to prevent accidents from shunting. They insist on having levers on each side of the vehicle, so that the men will not have to jump across the line. There have been some accidents through men having to jump across to put the brakes down, and now the Board of Trade recommendation is, to have the brakes on either side of the trucks. But they have no power to enforce that recommendation.

1119. Then, although it may be a recommendation from the Board of Trade, the private companies need not comply with it? No. As a rule, they accept these recommendations with a very good grace, and put them on one side. They do not say that they will not do it; but they forget all about it.

1120. As far as our trains are equipped now with the automatic brake, they were equipped in your time, or very largely so, were they not? Yes.

1121. There is a list there, I think, Mr. Chairman, of the cost of the parts. Can you, Mr. Batchelor, recollect the different costs in your time: have you any such knowledge now, after being some time away from the service? Yes; I have a rough idea of what they cost. I had no time to get any memorandum at all while I was coming down from Scottsdale.

1122. In your time, what did it cost to equip the four-wheeled wagons? Oh, the four-wheeled wagons were never equipped; but I have the prices and all the details for doing it.

1123. And you do not think it is necessary to equip them, even now? No, I do not. I have got the prices, so as I could give an estimate if I wanted to equip them. There are two ways of equipping the engine. There is one way of putting the vacuum brake on all the wheels of the locomotive, and there is another way of only equipping the engine with the parts for working the brake on the train. Of course, there is a lot of difference in the two costs. The cost, with the ejector, the driver's handle, guage-pipes, &c.—consisting, that is, of all the parts supplied by the Vacuum Brake Company, ejector, steamcock, hose, couplings for the engine-tender, together with one copper ejector-pipe, exhaust-pipe, and everything else—is £90 per set.

1124. *By the Chairman.*—What is that for? One engine. That includes the whole of the fittings for the engine.

1125. Is that for double cylinders? That is without any vacuum cylinders on the engine; that is merely for the appliances for working the vacuum brake on the train. I presume that is what they are doing now. If they were going to work the locomotives with vacuum cylinders, there would be the cost of two more cylinders to add to that—say £30 more.

1126. That would be £120 altogether? That would be the whole thing; and there would be about 10 per cent. to be added to that for freight and charges.

1127. Well, now, is that the estimate of what they would cost now? That was the actual cost when things were dear, in 1892.

1128. And were things as dear in 1892 as they are to-day? Yes.

1129. Now does that comprise ——? That is only for the engine.

1130. Well, will you give us the cost of the other fittings? Four-wheeled bogie carriages, everything complete, with two cylinders of 15-inch diameter, £46; that is, erected here. My estimate for the wagon was £25; that is, with one 15-inch cylinder.

1131. *By Mr. Hope.*—Does that include the total cost from England? Yes. The vacuum cylinders cost £11 15*s.* each; an 18-in. cylinder would cost £12 15*s.* The whole of the complete gear for a guards' van costs £45, erected; that includes guards' handles, and everything complete. Then you can come down to the N.E. Dundas style of train, with a 2-feet guage. The cost of equipping an engine on that line is £65. That is the actual cost.

1132. *By Mr. Hartnoll.*—I remember, Mr. Batchelor, that, some years ago, Mr. Barrett made a statement in the House, which he said was on your recommendation: that it would be a very advantageous thing for our service to flatten out the curves, or make a re-survey of some portion of the Main line. Did Mr. Barrett at any time have conversations with you in regard to a matter of that kind? Oh, yes—several.

1133. What was your recommendation? During the time I was there, there were a lot of men unemployed in the Colony, and I represented to Mr. Back that it would be a good thing to have a small sum of money set aside for a re-survey of the Main line. Then, when the unemployed came along, they could set to work and take out the worst part of the line the first year, taking other portions in the year following. It could all have been done in that way, and the Government would never have felt the cost. It would have been a reproductive work.

1134. If it had been done, do you think it would have shortened the distance from Hobart to Launceston? I believe it would. I could not say without a survey.

1135. And you feel pretty certain you would have lessened the grade? Oh, considerably so.

1136. And, consequently, you could have made the run through in less time, and taken heavier loads? Yes; similar improvements have been made on the railways in other States—in New South Wales, South Australia, and Queensland.

1137. I suppose grades do not matter so much if you have light loads? They do not matter at all on suburban lines, with trains running at short intervals; but when you have only one or two trains a day on main trunk routes, it is a serious item. Of course, if you have trains running short distances, what you cannot take in one train you take in the next.

1138. If you had the railway service in your own hands, and it was put to you which would be the most judicious thing to do—to equip your stock with the vacuum brake, or improve the line as you indicated just now—which would you advise? I should never think of putting on more vacuum brakes.

1139. You do not think it is necessary? No; it would be more of a nuisance than an advantage, in my opinion—on the Western line especially. On the Main line it does not matter so much; you travel 15 miles an hour, and stop 20 minutes at stations; you can do anything there; but when you are tied for time you could not do it.

1140. Does that remark, that the automatic brake is not necessary, apply to the mixed trains that form our ordinary service? Exactly so.

1141. Now, what is the difference in cost of one 18-inch cylinder and two 15-inch cylinders? One 15-inch cylinder costs £11 15*s.*; one 18-inch cylinder costs £12 15*s.*

1142. Supposing it were decided to equip the whole of our stock with the vacuum brakes, and there were 18-inch cylinders used on some of the stock, could you put 15-inch cylinders on to other stock and still make it a complete service? You would not put 18-inch cylinders on, only where you had weight to contend with. You only brake 90 per cent. If you braked more, you would skid your wheels; then you could not get along at all.

1143. Then, two 18-inch cylinders would be too much? Two 18-inch cylinders would be too much, of course. You would skid all the wheels; but it is all according to the weight of the vehicle.

1144. Now, Mr. Batchelor, from your experience of railway matters, do you consider that any question of the application of these vacuum brakes belongs to the engineering part of a railway system, or to the general management? Oh, they belong to the locomotive department, by rights; that department is responsible for all the brake power.

1145. And ought not the head of the engineering department to be thoroughly familiar with, and be able to give one guidance in regard to, all matters of that kind? You mean the permanent-way department?

1146. Yes? The permanent-way department has nothing whatever to do with the running of the trains.

1147. The running of the trains, and this question of the application of the vacuum break belong especially to the locomotive department? That is so.

1148. *By the Minister of Lands and Works.*—You very often made estimates, Mr. Batchelor, did you not, of your equipment and other things? Yes.

1149. And sent Home orders for it? Yes.

1150. Do you know what course was followed? I used to make my estimates, and forward the orders to the General Manager, who would forward them, through the Minister, to the Agent-General.

1151. There is an Engineer at Home, who looks after these things for us? Yes, an Inspecting Engineer.

1152. Mr. Meilbek? Yes.

1153. Do you know anything of him? I met him when I was at Home.

1154. Is he a capable man? I should say he was. He has several other Governments besides this one, to look after.

1155. Have you any reason to think that orders passing through his hands would be paid for by us at more than market value? Oh, no, I do not think so. He simply calls for tenders, and writes out the specifications, and the tenders go to the Agent-General.

1156. Would there be any reason for supposing that orders transmitted to London, and being tendered for in the way you have just referred to, would be paid for at more than the market price? Oh, I could not answer that question.

1157. Well, you are acquainted, I suppose, with some of these manufacturers. You know the Bristol Wagon & Carriage Co.? Yes.

1158. And the Lancaster Railway Carriage and Wagon Co.? Yes.

1159. And the Oldborough Carriage Co.? Yes.

1160. And Brown, Marshall, & Co.? Yes.

1161. And the Birmingham Carriage and Wagon Co.—and the Midlands Railway Co.—and the Metropolitan? Yes; I was through most of their works when at Home.

1162. Are these all reputable firms? Yes, but they would have to be guided by the price of the patented parts. For instance, if you call for tenders for the supply of any patented parts, the tenderers must apply to the patentees to know what they charge for royalties, and make their price accordingly.

1163. But if we invite tenders in England, and these firms put in tenders, is there any reason for supposing we are paying more than we should pay? They would all be guided by the patentees of the different parts. They would have to write, in this case, to the patentees of the vacuum-brake parts, and then base their calculations on the price the patentees demanded.

1164. How do you account for the great difference in the tenders? I could not account for that, unless the patentees favour some more than others. They might do that.

1165. Well, suppose Mr. Meilbek, after receiving tenders from all these firms, sends this memorandum (Appendix G.), would you say there was any reason for thinking we were paying more than we should? I suppose that tender is the lowest?

1166. Yes? Well, he could do no other.

1167. Is there any reason for believing we are paying more than the market rates when we buy in that way? Oh, I could not say that at all.

1168. In your opinion, as one having to do with the purchase of these appliances from time to time, could you suggest any other way of acquiring them? You are entirely in the hands of the patentee. If the patentee favours one firm more than another, he would, perhaps, give that firm an allowance of 25 per cent. as against the other firms. They would all have to base their calculations on that. As a matter of fact, the patent will be out in a few months. Then the thing will be open for anyone to make.

1169. Can you suggest any better way, supposing you were Locomotive Superintendent here to-day, and that your Minister required that these brakes should be applied whether you wished it or not; can you suggest any better way of securing fairness in the purchase than the way we have adopted? That would be the ordinary way to do it.

1170. And you cannot answer me whether there is any reason to imagine that we are paying more than we should? No, I could not answer that question. If I were dealing with the people I should very much like to have the job at the price.

1171. Do you know the prices we are paying? I heard you mention £70 for wagons.

1172. That is not a price, but an estimate. You generally prepare estimates, do you not? Yes; and I should base them on the details in my possession.

1173. You would make them rather higher than lower, would you not? I should simply take actual rates and add a percentage for inspection and freight.

1174. Well, can you give any opinion as to the price mentioned here—Bristol Wagon Co., gear for carriages per set, £17 nett? That is not very far out. That is only 5 per cent. higher than what I have just told you.

1175. You say that is a fair price, then? That is not far out.

1176. There is only one more question I want to ask you, Mr. Batchelor. As to B-cross engines—the tenders received up to present are for three sets for B-cross engines at £120 a set? The cost is £90. We paid that for them.

1177. You think it is the present price? I think it is a fair price.

1178. *By the Chairman.*—With double cylinders? There are no cylinders at all in that; that is merely for the working of the vacuum brake on the train.

1179. What is it you said that the cost of the extra cylinder would be? I mentioned that just now—if you are going to put extra cylinders on the tender and the engine.

1180. *By the Minister of Lands and Works.*—Then there are FF. bogie timber-trucks: 12 sets, £51 each? About £46 is what we paid for them—actual cost.

1181. That is what you paid for them? Yes—actual cost.

1182. Have you any price list on which you are basing your calculations now? I have copies of invoices.

1183. How many years ago is that? It was in 1892 and 1893. Things were very dear then.

1184. Is it a fair thing to express an opinion of present prices on that basis? I should say it would be fair, from what I know of the market. Iron has dropped considerably from what it was.

1185. Then there are 16 sets of A, C, and D wagons, at £30 10*s*. each? My estimate was £25. We had never done anything with these.

1186. Then, if we are paying £30 10*s*., you think we are paying too much? I think you are paying a very high price.

1187. Although fifteen companies tendered for them? Yes, although fifteen companies did tender.

1188. Can you give us any idea of how to get them more cheaply? I could not give you an idea of how the Government could get them more cheaply. I believe I could get them more cheaply if I were in the market myself. A private firm could get them cheaper, probably. It is all in the hands of the patentees. If one firm is more friendly with them than the other they might knock off 50 per cent. of the royalty.

1189. Then, the most friendly firm with the patentees would be——? Would be the successful tenderer, of course.

1190. If you were in the position of Locomotive Superintendent just now, could you suggest to the Government any cheaper way of buying? If they had come before me I should probably have refused the tenders, and advised their not being accepted.

1191. Not at all? No, I should call for fresh tenders.

1192. The only other question I want to ask you is with regard to the efficiency of the brake power applied to a heavy train with only the brake van and one carriage fitted with the continuous chain brake. Do you think that would be sufficient? Fitted with the Clark and Webb brake?

1193. Yes. Would you consider in case of a breakage while the train was entering Flat Top tunnel, say, going up north—in case of a breakage at that place with a full train load, with the brake laid on the van and one carriage only, would the brake power be sufficient to prevent the train backing down the hill? Quite sufficient.

1194. With how many trucks would that efficiency extend? As many as the engine could take. You see, if a train parts it must come to a standstill before it begins to go back. If the guard puts on the brake at once it would stop it.

1195. And you think that the brake-power on the van and one carriage is ample to brake the whole of that train? Yes, I do, provided it is put on at the right time. The guard may not be attending to his duties, but if he put on the brake directly the coupling broke, he could stop the train.

1196. And if the train get a bit of a start? He would pull it up if it did get a bit of a start, so long as he was not asleep.

1197. *By the Chairman.*—If you were making an estimate for stock of this description on the 9th of April this year, you would have a fair knowledge of the probable cost, I suppose, from the details you get—you would know something as to what it ought to cost? Oh, yes.

1198. Well, you would consider that you had made an extraordinary discrepancy in your estimates if, we will say, on twenty-two items your estimates were 28½ per cent. higher than the actual cost of the stock landed here? [No reply.]

1199. Would you be able to gauge pretty well what the cost of erection would be? Yes.

1200. Could you gauge that to a nicety? Yes.

1201. You would know very closely what the freight, insurance, and other charges would be? Very closely—yes.

1202. And I suppose, from your price lists, you could form an approximate idea of the cost—say, within five per cent., or so? Oh, yes.

1203. Would you consider that your estimates were very far out if you found the tenders 28½ per cent. less than you had estimated? I should think I was a long way out.

1204. If you estimated the cost of fitting the brakes to bogie carriages at £70, and you found that you could get them at £15 less than that, would you consider that a very wide discrepancy? Oh, I should think so!

1205. And if you got other stock at £11 16*s*. 3*d*. less than your estimate, would you consider that discrepancy excessive? Too high an estimate, certainly.

1206. And if you got engines—B-cross engines: you know the style of engines? Yes.

1207. Well, they were estimated to cost £600 to fit, and the actual cost is £439 13*s*.; that is a difference of £160 7*s*. on an estimate of £600—26¾ per cent.? He must have guessed at it.

1208. And the C-cross and D-cross engines, six of them, were estimated to cost £1130; and they were landed here and erected for £959 6*s*., or £170 14*s*. less than the estimated amount. Do you think those estimates had ever been prepared with due regard to the information obtainable? They ought to have had all the information at hand. I left records of everything in the office. They could turn up the books and see what the brakes cost, and looking at the different prices in the market, they could go within five per cent., either way, of the actual cost.

1209. Have you any idea of how long it will be before these automatic brake patents run out? I could not tell. It will be a very short time.

1210. And I suppose the owners of the patent are very anxious to make hay while the sun shines? They are anxious to get all they can, no doubt about it.

1211. Is it a practice of the trade, or would it be an unusual practice, for the representative of a company like that to approach an official of any railway company with a view to inducing him to make a recommendation to his company to equip their whole stock with this brake, and offering him a consideration for doing that? I could not say. I have no knowledge of those large transactions.

1212. Have such overtures been made, to your knowledge? No, not on the small transactions I have been concerned in.

1213. There are no approaches, then, made by the various people connected with the manufacture of the mechanical parts of railways with a view to inducing railway companies to equip stock with any particular gear? Oh, they send round illustrations and all sorts of things. They never mention a monetary consideration.

1214. You say that the Board of Trade regulations are, practically, disregarded at Home? To a certain extent. Some of the recommendations are simply absurd.

1215. Do the Board of Trade regulations compel the equipment of goods wagons with the automatic brake? They have no power to compel at all; they only recommend.

1216. Do they recommend it? Yes, they recommend it for carriages.

1217. But it is not compulsory? It is not compulsory—no, not for wagons.

1218. Then the only effect of a Board of Trade regulation is this: that, in the event of an accident, if it were proved that the Board of Trade recommendations had not been adopted, it would tell very seriously against a company in case of a claim for damages? Oh, yes—of course.

1219. Then it is for a company to determine whether, as a matter of insurance, it is better to adopt the Board of Trade recommendations, or to accept the risk of accident? That is so; but it is of no use one company adopting all these regulations without the other companies doing it, because there is an interchange of rolling-stock on the different lines. They have to have rolling-stock hunters there—men going about picking up their rolling-stock, and taking it back again to where it belongs. When a new line is made, the Board of Trade officer goes and passes it before it is opened. After that, any recommendations the Board make are considered, and if the companies consider them outrageous or absurd, they will not do what is required by the Board. If they think it is to their benefit to do it, they do it.

1220. *By Mr. Hartnoll.*—In regard to Board of Trade Regulations, you are only speaking of their authority with reference to railways—in other matters they have supreme power? Oh yes, with steamboats, and things connected with going to sea, and everything of that sort, they have power.

1221. Supposing you were on the spot in the old country now, do you firmly believe that you could purchase what is contemplated to be bought at the prices you have mentioned to the Committee this morning? I believe I could—yes.

1222. Would you like to guarantee that, and execute the order? Well, that is rather a large order.

1223. Would you like to "spec it" at anything near those prices? I believe I could equip the whole of your wagons at that price, and make a very good thing out of it.

1224. *By Mr. Hope.*—With regard to our express trains, I believe you said that you considered the vacuum is the proper brake to have on those trains? Yes, it is.

1225. Is that owing to the excessive speed of those trains? No; the speed is not so great.

1226. Is it not a fact that on the Western Line, between Launceston and Devonport, these mixed trains travel nearly at the same speed as the express? Between stations they do—yes.

1227. And we have as severe grades on that line as you have on the Main line, have we not? Oh, no; the ruling grade is about 1 in 70.

1228. What is it on that rise beyond Kimberley? Oh, I think that there it is 1-in-50.

1229. Then there is a steep grade between the Don and Ulverstone, is there not? Yes, a short bit of it.

1230. Is there not just as much need, for the safety of passengers, to have the automatic brake on that line, as on this? I do not see it.

1231. There are numerous crossings on that line that trains cross, are there not? Yes; but the brake power is ample. They whistle at all the crossings before they come to them. They can always pull up in a very short distance.

1232. You consider the automatic brake to be much safer than any other brake except the Westinghouse? Yes; but the Westinghouse is an automatic brake. They are the only two brakes the Board of Trade recognise. Here is the Board of Trade return up to 1899. The vacuum brakes were then fitted to 12,061 engines and 50,300 carriages, or a total of 62,361. The Westinghouse brake was fitted to 3360 engines and 20,624 carriages, or a total of 23,984. That is all that was equipped in England in 1899.

1233. In regard to these tenders sent in at Home, Mr. Batchelor, you say you believe you could get the brakes cheaper if you were at Home. Of course, you would go direct to the people and deal with them privately? Exactly so.

1234. But one would naturally think, would they not, that when tenders were called for publicly, each firm would be willing to do the work as cheaply as possible? No doubt they are, but they are entirely in the hands of the patentees. The patentees get to know that these brakes are for a Government, and must be had; and of course they put the prices on.

1235. *By Mr. Hartnoll.*—Do you say that what you have, then, is a list of the number of miles run with these brakes? No; the number of vehicles equipped.

1236. It is that only of a small proportion of the stock on English railways? No; it is the entire number equipped at that time. This is simply carriages and engines. The vacuum brake had then one fault per 297,288 miles run; the Westinghouse had one fault per 120,635 miles run.

1237. *By Mr. Hope.*—While you were manager of our rolling-stock, on several occasions engine-drivers reported breakages on the Main line, did they not? No; not to me. They altered all the brakes when I came on, by adding side-lever brakes to the wagons. With the brakes on the Main line they had no trouble at all.

1238. But we have had an account, I believe, of trains parting on the Main line? That was in the Main line time, before I took charge.

1239. *By Mr. Hartnoll.*—We had some evidence, Mr. Batchelor, that you, when the Main line was purchased and you had the locomotive department under your control, altered or did away with the chain brake, substituting side levers. Is that so? Oh, no; that was a fad of Mr. Back's. He wanted the side levers put on in addition to the chain brake.

1240. You were not responsible for that? Oh no.

1241. We had it in evidence, you know, that you did it? I had to do it. I got orders to do it.

1242. And the chain brake was still maintained? Oh yes; the chain brake is on now.

1243. *By the Minister of Lands and Works.*—On all the trucks? On the old Main line trucks.

1244. Is it on all our coal wagons? Oh no.

1245. You are aware, Mr. Batchelor, that in America fifty per cent. of the total equipment of the country is fitted with air-tubes? I do not dispute that at all. They run very fast in America. They are supposed to run faster than anywhere. But there is a difference between running fifty, sixty, seventy, or eighty miles an hour, and running twenty. This is not America.

1246. Now, I want to ask you one question with reference to the application of the chain-brake, as between single buffer and double-buffer trains—is the chain brake equally efficacious with the double-buffer as with the single-buffer? Oh, yes; there is no difference whatever.

1247. No difference? No difference whatever: the buffers can make no difference whatever to the brake. You can only skid the wheels, and either brake will do that, with single buffers or double ones.

1248. *By Mr Hope.*—But it was explained to us that the double-buffer was not so good as the single-buffer going round a curve—what do you think? It is just the opposite, I should think.

[The witness withdrew.]

WEDNESDAY, NOVEMBER 13, 1901.

EDWARD C. DRIFFIELD, *called and examined.*

Mr. Driffield made the Statutory Declaration.

1249. *By the Chairman.*—Your name is——? Edward Carus Driffield.

1250. And your are a civil engineer? A civil and mechanical engineer.

1251. And you are at present——? Superintending Engineer for the Mount Lyell Company.

The Chairman: I will ask Mr. Patterson to ask you some questions.

1252. *By Mr. Patterson.*—You have had a large experience, Mr. Driffield, I think, in South Australia, before you came to this country, both in civil and mechanical engineering? Yes, sir.

1253. Can you tell me what is the ruling gradient of the Mount Lyell Railway—it is 1-in-17 I think, is it not? The ruling grade on the portion of line that is constructed on the Abt system, is 1-in-16, combined with 1-in-20.

1254. And that grade governs the whole line, of course? Yes, that governs the whole line.

1255. How long is that grade? The total length of the Abt section is four and a half miles.

1256. Would it have been possible for you to work safely on such a grade, without adopting some form of automatic brake? Certainly not.

1257. And what form of brake did you adopt? The automatic vacuum.

1258. You have a large and intimate acquaintance with the South Australian railway system, have you not? I served my apprenticeship on the South Australian railways.

1259. Do you know what form of brake they adopt on their passenger stock in South Australia? Yes; the automatic Westinghouse.

1260. And on the goods stock? The same, with the small portion that they have fitted, as far as I am aware. In fact, for the moment, I am not sure whether the automatic brake has been fitted to their goods stock in South Australia; I think it has only been fitted to their live-stock stock.

1261. Yes, that is correct. Look at this telegram, will you, please? [Witness examines document.] Do you know the signature on that telegram? Is this meant for Thomas Roberts, the Locomotive Engineer of South Australia?

1262. Yes, you practically served your time there? Yes, under Mr. Thow.

1263. Now, that telegram you have is a reply to a wire I sent, asking him whether they used an automatic brake for their goods-stock. He says——? "No; only to 5-ft. 3-in. live-stock vehicles."

1264. You see from that, then, that they do not use the automatic brake on goods trains at all? I have been so long away from South Australia that I can scarcely say.

1265. But from that telegram it appears so? From that telegram, it does; but, definitely, I do not know.

1266. Well, you know the main line from Adelaide to Melbourne very well? I do, sir.

1267. You know that heavy incline from the Plains to Mount Lofty? Yes; it is 1-in-40.

1268. Is there anything on the Government Railways in this State comparable to that incline—on the Main line, for instance? Well, I could hardly say that; but I believe there are portions of your Main line equally as difficult.

1269. That is to say, we have gradients of 1-in-45? Coupled with 4-chain curves.

1270. No; there were 4-chain curves there, but they are eliminated; there are 5-chain curves there now; but is there anything on the railways of this State comparable to that heavy gradient up to Mount Lofty? Well, it would be very difficult for me to answer that question without a more intimate acquaintance with the State and the railways. At any rate, you know that that gradient to Mount Lofty is about nine miles along? Yes; there are about nine miles of 1-in-40 grade.

1271. Now, I suppose the reason why you adopted the vacuum brake on the Mount Lyell Railway was that you might be enabled to make your stock interchangeable with the Government stock? Exactly. The arrangement really was the outcome of a mutual conference between Mr. Back and ourselves. At the time when the class of rolling-stock we have now was being considered by the company, Mr. Back suggested that it would be infinitely preferable to adopt a class of stock that would be interchangeable with the Government stock, and fitted with the same class of brake that the Colony had adopted—the antomatic vacuum.

1272. Are you aware that in South Australia, in order to make their stock uniform, they discarded the vacuum brake, and the great bulk of their stock is fitted with the Westinghouse? I know that experiments were made in South Australia to compare the automatic vacuum with the Westinghouse. I am not aware, exactly, what the result of those experiments was; but, in the end, they simply removed the vacuum brake in order to make the class of brake in that State uniform.

1273. Now, were you or your Company offered these discarded vacuum brakes by the South Australian Government? We received an offer from the Locomotive Department of South Australia, offering to sell us a number of sets of the vacuum brake that had been taken off their stock. I believe the brakes are in thorough good order, but the offer was made to us at a time when we really did not require the brakes, and we did not accept them.

1274. Can you tell the Committee the price per set at which the brakes were offered to you? I have really forgotten that, Mr. Patterson. I could easily get the information for you by wiring, but I could hardly say from memory what the price was.

1275. You could not say even whether it was much under £10 a set? I could not say whether it was over or under £10.

1276. *By the Chairman.*—Can you say whether it was considerably cheaper than you could purchase the brakes for in the ordinary way? Undoubtedly; it was an offer of second-hand material.

1277. *By Mr. Patterson.*—Can you tell the Committee what the price of the brake comes to fitted as on the ordinary four-wheeled wagon? Yes. In response to a wire from Mr. Guesdon, I went to a great deal of trouble in getting out estimates. I may say, in this connection, that the information I have given to Mr. Patterson was more or less of a general character, but I look on these estimates as actual facts. The other information I casually gave to Mr. Patterson I did not consider, at the time, was to be made of such importance as it seems to have been. You first require the cost of the four-wheeled wagon?

1278. Yes, that is the standard Government wagon practically? Well, in order to make this thoroughly clear, and to have everything on the safe side, I have had separate estimates prepared. The first estimate is made out by the Loco. Department in their own practical way. It gives the cost of the brakes, allowing for the cost of forging, and allowing for the time of the smiths. I have brought a letter from the Loco. Superintendent, and his estimate. In addition to that, we made an office estimate. That letter of the Loco. Superintendent, and both the estimates, I propose to submit to the Committee. First of all, the Loco. Department gave the cost of fitting automatic vacuum brake set, after payment of all expenses of freight and insurance and so on, as £20 0*s.* 2*d.* The cost of fitting hand brake in conjunction with same——

1279. Yes; but I think we will take that separately? Well, you must have the parts, you see. There are certain parts of the brake necessary for the fitting of a hand brake, as well as the automatic brake, and I do not see how it is possible, really, to separate the two estimates. If you take the ordinary vehicles with hand brakes, it is simply a matter of removing the lever and putting on a vacuum cylinder to reconvert it, and you are using very much the same style of rods, and very much the same arrangement, generally.

1280. We will take the hand brakes separately, if you do not mind? The cost of fitting the hand brake is £11 12*s.* 9*d.* That would bring the total cost to £31 12*s.* 11*d.*, that is the loco. department's estimates. The office estimate from the plans is——

1281. *By the Chairman.*—Is that all for automatic brakes—what do you mean by hand brakes, do you mean the side lever brakes? Well, the brake blocks, if you can understand, Mr. Chairman, are required just the same for hand-brake operations as for automatic vacuum-brake operations; they are used for both. You do not have a different brake block for the vacuum brake and the hand brake.

1282. Then that is to bring your side brake under the control of your vacuum brake? No; the side brake is to be used independently for shunting about the yard, and so on, when there is no engine to make a vacuum.

1283. Then, supposing that your trucks were equipped with the side lever brakes, that would not be taken into consideration with that estimate? Certainly, it is allowed for in the estimate of £20 0*s.* 2*d.*; that is the cost of the vacuum brake only, and that is why I have taken out two estimates. If the truck has no brakes whatever upon it, to start with, it would really require £31 12*s.* 11*d.* to fit it up; if it is already fitted with a hand brake it will require £20 0*s.* 2*d.* to attach the automatic brake. In comparison to that estimate, I have a totally separate one prepared in the office from the plans, taking out the actual weight of the material. In that estimate the cost of the vacuum brake gear is given as £21 1*s.* 11*d.* Cost of the ordinary hand brake, £11 11*s.* 7*d.* Total cost, £32 13*s.* 6*d.*

1284. *By Mr. Patterson.*—Those two estimates, then, are practically the same? Yes; except that the loco. department has not had the same information available to work on.

1285. *By the Chairman.*—Does that price you have mentioned include duty? That includes everything. I have everything tabulated here, if the Committee wish to inspect it; that is, for the standard four-wheel wagon—the Government standard stock.

1286. *By the Minister of Lands and Works.*—Is that for a single cylinder or the double cylinders? A single cylinder. Of course, the four-wheel trucks never have the double cylinders.

1287. *By Mr. Patterson.*—Now, will you take the bogies, Mr. Driffield? I again take the Locomotive Department estimate first. It is impossible to separate the hand brake gear from the vacuum gear in this estimate, for the very reason that the conditions are not the same. If a hand brake is to be fitted on to a bogie car, as a rule it is just a set of brakes on one bogie, and, consequently, this estimate has been prepared for the total brakes, as if new brake gear altogther were being fitted. The Locomotive Department estimate is £39 11*s.* 9*d.* for the whole truck, entirely fitted up. I took out an estimate myself, separating the hand brake from the vacuum gear. The cost of the vacuum brake is £21 7*s.* 9*d.*; the cost of the hand brake gear is £20 19*s.* 3*d.*; or a total cost of £42 7*s.*; in other words, if the trucks were already fitted with an existing hand brake it would cost £21 7*s.* 9*d.* to convert it.

1288. Can you give us the cost for the carriages? They are practically the same, so far as we are concerned, the same type of underframes being used.

1289. The same as the bogies? The same as the bogies—and the brake-van is the same.

1290. Have you got the cost of erecting the brake on the engines? No. Our engines have been fitted in London—every one of them. I was not able to get a separate estimate of these.

1291. Now, in all these instances the charges you have mentioned include freight, agency, and all charges for customs duties, and so on? They include freight, customs, entry and shipment, insurance, labour in erecting: duty ten per cent., commission two and a half per cent., freight and other charges, ten per cent. Total charges, approximately, 31 per cent. I have the same charges for the wagons as well—the same duties worked out in accordance with your instructions in your wire. I should like to hand that letter in, just to confirm the estimate from the loco. department.

[Document put in and read by Chairman.]

1292. Well, Mr. Driffield, I understand from you that, practically, the cost of applying the automatic brake to a truck, which has already the hand brake, is about £20? About £20, sir,—£20 0*s.* 2*d.*

1293. Well, one reason why the Committee asked you to come here—I know, at considerable personal inconvenience to yourself—was to see if you could suggest any means of accounting for the fact that the brake on our 4-wheeled wagons, instead of costing £20, cost £36 5*s.*, without providing for any charge for duty? [No reply.]

The Minister of Lands and Works.—You are speaking of the estimate now, not the cost.

The Chairman.—The actual cost was £35 7*s.* 4*d.*

1294. *By Mr. Patterson.*—Well, it practically comes to this, that the cost of fitting a Government 4-wheeled standard wagon, which costs you £20, costs the Government nearly £40. Can you suggest, from your knowledge as a mechanical engineer, any reason why the Government should be called on to pay so much more than you do? Well, it would all depend, sir, on whether both estimates are framed exactly on the same data and conditions. Does the Government estimate include the hand brake?

1295. Oh, no; the hand brake is already on the vehicles. What do you think? That is to say, the truck actually had a brake on it before the vacuum-brake was fitted?

1296. Yes, that is the position. Can you explain it? No, sir; it is a very difficult matter for me to comment upon without further information.

Mr. Patterson: I think, Mr. Chairman, it would be a very good thing if we could ask Mr. Deeble to meet Mr. Driffield. There must be some explanation of this thing. At any rate, the discrepancy is so great that I think we should have some explanation.

Mr. Minister of Lands and Works.—I would not discuss it while Mr. Driffeld is here. Better take his evidence first.

1297. *By Mr. Patterson.*—I suppose, Mr. Driffield, that you meet with exceptional difficulties in working lines on the West Coast, with a rainfall of ten or twelve feet, and constant danger of slips, and so on? I think the conditions altogether on the Coast are most difficult in railway work—both on the Strahan-Zeehan line and the private lines.

1298. You would not think of comparing the Main line, with a rainfall of 1 foot 9 inches, with your line? Not in matters of permanent way and maintenance. In the rolling-stock there would probably be very little difference.

1299. Now I want to ask you, Mr. Driffield, to leave this subject and come to another. We have it in evidence that engines with 10 tons 7 cwts. on an axle are running express trains at thirty-eight miles an hour over 46-lb rails. Do you consider that that is an advisable state of things; or is there any risk in maintaining that procedure? Well, I should certainly like to have a closer knowledge of the whole of the facts before expressing an opinion on the particular point you wish me to answer; but, in a general way, of course, I might give a reply to that question.

1300. Perhaps I can help you. On the part of the line that I refer to it is a level run, and time is made up there by the express. The rails are twenty-four feet long, and the sleepers go ten to the rail. Would that assist you? Are they iron or steel rails?

1301. Steel? I should consider the rails are too light in the circumstances. The usual custom is to accept nothing under a minimum of five pounds per lineal yard of rail to the ton of axle load. If your axle weight is ten tons, your rail should not be less than 50 lbs. The continental practice is more liberal still, and would give you about a 70-lb. rail under the same circumstances.

1302. Suppose that you were engineer and manager of a railway company—a poor company—who were making an annual loss on their working of £110,000: would you prefer to spend £60,000 on taking out that light section of railway and putting in a 60-lb. rail, or would you spend it on putting an automatic brake on your goods stock—which alternative would you choose? That is rather a difficult question to answer, too. If the goods stock did not require a brake urgently in any way, I should certainly say, "Improve your permanent-way first." That would be the right course.

1303. I will put it in another way; we have it in evidence that the Main line has been worked for twenty-five years, during which time we had nothing but the hand brake on the trucks. It is stated that there has been a practical immunity from accident during the whole of the twenty-five years. Under these circumstances would you choose rather to adopt the automatic brake, or to relay your permanent way with a 60lb rail? Seeing the great importance of your passenger service between your capital and Launceston, I should certainly say that the permanent way should be the first consideration.

1304. I suppose you see the annual report of the South Australian railways from time to time do you—you get the reports, I suppose? Yes we get the reports, but I cannot say I am very familiar with them.

1305. I am going to quote from one of them. In South Australia there are 1374 miles of single lines on the 3-ft.-6in. gauge, having 3500 wagons and goods trucks, and not one of those trucks is fitted with the automatic brake; nor is it so proposed to fit them. In that State last year, they not only paid the interest on their railway debt and all their working expenses, but they added a contribution £53,000 to the benefit of the general revenue. The question I am asking you is this: seeing that in South Australia they have the same grades, and five times the size railway system that we have; and seeing that we in this State have lighter traffic and slower speeds than they have in South Australia, and non-paying lines, while in South Australia they could well afford to use the automatic brake, if they wished to ———

Mr. Minister of Lands and Works.—Are you arguing with Mr. Driffield, or putting him a question?

1306. *By Mr. Patterson.*—I am going to ask the question at all hazards. In South Australia, Mr. Driffield, they could easily afford to apply the automatic brake to their goods stock, if they thought it necessary, because last year they had £53,000 to the good, after paying interest and all working expenses. They have not adopted it, and they have the same curves and grades there as here. But here we have an annual loss on our working of £110,000, with fewer trains and a low rate of speed; and yet, despite the position in South Australia, we propose to equip our goods stock with the automatic brake. Now, in your opinion, has anything in the past occurred—bearing in mind that there has been immunity from accidents for twenty-five years—such as would make you believe that the vacuum brake here is a crying necessity in the interests of the public? I do not think that is exactly a fair question, such as I should be asked to reply to.

1307. Then I will not ask you to answer it. You do not wish to? It is a question as to which there may be a great many circumstances concerned—circumstances such that only a man having a full knowledge of the details would be qualified to give an opinion on.

1308. Then I will read you the latest opinion of the Board of Trade with regard to goods stock. It is this: "Within five years of the coming into operation of those rules, brake levers must be fitted to goods wagons on both sides to avoid danger of accident in shunting. But the Board of Trade has never even suggested that goods stock should be equipped with an automatic brake. That is the regulation of the Board of Trade in England. Can you see any reason why we, with our limited traffic in these States, should go to the expense of the automatic brake for goods-stock, when the English Board of Trade does not require such brakes on goods-stock there? Well, on general lines, I certainly can answer your question. I consider that with the average limited goods traffic on most of the colonial lines, the automatic brake is not required, except, of course, on such long banks and gradients as may cause danger to passenger traffic, or where other special circumstances may exist that are peculiar to the local conditions of any given place. But I certainly think, in any case, that the conditions of Tasmania entail the necessity of fitting the automatic brake to your passenger service.

1309. *By Mr. Dumaresq.*—And to mixed trains? Well, the mixed trains, of course, are passenger trains; they carry passengers.

1310. *By Mr. Patterson.*—I want to ask you another question, Mr. Driffield. I suppose you are aware that in our mixed trains here the passenger carriages have a continuous chain-brake? I know that that is so on the Strahan-Zeehan line.

1311. Well, it is so on all our lines. Now, you know the long section of line from Launceston to Emu Bay? Yes.

1312. And you know the grades and curves on that line? Well, I do not know much of them: simply what I have noticed while travelling on the trains along there.

1313. Do you see any crying necessity for applying automatic brakes to goods wagons running on that line? Running, do you mean, as parts of mixed trains, or as goods trains?

1314. Running with mixed trains—remembering that the carriages on such trains are fitted with the continuous chain-brake? Well, I would hardly like to give you an opinion on that point. On any matters to which I can give you straight-out information on points of fact, I am ready and glad to do so; but in matters that require very careful sifting of conditions and circumstances, as matters of this kind must do, it is hardly competent for me to form an opinion on hearsay, and not on facts. I do not see that my opinion on such a matter can be worth twopence, when I have not been carefully over the lines. If I were examining the line with the object of reporting on it, I should have all the plans and facts and all the available information required before me. That would place me in a quite different position. You cannot ask me to state an opinion on such matters on mere hearsay.

1315. *By the Minister of Lands and Works.*—Do you think the responsible Government officials who are called on to advise Ministers in these matters would have all the facts before them? They certainly should have.

1316. *By Mr. Patterson.*—Well, I come to another line now: the Fingal line; which is practically a coal-track. Do you think that on that line, where no passengers are carried, that it is advisable to go to the expense of applying the automatic brakes to the coal-trucks—and goods stock on that line? If you ask the question in a general way, and say that you have an ordinary flat line, not necessarily the Fingal ———

1317. Take an ordinary line then, under those conditions? A line perfectly level, perfectly flat, and with a limited traffic?

1318. It is undulating country, without any steep banks.

Mr. Minister of Lands and Works.—That is hardly a full description of it. There is one very nasty river to cross.

The Witness.—It is a very difficult matter for me to answer such questions when they are applied to a particular line that I am not conversant with. If they applied to ordinary cases, and had no particular application, I could answer them in a general way.

1319. *By Mr. Patterson.*—Do you know the Mount Lyell Railway Act? Yes, sir.

1320. Have you seen it lately? Yes.

1321. Can you tell me whether a statement we had made in Parliament as to that Act is correct?—The statement that ——

1322. *Mr. Minister of Lands and Works.*—Oh, that was incorrect; that is admitted. I was under a wrong impression when I spoke. I know, as a matter of fact, Mr. Driffield, that Mr. Back advised you to apply the automatic brake on your stock. That is so, I think? Oh, yes, that is so; but it was quite a mutual arrangement.

1323. *By Mr. Hartnoll.*—Mr. Driffield, are you aware on what system or by what method your company purchases these automatic vacuum brakes in London? We have a consulting engineer in London, Mr. Meilbek. Tenders for anything of the kind we want are always sent to the London Board, who place them on the market through Mr. Meilbek. The tenders are invited in the ordinary way.

1324. Do you know whether your board would make any arrangements with the patentee to pay an ordinary bonus for each brake supplied; and then get the work done by tender to some acknowledged manufacturer in the Old Country? What would the bonus be for?

1325. Well, this vacuum brake is a patent, is it not? Certainly.

1326. Well, a suggestion was made by one witness before this Committee, a witness who was asked the same question that you were asked just now—if he could give the Committee any sort of idea of what had caused the great difference in the prices paid by the Government here and the cost of the appliances to your company? He said he did not see how it could be explained, except by the fact that the patentee made variable charges for the use of his patent. Do you think that anything of that kind could arise to account for the difference in prices? Well, of course, there are royalties charged on special goods. But I do not know that there are royalties charged on the vacuum brake gear; because, as a matter of fact, the brakes are all supplied by the company who hold the patents.

1327. But you would have to pay them a certain amount for royalty on every brake supplied? No; you buy the brake from the firm; they hold their own patents.

1328. Do you know whether they make any variable charge? I am not aware of any. There is a variable charge according to the state of the metal market, naturally. If metals are up, the price of all the gear is up; if metals are down, on the other hand, the price of gear is down. We

have had fluctuations of thirty shillings in the price of vacuum-brake cylinders in our short term of six years' purchasing.

1329. In your judgment, then, there is one standard price charged by the Vacuum Brake Company to anyone who wants to go in for this particular class of stock? Precisely,—fluctuating with the metal market.

1330. I notice, Mr. Driffield, that you have a number of papers with you, quite independent of those you have given to this Committee, or referred to during your evidence here. Are there any other matters disclosed in those papers that you have taken out thinking they might be of service for our purpose? Well, I have brought the papers relating to prices and commission, as I was instructed to do in the telegram I received from the Chairman.

1331. You have given us that? Yes.

1332. And all that matter is in evidence, without the necessity of your referring to your other papers? Well, it is just a matter of what questions you desire to ask.

1333. I thought, perhaps, Mr. Driffield, that you had an idea that there was some other information that the Committee might like to have, and that has not been brought out by any direct question put to you? Well, I have the actual cost of each of the articles and the charges for freight, for the purposes of comparison, if the Committee requires that.

1334. I suppose you would not have any objection to putting those documents in, for the perusal of the Committee, to be returned to you after the close of the Committee's deliberations? I think not. I believe there would be no objection.

1335. Have you that information with you, then? I have sir.

1336. I saw that you had a number of other papers with you. You will understand why I questioned you as to that? Of course, I hardly knew what I would be examined on.

1337. I have found frequently, that witnesses come to a committee and are examined, and then go away and say, "There were lots of things I could have told you that would have been useful to the Committee; but no direct question was put to me, and therefore I did not volunteer the information." I am only asking you now, for that reason, if there are any other matters dealt with in those papers, that you think might be of service to the Committee? Well, there is certainly one matter I ought to bring very strongly under the notice of the Committee, and that is the question of the fluctuation of prices. It does not particularly apply to the brake gear, but I can give you some facts that will be very fair evidence of how prices can fluctuate in a very short time. Now, take first June, 1899. In that month we purchased some coke wagons in London by tender. The accepted tender was £295 each. In December of the same year we purchased four more, and the tender was £345 each, There you have an advance of £50 on one class of goods in a very few months. I have here instances of other discrepancies of that kind, showing that it is impossible to fix any particular price at all for these brake parts. It is all according to the size of the order and the congestion of the market. If the shops are full, and you want the material hurriedly, you have got to pay for it.

1338. I may tell you, Mr. Driffield, that we have it in evidence from Mr. Batchelor, what he says was the cost of these vacuum brakes in 1892, and the says that the metal market was quite as high in 1892 as it is to-day. Are you aware whether that is so or not? I could not tell you, sir. But it is a matter that could be easily ascertained by referring to the statistics.

1339. But if the metal market in 1892 was as high as it is to-day, the brakes ought to be obtained at about the same price now as then? Yes. I think the price of steel rails is about the best and fairest means of comparison of the condition of the metal market. Whenever the price of steel rails fluctuates, the price of other railway stock fluctuates with it. You could nearly always take that as a fair base to work on.

1340. *By Mr. Dumaresq.*—Mr. Driffield, you said your bogie-brakes cost about £39 11*s.* 9*d.*; was that with a single cylinder, or with double cylinders? That is a loco. department estimate; £42 7*s.* was the office estimate for the same work.

1341. That is with the single cylinder? With a single cylinder—yes.

1342. And the double cylinders would cost more? Yes, more, by the price of the extra cylinder and the fittings. The cylinder would be about £12, and the cost of connecting it possibly about £2 5*s.*

1343. And were your bogies and carriages made ready for being fitted with the brake in London? They were actually fitted with the brakes in England.

1344. *By Mr. Hartnoll.*—Although yours is a single cylinder the size of the cylinder is different from that of the cylinders on the Government stock? It is 18-inch on the bogie wagons, and 15-inch on the other wagons.

1345. Then, if you had the double cylinders on your bogie wagons, you would have two of 15-inch? Probably less than 15-inch. They would probably be about 13 inches diameter.

1346. What is the difference between the cost of fitting with one 18-inch cylinder and the cost of fitting with two 15-inch cylinders, and whatever extras might be required with the two cylinders? Oh, there would be a considerable difference in price there. The price of one 18-inch cylinder is £13; and 15-inch cylinders cost £12 each. You might possibly get them at a shade under that if you got a quantity, of course.

1347. That would be a pound difference on each cylinder. So that by fitting two cylinders in place of one you would certainly be adding an extra £10 to the cost of your brake? I think myself, that putting on the extra cylinder would add close on £14, fitted to the truck.

1348. *By Mr. Hope.*—There is one point I wanted to ask you about, Mr. Driffield, with regard to those firms who tendered for the locomotive brakes in England. I understood that there were some ten firms tendered, and the prices varied a good deal. I suppose these firms would all have the opportunity of getting the automatic brake from the patentee at the same price? Yes, they would all simply ask for quotations from that firm, and they would base their tenders on the prices quoted. At the same time, of course, there are a great many trade discounts in the London market. Any large firm like Stableford's, in the habit of putting a lot of work in the Vacuum Automatic Brake Company's way, would probably get trade discount. Some of the large firms would probably get a considerable discount on their goods.

1349. *By Mr. Hartnoll.*—Well that, I take it, is precisely the same as making a variable charge? It is a trade discount.

1350. What Mr. Hope wants to get at, I think, is this:—Are these trade discounts different to one firm tendering from what they would be to another? That is an impossible thing for any man to say.

1351. But anybody in the trade would know it, I suppose? Well, it is precisely the same as it would be with you or any gentleman dealing in a large way with any firm. You would probably get concessions that another person going and making a small purchase once a year or so would not receive. Some of the English railways buy this class of stock in very large quantities.

1352. Then the trade discounts you speak of are very much the same as the allowances made off hollow-ware; the price becomes variable according to the state of the metal market? Yes; so much off list.

1353. It moves up and down? Yes. They have a list of that kind at Home for all specialities; but they have trade discounts on top of that, as well. I could just show the Committee a tender I have here—just a small tender for wagon-wheels and axles—which will prove to you how tenders fluctuate. These firms tendering must have been in precisely the same condition as to the cost of materials; but still, there is a striking discrepancy in the tenders.

1354. *By Mr. Hope.*—Of course, the same thing applies to our local men. If tenders are called for when they have plenty of work, they make their tenders a little higher than they otherwise would. I suppose the rule applies to these English firms in the same way? Yes. And there is another point to be considered. If they think you want a thing in a great hurry, they will not hesitate to put the prices up. In fact, it is a very hard thing indeed to manage the London market. It is a most difficult market to reconcile. You see, there are three tenders here for the class of stock I referred to just now ———

1355. *By the Chairman.*—And there is ten per cent. difference in two of them? Yes, and they were both tendering under the same conditions. If I had known or had any idea of the class of information you wanted on that point I could have brought papers along dealing with several other matters of the kind.

1356. *By Mr. Dumaresq.*—Mr. Driffield, you made one remark on the general question before the Committee, that it would be well to make clear. You said, I think, that, taking into consideration the class of our lines here, you should advise the adoption of the automatic brake where passengers are carried? Yes.

1357. And that remark would apply to all mixed trains, as well as ordinary passenger trains? Yes; I consider that with passenger cars running on a 1-in-40 grade, in case of a parting, you might have a very serious runaway, unless the trains were fitted with some kind of automatic brake.

1358. I mean, you would recommend the adoption of the vacuum automatic brake, and not the chain brake? The chain-brake is not automatic.

1359. And you mean, that on all trains carrying passengers you would have an automatic brake? Yes; of any type, as long as it was automatic.

1360. *By Mr. Hartnoll.*—There is one question, Mr. Driffield, of the questions that I desired to ask you, that I omitted to ask in my examination of you just now. Have you any knowledge as to when the patent rights of this automatic brake will cease in the Old Country? I have not, sir.

1361. *By Mr. Hope.*—I understand, Mr. Driffield, from your evidence, that you consider the automatic vacuum brake is one of the safest brakes we could have for carrying passengers? I think it is a recognised thing throughout the world that the automatic vacuum brake is one of the very best brakes in existence.

1362. *By the Minister of Lands and Works.*—Mr. Driffield, how long ago is it since you agreed with the Railway Department to provide your stock with automatic brakes, so that it would be interchangeable with the Government stock? At the very commencement, when the line was being opened. That would be very early in 1896.

1363. Over five years ago? Over five years ago.

1364. Was it then your impression that the whole of the Tasmanian Government rolling-stock was to be fitted with the automatic brake—or that it was in contemplation? I do not think I ever heard any question relating to it at that time.

1365. Then why would it be necessary, if our stock was not fitted with the brake, to apply it to your stock for the purpose of making it interchangeable with ours? As far as I understood the question at that time, it was the intention to fit all wagons running on the Main line trains with the vacuum brake, so as to be able to run them on the mixed trains. That is what I understood at the time.

1366. From whom do you generally purchase your automatic brake gear—any one firm in particular? Well, no; it is generally supplied with the stock under any tenders that are let. If we call for tenders for, say, so many wagons, and so many sets of gear, the firm tendering purchases the vacuum brake gear and supply it with the wagons. On the other hand, if we indented duplicates we should purchase directly from the Vacuum Brake Company itself.

1367. Now, as to your workshop estimates: are they based upon the assumption that the gear will be purchased in a fit state to be applied at once to the stock, or does it mean that a good deal of the work is done by yourselves in your own workshops? The actual estimates furnished to-day, you mean?

1368. Yes? They are the prices at which we consider that we could fit the brakes at the present moment.

1369. Then, will you explain what plan you follow: do you order full sets from Home? We order simply the patented parts that we cannot make, and we make everything else in our own shops. That is, we order from London the vacuum cylinder and the valve attached to it, and such things as the train pipe and the coupling-hoses and the hose-clips.

1370. Is that the general method of ordering the gear, do you know? I should think so. It would be very much cheaper to make your own ironwork than to bring it from Home. Ironwork has to pay a heavy duty coming in, if it is manufactured; and if you bring it in in an unmanufactured state, the conditions of the labour market here would favour the work being done in the Colonies.

1371. Would that apply to the Government in importing its own ironwork, duty free? Well, I could hardly answer that without working it out to see what the comparison meant.

1372. What is your practice when ordering the stuff from Home? We send to our London office—the office of the London board—and if it is a contract, and has to be tendered for, the tenders are called for through that office. But if it is a speciality, of course—

1373. What is Mr. Meilbek's function? He comes in as Consulting Engineer.

1374. And makes recommendations to you as to accepting tenders? Yes; and makes recommendations as to tenders, too.

1375. Now, will you look at that list or schedule of tenders. [Witness examines document.—List of tenderers for Government brake stock.] On that a tender is recommended for acceptance by Mr. Meilbek.—Have you any reason to think, that in the case of these particular tenders, we are being asked to pay more than the market price for the article we are purchasing? Well, I want fuller information. Do these tenders include full sets of brake gear? What is the specification attached to that schedule? I am inclined to think by the prices there, that they include the whole of the brake gear complete, with every bit of the ironwork. Of course, I have been led to believe that the only consideration was the vacuum brake itself; whereas, from what I gather from these prices, I think it applies to all the ironwork. If so, those prices would certainly be very reasonable.

1376. Do you know the firms that tendered, according to that list? I know all the firms; at least, I know the names.

1377. Are they reputable firms? Certainly.

1378. Well, you notice that list again—[witness examines document]—and tell us with regard to the tenders: there are big discrepancies there between the tenders for the same thing? Yes; there is quite a fluctuation.

1379. Varying from—? From £47 to £74: I think that is about the range on one lot; and £32 to £70 on the other.

1380. And we have a schedule of tenders received here, Mr. Driffield. The four-wheeled wagons are given in the tender as f.o.b., London, £30 10*s.*; freight, insurance, and inspection, extra, £3 9*s.* 4*d.*; cost of erection, £1 10*s.*: total cost, erected, £35 9*s.* 4*d.*—Well, may I interrupt you there, sir? That compares, I think, very closely with the estimates I have already furnished here, providing that it includes the same parts; and I am almost satisfied it does. For the same wagon, these estimates of mine are £31 12*s.* 11*d.* and £32 13*s.* 6*d.*; so you see that they are very close, approximately. That estimate of yours, I think, includes the same as these estimates; that is, the whole of the ironwork. Of course, before we can get any real comparison we must know what this estimate of yours includes, and whether it can be compared with mine; but as I say, I think this estimate refers to exactly the same amount as that one.

1381. Will the fact that the cost of erection in this estimate is only put down at £1 10*s.* assist you—would that indicate that we are getting the whole thing complete, and simply putting it on the brakes here? Precisely.

1382. What is your own local expense of putting the brakes on—the cost, I mean, of doing all the work that you do yourselves locally? Well, we have got £8 8*s.* down for the forge work and fitting of the hand brake, and £1 15*s.* for attaching the other parts subsequently; so it is really a matter with us of £10 3*s.* for labour.

1383. Now, I will come to the bogie wagons, Mr. Driffield: our price is, f.o.b., London, £51? What is this for?

1384. This is for the bogie wagons, fitted with two cylinders, £51. Freight, insurance, and all charges, £4 13*s.* 9*d.*; cost of erection £3.; cost, erected, £58 13*s.* 9*d.*? Well, for the same work, without the double cylinder, we have £42 7*s.*; to which you would have to add at least £14 before you could compare the tenders. That would give you £56 as our price.

1385. You have carriage brakes also? Yes; but our carriage under-frames and wagon under-frames are precisely the same.

1386. The carriage here on our Schedule works out at £54 11*s*. How does that compare? That is against, practically, £56 with us.

1387. What would these prices indicate to you now, then, Mr. Driffield? [No reply.]

1388. I mean in this way: are we purchasing more than you purchase in London, and therefore paying a higher price for it; or are we paying a higher price for the same thing? Well, on the face of this, I should say that the prices are almost identical, because I am fairly satisfied, from the figures that are quoted here, and other indications, that your prices cover the whole of the brake complete—that is, the whole of the parts, for the hand brake and everything. If so, your tenders and our estimates are very close to each other. I have the whole of our freights and insurances worked out in percentages of the total value; and it could be very easily determined, if the instructions were given to the department, what your's were, in the same manner. From twenty-eight to thirty-one per cent. I think, they work out.

1389. That includes duty, though, does it not? It includes everything—all charges, sir.

1390. *By the Chairman.*—What is the duty? The duty is 10 per cent. Well, it was that—it is more now.

1391. *By the Minister of Lands and Works.*—Then, subject to our ordering the whole of the parts, you think there is really no very noticeable disparity between our prices and yours? No—not on the basis of that statement, as I understand it.

1392. *By the Chairman.*—But these prices of ours do not cover duty? No; of course ours cover duty.

1393. *By the Minister of Lands and Works.*—Given a heavy goods train with a full load going upon a continuous grade of four miles of 1-in-40 or 1-in-45, and the only brake-power attached to the train being in the brake-van and the passenger-carriage in the rear? Yes.

1394. In the case of such a train parting—that is, the whole train parting from the engine and tender—do you think that that chain brake on those two vehicles would be sufficient to prevent the train backing down the hill? What would the whole train consist of—how many trucks?

1395. About 12 trucks? I should certainly say the brakes would not be sufficient; in fact, the brakes operating at the lower part of the train would, probably, lead to a derailment. You would have all that free weight of the trucks forcing the braked portion of the train off the rails.

1396. Do you have any accidents on your line in consequence of trains parting? No; I am glad to say that we have never had a train part.

1397. I suppose your couplings are of a stronger character than ours, on account of the steepness of the grade? Well, we anneal them every six months; that is, we take them out and place them in the furnaces, and examine them red-hot for flaws.

1398. Does the use of the automatic vacuum brake entail any loss of time at the stations where shunting has to be done? Well, a good deal depends upon the size of the train and of the train-pipe. If a large pipe is used, and there is a van-valve as well, and the air is admitted at both ends, your stops are, practically, as rapid as with the Westinghouse; but, in getting away, you have to release from one end.

1399. I was not talking about the time it takes to stop; but the time lost in shunting—putting a carriage or a couple of trucks off, and so on? At stations?

1400. Yes. Will the use of the vacuum brake cause any greater delay than any hand-brake would cause? Decidedly.

1401. To what extent? Well, it would be difficult to say, because everything depends on the length of the train, and the number of vehicles to be shunted. But certainly, the delay is longer than with the ordinary lever-brake.

1402. How long would it take for each time a coupling is disconnected? Well, it would certainly take you a minute to release a wagon, by the time you have let air into the cylinder. Then all the connected trucks have to blow up again to shunt.

1403. Now, Mr. Driffield, with regard to the weight of rails and the speed of trains. Is there any formula adopted by engineers with regard to the weight of rails and the weight on axles, and the rates of speed run? Oh, yes.

1404. A strict formula? There are three or four well-recognised formulæ as between axle load and weight of rail. But these have been reduced to a more or less empirical formula: that is, taking from a minimum for your weight of rail of about five times the weight on the axle, to a maximum of about seven. Continental practice is on the safer side; and colonial practice has been more closely approaching to the minimum, owing to the heavy price of rails and the expense of importing them.

1405. You have travelled several times from Hobart to Launceston? I have, sir.

1406. Do you know the part of the line where the highest speed is attained? Well, it has always occurred to me that the highest speed is on the northern end, near Launceston.

1407. Have you noticed the line there—is it more direct and level than elsewhere? Yes.

1408. And therefore a higher speed is run there? I should certainly say so; you can get along faster.

1409. Would there be the same necessity for a heavier rail on a level country with a straight run as there would be on more difficult parts of the line? I do not think it makes any difference so far as the axle-load is concerned, whether it is on a grade or not: the actual vertical pressure is hardly altered. It is only when you come to gradients of less than 1-in-10 that the grade makes itself appreciably felt in that way.

1410. Has the spacing of the sleepers got anything to do with the stability of the line in that way? Certainly.

1411. Is it an important factor? Well, the strength of your rail is largely proportionate to the distance your sleepers are apart.

1412. Is it possible, then, to make up some deficiency in your weight of rail by putting your sleepers so that ———? By closer sleepering?

1413. Yes; by increasing the number of your sleepers? Yes; certainly.

1414. I think you have been asked a question before with regard to what you would recommend as to the application of the automatic brakes to a mixed train? Yes, sir.

1415. And would you think that a mixed train, in which half the trucks, or a little more than half, were piped, and the balance fitted with the automatic brake gear, would be sufficiently braked? Well, that would all depend on the gradients; it is a matter very easily arrived at.

1416. I mean with our heaviest gradient; that governs the whole line? I do not quite grasp your question in that form.

1417. You understand what piping a truck is? Yes; a truck piped, but without the vacuum cylinder fitted—a dummy.

1418. Well, supposing that we had a mixed train, with the brake appliances attached to nearly half the trucks, and to the brake-van, and to the passenger carriage, would that be a sufficient number of braked vehicles to prevent catastrophe if the train parted? Do you mean to put your trucks alternately right through the train—first a piped truck, then a brake truck, and so on—or to put all your dummy trucks on one end of the train?

1419. I suppose the train would be really made up with alternating trucks, so far as they could do it. Would those brakes be sufficient? Well, if it came out in the shunting that the trucks were behind, it would be all right; but if all the brake trucks were next to the engine, it would be all wrong.

1420. Do you think that the side-brakes, Mr. Driffield, with the addition of the two braked vehicles at the rear, that is, the guard's van and the passenger carriage, would be a sufficient brake if they could be applied coming down a hill; or if a train parted going up a hill, they would be sufficient to prevent it backing down the grade? Certainly, sir; it has been sufficient in many other parts of the world, and in other parts of the States. That it is sufficient is proved by the great number of hand brakes that are in use.

1421. But I mean in case of a break-away? Oh, nothing in the world will prevent vehicles running downhill when a train once gets away, and the acceleration is too rapid before the guard can stop it. The only safeguard you can have is that of paying greater care to your couplings and safety chains or fitting an automatic brake.

1422. *By Mr. Hartnoll.*—Arising out of the Minister's questions, I would like to ask you, Mr. Driffield, two other questions—you have said, I think, that there would be a greater loss of time in shunting with your trains fitted with the vacuum automatic-brake than there would be with the continuous brake, and that the time lost on a truck would, generally, be about a minute? Yes, sir. But the vacuum brake, of course, is continuous.

1423. I meant the ordinary chain brake—with the vacuum brake, you say that one minute would be the time taken to release a wagon? About a minute to release a wagon that has been cut out.

1424. Take a very dusty day, now. It is an exceedingly small orifice, is it not, through which the air passes into this vacuum-brake, and if any dust got in it would affect considerably the time it would take to release a truck or trucks. Might the time taken extend to a period of 2½ or more minutes, under certain conditions? Quite possibly, sir. It would depend on the condition of the vehicle. It might have been in traffic a long time, and got into defective working. It is not at all infrequent for the piston to clog.

1425. What is the longest time you have known it to take to release a truck under these circumstances? Well, I have known it to be necessary to get a lever to pull the piston-rod down in the cylinder, and, of course, that meant losing time getting the brake off. I have known exceptional cases where it has been necessary to knock the toggle-pin out to disconnect the brake piston-rod.

1426. And I suppose, then, that it might take ten minutes or a quarter of an hour? Oh, yes; these are things that might happen with a defective vehicle occasionally.

1427. Now, with regard to this piping of the trucks on a train. Could such a system be applied, under the conditions of our traffic, where you must throw off a truck at one station, another at another, and so on, one here, two there, three there, all along the service. Might it not, as I think you have indicated, come about that all the piped trucks might be at one station and all the trucks fitted with the brake at another? Yes; that is the difficulty with that system.

1428. And, practically, it would be inoperative to pipe half of them and have the others fitted with the brake? It would, no doubt, entail a good deal of shunting.

1429. Would it not, if the vacuum brake were applied throughout our service, entail the necessity of a larger staff to cope with this extra shunting and loss of time? I do not know that, sir. It would entail a certain loss of time.

1430. You think the same staff as at present would do, but there would be some time lost? Yes.

1431. *By Mr. Patterson.*—I omitted to ask you two or three questions I wish to ask, Mr. Driffield. Will you give us the number of goods wagons on your line, both four-wheeled and bogie? Yes, I have the list here. [Document put in.]

1432. How will the fluctuations in the cost of metals affect the price of a set of brakes on a four-wheeled standard wagon, speaking from your experience of the last four years—what is the extreme fluctuation? They fluctuate probably about a matter of £3.

1433. A set? Yes, £3 a set would be about the limit of fluctuation. That is approximate, of course.

1434. In your opinion, would a vacuum brake applied on all the wheels of an engine and all the wheels of the tender be very much more powerful than a steam brake on the engine and a hand brake on the tender? No, not more powerful. A brake can only be as powerful as will enable it to pick up the wheels; when it has picked up the wheels it is as powerful as you can make it.

1435. Then the vacuum brake is not more powerful than the hand brake? More powerful—not at all; because you can pick up the wheels with a hand brake.

1436. Do you know that special instructions were issued by the Board of Trade as to the brake on the engines and tender—the automatic brake, and no other brake on the train except in the guard's van? I did not catch that question.

1437. Do you know that special instructions are given by the Board of Trade as to the application of the automatic brake to the engine and tender, with no other brake except on the van? I know that a lot of trains in England run entirely with hand brakes.

1438. And that with regard to goods trains the Board of Trade deemed it sufficient if the wagons were equipped on both sides by hand lever brakes. Is that clear? Yes, sir.

1439. You would not gather from that that the automatic brake is a more effective and powerful brake than the steam brake and the hand brake? I do not think it would be more powerful. It would be a more convenient and a quicker brake to apply.

1440. More effective? I do not see that any brake could be more effective than its full capacity, whether applied by hand or power.

1441. I have just one more question to put to you. I want the Committee to understand perfectly this question of prices. We have on our lines wagons fitted with all the appliances of hand brakes and blocks. On such wagons, I understood you to say, the automatic brake should be fitted at a cost of £20? Yes, £20 0*s.* 2*d.*

1442. And when you said just now that the prices of these scheduled tenders were almost identical with your estimates, you meant to say with your estimates, including the hand brake? Yes, new sets of material all through.

1443. Fitted on the trucks standing without any brake whatever? Yes.

1444. *By Mr. Hope.*—Our train system, now, is fitted with the chain brake and the automatic vacuum brake. Regarding these brakes, which would you consider would be the least expensive to keep up if all our trains were fitted with it—the automatic brake or the chain brake? I think the chain brake would be the most expensive to maintain, but not so expensive to fit up.

1445. *By the Minister of Lands and Works.*—The chain brake is expensive, I think? Not the initial expense. I could not give you prices of the chain brake.

1446. *By Mr. Hope.*—Which would be the cheapest to keep up? Well, that is a question that I really ought not to reply to, because I have had very little experience of the working of the chain-brake, and you have the Strahan-Zeehan line to get the facts by.

1447. *By Mr. Hartnoll.*—One question more. I am informed, Mr. Driffield, that to day trains running from the north of Scotland into Aberdeen—mixed trains, passenger and goods, travelling at a high rate of speed, and with far more frequent running than any we have in this State—are run without automatic brakes. From your reading or information do you know if that is correct? No, sir, I do not; I could not say at all.

1448. Would you think it might be correct? I think it is against good railway practice.

1449. *By Mr. Hope.*— But there are double lines of rails there, are there not? That I could not tell you.

1450. *By the Chairman.*—Mr. Driffield, was it because of a mutual arrangement between you and Mr. Back that you fitted up your Lyell stock with the automatic brake, or was it because you considered it a necessary equipment? We had to fit a continuous brake on our trains, and after consulting with Mr. Back, seeing that the vacuum brake had already been adopted in this state as the standard brake—and very rightly, too—I thought it was advisable that we should adopt the same brake ourselves, so that the wagons would be entirely interchangeable.

1451. Would you consider that the severe grade that you have on a portion of your line—which, of course, I suppose, is the governing grade of the whole line—would make the use of a more powerful brake more necessary with you than on our Government lines? Well, it made the necessity of an automatic brake imperative.

1452. Made it an absolute necessity? Yes.

1453. Suppose, Mr. Driffield, that you were placed in charge as an engineer, mechanical and otherwise; or, say, appointed generally to administer a railway system: and supposing that you took up a stock which was equipped with a certain class of brake under which the service had enjoyed an absolute immunity from accident for twenty-five years; would you be satisfied to continue that class of brake, or would you feel that you were justified in running your owners into a heavy

expenditure to equip the stock with a more modern form of brake? Well, if I were to answer on the bare question, I should say—"Certainly not: I should leave the stock alone."

1454. I think, from what I have heard you state in the evidence that you have given, that you are satisfied that as long as the chain brake will act it is an efficient brake? Yes, the chain brake is a thoroughly efficient brake.

1455. Supposing that you were sending a heavily-loaded mixed train up the steep bank from Colebrook to the tunnel—Flat-Top—and the train was equipped with the chain brake in the way in which I understand it used to be in the old Main line days, that is, with one-half of your train with the continuous chain brake applied from the guard's van, and the other half of your train equipped with the continuous chain brake from the engine. If that train broke away, would you consider the chain-brake operated from the guard's van sufficient to control it? Certainly, if it were operative.

1456. That is to say, you are splitting your continuous brake into two—one-half worked from the van, the other half from the engine. Wherever that train broke you consider the brake would be sufficient to control the train? Certainly—if it were operative; but it has frequently been the case with the chain-brake that where the vehicles have been long in traffic the chain has become defective. The chain, of course, has only the strength of its weakest link, and the chain-brake is more open to accident than the vacuum brake or the Westinghouse. It is just a question in case of break-away how far the chain will hold, and the brake be operative.

1457. What proportion of your stock does that return you gave me just now represent? The whole of the 3-ft. 6-in. rolling-stock.

1458. And if you contemplated adopting the automatic brake on all your stock, would you consider it sufficient, in the interest of public safety, if you equipped all your locomotives, all your passenger coaches, all your guards vans, and bogie vans, and 50 per cent. of your goods wagons, piping the other 50 per cent.—do you consider that sufficient insurance against risk? Well, it would be absolutely impossibe to answer that question, without one knew how the trains were to be run; because supposing that all the piped wagons or dummies got into one train, you would have no brake power whatever.

1459. Do you mean that it is a question as to how you could arrange your stock? Certainly, as to how you could arrange your stock. That could only be determined by the conditions of your traffic. It is a question that I could not answer without that knowledge.

1460. And we are to understand that this is an expenditure which you would advise if you were controlling or administering the railway system of this State? I could not say that either, sir. The question you asked me was whether there would be sufficient brake-power on certain trains, under certain conditions. The only reply I could make was that there would be sufficient brake-power if you had sufficient braked vehicles on the train; but if there are a lot of dummies, it all depends how they are put into the train.

1461. You did not understand my question. You consider the adoption of the automatic brake is a proper precaution to take in the interests of the public safety? On passenger trains?

1462. And on mixed trains? On mixed trains also—they carry passengers.

1463. You are emphatic about that? I am emphatic about it on steep gradients.

1464. But you are not prepared to say whether you would be satisfied with the proportionate equipment, that is, with 50 per cent. of the trucks fitted with the brake, and the rest piped? I would not be prepared to say how far goods stock should be equipped at all. It is a question that depends on so many considerations that it becomes a question on which only a man who is very intimate with the subject could properly express an opinion.

1465. You know the class of goods wagons that we have here? I do.

1466. Are they practically the same as yours? Ours are built to the same standard.

The Chairman: I understand, Mr. Minister, that we have a double cylinder on the 4-wheeled trucks.

Mr. Minister of Lands and Works: No; only on the bogies.

1467. *By the Chairman.*—When you make out an estimate in your office for goods to be indented or tendered for in London, can you tell us, approximately, how near you get to the actual price—that is to say, what do you consider a reasonable variation between your estimates and the actual cost to your company when the stock is delivered? No; I could not tell you that, because sometimes the differences have been excessive. It is according to the market.

1468. Would you consider a variation of 28·27 per cent. between your estimate and your actual cost landed here as an excessive one? No, sir, I would not, in certain circumstances.

1469. That is to say, you think that the market may fluctuate to that extent? [No reply.]

1470. You know pretty well, for instance, what the cost of your erection will be? Yes.

1471. And you know what freight, insurance, and other incidental expenses would be? Up to a certain stage, approximately.

1472. For instance, a £47 brake, f.o.b. London, cost us £54 10*s*. Where would the wide discrepancy come in there—on the purchasing in London? Yes, in the size of the order. If a large order were placed at one time, and subsequently a small order, there would be a fluctuation in the price of probably 15 per cent., and possibly 20 per cent., as between the two orders. Then your charges are proportionately higher on a small order.

1473. Our bogie wagons are the same as yours. Do you think, then, it is necessary to equip them with double cylinders? I certainly think bogie wagons should be equipped with two cylinders. If you apply only a single cylinder it is too strong and may injure your under-frames.

1474. Are your bogie wagons fitted with double cylinders? No, with single cylinders. But I am speaking from experience. We know, now, that double cylinders would be better, and if we get any more fitted we shall have double cylinders.

1475. Let me ask you, do you see any material difference in these two positions—you take charge of a train service at the outset, and you determine to equip it with a certain class of brake; that is, you begin from the beginning. You take charge of another train service, which has already been equipped with a class of brake that has proved its efficiency for years and years. Would you not feel very much more reluctant to order or recommend a large expenditure to alter a whole system of brakes in connection with the train service which is equipped with a brake that has proved its efficiency, than to order a new brake for the equipment on an entirely new stock—you see the difference in the two positions, do you not? Yes; it is a question very difficult for a layman to express an opinion on; although I should certainly say, answering the question in a general way, that I should be quite satisfied to accept the existing conditions, and make no alterations.

1476. *By the Minister of Lands and Works.*—The position has been put to you that our rolling-stock on goods trains had been equipped with a continuous chain-brake. Do you know, as matter of fact, that it is not equipped with a continuous chain brake, Mr. Driffield? No, sir; I only know the chain brake, so far as your railways are concerned, on the Strahan-Zeehan line.

1477. Do you know that our goods trucks have only the side brakes? Yes.

1478. Without the chain mechanism at all? Without that mechanism at all, as you say.

1479. Very well. When the position is between the chain brake as described to you and the vacuum brake, and between the side brake with only two vehicles connected by the chain, as compared with the vacuum brake, would that be on the same plane—is there any comparison between the two positions? [No reply].

1480. Let me make that clear to you. One position is that we have the continuous chain brake running right through our train. The other position is that we have only two vehicles braked, and the rest of the train equipped with side levers. Is there any comparison between those positions? What are the two vehicles braked with?

1481. The chain brake? The positions would not be analagous at all. In the one case you would only have side brakes on your trucks, and the man would have to go along and drop the levers as the train went on. The other position is quite different.

1482. Is there any comparison between a train with side brakes on the trucks and two vehicles with the chain brake and a train with a continuous chain brake right through? Well, I think the question of how a brake is applied is immaterial to the issue. If it skids the wheels, it can do no more.

1483. I will put it in another way. Two trains leave a station and travel the same route One is equipped with a continuous chain brake operated by the guard. The other is fitted to vehicles only with the chain brake, and the balance of the train with side brakes. Is the latter train sufficiently equipped with brakes on a steep grade? Yes; both cases might be alike. If all the vehicles have got brakes on, it is only a question of how you apply them. If the guard goes along and puts on the brakes the effect will be the same as if he puts them on from the van. If you ask me if they are equally braked in case of a break away, that is a different thing altogether. In the one case the continuous chain brake would be efficient. In the other case it would be a question of whether the guard could put all the brakes on in time.

1484. That is a correct list of the prices of the stock you have adopted? Yes, sir.

1485. Then we can take it as correct? That is a price list received the other day.

1486. *By the Chairman.*—Is that the list from which you gave your evidence? A portion of the evidence was taken from that. I was asked a question a little while ago whether our purchases were made direct from the Vacuum Brake Co., to which, if I remember rightly, I replied, "Only in the case of duplicates." That is, the cost of duplicates.

The witness withdrew.

Friday, November 14, 1901.

JOHN M. M'CORMICK, *re-examined.*

The Chairman.—Mr. M'Cormick, the Minister wishes to re-examine you.

1487. *By the Minister of Lands and Works.*—It is on the question of the weight of rails, Mr. M'Cormick. You are running your engines at speeds which, it is stated, reach thirty-eight miles an hour? Yes. Thirty-five was the speed stated when I was giving evidence. Of course, it makes very little difference.

1488. Thirty-eight was given us by Mr. Deeble, I think? Well, thirty-five is the general highest running speed, you know.

1489. I want to read to you some questions, and the answers given in evidence before this Committee. [The Minister reads extract from report of Mr. Driffield's evidence.] Now, I might

ask you, having heard the evidence as given to us in questions 1286, 1287, and 1288, for any observations you would like to give us as to the stability of the line? Well, I disagree with Mr. Driffield. It is true that there is an empirical rule of about five times the load on the axle, which would give us about a 50-lb. rail; but the various formulæ show that we have a factor of safety of four or thereabouts on steel rails; and although the formula which is given in Molesworth's by Sir Benjamin Baker apparently has a factor of five, which would give us here a rail of about 56-lbs., still the same man, Sir Benjamin Baker, in his book on small-span bridges, in dealing with rails (which means really a small-span bridge), says that a factor of four is all that is necessary. I may say, in passing, that there are numerous authorities who, owing to the improved quality of rails, and rails being now of steel, also consider that a factor of four is sufficient; and I can even quote authority for less. Then, again, among some of the leading engineers, the very best authorities, it is admitted that any formulæ on the stress on rails are inaccurate, and necessarily inaccurate, because they cannot arrive at the test; and they state that these are only theoretical hypotheses which are frequently upset, and practically upset all over the world. I go further, and take our own case and our own practice. I have been running the 46-lb. rail on the Main line ten years. There is at present no sign of defect in the rails, and no case of derailment from weakness of rails. I maintain that my opinion should be considered on the matter. I am here, and I am held responsible, and I ask that this Committee should give more weight to my opinion than to that of outside engineers. I have already stated that I consider the rail safe, and that there is no special danger of any sort, and I repeat that statement. It is a matter largely of practice, as I said just now.

1490. What is the spacing of the sleepers on your line? 2-ft. 6-in. centres on the 46-lb. rails. I go further, and I say that we have on our other lines—with the exception of the Scottsdale line and the Western lines, which have heavy rails, and the 61-lb. rails, such as I advocate laying down, as being more economical, and giving a bigger margin of safety on the Main line—approximately a factor of four. On the Mersey line we have a 40-lb. steel rail, on which we run upwards of thirty miles an hour with safety. The sleepers are laid closer to make up for the weight of rail. If the Main line is dangerous, which I do not admit, then all our lines are dangerous, with the exception of the Scottsdale and the Western.

1491. *By Mr. Patterson:*—You state that various formulæ work to show that there is a factor of safety of four with this 46-lb. rail? I say that there are various authorities on the point.

1492. Will you give me one of the formulæ? I will give you one of the formulæ—yes. The 56-lb., according to Molesworth, I worked out myself. The formula—[exhibited]—shows a factor of four, and it is worked out by Mr. Middleton for me; that from Molesworth is worked out by him, and also worked out by myself. The formula in Molesworth is by Sir Benjamin Baker; and he also says, in the book I referred to just now, that a factor of four is sufficient.

1493. This is a complicated thing? It is a complicated thing; nevertheless, it is one that has been received, and generally received by engineers.

1494. I will take the one formula I have here—that is Molesworth's: you know that? You have heard my point: that the formula in Molesworth is Sir Benjamin Baker's; and that he, in his own book on small-span bridges, expreses another opinion. A railway is not necessarily unsafe with a smaller factor: that rule is opposed all over the world, in practice.

1495. Now, I suppose, you agree with me, Mr. M'Cormick, that Sir Guilford Molesworth is one of the greatest railway authorities in the world? He is a well-known authority.

1496. One of the greatest? Not on all questions. You are taking this book as his; but that is a collected book; that is not all on the authority of Molesworth. The particular formula in question is on Sir Benjamin Baker's authority.

1497. But this formula was in Molesworth before Sir Benjamin Baker? Sir Benjamin Baker's name is put to it. You will see Sir Benjamin Baker's name to it; it was taken from him.

1498. You have a later edition than mine, then. The name is not in mine, but you say it is in yours? Yes, it was taken from him. Of course, there is a general empirical rule, referred to by Mr. Driffield, as you and I know well. "Sir Benjamin Baker," it is here, "Rule for weight of rails."

1499. Well, anyhow, that rule would make the proper weight of your rails come to 56-lbs.? Yes. What you see there is identical with my own working. But——

1500. I want to put it in a simpler manner for the Committee to understand. I have, here, Sir Benjamin Baker's formula, and also Sir Guilford Molesworth's. There are two different formulæ——? Is there a difference between one and the other—are they not identical formulæ?

1501. No; but they are practically the same. Sir Benjamin Baker would make your rail 56 lbs. for that weight of axle, and Sir Guildford Molesworth makes it 60 lbs.? Yes. There you see a difference of formula at once. Practice has upset these things lately. I can give you later authorities. Even the Board of Trade is relaxing its rules, because of the quality of the steel rails now made. On the Forth Bridge they allowed Baker and Fowler to make their own factors.

1502. Of course. But that is a different question? No. It is on account of the improved quality of steel as against iron.

1503. But two great authorities pronounce, in the one case, that you should have 56-lb. rails for your weight of axle; in the other, that you should have 60-lb. rails? Yes.

1504. And you disagee with them? I do not say that I disagree with them. I said that a factor of four is sufficient, and that Sir Benjamin Baker says that a factor of four is sufficient in his book on small-span bridges, in which he also deals with rails. Another thing, these formulæ are being upset all over the world.

1505. That is not my point, you know? I have had ten years' experience of these rails we are using in Tasmania, and we have never had an accident with them. They have never failed us, and I——

1506. Still Sir Benjamin Baker says they should be 56 lbs., and Sir Guildford Molesworth 60 lbs.? He says so there; that is quite right. But do not overlook what I say, that Sir Benjamin Baker, in his book on small-span bridges, says that a factor of more than four is not necessary.

1507. *By the Minister of Lands and Works.*—Can you quote the expression of Sir Benjamin Baker's where he says that? I can produce his book if necessary, and Mr. Patterson can see that that is so. I have given the deduction in this way. He is treating at the time of narrow-span bridges, and he brings the rail in. Here is what it practically is. In his book on long-span railway bridges and narrow spans, he gives the working stresses per square inch of a solid rolled-iron rail, as compared with a built iron girder, as five and a half tons and four tons respectively. Then, as the working stress per square inch for built steel girders is six and a half tons per square inch, giving a factor of safety of about five, the equivalent working stress per square inch for a solid rolled steel rail would be about nine tons, giving a factor of safety of nearly four. As the 46-lb. steel rail (Winkler's formula) has a factor of safety of four with 5·35 tons per wheel, with sleepers 2-ft. 6-in. centres, the working stress per square inch would be about eight tons.

1508. But what you quote from Sir Benjamin Baker is for a bridge? No—for the rail. He takes the rail to illustrate his bridge, and he fixes the rail as a continuous girder.

1509. *By Mr. Patterson.*—Now, I want to examine you on your evidence given the other day. In reply to a question you said you saw no necessity for re-laying this road with 60-lb. rails. I asked you how you would do. You said you coped with the difficulty by placing the sleepers closer together? I said the difficulty was met to some extent by placing the sleepers closer together.

1510. Is not the spacing adopted on the Main line your rule on all lines? Oh, no; the spacing varies; we have got eleven, and we have got ten to a rail.

1511. Take a light railway-line like the Ulverstone? I will give you our spacing, Mr. Patterson; it varies, otherwise I could not say that these factors of four were the same in each case. I will give you the distances between the sleepers. The distance between sleepers for 40-lb. rails is 1 ft. 6 in.; 1 ft. 6 in. for 43-lb. rails; 1 ft. 9 in. for 46-lb. rails; 1 ft. 9 in. for 50-lb. rails; 2 ft. for 61-lb. rails.

1512. Then, as a matter of fact, there are fewer sleepers with the 46-lb. rail than with a 40-lb.? Yes, there are fewer; there is one less. There are eleven on the 40-lb., eleven on the 43-lb., ten on the 46-lb., ten on the 50-lb., and nine on the 61-lb. to a rail.

1513. But you said that you met the difficulty of your light rails and heavy axles by placing the sleepers closer together? I said to some extent the difficulty was met by placing the sleepers closer together.

1514. But, as a matter of fact, they are farther apart on the 46-lb. rail? Do you mean to say they are farther apart than with the 61-lb. rail?

1515. I am not talking about the 61-lb. rail. Do you mean ——? But I was comparing the 46-lb. and the 61-lb. on the Main Line. I say that the spacing is closer on the 46-lb. rails. You know that I advocate the 61-lb., and I never ordered anything but a 61-lb. and a 50-lb. since I have been here. But the spacing on the 61-lb. saves a considerable number of sleepers. I think it is 1980, against 2200 on the 46-lb.

1516. I asked you, in question 203, "And you think that is safe, on these light lines?" and you said, "Well, to cope with that, we place the sleepers closer together?" I gave that as a reason. You are not dealing fairly with me. I said that the maintenance of the line also came in and helped to meet the difficulty. And I spoke as to the ballast.

1517. If you will wait a moment, I think you have made an error here, and I want to help you to correct it? How have I made an error?

1518. Do not interrupt me for one second, and I will tell you ——? I said that the maintenance came in, and other factors, besides the sleepers, and I answered you on those points ——

1519. Will you listen for one moment. I asked you in question 203, "And you think that is safe,"—that is, the load on these light rails—and you said, "Well, to cope with that, we place the sleepers closer together?" Quite so. And I told you elsewhere that the maintenance also came into the question. You are trying to tie me down to one point instead of keeping to the general question. You have not read the whole of the questions you put to me.

1520. Well, I will go on; "204. You see no necessity for relaying the light parts of this line with a heavier rail? I said before, that I should like a heavier rail. 205. But there is no necessity for it, you say? I did not say so; I say there is no danger." That is what you said? Yes, I am giving my honest opinion; there is no danger.

1521. I thought you had misunderstood the question. Instead of the sleepers being closer with 46-lb. rails, they are further apart—on the 40-lb., 1 ft. 6 in.; on the 46., 1 ft. 9 in.; but you

said you placed them closer on the 46-lbs.? Not closer than on the 40-lb. We were dealing with the 46-lbs., and the 61-lbs. on the Main line. It is the Main line you have been taking as your example. You misunderstood me. You understand, I have no wish to lead you astray there.

1522. There is no question of leading astray. I understand that the sleepers were placed closer together so as to give better carrying capacity to the rail? They were not dealt with by me at all; they were laid before I came here. The closer spacing has been largely adopted in the Colonies as a means of meeting the difficulty of light rails and heavy engines.

1523. *By the Minister of Lands and Works.*—What is the spacing of the 61-lb. rails? The spacing of the sleepers with the 61-lb. rail is 2 feet apart, or 2 ft. 6 ins. centres. From centre to centre the spacing is 2 ft. 6 ins. But, pardon me, the spacing from centre to centre on the 61-lb. rail is 2 ft. 9ins.; on the 46-lb. rail it is 2 ft. 6 ins. We are giving extra, unnecessary strength on that 61-lb. rail, as you know, Mr. Patterson. There is no necessity for it.

1524. Of course, the heavier the rail the greater the spacing of the sleepers? Up to a certain extent. It is not desirable to give too much space in any case. The minimum in England used to be 2 ft. 9 ins. They do not go closer than that, nor do I like the practice of spacing closer. I would rather have the 61-lb. rail, with the proper spacing.

The witness withdrew.

WILLIAM RUFUS DEEBLE, *re-examined.*

The Chairman.—The Minister of Lands wants to examine you, Mr. Deeble.

1525. *By the Minister of Lands and Works.*—You have seen that schedule [document handed to witness]? Well, I just saw it for a moment last night, here. I have not had time to compare, or anything of the kind, sir.

1526. Will you have a look through it now? Yes, sir. The total cost here is £31 12*s.* 11*d.*

1527. What is that for? That is for the vacuum brake and the hand brake.

1528. Now, what have you ordered from Home? The whole equipment for the hand brake and the vacuum brake.

1529. The whole equipment? Yes, the whole equipment.

1530. Why have you ordered brake-blocks and brake-levers, and all that, from Home? Well, the whole matter, Mr. Mulcahy, is in the hands of our consulting engineer, Mr. Meilbek, in London, and I will just read you a Memorandum concerning that matter. "13 Victoria-street, Westminster, S.W., January 7th, 1901. To the Agent-General for Tasmania." This is an extract from a letter referring also to several other things. "With reference to the vacuum brake-gear for A, C, and E class wagons, I am assuming that it is intended to do away with the existing hand brakes altogether, and fit the wagons with a combined vacuum and hand or side lever brake, same as recently supplied to the Emu Bay Railway Company as per drawing No. 2390 herewith, each brake capable of application independently of the other. I may say that the brakes on the 32 new wagon frames under G. M-O No. 44, now in course of shipment, are similarly arranged. If this design be approved, I would request the word 'combined' to be cabled Home as soon as possible after receipt of letter. There is, however, another plan which could be adopted in fitting the vacuum brake gear to these wagons, viz., to retain the existing hand brake exactly as it is, and to add the vacuum brake as an independent brake, with separate brake-shaft, levers, rods, hangers, and two brake-beams, with four brake-blocks on the outside of the wheels. There would then be six brake-blocks on each wagon, viz., two inside ones for the lever-brake, and four outside blocks for the vacuum brake. I do not advocate this plan, nor do the Vacuum Brake Company, and would recommend the combined brake especially, as the only saving that would be effected by the retention of the existing hand-brake would be the new brake-lever and the clutch, &c. complete, required for the combined brake. Should it, however, after all be decided to adopt this plan, I would request the word 'addition' be cabled Home." After receiving that letter from our Consulting Engineer I at once wired to have the combined brake. I think it is apparent that the cost of the upkeep of all that brake-gear with a hand brake, independent of the vacuum brake, would be very large indeed, and quite unnecessary. We would have the hand brake and two brake-blocks to maintain, in addition to the vacuum brake. But with this selected design the hand brake and vacuum brake are practically in combination, with four blocks only—a block for each wheel.

1531. There is a good deal of work in connection with these brakes that could be done here, I think? I have in hand at present, a set of brake gear complete, forgings and everything apart from the patent parts. We are having a set forged in Hobart, and a set in Launceston, and we are using in that trial all the parts we can from the old brake-gears, so as to test the price of the brakes manufactured in the State as compared with the English price. If the price comes out any cheaper, of course it will be desirable to do all that part of the work in the State. We have only ordered forty-eight sets for these trucks, that is, sixteen sets of each, A, C, and E, whereas we have over a thousand four-wheeled vehicles in the service. We have only ordered sixteen sets of each type.

1532. That is, ordered up to the present? Ordered up to the present—yes.

1533. *By Mr. Hope.*—You said if the work could be done cheaper here you would get it done. But I suppose if you could do it at the same price, or nearly as cheap, you would have

it done in the State? Most decidedly. As I say, I am having a set made at each end, and we are doing the work by the cheapest method possible, making use of all the material possible from the side-brake gear.

1534. *By the Minister of Lands and Works.*—Have you had an opportunity of examining any of the Mount Lyell rolling-stock? Only the bogie wagons, sir.

1535. Is there anything exceptional in the Government rolling-stock, that might cause any slight divergence in price between the two? In the bogie wagons, sir, we practically have a double set of gear, as compared with their stock.

1536. Double cylinders? Double cylinders, and two brake shafts, and two sets of pull-rods, and so forth. If I may be permitted————

1537. Pardon me, one moment. You observe here, that the estimated cost given by the locomotive department of the Mt. Lyell Company for fitting up the whole of their vacuum brake-gear, making all the connections and ironwork themselves, and simply buying the patent parts, is £31 12*s.* 11*d.*? Yes; that is the four-wheeled vehicles.

1538. And the Mount Lyell office estimate from plans is £32 19*s.* 6*d.*? Yes.

1539. You know that the actual cost of what you have ordered comes out at £35 9*s.* 4*d.*? Yes. That is, of course, estimating freight, insurance charges, and cost of erection. Possibly, these returns of theirs may be from actual results of working at their own works.

1540. You know that the tender f.o.b. in London, for four-wheeled wagons, as ordered for the Government, is £30 10*s.*? Yes, sir.

1541. Whereas the whole cost of the Mount Lyell wagons, on which a duty of 10 per cent. has been paid, is £32 13*s.* 6*d.* landed here; is there anything in the construction of our wagons, or the size of them, or any peculiarity about them, that would make the cost of our gear at Home in in excess of the cost of the Mount Lyell gear? Well, I do know the Mount Lyell gear, but I understood that the Mount Lyell gear is a replica of our own.

1542. *By Mr. Patterson.*—That is the evidence we got yesterday—made to the Government standard? Yes; but, mind you, as to the Government standard, we have never had vacuum gear on the four-wheeled wagons. Our gear has been designed for the existing frame, which, I presume, is the same as the Mount Lyell's. It is the same, anyhow, as the Emu Bay Railway Company's.

1543. And you say the whole of the gear is tendered for? Yes, side brakes, and the whole thing complete.

1544. *By the Minister of Lands and Works.*—Well, the difference between the Mount Lyell estimate and your price of £35 9*s.* 4*d.* landed here, is nearly £3—£2 17*s.* That is merely, however, upon the four-wheeled wagon? Yes, upon everything else I consider we come out cheaper than the Mount Lyell.

[At this stage the Chairman read a letter from Mr. Driffield. Appendix H.]

1545. *By the Minister of Lands and Works.*—That is the estimated cost of fitting bogie wagons on the Mount Lyell? [Witness examines document.] Yes, sir. Well, now, as I have already explained, we have almost a double set of gear. But if the Committee will permit me, I can explain better by the drawings, perhaps. I have the drawings with me, if anyone would like to see them. They will show you why Mr. Meilbek has adopted two cylinders in place of one.

Mr. Patterson.—We really do not want that.

1546.—*By Mr. Minister of Lands and Works.*—I want to ask you again—you have answered the question before, I think, but I want it brought out again. When you were making your estimates for these brakes: can you give the Committee any reason why your estimates so far exceed what the actual price of articles has been, in some respects? Well, I think, I explained that in my last evidence, I read a letter from Mr. Meilbek, dated 6th April, 1900. My estimate was made in August. That was before the matter was brought before Parliament at all. This is an extract from Mr. Meilbek's letter of 6th April, 1900:—"Prices of material are still rising, and it is difficult to say when the top will be reached." And in connection with that, I have here the prices of some material that we imported in 1892, and it seems to me that we are not paying any more now than we did in 1892.

1547.— *By Mr. Hartnoll.*—Are you paying as much? I do not think we are, Mr. Hartnoll. I am not in a position to say so, but I will read you this—"cost on 15th August, 1892, £12 2*s.* 3*d.*" That would be the same 15-inch cylinders we are using on the bogie-wagons and the carriages. The cost of the 18-inch was £12 12*s.* 8*d.*

1548.—*By the Minister of Lands and Works.*—And what is the price now? Well, so far as I can judge, sir, it is practically about the same, may be, a few shillings more. We might be paying £13. But I have really no opportunity of taking out the cylinders separately. We might, as I say, be paying £13; but in August, 1892, we paid £12 2*s.* 3*d.*, that is with all charges. Mr. Meilbek, in writing in reference to several matters on 6th September, 1900, describing various matters that the department was interested in, touched on this, and adds, "Prices of material are now double what they were in 1892." There is the paragraph, in Mr. Meilbek's handwriting. However, the prices of our cylinders have, certainly, hardly risen at all.

1549. *By Mr. Hartnoll.*—Does that state that the price of all materials is double now what it was in 1892? Yes. This is in the course of remarks about iron and steel materials used in our department:—"Prices of material are now double what they were in 1892."

1550. *By the Minister of Lands and Works.*—Now, Mr. Deeble, about the time taken in coupling and uncoupling the automatic vacuum brake, and the time lost in shunting. Is that loss

of time found to be considerable? It has been found in practice to not take, practically, any more time than is taken in ordinary shunting. I shall show the Committee exactly what has to take place and what has to be done. [Witness explains by diagrams.]

1551. *By Mr. Hartnoll.*—What does he have to do to start again? Oh, he simply has to couple again.

1552. Is there not an exhaustion of air? That is all done on the engine.

1553. Has not the air to be charged again, and does it not go through a very small orifice? Well, you hardly notice the time on the express. He will create a vacuum in about three seconds.

1554. Mr. Driffield said it might take ten minutes; what do you think? In that case there must be something wrong with the gear. I might explain, perhaps, that Mr. Driffield's are smaller pipes than these of ours. Ours are 2-inch pipes; and Mr. Driffield's are the same as are on the North-East Dundas tram—$1\frac{1}{4}$-inch. Ours, of course, is freer.

1555. Did I not see an account of a trial somewhere in one of the other colonies, where it took thirty-two minutes? That must be one of the old ones.

1556. *By Mr. Patterson.*—That was through some defect in the brake—something got jammed? Yes. That is why the vacuum brake patentees recommended that we should maintain our steam brakes and hand brakes on the engines intact, so that if anything becomes inoperative you have your steam brakes and hand brakes to fall back on.

1557. *By Mr. Hartnoll.*—And without that you might have loss of time? Yes, if a connection gets out of order, or anything.

1558. Cannot dust do harm to your brake-gear? Yes, and in looking after maintenance that is a thing we look to very carefully. It is only a matter of strict attention on the part of those in charge.

1559. *By the Minister of Lands and Works.*—I think what we want to get at is this: when you disconnect a carriage fitted with the vacuum brake, does it not take some time before you can move it again. It has been stated to us that it does, and that it takes variously from one minute to three or four minutes? They simply have to pull the release valve open, and the air rushes in at the rate of ten miles a minute. So how long should it take?

1560. Will that release the brake, then? It destroys the vacuum, and the brake drops off by gravity.

1561. And how long does that take? I do not think it would take two seconds.

1562. *By Mr. Hartnoll.*—That is, if there is no obstruction? Yes, if there is no obstruction, all parts being in proper working order.

1563. Might it not come out of your workshop in perfect working order, and then a fearfully dusty day create some defect? We have not had it so. Of course, you might occasionally get one vehicle in six on your rolling-stock not working right, but very seldom.

1564. I am only thinking of this delay in shunting? I do not think it is material.

1565. *By Mr. Hope.*—Supposing you were working with a continuous chain brake, what time would you lose? It would take longer than with the automatic brake. A man has to take up the chain and put it into a slot.

1566. *By Mr. Patterson.*—I may say at once, Mr. Deeble, that you have thrown a flood of light on the whole matter. I think the explanations you made were staggering. But I want to ask you this: Did Mr. Meilbek make another alternative proposal to these two in any other correspondence? None whatever—never once.

1567. I suppose you know that in the case of Mount Lyell he offered another alternative? I do not remember. I had nothing whatever to do with that in any shape or form.

1568. I will tell you, Mr. Driffield has told us, in his evidence, that his side-levers and hand brakes were in every instance utilised, and the only parts brought out from England were the patented vacuum parts—which were brought out at a cost of £20? Mr. Driffield's stock, now, he tells me, is braked on all four wheels, and the old hand brake is only applied to two wheels, on one side of the wagon.

1569. But this is his evidence? Will I read you Mr. Meilbek's correspondence, in which he certainly does not advocate it, and he says that the Vacuum Brake Company does not advocate it.

1570. Still, from Mr. Driffield's evidence, he equips his wagons at a cost of £20 each? Yes.

1571. Where is the comparison between our cost of £32, or £39 with the hand brakes already attached, and their £20? Oh, he says there that their cost is £32—that is for the four-wheeled truck with the side brake and all attached, according to his statement.

1572. I am asking you about the trucks where they utilise the lever brakes. He says distinctly that he can fit the automatic brake complete, with duty paid, at £20 a truck. Now, we are going to take all these levers off on our trucks? Well, as I said just now, we are having sets made in Hobart and Launceston to test what we can do by utilising as much of the side brake material as possible. We have only got forty-eight sets, sixteen of each class, in order to give Mr. Meilbek and the Brake Company an opportunity of designing brakes for each type of wagon.

1573. Then, seeing the success that has attended the adoption of the automatic brake to the existing brake-gear of the Mount Lyell Railway for £20 a truck, would you be prepared to advise the Government to follow a similar procedure for the balance of the automatic gear you require? I would be prepared—I am prepared—to advise the Government, after I have made

these trials, if it does turn out that we can do this work at very much less, or at the same money, to build them in our own works.

1574. And utilise what material you have by you? And utilise what material we have—yes. That was the original intention of the department. There were only sixteen of each sort ordered. We had in view that we had over a thousand to fit, and the idea was to get those few sets from England, and see what we could do.

1575. And there is no reason why, if Mount Lyell can do it, you cannot do it at £20 a truck? I do not see how we can do it for that.

1576. That is the evidence? Then they must have had a different side brake from ours. However, I am putting the thing in hand in the most economical manner.

1577. Well, Mr. Driffield told us that their rolling-stock was quite the same as ours, and they could do it for £20? If they can do it, I am sure we can do it.

1578. And if you can that will be a very material saving? Yes.

1579. And you are keeping that in view? Yes; we are having sets made as economically as possible in Hobart and Launceston at the present moment.

1580. *By the Chairman.*—And that saving is not in any way accounted for in the returns you have sent us? No. I have now gone about it in the most economical manner, using all the old material I can.

1581. And you can make a possible further saving? Yes, there may be a possible further saving.

1582. *By Mr. Hartnoll.*—If your trial comes out a success in utilising hand brakes, the estimate that you have now made can be reduced from £37,000 to £20,000, it leads one to think? I would not say that.

1583. But you say that if the Mount Lyell can do it, you can? Well, I reckon we have as smart men as the Mount Lyell, and as good equipment.

1584. And if they do it for £20? Well, their side brake may have been of different type.

1585. They say it is from drawings, according to the Government standard; Well, if they can do it, we can do it.

1586. And presuming that can be done, this estimate can be lessened by one-half? Well, it could be considerably lessened; because the four-wheeled vehicles are our biggest item.

1587. And, approximately, it would come out at one-half, if all the conditions are favourable? Still, I say that, if the Mount Lyell has the same stock and can equip it for £20, we can do it. But I do not know just how they do it. I believe they are paying £13 for their 15-inch cylinders, and I believe we are getting them at less; but we have got nothing that I could pick out so as to get at the cost of the cylinder. I can guarantee that any work that is done in the State by the Mt. Lyell can be done as cheaply or cheaper by us.

1588. Then, if they can do it for £20, and all their side brakes are identical with ours, in effect, you say that you can do it for £20. Well, I do not know; you should not tie me to that. I say that anything they can do, we can do.

1589. Then, if they can do it for £20, it means that you can? Well, I am not sure; I cannot say precisely what they are paying.

1590. But I am saying this: if the conditions are precisely the same—if the conditions are different, of course, your answer would not count—you could do it at the same price as them—£20? Well, supposing they are paying £13 for their cylinders: then there are hose pipes and connections; possibly, another £5.

1591. *By the Minister of Lands and Works.*—Their estimate is: 15-inch cylinders, £12 12*s.*? So that they are paying £12 12*s.* for their cylinder. Then there are the pipes, hoses, and the various connections: I should say at least another £4. That would make it practically, £17. That only leaves £3 10*s.* or less for all the forging. They could not do it. The money would almost be in the iron alone.

1592. Of course, Mr. Deeble, we should tell you that what has been called the price at Mount Lyell is really only an estimate. They estimate that the forging will take so many men so many hours, and so on. A position is being put to you, which I think it is quite right that you should protect yourself against? [No reply.]

Mr. Hartnoll: There is no desire on my part to put Mr. Deeble in any false position. I would like only to make it clear, and I have always adopted that principle, that what we can do in the States at or at anything approaching the English price we ought to do.

1593. *By the Minister of Lands and Works.*—That is another thing altogether. The questions you have really asked, Mr. Deeble, is whether you hope to be able to fit these trucks for £20, because it is said that the Mount Lyell people have fitted theirs for £20, by utilizing their side brakes. Can you say whether you hope to be able to do the same thing? I could not say. All I can positively say is that we can turn out our work as cheaply as any that can be done at Mount Lyell or anywhere else in the State.

1594. What do you estimate the cost of a forge per hour, with a man and his assistant, blacksmith and striker? I should say that we should have about 2*s.* 9*d.* per hour.

1595. Well, they have it here at 2*s.* 6*d.*? I do not think that that would cover everything.

1596. *By Mr. Hartnoll.*—Mr. Deeble, having put this work in hand, when do you think you will be able to know, and able to judge, really, if it is a success? By the end of next week or the beginning of the following week, I will be able to tell you what the cost will be.

1597. *By Mr. Patterson.*—Do I understand that you have already begun to utilise the side levers? I have already begun, in Hobart and Launceston. If we can do it at anywhere near the English price, or lower, the object is to do it in this department. I estimate that by the time we have equipped the other vehicles we will have all these sets prepared.

The witness withdrew.

APPENDIX A.

Extract from Inspection Report by Colonel Gracey, C.S.I., R.E., on the Uganda railway, dated 25th March, 1901.

"(*b.*) In sending out rolling-stock for the Uganda railway it does not appear to have been sufficiently recognised that it principally consists of long continuous grades of 1-in-50 and 1-in-66, on which any failure of the engine-brakes would result in the whole train running away to destruction, because, with the engine unbraked, the number of braked vehicles manned in the train is not sufficient to stop it; moreover draw-bars are continually breaking, and if such a breakage occurred at night when the brakesmen were asleep, the destruction of the train would certainly follow. My opinion is, that the working of the Uganda railway without automatic brakes is extremely dangerous, and that they are further rendered necessary on account of the inefficient working of the signals. As a Government Inspector, I would hardly have considered myself justified in recommending that the line should be opened for public traffic until they had been provided, had it not been that in doing so I was following in the footsteps of such a high authority as Sir Guilford Molesworth.

There can, in my opinion, be no doubt that the working of the Uganda Railway without automatic brakes is dangerous, and I doubt if it is even economical, as the pay of the numerous brakesmen it is now necessary to employ would probably nearly balance the interest on the money expended on supplying the automatic brakes, and keeping them, when supplied, in order, whilst the expense connected with the repairs to a very few wrecked trains would exceed their total cost.

The Locomotive Superintendent has supplied me with the following estimate for providing the automatic brake-power that appears to be required at once:—

	£
70 engines, at £110 each	7700
61 oil and water tanks, at £30 each ...	1830
200 coaching vehicles, at £40 each	8000
160 bogie wagons, at £55 each	8800
150 covered goods, wagons, at £30 each	4500
630 wagons, piped, at £8 each	5280
Examining pits at termini	1000
TOTAL—say	£37,000

The interest on £37,000, at 3 per cent. is £1110 per annum, a very moderate amount to pay, even if there were no prospect of counter-balancing savings in other directions, for safety from accidents, which otherwise will, I feel certain, be numerous."

APPENDIX B.

Extract from Report (dated 22nd May, 1901) by Sir Guilford Molesworth on Colonel Gracey's Inspection Report on the Uganda Railway.

"I quite agree with Colonel Gracey that it would be advantageous to adopt an automatic brake on the Uganda Railway, but, in the event of its adoption, I would strongly recommend the use of the automatic vacuum brake.

"The Westinghouse brake may be suitable for the English high-speed railways on which great rapidity of action is all-important, but I consider it is eminently unsuited, and even dangerous, for heavy and continuous gradients such as exist on the Uganda Railway.

"The automatic vacuum brake is much more under control, and far safer under those conditions to which the Uganda Railway is exposed."

APPENDIX C.

Hon. Minister of Railways, Queensland, Brisbane.

PROPOSAL under discussion in Tasmanian Parliament equip all rolling stock automatic continuous brakes meeting with opposition. It is stated Queensland fitting automatic brakes to locomotives only. Are your engines already equipped with efficient steam brakes? If so, what object in fitting Westinghouse to twenty-three engines, as per last report? Do you contemplate eventually equipping all rolling stock with Westinghouse? Is automatic brake used for mixed trains now? Kindly cable reply.

E. MULCAHY, *Minister of Railways.*
25.10.'01.

Hon. E. Mulcahy, Minister Railways, Launceston.

YOUR cablegram twenty-fifth instant: All latest locomotives, both passenger and goods, equipped with Westinghouse brake, and nearly all carriages on three trunk lines, also large number goods and live stock vehicles; intend eventually equip all rolling stock; Cairns railway already fully equipped; mixed and live stock trains run now with several braked wagons.

JOHN LEAHY, *Secretary Railways, Brisbane Railway.*
26.10.'01.

APPENDIX D.

Tasmanian Government Railways.

Chief Mechanical Engineer's Office, Launceston, 31st October, 1901.

The Chairman Vacuum Brake Select Committee, House of Assembly.

SIR,

I HAVE the honour to reply to the question put to me this morning *re* brake levers on both sides of wagons. I beg to state that I have been unable to find this in the Board of Trade Regulations, but I quote extract from the *Engineer* of 16th March, 1900, *re* the Railways (Prevention of Accidents) Bill:—

"Among the many Bills which have been laid upon the table during the present Session, the Railways (Prevention of Accidents) Bill occupies a prominent position in the list of measures which are likely to be placed on the statute book. Prepared and brought in by Mr. Ritchie, Mr. Attorney-General, and Mr. Solicitor-General, it embodies a series of clauses which confer wide powers upon the Board of Trade in relation to the prevention of accidents.

"The following *precis* will serve to show the nature of the Bill:—The Board of Trade may, by Clause 1, make such rules as they think fit with respect to any of the following subjects, with the object of reducing or removing the dangers and risks incidental to railway service."

In my opinion, this is for the protection of shunters and guards, providing for levers on both sides of the wagons, so that the brake may be operated from either side of the wagons, thereby obviating the necessity of crossing the line in front or between wagons when shunting or making up trains, and does not add in any way to the power or efficiency of the brake.

Your obedient servant,

WM. R. DEEBLE, *Chief Mechanical Engineer.*

APPENDIX E.

ESTIMATED Cost of Equipping all Passenger Stock, Engines, Bogie Wagons, and 50 per cent. of Four-wheeled Wagons, and Piping Balance.

(Select Committee, Question No. 726.)

	£	s.	d.
Re-estimated cost of material ordered	11,432	19	4
9 bogie carriages, at £54 11*s.*	490	19	0
42 carriages, 4 and 6 wheel, at £35 9*s.* 4*d.*	1489	12	0
17 brake-vans, 4 and 6 wheel, at £40	680	0	0
22 bogie wagons, at £58 13*s.* 9*d.*	1291	2	6
516 Wagons to brake, at £35 9*s.* 4*d.*	18,300	16	0
564 wagons, piping only, at £6 9*s.* 8*d.*	3656	12	0
Total	£37,342	0	10

WM. R. DEEBLE, *Chief Mechanical Engineer.*

Chief Mechanical Engineer's Office, Tasmanian Government Railways,
Launceston, 5th November, 1901.

Appendix F.

COUPLINGS, &c., BROKEN.

File No.	Date.	Remarks.
1897.		
56	June 22, 1897 ...	Coupling broken leaving Hobart
62	June 4, 1898	Whilst passing Claremont
88	July 10, 1898 ...	Whilst ascending Tin Dish Incline
104	August 6, 1898...	Two side-chains broken whilst ascending Broadribbs
136	September 5, 1898	Detached when coming into Conara
98/274	Dec. 26, 1898 ...	Coupling broken, Tea Tree
29	January 18, 1899	Ditto, Cleveland
111	March 25, 1899...	Carriage and van derailed, permanent way damaged, on Strahan-Zeehan Line
152	April 19, 1899 ...	Coupling broken, Antill Ponds, whilst shunting
168	April 28, 1899 ...	Tender coupling broken between Tunbridge and Ross
174	May 1, 1899	Coupling broken, Antill Ponds
285	July 3, 1899	Ditto, Snake Banks
352	August 7, 1899...	Ditto, Evandale Junction, whilst shunting
485	October 20, 1899	Coupling and side-chain broken between Westbury and Hagley
504	October 29, 1899	Coupling broken at Hobart whilst shunting
543	Nov. 21, 1899 ...	Ditto at Ross
551	Nov. 27, 1899 ...	Car coupling broken at Devonport whilst shunting
553	Dec. 26, 1899 ...	Truck coupling broken when leaving Claremont
60	January 30, 1900	Ditto discovered broken on arrival at Evandale Junction
74	February, 5, 1900	Ditto ditto at Conara
148	March 15, 1900...	Truck coupling broken starting from Tunnel
160	March 24, 1900...	Ditto discovered broken on arrival at Conara
382	July 13, 1900	Engine coupling broken running into Scottsdale
240	April 30, 1900 ...	Truck coupling broken, Bridgewater Junction
528	Sept. 26, 1900 ...	Van coupling broken, Lisle Road.
600	Nov. 9, 1900	Horse-box coupling broken at Ross whilst shunting.
633	Nov. 26, 1900....	Carriage coupling broken when leaving Breadalbane.
393	July 5, 1901	Truck coupling discovered broken on arrival at Evandale Junction.
178	March 19, 1901...	Ditto
190	March 29, 1901...	Engine coupling-link broken whilst ascending Tin Dish.
210	April 2, 1901.....	Ditto broken, Brighton Junction. (Two engines coupled)
229	April 6, 1901.....	Car coupling discovered broken on arrival at Parattah
343	June 7, 1901.....	Truck coupling broken entering Evandale Junction
56	January 19, 1901	Ditto
	BRAKE CHAINS BROKEN.	
185	October 28, 1898	Brake-chain broken, Parliamentary special.
391	June 29, 1901	Brake-chain, van ADX 2.
	TRAINS PARTING. (See attached statements of drivers.)	
50	June 11, 1897	Strahan-Zeehan Line. Driver ran about a mile before discovering mishap.
60	June 1, 1898	Western Line, between Westbury and Exton. Ran about a mile before finding out.
45	January 19, 1900	Main Line, near Clarendon.
344	June 10, 1901	Western Line, leaving Deloraine.
456	August 6, 1901 ...	Engine coming out of Glenora. Drawbar broken.

WM. R. DEEBLE, *Chief Mechanical Engineer.*

Appendix G.

94, Davey-street, Hobart, 9th November, 1901.

Sir,

I have the honour to inform you that, from the latest Administration Report on Indian Railways, I find that, on the broad-gauge lines, out of 10,179 coaching vehicles, 7091 are fitted with the vacuum brake, and 792 are piped.

Ten of the metre-gauge lines, with 4138 coaching vehicles, do not use any automatic brake at all ; the remaining lines have 2566 coaching vehicles, out of which 692 are braked, and 98 piped.

As regards the goods wagons for all lines, the number fitted is so infinitesimal that it may be said that the braking of such vehicles has not yet begun.

The broad-gauge lines pay over five per cent., and the metre-gauges average six-and-a-quarter per cent. on a total capital of over £175,000,000.

I have, &c.,

GEO. E. MOORE, *M. Inst. C.E.*

The Chairman Automatic Brakes Committee.

Appendix H.

Hobart, 13th November, 1901.

Dear Sir,

According to the instructions of your Committee, I attended at the House this evening by arrangement to meet Mr. Deeble, in order to confer with him regarding the exact nature of the details covered in the Government Specifications for vacuum brake gear, and after a careful perusal of these Specifications I consider that the vacuum brake gear of the Mount Lyell Co.'s 4-wheel rolling-stock is identical with that of the Tasmanian Government Railways. I have also discovered that the prices scheduled by the Government officers for fitting up their rolling-stock with the vacuum brake include the posts also required for the hand brake; and if the estimates are compared on this basis, there is practically very little difference between the prices paid respectively by the Tasmanian Government Railways and the Mount Lyell Company for brake gear.

I have, &c.,

E. CARUS DRIFFIELD,
Suptg. Engr. Mt. Lyell Coy.

The Chairman Select Committee on Vacuum Brakes,
Parliament House.

Appendix I.

Estimated Cost of Equipping 4-wheel wagons, with combined hand and automatic continuous vacuum brake, other than patent parts, utilising as far as possible material of old side-lever brake, and manufactured in the workshops of the Department.

	£	s.	d.
Automatic Vacuum Brake	16	10	0
Hand brake and necessary forgings for combined brake	10	10	0
Labour erecting	1	10	0
Total each	28	10	0
Estimate 5th November, 1901, each	35	9	4
Saving, each	6	19	4

Estimated saving equipping 55 per cent. of 4-wheel stock; 512 wagons, less 48 sets ordered—			
Estimate, 5th November, 1901	38,965	2	2
Saving 524 at £6 19*s.* 4*d.*, each	3,650	10	8
Final estimate	35,314	11	6
Equipping all stock—			
Estimate of 5th November, 1901	53,574	11	10
Saving, 1080 at £6 19*s.* 4*d.* each	7524	0	0
	46,050	11	10
Original Estimate	55,188	5	0
Final estimate	46,050	11	10
Total saving	9137	13	2

WM. R. DEEBLE, *Chief Mechanical Engineer.*
22.11.'01.

MEMO BY COMMITTEE ON ABOVE.

Final Estimate				46,050	11 10
Less 50 per cent. wagons 564—at	£22	0	0		
Cost of Equipment, estimated at	£28	10	0		
Less saving on cost of piping	£6	10	0	12,408	0 0
	£22	0	0		
				£33,642	11 10

WILLIAM A. GUESDON, *Chairman.*

Appendix J.

TELEGRAMS EXPLAINING PART OF MR. DRIFFIELD'S EVIDENCE.

"To E. C. Driffield, Esq., Mount Lyell Railway Co.,
Mount Lyell.

"Your estimate of cost of brake equipment to four-wheeled wagons not quite clear to Committee. Will you state exactly cost of importing patented portions of vacuum brake and fitting same to existing hand-brake gear? Does the twenty pounds mentioned by you include the cost of patented portions of brake as well as labour and material in adapting and utilising existing hand-brake gear?

"WILLIAM A. GUESDON, *Chairman.*
"House of Assembly, 22nd November, 1901."

Queenstown, 22nd November, 1901.

Our estimate of £20 covers all cost patented parts and labour and material for fitting vacuum brake to vehicle already fitted with hand-brake suitable for conversion to vacuum brake. If vehicle fitted with ordinary shunting two-block brake on one side only or any hand-brake unsuitable for conversion to vacuum brake the full price of thirty-two pounds must be allowed for fitting up entirely new hand-brake gear as well as the vacuum gear. Of course on any such vehicle where some of the existing hand-brake parts might be made use of in connecting the vacuum brake a deduction according to their value should be made from the full amount of thirty-two pounds—hope this is clear to you.

E. CARUS DRIFFIELD.

To W. A. Guesdon, Esq., M.H.A., Hobart.

JOHN VAIL,
GOVERNMENT PRINTER, TASMANIA.