13. Can Mr. Hay's detailed estimate as it stands be put in?—I do not think it is his estimate. It was made up by one of the draughtsmen.

14. But you told us just now that he made it?—It was made up under his supervision.

15. He must have passed it and approved of it?—Well, he did not, because he did not adopt the figures that were there: he added nearly half as much again.

16. *The Chairman.*] I will ask Mr. Blow to put that in. The cost that you quote for the Otira Tunnel is £60 15s. per yard, Mr. Vickerman: what is the next highest cost to that, and in respect of what tunnel?—I have the figures here for the Lyttelton Tunnel, if you like. It is a mile and three-quarters long, and cost £65 a yard, and it is not lined.

17. Give us a modern instance, if you can?—The Mont Cenis Tunnel, 26 ft. by 26 ft., cost £206 a lineal yard. It has a double line of rails.

18. *Hon. Mr. R. McKenzie.*] What is the cubic content of that?—About 80 cubic yards per lineal yard.

19. *Mr. Davey.*] How does the Lyttelton Tunnel compare with the Otira in size?—The Lyttelton Tunnel is a little larger than our ordinary tunnels, but I do not think it is quite so large as the Otira Tunnel: I have not the exact width of it. There is another tunnel on this list that you might like me to quote—the Poro-o-tarao Tunnel, on the Main Trunk line. It is 1,166 yards long.

20. *Hon. Mr. R. McKenzie.*] That is a pumice tunnel, is it not?—It goes through papa and sandstone, but it is lined right through. It cost £33 4s. a lineal yard, a good deal of which was due to the cement having to be carted up from Te Awamutu. They had to make a road of their own—some £16,000, I think, they spent on that. Then, the Spooner's Range Tunnel, Belgrove, is 1,474 yards long. It was very cheaply done, the cost being £20 13s. per lineal yard, including lining. Those are the principal tunnels that have been done by contract. A lot of tunnels have been constructed since 1890 by co-operative labour. I will give you some of those. The Tahekeroa Tunnel, which is in papa country, not so hard as the Arthur's Pass country—is 488 yards long, and cost £22 10s. per yard. This was brick-lined, and was 15 ft. 6 in. by 12 ft. 6 in. in size. The Ahuroa Tunnel, 424 yards long, cost £23 a lineal yard; the Hoteo, 528 yards, cost £21 16s. 6d. a lineal yard; the Mainene, 17 ft. by 15 ft.—the largest size—cost £28 11s. a lineal yard. Then the Ross Hill Tunnel, 17 ft. by 15 ft.—the last tunnel finished—is 374 yards long, and cost £40 12s. a lineal yard.

21. *Mr. Seddon.*] How do you account for that costing so much more than the others?—The ground was somewhat heavy, and the tunnel was pushed through by means of a bottom heading and was left standing for some time; the ground began to give way, and we had to do extra timbering.

22. *Hon. Mr. R. McKenzie.*] Did you have any run?—No, we did not get a run. Then, on the Paeroa–Waihi Railway the Karangahake Tunnel was put through. That was 15 ft. 6 in. by 12 ft. 6 in. in measurement. The work was done from about 1900 to 1905. The tunnel was 1,194 yards long, and cost £27 17s. 9d. a lineal yard.

23. That is a rock tunnel, is it not?—That is so; it is in diorite.

24. *Mr. Blow.*] All these tunnels that you are giving us now are lined?—Yes. There are two small tunnels on the Gisborne line which were done in 1905 and 1907. One was 202 yards long and cost £32 8s. 3d. a yard; and the other 286 yards, costing £29 2s. 10d. a lineal yard.

25. *Hon. Mr. R. McKenzie.*] There was a considerable expense in connection with these tunnels, was there not?—They were in rotten papa, and the papa came down.

26. How far did you have to cart your shingle and cement?—About a couple of miles.

27. *Mr Seddon.*] What was the size of these two tunnels?—15 ft. 6 in. by 12 ft. 6 in. On the Main Trunk line, the Raurimu Spiral, done in 1907, the larger one was 418 yards long and cost £25 4s. 11d. a yard, and the small one 99 yards long, costing £29 9s. 5d. These were the largest size—17 ft. by 15 ft. At the south end of the Main Trunk line, the Mataroa Tunnel, 15 ft. 6 in. by 12 ft. 6 in., and built in 1905, is 666 yards long, and cost £21 18s. per lineal yard. The Powhakaroa Tunnel, 15 ft. 6 in. by 12 ft. 6 in., constructed about 1897, is 600 yards long, and cost £18 16s. a yard. The Hapuawhenua, 17 ft. by 15 ft., built in 1907, was 225 yards long, and cost £28 12s. a lineal yard.

28. *Hon. Mr. R. McKenzie.*] Have you got particulars of the Whangamomona Tunnel?—They are not made up yet.

29. Give us the cost of the tunnels going up the Waimakariri on the Midland Railway?—Very well, I have them here.

30. *Hon. Mr. Fraser.*] Let me ask this first: in most of those tunnels that you mentioned in the North Island the material driven through was papa?—Yes, mostly.

31. Is papa as difficult to drive through as the material being driven through now at Arthur's Pass?—It is not so hard and not so costly. You could not have better material for driving a tunnel through than good papa.

32. In what relationship would you set the cost of the one to the other?—The lining would be the same, but whereas you would excavate for about 8s. a cubic yard in the papa, you would want about 12s. in the clay slate. That is for mere driving.

33. What proportion of the cost of a tunnel does the driving bear to the total, or what does the bricking cost?—In papa the driving and the lining cost much the same; but when you get harder rock it is two-thirds driving and one-third lining.

34. *The Chairman.*] You were going to deal with some of the tunnels on the Midland Railway: give us one or two?—I will give you the longest ones. No. 3 tunnel, 594 yards long, cost £32 16s. a lineal yard.