

111. You are of opinion that we can do them quite as economically as other countries?—Oh, yes.

112. *Mr. Veitch.*] You say that you prefer the contract system to the co-operative system?—For a large job like this.

113. Is it not a fact that the figures you have given us this morning show clearly that the experience of the Department has been that co-operative jobs have proved cheaper than contract jobs?—I do not think so.

114. How do you reconcile that statement with the figures you have given us this morning?—I do not think the figures I gave you showed very much saving by the co-operative system. I can give you as low-priced a tunnel done by contract as any tunnel that has been driven. I refer to one done by Mr. McLean here, as long as he was in the hard ground. The Makarau contract was let to Mr. McLean, 627 yards at £18 10s. a lineal yard. That was supposed to be in sandstone and stand-up ground. But when he got into rotten clay mud the design of the tunnel had to be altered, and he was paid extra; but as long as he was in the hard ground the tunnel was done for £18 10s. a yard.

115. If the same amount of work had to be done in a level tunnel, instead of at a grade of 1 in 33, as at Otira, would it materially reduce the cost of doing the work?—It would make a slight difference, but not so very much; because, though at one end you have to haul, at the other you get down-grade traction.

116. *Hon. Mr. R. McKenzie.*] Can you tell us what wages the Department pay for men working in tunnels: I mean, what do the men earn—not day wages?—Anything from 10s. to 12s.

117. Can you give the Committee a fair average?—I do not know whether I have sufficient knowledge of what has been going on just lately.

118. Has the Department ever had any serious trouble with men working in tunnels?—We have had troubles.

119. Any serious trouble, I mean?—We had trouble in the Karangahake Tunnel.

120. Has the Department had any serious trouble with the men since the Arthur's Pass contract was let?—I am not aware of anything special at the moment, unless you can recall it to me.

121. Have you experienced any difficulty in getting the necessary number of men to carry on the tunnel works throughout the country?—We had some trouble at Whangamomona—trouble to get the men, and to get them to go on at all. We had to give them high rates.

122. Do you know what the difference was from what they were getting before?—I think it came to nearly half as much again.

123. Are you sure?—Mr. Blow would be able to give it to you.

124. Now, Government officers, in estimating the cost of works of this nature, are guided by the experience gained in similar tunnels in other parts of the world?—Yes.

125. Is there any difficulty in making an estimate as long as you know the wages and cost of materials in other countries, other conditions being equal?—You want to know what class of men you are going to have. Men in different countries work differently.

126. It is all a question of wages?—But the output is different.

127. Is there anything in the conditions that cannot be estimated, approximately?—I would not say there is. You can always form an estimate if you know anything about the work yourself.

128. You say it is more expensive to drive the Arthur's Pass Tunnel than the larger double-line tunnels in Europe or America?—Yes, per item.

129. I mean per lineal yard?—Oh, no, not per lineal yard. I said per item—per cubic yard.

130. Does that apply to the lining?—Yes.

131. Does it apply to the timbering?—The timbering would be heavier.

132. What would be the increase in the larger tunnel for timbering?—The timbering would support a very much greater number of cubic yards and be divided over them.

133. Would the timbering of the larger tunnel cost double the amount?—Not per cubic yard excavated. I do not think you would find it cost very much more than with us.

134. Do you mean to say that you can carry a 25 ft. tunnel roof on the same strength of timbering as a 14 ft. one?—A 25 ft. tunnel would be 25 ft. wide, and you would have about three times the cubic contents in that tunnel; and if you divide the timber over the cubic contents, you would find that it would not come to much more than half of what it does in our tunnels.

135. But the cost of timbering would be at least equal in the large tunnel to what it was in the small one?—Just so, but you would spread it over a larger area of stuff.

136. Would the cost of lining be the same?—I do not think there would be a great deal of difference, but it would be in favour of the bigger tunnel.

137. So that the whole difference would be in the cost of excavation?—That is so.

138. And the cost of running the spoil out?—That would be slightly cheaper in a big tunnel.

139. What would you consider the difference in cost for running the material out?—You would be in twice as good a position in a big tunnel.

140. How much does it cost us to run the material a distance of a mile, say, in the Arthur's Pass Tunnel?—I could not answer that.

141. Do you know what length in the Arthur's Pass Tunnel the headings are driven at both ends?—Yes. On the 4th July the bottom heading was in 1 mile 68 chains 87 links at the Otira end, and 27 chains 90 links at the Bealey end, making a total distance of 2 miles 16 chains 77 links.

142. Give us the top heading?—The top heading was in 1 mile 47 chains 27 links at the Otira end, and 24 chains 28 links at the Bealey end, giving a total of 1 mile 71 chains 55 links.