43. But what is the Committee to understand by "heavy ground"?—Heavy ground means ground that would be coming in and crushing in the timber.

44. Do I understand you to mean by this that it is ground that is on the creep?—Yes; ground that may be on the move. It may be coming in sideways, or coming in direct from the top or at an angle. It has all got to be counteracted by putting in struts, and so on.

45. I suppose at the time when you took charge of this Makarau Tunnel the contractors were in heavy ground?—Particularly heavy ground.

46. They were in the midst of the difficulties as regards this breakdown?—They were.

47. It has been stated in evidence that there was no necessity for a sole-plate or bottom sill, or to build an invert. In your opinion, was it necessary?—In that ground it was absolutely necessary.

48. [Referring to the plan on the wall] Would it be possible, after the work was solidified, for the two props to have rested on and carried this upper sill here?—That sill was in position before this brickwork was built in. The brickwork was built round it. Sometimes there were two rings, and sometimes two and a half. If the sole-plate could have been done without it would have been a great saving.

49. In your opinion, it was absolutely necessary for the contractors to put in a sole-plate?—Yes; in this case I consider it was necessary.

50. *Mr. Massey.*] You say they were still in the heavy ground whilst you were in charge?—Yes.

51. If the sills were taken out before the brickwork was put in, would there have been any danger of the tunnel coming down?—Well, I should have hesitated to do it. I should only have done it after instructions from the department, which I should have considered myself bound to carry out. I have not done anything in my own tunnels which was not approved of by the engineer.

52. Still, as an experienced man, you would not have considered it advisable?—No; I should have advised against it.

53. *Mr. Graham.*] You were not Inspector in this work during the whole period of the construction of the tunnel?—No.

54. How much had been done before you came on?—About three-quarters of it, I suppose.

55. In the other ten tunnels you worked at, did you experience any of the same kind of ground?—Not exactly the same kind of ground, but the same class of work.

56. You have carried out works of equal difficulty?—Equally difficult, if not more so.

57. Work that would put greater strain on your ability to cope with it?—Yes, greater.

58. What is the object of putting in that sill across the centre?—So that the legs can be removed and the timber taken out.

59. Yes; but what is the object for its being put in at first?—For support. This minor sill is put in for convenience' sake, so that it can be taken out and moved ahead.

60. But the purpose for which it is put in at first is to be able to support all that work that holds up the arch?—Yes; and that keeps up the sides.

61. And the object is to keep that up until you get the brickwork in and hardened and solidified, so that it will carry itself?—Yes.

62. If that were taken out before the brickwork set it would be wrong?—Distinctly wrong; it would be risking too much.

63. If that were done, no matter by whom, it would be a wrong thing to do?—It would be a wrong thing to insist on doing.

64. And the consequence would be what occurred there?—Yes.

65. And if it came in you would say it was in consequence of the sill being taken away while the work was green?—I would never have it taken away; I should consider it a very wrong thing to do.

66. And that the result might be disastrous?—Yes.

67. *Mr. Holland.*] If you took the under-sill away, what would the ends of these posts rest on?—That is the top pieces. They would be resting on the arch simply.

68. And you think that should have been left in very much longer for the timbers to rest on that sill until the work was thoroughly set?—Yes.

69. *Mr. Graham.*] Do you think if the arch had been thoroughly set it would have been able to carry the tunnel?—Well, probably.

70. But when it got thoroughly set you think it would have been all right?—Well, brickwork takes some considerable time to set sufficiently to carry all the work of a tunnel. If you were to wait for four or five weeks it probably would have been strong enough; but that would mean that there would have to be a delay in the work.

71. *Mr. R. D. McLean.*] How long do you say it would take as a rule?—I think about a month would be necessary.

72. *Mr. Flatman.*] Do you know whether it is customary with every contract for the Public Works Department to supply a plan of how a tunnel should be strutted?—No; I do not think it is customary. It is not generally customary. Very often in general conversation with the contractors a suggestion may be offered.

73. There is no plan given?—They do not supply a plan; but if they insist on it being done in their own particular method they will supply one.

74. Was there a plan supplied on this particular occasion?—No.

75. Then, a contractor is left to construct a tunnel according to the way he thinks most advisable?—As long as he is competent; but if he is incompetent I should say the department should direct him how to do it.

76. Practically, the timbering of a tunnel bears the same relation as scaffolding to a building; there is no plan supplied any more than for the scaffolding of a house?—That is so.