Minutes of evidence taken before the Royal Commission on metalliferous mines and quarries : volume 1.

ROYAL COMMISSION ON METALLIFEROUS MINES AND QUARRIES.

MINUTES OF EVIDENCE

TAKEN BEFORE THE

ROYAL COMMISSION ON METALLIFEROUS MINES AND QUARRIES,

WITH INDEX AND APPENDICES.

VOLUME I.

Presented to both Houses of Parliament by Command of His Majesty.

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MINUTES OF EVIDENCE

TAKEN BEFORE THE

ROYAL COMMISSION ON METALLIFEROUS MINES AND QUARRIES.

FIRST DAY.

Friday, 10th June 1910.

PRESENT:

SIR HENRY HARDINGE SAMUEL CUNYNGHAME, K.C.B. (*Chairman*).

RICHARD AUGUSTINE STUDDERT REDMAYNE, Esq., M.Sc.
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Mr. MALCOLM DELEVINGNE called and examined.

1. (*Chairman.*) I do not think I need introduce you to the Commission. You are one of the Home Office officials, who has been many years now directly dealing with the whole question of the coal mines and metalliferous mines in the country. I have told the Commission that on all points of administration, and as to the general knowledge of the subject, you will be able to assist them, and when it comes to mining and technical questions you will indicate, as far as you know them, the views of your office, and leave us to get such further, minuter, and more technical evidence as we think proper afterwards?—Yes.

2. You have been good enough to put into our hands an outline of the evidence you are going to give before us, and that outline I am going now to ask you to fill in. Will you give us a short account of the extent and distribution of the industry in Great Britain and Ireland connected with metalliferous mines?—In 1909 there were 687 mines under the Metalliferous Mines Act, employing 28,437 persons, of whom 16,735, or about 59 per cent., were employed below ground, and 11,702, or 41 per cent., above ground.

3. Have you got tables of these, showing the mines and the people employed?—I will hand in a series of tables,* showing over a series of years since the passing of the Metalliferous Mines Act in 1872, the persons employed, the output of mineral, the number of deaths from accidents, and the death rate per 1,000 persons employed. They are detailed tables, showing the numbers of each class of workmen, that is, those employed underground and those employed above ground, distinguishing between males and females, and also showing the output of each class of mineral for the same period of years in tons.

4. Does that show how the mines are classified, such as copper or tin mines?—It is rather difficult to classify the mines purely by mineral, because in some mines more than one class of mineral is worked. I can give briefly the chief figures for the different classes of mineral.

5. Roughly, we should like to know how many of these 687 mines could be classified?—Iron ore comes first in importance, the output of mineral last year being 1,674,643 tons. The number of persons employed below ground was 4,944, above ground 1,910, making a total of 6,854.

6–7. Can you say how many mines there were of that class? When we come to inspection, it is useful to get an idea?—The number in 1909 was 172.

8. Does that include china-clay mines?—I was referring to iron ore.

9. The general figures you have just given will not include that; there is no china-clay mine?—I do not think there is.

10. By a "mine," you mean a thing dug out of the earth, out of galleries?—Underground workings, as opposed to open workings. China-clay does not appear upon the list of minerals in the table. Next to the iron mines in importance comes the tin industry in Cornwall and Devon, which employed underground in 1909 4,250 persons, above ground 3,575, a total of 7,825. The output in tons seems comparatively small, only 7,403, but the figures of persons employed below ground are, I think, the chief index of the importance of the industry.

11. That industry alone is nearly one quarter of the whole industry?—Yes.

12. That shows its importance?—Yes.

13. (*Mr. Thomas.*) The output, 7,403 tons, is tons of flat black tin?—Yes, dressed tin ore.

14. (*Chairman.*) The tin mines take a quarter of the men employed?—About that.

15. The iron mines, roughly, what proportion?—They employ more underground, but fewer persons above ground.

* Appendix A.

16. What proportion of the people employed in the mine?—The total is 6,854.

17. That is nearly another quarter?—Yes.

18. So that there is a quarter in iron, a quarter in tin, and what is the next?—Next—a good way after—comes the slate industry, which employs 1,297 below ground, 2,030 above ground, or a total of 3,327.

19. About one eighth?—Rather less. The output was 92,000 tons. There, again, the output is dressed slate, and is only a very small fraction of the amount of rock got. The Slate Committee found only 5 per cent. of the total rock mined was of any use for commercial purposes.

20. (*Dr. Haldane.*) Can you tell me what the value of a ton of dressed slate is?—It is in the mineral statistics. I am afraid I have not got it by me.

21. (*Chairman.*) We will have that afterwards. You have given three: iron, tin, and slate. Those are the most important. Will you please give us another?—The next is a group which comprises mines producing lead ore, lead and zinc ores, lead ore and fluor-spar. The total employed underground in that group was 2,665, above ground 1,633, a total of 4,298.

22. About one sixth?—Yes. The output of lead was 29,688 tons, zinc about 10,000 tons. Those are the four chief groups. There are a number of smaller groups: limestone, which employs about 1,400 altogether, with a very large tonnage, 407,000 tons; gypsum, a total of 780 men employed altogether, and a tonnage of 200,000. In a falling scale you have rock salt, sandstone, clay and shale, igneous rock, barium, fluor-spar, sand, zinc ore, gold ore, and other minerals. I can hand that table in.*

23. To sum up, iron takes about one quarter of the people employed, tin one quarter more, slate mines about one eighth, lead and zinc about one sixth, and the remainder is made up of a miscellaneous group of gypsum, rock salt, and other things.

23*a*. (*Mr. Redmayne.*) There is included in the remainder, copper?—Yes. I have the output of copper separately, but not the number employed separately, the output is so small now.

(*Chairman.*) You may take it the number is not large.

24. (*Mr. Thomas.*) There is no reference to china-clay?—I have no entry for china-clay.

(*Chairman.*) Is china-clay mined?

(*Mr. Redmayne.*) It is quarried. It is washed.

(*Mr. Thomas.*) It was recently decided that china-clay was a mineral.

25. (*Chairman.*) Will you tell us where the chief centres of the industry are to be found?—Before leaving that, I might call attention to two points. One is the large proportion of the workers employed above ground.

26. The proportion above ground is 41 per cent.?—Yes. That is much larger than in the coal industry.

27. What is the coal figure?—In coal mines the percentage of surface workers is only 20.

28. About half?—As regards the actual work of mining, the total number employed now is only 16,000. The second point is the very great falling off in the numbers employed since the Act of 1872.

29. Will you give us the rough proportion, without going into elaborate detail?—About 50 per cent. In 1873 the number employed underground was 37,000; in 1909, 16,000, just about half.

30. It has gone down to about half what it was in 50 years?—In fact the character of the industry has changed. The output of copper has fallen in that series of years from 70,000 tons to 3,600. Iron ore has fallen from 2½ millions to under 1,700,000; lead has fallen from 70,000 to about 30,000; tin has fallen from about 13,000 or 14,000 tons to about 7,000. Zinc, which has fluctuated very much during the period, has fallen very heavily during the last two years. On the other hand, clay, gypsum, igneous rocks and other minerals, have shown very large increases, but they employ very much fewer men.

31. (*Mr. Redmayne.*) And slate?—Slate has shown a falling off, too, in recent years. In 1874 the production of slate was 151,000 tons. It rose in some years to a slightly higher figure, 170,000 to 180,000.

32. (*Chairman.*) Always in mines?—Yes. And last year it fell to 92,000 tons.

33. Roughly, we may say in the course of half a century the number of men employed in metalliferous mines has about halved, and the output has also diminished in something like the same proportion?—The output in certain classes of mines. The total tonnage for all minerals worked in the metalliferous mines is nearly the same; that is got by reckoning in clay and sandstone.

34. (*Dr. Haldane.*) Are they reckoned against a ton of tin, worth 80*l.*?—Yes. The numbers employed are the real criterion of any branch of the industry. Another point is that the employment of women above ground has diminished almost to a vanishing point. It was 5,000 in 1873, and it is now 200.

35. (*Chairman.*) Have you any figures of children and young persons?—Yes. There are no children under 14 employed below ground. The Act only forbids it under 13. Actually there are none employed under 14. The children under 14 employed on pit banks number 26, all boys. Children from 14 to 16 number 648, of whom 16 are girls, and the women above 16 are 189.

36. The number of children has enormously diminished, in a much larger proportion than that of the women?—I have not the figures, but I believe that to be the case.

37. Where are the chief centres of this industry?—Taking the mines inspection districts——

38. I think you had better tell us those. Have you a map of the mining districts?—Yes; of the districts as they existed up to the 1st of the present month when certain changes came into force.*

39–41. You might show the Commission one; some of the members are not as familiar with it as we are. Perhaps you can tell us about the chief centres of the industry. Take the Southern district first; what is that?—The Southern district (now altered), so far as regards metalliferous mines, meant Cornwall and Devon.

42. There are 224 mines, employing 9,563 people in that area?—That is so.

43. Comprising the South of England?—Yes. It really means Cornwall, of course. Then there is the Newcastle district, which includes Cumberland, and the Furness district of Lancashire and the Isle of Man, which has 101 mines, employing 7,848 persons. The Liverpool and North Wales district, which includes the slate mines of Merionethshire, has 90 mines, and employs 5,021 persons. Those are the three most important centres. Then the Midland district (now altered), which comprised a number of Midland counties, had 65 scattered mines, employing 952 persons. The Durham district, comprising South Durham, Westmorland and the North Riding, has 46 mines, some of which are lead, employing 1,125 persons.

44. So far as localities are concerned, Nos. 3 and 7, and the western part of 12, are the localities that most occupy our attention?—I think so.

45. Will you tell us about the present system of inspection? Will you describe the system of inspection in the districts and the changes which have taken place?—I have some figures about the size of the metalliferous mines. Would the Commission like to have those first?

46. Certainly, by all means?—It is rather interesting, indicating the nature of the conditions under which the industry is carried on. In 1909 the number of mines which employed more than 10 persons below ground was only 287, and the number of mines employing only 10 or less was 400.

47. Out of 687 which existed altogether?—Yes; or taking the limit of 30 persons below ground, which is the limit adopted in the Coal Mines Act for the requirement of the certificated manager, the number of mines

* Appendix A., Table IV.

* The names of the old districts were as follows:—No. 1, East Scotland; No. 2, West Scotland; No. 3, Newcastle; No. 4, Durham; No. 5, York and Lincoln; No. 6, Manchester and Ireland; No. 7, Liverpool and North Wales; No. 8, Midland; No. 9, Stafford; No. 10, Cardiff; No. 11, Swansea; No. 12, Southern.

employing more than 30 below ground was only 119, and the number employing 30 or less was 568.

48. So that you have got a very large number, three-quarters of the mines in the country, that you may term very small mines?—Yes.

49. The industry is not apparently a homogeneous one?—No. That table I have prepared shows that there are a great variety of minerals worked, and a great variety of mines. Altogether, for the purposes of the Home Office classification, we take 27 groups of minerals.

50. You put that table in?—I will put that table in.*

51. I think that ends your general remarks on the extent and distribution of the industry in the country, and gives a general view of the whole thing?—That is all I have to say.

52. Now will you give us in the same way a general sketch of the present system of inspection, and please do not assume that we all know about it?—There is not very much to say. The metalliferous mines of the country are inspected by the same staff that inspect the coal mines of the country, with the exception of three inspectors, who were appointed in 1894 specially for the metalliferous mines. None have been appointed since that date, and thus the inspection of all the mines in any district is made by one class of inspectors.

53. Has that system of working by one class of inspectors been found on the whole to be preferable?—For administrative purposes it is very much simpler, both for the inspectors, the owners, and, I should imagine, for the public.

54. I will ask you more details on that presently. One wants the general sketch at present?—There used to be two special metalliferous mines districts, one Cornwall and Devon, and one which comprised North Wales and some of the South-Eastern counties of England. The latter district was found to be very unwieldy, and when Sir Clement Foster, who was in charge of it, retired in 1901, it was abolished and absorbed in the other inspection districts. The Cornish district had previously been abolished in 1892.

55-6. The inspection districts as they formerly existed were as shown?—From 1901 up till this year there have been 12 inspection districts for both coal and metalliferous mines.

57. Until the appointment of the Chief Inspector, each of them was under an inspector of mines related directly to the Home Office?—Yes.

58. I am going to ask you about the changes that have been introduced?—The only change that has taken place, apart from the appointment of the Chief Inspector of Mines, which was about two years ago, has been the consolidation of some of the districts, following upon the recommendation of the Royal Commission.

59. A further grouping took place. Will you explain that?—Eventually the country is to be divided into six large districts. The whole of Scotland will form one district.

60. That is to say, Nos. 1 and 2 districts are now grouped together in one district?—Yes.

61. What was done with Nos. 3 and 4?—They are eventually to be combined into one district. At present they are being left as they are.

62. What will be the next district?—The York and Lincoln district has been increased by the addition of Nottingham and Derby, which is rather an important coalfield and which has been taken from the Midland district. Two Lancashire districts, Manchester and Liverpool, are eventually to be combined into one district, but at present they are being left as they are.

63. That was a temporary arrangement for practical purposes at the present time?—Yes, entirely administrative.

64. It has been found impossible to carry out a change of this kind too suddenly?—Yes. It was difficult to make all the changes take place at once.

65. Will you please go on with what you were saying?—The two South Wales districts have been consolidated, and Monmouthshire has been taken from the Southern district and added to them, and those will form the new South Wales division. The remainder, that is, the Stafford district and the rest of the Midland and the Southern districts, have been combined into one large district called the Midland and Southern.

66. (*Mr. Greaves.*) What about North Wales?—That remains as it was, attached to the Liverpool district. Eventually the two Lancashire districts will form one large district.

67. North Wales will go with Lancashire?—Yes.

68. Nos. 6 and 7 will be one district?—Yes.

69. (*Chairman.*) The outcome will be that there will be ultimately six districts instead of twelve?—Yes, at present there are eight.

70. As far as that has gone that has been an improvement administratively?—It has only taken effect from the first of this month.

71. Generally I want your opinion upon that change?—I have no doubt, from an administrative point of view, it will be a great advantage. I should add that all the inspectors have to qualify in a knowledge of metalliferous mining, as well as in a knowledge of coal mining.

72. We shall be glad to go more into that when we come to your suggestions. This is merely an outline at present of the system. Does that cover all that you have to say under that heading?—I have nothing more to say upon that.

73. Now we come to the next point. Will you give us the Acts by which the industry is regulated?—The principal Act is the Metalliferous Mines Act of 1872. It was amended as regards the returns of output and the persons employed, by the Metalliferous Mines Act, 1875, as regards the reporting of accidents by the Notice of Accidents Act, 1906, and on minor points by some other Acts.

74. Did the amendments that took place in the Explosives Order apply to metalliferous mines?—Do you mean the Explosives Order under the Coal Mines Act, 1896?

75. Yes?—No, they do not apply.

76. There has been no new legislation, as far as explosives are concerned, applied to metalliferous mines?—No. The Metalliferous Mines Act applies both to the surface and underground workings, but the surface workings in metalliferous mines are also subject to the Factory and Workshop Act, which regulates the hours of employment of women, young persons, and children, and also provides for the fencing of dangerous machinery, the provision of sanitary conveniences, and others matters.

77. Consequently now you get a double inspection?—You get inspection under a double series of Acts. The metalliferous mines are inspected for the purposes of both sets of Acts by the mines inspectors as regards the mine itself.

78. For that purpose they act as factory inspectors?—As regards the mine they act as mines inspectors under the powers given in the Metalliferous Mines Act. As regards the surface workings, which include any works adjacent to the mine where the minerals are broken, crushed, ground, screened, washed, rough-hewn, or dressed, they enforce the provisions of the Factory Act, and have been given the powers of factory inspectors for that purpose.

79. The employers and workmen have to make themselves acquainted both with the provisions of the Metalliferous Mines Act and also the Factory Act?—That is so.

80. They have a double system of inspection?—No, it is not double. The mines inspectors are sole inspectors for those works.

81. The mines inspector has to get up the Factory Act for the purpose of acting as a factory inspector?—Yes. On the other hand, the factory inspectors inspect all places where any process of manufacture is carried on, like brick-making, smelting, and cement-making.

82. Do you call the squaring of slates a process of manufacture?—That is considered to be the dressing of material.

* Appendix A., Table III.

83. I purposely asked the question because it is a difficult point. Questions of that sort are among the difficulties of administration?—There is a difficulty in drawing the boundary line.

84. I asked the question for a purpose. I want the Commission to be aware of the difficulties?—Practically there is no difficulty, because any questions arising as to boundary are settled by departmental arrangement.

85–7. I believe you have something to say on the question whether it would be better that the metalliferous mines should be wholly under one set of Acts instead of two?—It seems desirable.

88. Do the inspectors themselves find difficulties in the inter-locking of the Metalliferous Mines Act and the Factory Act?—The inspectors have repeatedly advised the Secretary of State that they find the application of two sets of Acts is confusing for themselves, and the owners, and the public.

89. Are the prescribed hours of work different in the Coal Mines and Metalliferous Mines Acts?—There are no hours of work prescribed in the Metalliferous Mines Act for employment above ground.

90. There are hours of work prescribed in the Factory Acts?—Yes. The provisions of the Factory Act apply to women or young persons employed at the pit banks.

91. I am not asking for my own information, but purposely to get it on the notes?—Perhaps it will be convenient to the Commission to have a comparison of the hours at coal mines and at metalliferous mines. In coal mines the Factory Act does not apply to pit banks, the hours of work of women and young persons being regulated by a section in the Coal Mines Act. I think the suggestion of the Department would be, for the consideration of the Commission, that some section should be inserted in a Metalliferous Mines Act to regulate the employment of women and young persons above ground in the same way. The provisions compare roughly as follows. For children under 13 the Coal Mines Act allows 36 hours' work weekly, and the Factory and Workshop Act only 28½ hours. In that respect the Factory Act is more favourable.

92. This is above ground employment?—Yes. The employment of children is almost a negligible quantity now. Under 14 the Coal Mines Act allows 54 hours in the week, and the Factory Act allows 28½ hours, or if the child has obtained an education certificate, 60 hours, so that for children between 13 and 14 who obtain the necessary education certificate the Factory Act is less favourable than the Coal Mines Act. From 14 to 16 the Coal Mines Act allows 54 hours, and the Factory Act 60. There, again, the Factory Act is less favourable. From 16 to 18 the Coal Mines Act allows 54 hours for girls, while the Factory Act allows 60 hours. On the other hand, the Coal Mines Act imposes no limit on boys above 16, while the Factory Act imposes the same limit of 60 hours for boys between 16 and 18. So there is a balance of advantages and disadvantages. I think the Coal Mines Act does not compare unfavourably with the provisions of the Factory Act.

93. Have you given us the women in comparing the employment under the Coal Mines Act and the Factory Act?—No. For women the Coal Mines Act only allows 54 hours, and the Factory Act 60 hours. Again the Coal Mines Act is more favourable. The provisions of the Factory Act, which are drawn up with reference to a different class of works, are extremely complicated.

94. I think that concludes that head?—Yes.

95. The outcome of it all is that in its present condition it is difficult for a person approaching the subject for the first time to grasp these difficult Acts and understand their relationship one to the other?—Certainly.

96. I think you have got a table showing the differences between the Metalliferous Mines Act of 1872 and the Coal Mines Regulation Act?—Yes. I can give that.*

97. We should like you particularly to bring out points where similar things are used in the two industries, and yet where the regulations are different with regard to them?—The Coal Mines Act was passed in 1887, 15 years after the Metalliferous Mines Act, and embodied a good many provisions which experience had shown desirable. No amendments of importance, except as regards the reporting of accidents, have been introduced since 1872 into the metalliferous mines legislation. The Metalliferous Mines Act, therefore, is behind the coal mines legislation on a good many important points. Some of the provisions, however, in the Coal Mines Act would not be applicable to Metalliferous Mines, and that has to be borne in mind when one mentions the differences between the two sets of Acts. One point for the consideration of the Commission is how far the additional provisions in the Coal Mines Act are applicable and necessary in the case of metalliferous mines. In the body of the Act the chief differences are, first, the requirement in the Coal Mines Act of two shafts in every mine; then, the requirement that every mine shall be under a certificated manager, and that that manager shall exercise daily personal supervision.

98. Which is required in the Coal Mines Act, but not required in the Metalliferous Mines Act?—There is no provision on the subject in the Metalliferous Mines Act. Then, metalliferous mines employing less than 12 are exempt from certain very important provisions. There is no such exemption in the case of coal mines. The requirements as to the plans of mines are less full and stringent than those in the case of coal mines, and those in the case of coal mines have been found by the other Royal Commission to be insufficient; and the provisions as to plans of abandoned mines in the Metalliferous Mines Act are more defective than in the Coal Mines Act.

99. The importance of that is the danger of an inrush of water?—Then, as regards the General Rules, the chief differences between the two sets of Acts are these. In regard to ventilation, the general standard is very much the same, but the Metalliferous Mines Act does not contain the provision which appears in the Coal Mines Act, that the ventilation must be such as to dilute and to render harmless all noxious gases in the workings; nor is there any provision, as in the Coal Mines Act, requiring the quantity of air to be measured. Then the Coal Mines Act contains some important requirements, that before work is commenced the condition of roads and working places must be examined by a competent person. There is no such provision in the Metalliferous Mines Act. The same is true of the provision that a similar inspection must be made during the course of the shift. Nor is there any provision in the Metalliferous Mines Act for the periodical inspection of machinery and gear. There is no provision for the withdrawal of workmen in case of danger, such as appears in General Rule 7 in the Coal Mines Act.

100. Is that only in the case of gas, or general danger?—Generally, any cause whatever rendering the mine or any part of the mine dangerous. There is no provision to that effect in the Metalliferous Mines Act. The provisions as to the use of explosives are less full, and in some respects seriously defective, although they have to some extent been supplemented by Special Rules.

101. With regard to that item, explosives must continue to a certain extent to be dealt with by Special Rule, on account of the constant changes that take place in the advance of the industry. It is difficult to lay down a hard and fast line in an Act of Parliament with regard to explosives?—Certainly; but difficulty arises where the General Rule has laid down a provision. You cannot amend that provision by Special Rule under the Metalliferous Mines Act. There is no provision in the Metalliferous Mines Act requiring bore-holes to be kept in advance when approaching accumulations of water. That is a very important provision, of course. There is no provision requiring the roofs and sides to be made secure, or about overwinding and ambulance, and there is no provision such as appears in General Rule 38 of the Coal Mines Act about inspection by the representatives of the workmen.

102. In giving those, I understood you hitherto have not been expressing opinions upon them so much

* Appendix A., Table XIV.

as calling attention to the differences between them. It does not follow necessarily that everything that is here is applicable to both, but those are the chief points of difference?—I thought it would be convenient to the Commission to give those.

103. Does that exhaust what you have to say on that?—Yes.

104. Will you tell us what has been done in previous inquiries with regard to metalliferous mines?—The important inquiries have been four. The first was in 1864, when a Royal Commission reported. I do not know whether it would be of interest to the Commission to know roughly what their conclusions were.

105. Decidedly?—Their two chief conclusions are: "(1) That there is a great excess of sickness and mor- " tality amongst metalliferous miners which is mainly " attributable to the imperfect ventilation of the mines. " (2) That several other causes, both general and local, " largely contribute to impair the health of the miner."

106. Did they say anything special about any kind of disease?—Yes. They drew attention to the excessive mortality, chiefly from pulmonary diseases. They sent, as regards Cornwall, medical men to investigate the conditions in the Cornish mines, and they summarised the report of those medical men as follows: "They ascribe the unhealthy condition of the miners " to several causes . . . to the early age at which " miners commence working underground "—at that time it was 10—" to the severity of the labour which " they undergo, especially in deep mines, where ladders " are the only means of access; to working in a heated " atmosphere or in places which are draughty or wet " from defective drainage; but more particularly to " the impurity of the air which the men have to " breathe when underground . . . exposure to " cold and damp at the surface, or in the shafts and " other parts of the mines, is the most frequent excit- " ing cause of disease among the miners, operating " with peculiar severity upon men in a state of perspi- " ration or exhausted from having worked in close " places, or ascended ladders from great depths." They made certain recommendations for the improvement of ventilation, and on other points.

107. I think you might outline those roughly to us. They were with regard to changing-houses, and mechanical means for raising and lowering the men?—The Commissioners recommended the provision of changing-houses—that was given effect to in the Act of 1872; and also the provision of mechanical means for raising and lowering the men when the mines were of great depth—that was not given effect to; and without formulating a definite recommendation as to the means, they insisted on the necessity of an adequate amount of ventilation in the mines.

108. The difficulty in carrying out improvements in recent years is to some extent to be attributed to the declining nature of the industry in a good many mines, I mean the want of money?—I should think that was an operating cause.

109. We have to look that in the face, I suppose?—Yes.

110. What is the next inquiry to which you wish to draw our attention?—No further inquiry took place with regard to any section of the industry till 1895, when Mr. Asquith appointed a Committee to inquire into the conditions of work in the Merionethshire slate mines. I presume that Report* will be before the Commission. They made a number of recommendations, some of which required legislation, and have not yet been carried into effect. A considerable number could be given effect to by means of Special Rules, and a code of Special Rules was prepared and established for the Merionethshire slate mines in 1900.

111. Can you mention the principal one of those recommendations that strikes you that has not been carried out?—They strongly recommended that a certificated manager should be appointed for every mine. They recommended that the General Rule in the Coal Mines Act to which I referred just now, which requires roofs and sides to be made secure, should be applied to metalliferous mines; that the daily visit to every working place by a competent person should be made compulsory, the same as the rule in the Coal Mines Act. They recommended that interested magistrates should not be allowed to adjudicate upon cases under the Act, that is, similar to the provision in the Coal Mines Act; and an amendment of the definition of non-fatal accidents, which has been carried into effect by the Notice of Accidents Act, 1906. There were general recommendations about technical instruction and other matters which did not fall within the jurisdiction of the Home Office.

112. So much for that Committee of Inquiry. Now will you tell us what has been done about ankylostomiasis?—An inquiry was held by Dr. Haldane into the outbreak at Dolcoath in 1902, and his report was published, and the recommendations in the report were given effect to by a Special Rule which was established at all Cornish mines in 1905.

113. What evidence have we got of the present condition of ankylostomiasis in the Cornish mines beyond the report of Dr. Haldane?—There have been subsequent inquiries by Dr. Haldane and Dr. Boycott.

(*Dr. Haldane.*) And the Mines Commission.

114. (*Chairman.*) You refer this Commission to the information obtained by that Commission?—They have dealt with it in their Second Report.

115. (*Chairman.*) We might leave that for the present at all events. Now as regards the inquiry into the health of Cornish miners in 1904?—In consequence of reports which reached the Home Office as to the prevalence of disease amongst the Cornish miners, the Home Secretary appointed Dr. Haldane, Mr. Thomas, and Mr. Martin, the Mines Inspector, to make inquiry into the subject. Inquiry was made and the Report was published. The Report recommended certain precautions. It found that the prevalence of disease was due chiefly to the inhalation of dust by persons engaged in rock drilling, and recommended that rules should be made for keeping down dust when rock drilling was going on. The recommendations were carried into effect by means of Special Rules which were established in 1905, and they have now been in force about four years. I propose later to give the Commission the general results but I will keep that back for the present. I ought to add that similar rules were established immediately afterwards for Ganister mines in Yorkshire. Those Ganister mines come under the Coal Mines Act. I understand that the Secretary of State desires that the Commission should inquire into the effect not only of the Cornish rules but also the rules for the Ganister mines.

116. (*Mr. Lewney.*) Would not the metalliferous mines of the Isle of Man come under the same rules?—No, there are no Special Rules on the subject there. That will be one of the points for the Commission.

117. (*Chairman.*) I suppose we may say here, without anticipating what is going to be said, that the question of dust or the danger of dust depends largely upon the character of the dust. It seems to me mysterious that some dust is dangerous and that other dusts can be breathed in large quantities with impunity?—It depends on the nature of the dust.

118. Therefore these rules have to take carefully into account the character of the dust?—Yes.

119. That I think ends all that has to be said on that head?—Yes, I have nothing more to say on that at present.

120. Now we will pass to the accident tables?—I have prepared a series of tables* one of which shows the number of accidents from each cause since 1872, and another the death rates from groups of causes since 1872. Those two tables apply to all metalliferous mines, and I have similar tables for the iron mines since 1895, for the slate mines in North Wales since 1873, and for the Cornish mines since 1873. I have tables showing the non-fatal accidents from each cause since 1895, that is non-fatal accidents reported to the inspector, which are the more serious non-fatal accidents. I have also a table showing for 1908 and 1909 the number of accidents which disabled for more than seven days. Those returns were

* C. 7692, 1895.

* Appendix A., Tables VI.–XII.

not required before 1908, because they were made compulsory for the first time by the Notice of Accidents Act, 1906.

121. I suppose we can have a table showing the relative danger of this industry as compared with some others, such as coal-mining. Perhaps you can give us some remarks on that point?—I can give a comparison of the death rates in the two classes of mines.

122. What you are going to read you will put in as a table?—I can put it in.*

123. With regard to fatal accidents, what remarks have you to make upon the general results shown by those tables?—As regards the actual number of deaths from accidents during the period since the Act of 1872, the figures show a very remarkable fall I might, perhaps, give the Commission the figures. I have had them worked out in averages for periods of 10 years.

124. That is in the form of a table which you put in†?—Yes. The results are as follows:—During the period from 1873 to 1879, that is, not a complete decade, the average number of deaths underground annually was 78; during the next decade, 1880 to 1889, the average annual number of deaths was 65. That is, a fall of 13. During the next decade, 1890 to 1899, the average number was 42, or a further fall of 13, and during the last decade, 1900 to 1909, it was 29·9 or just about 30.

125. What relation did that bear to the diminution of workmen employed, because the numbers were being diminished all that time in a ratio something like that?—The diminution in the figures of persons employed underground was about half.

126. (*Mr. Greaves.*) Have you those figures in terms of men employed?—No, these are the actual numbers.

127. You have not worked them out in terms of thousands employed?—I give the death rates in another table.*

128. (*Chairman.*) It shows a favourable result?—The accident rate has fallen more rapidly than the numbers employed. Taking individual causes of accidents, the most important is falls of ground, 30 in the first period, 27 in the second, 17 in the third, and 14 in the last decade.

129. That is not so favourable, only about half?—Just about half. Shaft accidents 24 in the first period, 16 in the second, 10 in the third, and six in the fourth. Miscellaneous underground accidents were 22 in the first period, 20 in the second, 14 in the third, and nine in the fourth.

130. Do you have accidents from explosives?—Yes. Those are included in the miscellaneous accidents underground. In the first period the number was 10, in the second the number was 8, in the third, 3·6, and in the fourth 3·4.

131. (*Mr. Ainsworth.*) An explosion I suppose means an explosion of a shot?—Yes, the use of explosives. In the whole period there have only been two years in which there was any accident from explosions of fire-damp.

132. Is there such a thing as fire-damp in metalliferous mines?—In one or two mines.

133. Probably adjoining coal?—No, there are one or two mines which have fire-damp.

134. (*Chairman.*) Now the non-fatal accidents?—One of the Commissioners asked me how the death rates showed. I will mention that. I have given the absolute figures.

135. It can be worked out and added to the table?—I have a table and will hand it in.

136. Non-fatal accidents, what statistics have we as to those?—Two sets of statistics. The figures of accidents reported to the inspector, which are the more serious accidents, and the accidents of which we now get returns under the Notice of Accidents Act, that is, accidents which disable for more than seven days. I hand in two tables of those accidents.‡ The first is accidents reported to the inspector, classified according to causation, but those figures are not worth much because the standard of reportability till 1906 was very vague, and different owners would interpret the requirements in different ways, the standard being that it must be a serious accident. Different people would entertain different views as to what was a serious accident. The Home Office never attributed very much importance to those returns of accidents reported to the inspector. For what they are worth I will hand in the table. As regards the figures of accidents which have disabled for more than seven days, of which I can give particulars for 1908 and 1909, the results are certainly rather interesting. In 1908 there were 1,407 persons disabled by accident for more than seven days in metalliferous mines. There were 29,927 persons employed, so that one in every 21 or 22 persons in 1908 met with an accident which disabled him for more than seven days. The figures for 1909 are similar. That compares very favourably indeed with the coal-mining industry. In 1909 in the coal-mining industry there were 153,000 persons injured by accidents which disabled them for more than seven days. The total number of persons employed in the coal-mining industry was a little over one million, so that in coal mines one in every six or seven persons employed was injured by an accident which disabled for more than seven days. In the metalliferous mines it was only one in 21 or 22, so that the metalliferous mines compare very favourably as regards non-fatal accidents with coal mines As regards fatal accidents there is not very much difference between coal mines and metalliferous mines. In 1909 the death rate in coal mines for both surface and underground was 1·43 per thousand persons. In metalliferous mines it was 1·41, so that it is almost the same.

137. (*Mr. Redmayne.*) The proportion of surface to underground is twice in the coal mines to the metalliferous mines?—If you take the underground rate the death rate per thousand persons underground in coal mines in 1909 is 1·61, in metalliferous mines 1·97. In metalliferous mines the numbers are so small that the death rates fluctuate very much from year to year. To give an accurate idea of the death rate you must take a series of years. For the series of years 1893–1902 the average death rate was 1·96, and for the last seven years the death rates underground have been 1·20, 1·62, 2·49, 1·63, 1·45, 1·84, 1·97. They fluctuate very much. They are not so steady as in the case of coal mines.

138. (*Mr. Ainsworth.*) Have you any explanation why the accidents disabling people more than seven days should be much more frequent in coal mines than in metalliferous mines? It seems strange?—I am not prepared with an explanation.

139. (*Mr. Greaves.*) Have you any record of the length of disablement, comparatively?—I have not got any figures out. We have got records, and it is possible that we have them tabulated.*

140. (*Mr. Jones.*) What is the comparison between open and closed quarries?—I will come to that afterwards. It is very much the same.

141. (*Chairman.*) I suppose a good proportion of these seven-day accidents consist of wounds that fester. That is the common thing where you get a cut and the cut festers too badly for the man to handle the tool?—That often happens.

142. It is to be considered in regard to the question of danger. The seven-days period is due to the inflammation of the wound more than to the character of the injury?—A very great number of the seven-day accidents are quite small accidents.

143. The original thing was a cut, but it has developed into a fester, which alters the character?—Frequently the seven days was due simply to the cut, especially in the slate mines of Wales. In those mines cuts are very frequent indeed, and a great proportion of the seven-day accidents there are cuts.

144. Where the wound has festered?—It may not have festered, but is an ordinary cut—a severe cut.

145. Is any conclusion to be drawn from this. Are there more men who are in the benefit societies in coal mines than in the slate mines? I mean a man who is thoroughly protected by a benefit society as well as the Workmen's Compensation Act might lay

* Appendix A., Table I.
† Appendix A., Table VI.
‡ Appendix A., Tables XI. and XII.

* Appendix A., Table XIII.

up rather more than a man who was not. Can it be said that metalliferous miners do not lay up on occasions when they might, for fear of losing their pay?—That may be an explanation. A large number of coal miners are in miners' relief funds, but I do not know if that is so in the case of metalliferous miners.

146. That concludes all you have to say on the heading of accidents?—No, there are one or two points I should like to call attention to. This table which I have prepared classifies the accidents according to cause.* If I may briefly give the chief points in the table to the Commission, I should like to. The chief cause of accident, of course, in metalliferous mines, as in coal mines, is falls of ground. Falls account for nearly 50 per cent. of the accidents underground during the last decade.

147. That is the same figure as coal mines?—Very much the same. Among shaft accidents the most numerous are those of men falling down, and the figure seems to have some significance in connection with the mode in which metalliferous mines are usually entered, I mean by ladders and in other ways, and not by mechanical means as in coal mines. Among other underground accidents the use of explosives is the most serious cause. I have given the figure for that. Then as to irruptions of water, at one time there was a certain number of accidents due to that cause, and in 1893 there was one very bad accident which caused the loss of 20 lives, but there have been no accidents from that cause for 13 years. Again haulage is not a serious source of danger in metalliferous mines as it is in coal mines. The average has all through been very small indeed. For instance, I have them here classified into three causes. There are no accidents due to the breaking of ropes or chains. The averages, during four periods, of accidents caused by persons being run over or crushed by trams or tubs are ·6, ·4, ·2, ·7, and the other haulage accidents are ·3, ·5, ·6, ·3. It is a very small matter compared with other causes.

148. (*Mr. Greaves.*) How do you classify haulage and winding? Where a mine is approached by an incline is that haulage or is that a shaft?—It would depend upon the angle of inclination. If it was almost level I think that would be haulage; if an angle of 45 they would probably classify it as a shaft, but there is no hard and fast line laid down by the Act. Then electricity accounts for no accidents at all, either below or above ground. We have only heard of one or two cases in which the use of electricity has been introduced. Among the surface accidents the use of machinery and the movement of wagons and locomotives on sidings are the chief causes of accident. I think those are the chief points to be noted on that table.

149. What have you got to say with regard to the health question?—I have referred to the Report on the Health of the Cornish Miners.

150. You mean Mr. Martin's Report?—The Report of Dr. Haldane, Mr. Thomas, and Mr. Martin. As regards other classes of metalliferous mines, I may perhaps refer the Commission to the recent Report by Dr. Tatham, which has been issued by the Registrar-General's Office as a supplement to the Registrar-General's reports, in which he takes the different classes of metalliferous mining and discusses their liability to disease. In the case of lead miners he says, "They "appear to suffer inordinately from phthisis and "respiratory diseases." I should perhaps call your attention to a paper which Sir Thomas Oliver read a little while ago on the subject of the incidence of disease among lead miners. The Home Office's attention was called to it at the time, and I think the Secretary of State desired that this should be brought to the notice of the Commission. I will hand it in to the Secretary for the information of the Commission.

151. (*Mr. Lewney.*) Could you give any figures relative to the death rate, say, 40 years ago compared with what it is to-day or in recent years?—Do you mean from disease.

152. Before the introduction of the rock drill and the present class of explosives from that particular disease?—The information will be probably in these reports of the Registrar-General. They go back for a long period of years, and comparative figures could be got out.

(*Dr. Haldane.*) There are some figures in the Cornish mines report. They are given for 50 years back. We do not give the figures for the lead mines.

153. (*Mr. Lewney.*) The same thing applies to the lead mines?—I think the information is available. They are not Home Office figures, they are the Registrar-General's figures, based on the Census figures. The Home Office gets no general returns of disease amongst miners. We are collecting a few special returns in the case of Cornish miners. As regards ironstone miners, the death rate from lung disease is comparatively low; the mortality figure, taking 100 as the normal figure for occupied males generally, in the case of tin miners is 419; in the case of lead miners 155; in the case of coal miners 111; in the case of ironstone miners only 79. It is very much below the average even of occupied males generally throughout the country.

154. (*Mr. Greaves.*) Have you the figure for the slate mines?—Figures are not given for the slate mines.

155. (*Mr. Lewney.*) My question related more particularly to lead mines. I admit the iron mines are the most healthy of the lot?—I think we can get the information. It is right to say that in recent years the number of persons employed in lead mines is so small that the figures have to be used with caution. This is the last decennial supplement.

156–7. (*Dr. Haldane.*) Those are the comparative mortality figures you are quoting. These are based on the mortality within a certain age. I think they are between the ages of 20 and 40 or 50?—No, from 25 to 65.

158–60. (*Dr. Haldane.*) These comparative mortality figures are a little bit misleading, because he does not count the mortality after a certain age, and from all these dust diseases the worst of it comes towards the end. The older a man gets the worse the effects become?—They give the general indication. They show that there is an excess of incidence among lead and tin miners.

161. (*Chairman.*) I think that ends what you have to say about the health business?—I have no more general remarks to make, but there are certain things which I will suggest later on.

162. The Royal Commission on Mines has dealt with the following subjects: Special Rules, ankylostomiasis, the administration of the Act and discipline in mines, the investigation of accidents, the use of explosives, and surveying and plans?—Yes, and very largely the recommendations of the Royal Commission in regard to coal mines would apply to metalliferous mines.

163. Now will you go through any points that occur to you as desirable for the Commission to consider?—The Home Office has had for a number of years certain questions in relation to the amendment of the Metalliferous Mines Act under consideration, and I think perhaps it would be useful if I put before the Commission the points which the Home Office has considered, and suggest that they should engage the Commission's attention in their inquiry. I have them in no special order. The first point is the exemption which metalliferous mines employing 12 persons only or less are entitled to under the Act. For example, section 12 of the Metalliferous Mines Act, which requires notice of opening of mines and notice of abandonment of a mine to be given to the mines inspector, does not apply to any mine in which 12 persons or less are ordinarily employed below the ground. It seems very important that the inspector should have notice of every mine which is opened or abandoned, whatever the number employed.

164. That would be so in coal mines?—Yes.

165. There is no such limitation?—No. Then, Section 14, which requires plans of abandoned mines to be sent to the Home Office, does not apply in the case of mines employing 12 persons or less below ground. It seems important that the Home Office should have plans of all abandoned mines. Section 19, which requires plans to be kept of the mine while at work, a provision which

* Appendix A., Table VI.

in the case of coal mines applies to all the mines, also does not apply to mines employing 12 persons or less below ground, and the same with section 23, paragraph 16.

166. By section 14, I may observe, where less than 12 men are employed in a mine, you need not send any abandoned plans, even though the mine may be enormously extensive. They may be digging out a corner, although the mine is very big, and yet they are able to abandon it?—It would depend on whether more than 12 persons had *ordinarily* been employed belowground in the mine or not.

167. Abandoned mine questions are required for the benefit really of everybody who is working in the future?—There is always a danger of water accumulating in an abandoned mine, and an irruption occurring through a hole being made into it from another mine. Paragraph 16, section 23, is a general regulation which requires the provision of dressing rooms, and that does not apply to these mines employing 12 or less, and the provision in the Act of 1875 with regard to the Annual Returns also does not apply. The Home Office suggest for the consideration of the Commission whether that exemption should be allowed to continue any longer. While I am on the question of plans I may call attention to the fact that the provisions, such as they are, in section 19, with regard to the keeping of plans of mines, are not so full as the corresponding provisions in the Coal Mines Act. No doubt the Commission will have before them the recommendations of the other Royal Commission in regard to keeping plans of mines. I might refer again to the accident which happened in a Cornish mine in 1897, when 20 lives were lost through an irruption of water. It was found that the working plan was inaccurate through no allowance having been made for changes in the magnetic meridian, and that points to the necessity of plans being made by competent persons. Another matter of importance which the Home Office would suggest for the consideration of the Commission is the question of ventilation. I have referred to the Report of the Royal Commission of 1864, which called attention to the unsatisfactory state of the ventilation in metalliferous mines at that time, and to the provision on the subject which is made in the Act of 1872. No further provision has been made since that time in regard to metalliferous mines. The Report of the Merionethshire Committee did not draw attention to the subject so far as the slate mines were concerned. They apparently found nothing unsatisfactory in connection with ventilation, but the Report of the Committee on the health of the Cornish miners by Dr. Haldane made some remarks on the subjects. Perhaps I might read to the Commission, for the purpose of getting it on the notes, the conclusions which that Committee came to on pages 9, 10, and 30 of their Report. They reported that so far as regards Cornish mines the natural ventilation on which those mines relied was capable of producing adequate general ventilation, at any rate in deep mines, if proper means were taken to enable the air to circulate. They thought generally the distribution in the mines was fairly good except in ends and rises, where there was no through current unless artificially induced. Then, on page 30, they make their recommendations, which perhaps I might quote. In the first place they say: "We think it of great importance to endeavour "to obtain all the good effect of ventilation in carrying "off dust and other impurities without at the same "time drying up the workings, and so favouring the "formation of dust. With this object in view it seems "desirable, as far as possible, to so arrange the venti- "lation that a plentiful supply of fresh air is carried "straight to the bottom levels, where it becomes "warmed and saturated with moisture, and afterwards "rises upwards through the workings without taking "up much, if any, further moisture. To secure this "object the downcast shaft or shafts must be isolated "from the workings, and doors or curtains provided at "the levels where necessary. Arrangements should also "be made, in connection with winzes, &c., for distribut- "ing the air where it is most needed to keep down the "temperature and carry off dust from blasting, &c., "without exposing men working higher up to dusty air. "In any particular mine it may be quite impossible to "arrange for an ideal system of ventilation; but as a "rule a great deal may be done by keeping in mind the "main objects and principles of ventilation, and par- "ticularly the desirability of so utilising it as to reduce "to a minimum the temperature and the inhalation of "dust by the men. Other impurities than dust are, "as shown in Appendix III., of comparatively trifling "importance, except in confined spaces. It is, however, "of great importance from the economic standpoint to "keep the temperature of the workings from rising to an "uncomfortable extent. A man cannot, and in any case "will not, do a full day's work in air which is both very "warm and very moist; and, where possible, the temper- "atures above 75° or 80° Fahrenheit should not be "exceeded."* Those recommendations refer only to Cornish mines. The question of ventilation has been carried one stage further in the Second Report of the other Royal Commission, where they dealt with the standard of ventilation which is necessary for keeping the air free from black damp. I may just briefly refer to their remarks on pages 75 and 76 of the Second Report,† in which they make a recommendation as to the standard of purity to be maintained. That recommendation appears to be applicable as much to metalliferous mines as to coal mines, and the question of giving effect to that will have to be considered. Generally the Home Office would suggest to the Commission to investigate further the subject in regard to the present conditions both in Cornish mines, and in the other classes of metalliferous mines which have not been covered by recent inquiries. I should perhaps say here that when making Special Rules for Cornish mines to carry out the recommendations of Dr. Haldane's report, no provision was made, or could be made, as regards the general ventilation, and the only provision as regards ventilation that was made was a requirement to rid the air of the dust and the smoke caused by blasting. That ends what I have to say as to ventilation. Another point to which the attention of the Home Office has been called from time to time by the inspectors is the question of the mode in which the men enter and leave the mine. The Royal Commission of 1864 called attention to that, and were under the impression that the climbing of ladders was one of the causes of the pulmonary disease from which the men suffered, but that is negatived by the later inquiry of Dr. Haldane to which I have referred. However, provision is made by General Rule 15 in the Metalliferous Mines Act, 1872, that ladders should never be placed either in an overhanging or in a vertical position, and the inspectors have called attention to the fact that ladders, although not actually vertical, were so near to the vertical, being only one degree or two out, that the effect on the men must be practically the same. They have suggested that the rule should be amended so as to prevent cases of that sort. Perhaps I might just repeat to the Commission what they have told us. Writing in 1885, Dr. Foster, who was afterwards Sir Clement Foster, said he could give numerous instances of mines where the ladders were fixed at an angle of 88 or 87 degrees, or only two or three degrees from the vertical. He mentions the fact that in Belgium, for many years past an angle of 10 degrees from the vertical has been made compulsory, and suggested some similar provision should be inserted in the Metalliferous Mines Act. He also suggested that the intervals between the platforms on the ladders should be reduced from 20 to 10 yards. Generally the inspectors were in favour of the provision of mechanical means of raising and lowering the men. That is one of the subjects which the Home Office would suggest for the consideration of the Commission.

168. At all events in mines opened in future, but the question naturally arises in regard to mines existing?—Of course it is a difficult question. Dr. Haldane says in his report that a very great improvement has taken place in Cornish mines, and frequently the men are taken into the mines by mechanical means.

* Cd. 2091, 1904.
† Cd. 4820, 1909.

169. There are differences between ladders, and some are better than others?—Yes. I have called attention to the number of accidents caused by men falling down the shafts, and that suggests that the matter requires consideration. What I have said refers to Cornish mines. In the Merionethshire Slate Mines Inquiry the Committee said that the mines were not deep enough to require mechanical means for the raising and lowering of the men. The next point of importance is the absence of any provisions in the Metalliferous Mines Act similar to those in the Coal Mines Act, which require daily inspection before the men begin work, and which require the roof and sides of the mine to be made secure. The want of those provisions has been repeatedly noticed by the Inspectors. In metalliferous mines it is not possible to examine the roof daily in the same way as the workings of a coal mine can be examined, owing to the height, and the Report of the Merionethshire Committee suggested that the rules should be modified to the extent that the roof in such cases should be examined only at considerable intervals. I might give the Committee the rule which has been made for the Merionethshire mines: "The sides and roof of each working chamber " shall be minutely inspected at intervals not exceeding " six months with the aid of electric light or some other " powerful illuminant." Then there is the question of requiring bore-holes to be kept in advance when approaching accumulations of water. The accidents of the past seem to make that desirable in metalliferous mines as in coal mines.

170. (*Mr. Greaves.*) You said that there had been no accidents of late years?—Not for 13 years. Then there is the question of the provision of double shafts. The Coal Mines Act requires that every coal mine shall be provided with two shafts, but there is no such provision in the case of metalliferous mines, and it is a point which the Home Office mentions for the consideration of the Commission. Of course the circumstances are different. There is not the same danger of shafts being blocked by explosion, and in many cases where the shafts are driven through rock there is not the danger of the shaft falling in. We can point to no accident, or rather no deaths, which have occurred through a mine being blocked in this way.

171. (*Mr. Lewney.*) Do they make this recommendation for ventilation purposes or as a means of escape?—We do not make any recommendation. We put the matter for the consideration of the Commission.

172. What is the purpose of the suggestion?—The question whether it ought to be done depends on the consideration of those things, whether it is necessary for ventilation or for preventing the mine being blocked, and so on. It seems no general requirement can be made in the case of metalliferous mines. If it is made it must depend on the particular circumstances. That is a matter the Home Office wish to have the advice of the Commission upon. Then there is the important question of the appointment of certificated managers. I think I may, without reading it, put in the evidence I gave before the other Royal Commission on the subject,* which explains what the arguments are in favour of establishing a system of certification for managers in metalliferous mines. The points which require consideration, if it is thought desirable to establish such a system, are whether there should be one form of certificate for all classes of metalliferous mines, and whether the certificate should be given after examination by or on behalf of the Home Office. There are very few mines comparatively speaking, just over 100, in which more than 30 persons are employed, so that if the Commission decided to adopt the same limit as exists in the case of coal mines it would be a very small matter indeed.

173. (*Chairman.*) I suppose there are not so many small coal mines proportionately as small metalliferous mines?—Very far from it.

174. The appointment of a full certificated manager for a mine with four people in it might be a difficult matter?—Yes.

175. You might still have some form of qualification for the man who was in charge short of a full manager's certificate in a small mine?—That is so.

176. It need not be a difficult examination, but it might be something?—Whether the Commission come to the conclusion in favour of certification or not, the Home Office suggest that a responsible manager requires to be appointed in every case.

177. That is what I meant?—Then there is the question of the use of explosives. The existing provisions in the Act are quite inadequate, and have had to be supplemented by Special Rules. It seems desirable that the existing provisions of the Act should be amended, and further provision made as regards such matters as unramming, miss-fire shots, and so on. One point I want to call special attention to is the number of accidents which occur through the use of frozen explosives of the nitro-glycerine class. That is a greater danger in the case of metalliferous mines and quarries than in coal mines, inasmuch as metalliferous mines and quarries are often situated in high and exposed situations where the explosives are more likely to become frozen than in coal mines. The Home Office has taken some notice of the matter by issuing a circular to all owners of metalliferous mines and quarries, enclosing a notice to post up at the mine or quarry that all explosives of that class must be properly thawed before use during the winter months and at any other times if the cartridges are not in a soft or pasty condition, but these accidents still occur, and it seems desirable that some further provision should be made.

178. (*Mr. Lewney.*) Are these accidents as numerous as they were ten years ago?—I cannot say offhand, but they are continually coming to our notice. I do not say that the numbers are large, because the number of men employed is small, but there is a steady stream of them.

179. (*Mr. Greaves.*) From frozen explosives?—Yes.

180. (*Chairman.*) Does anything arise with regard to the storage of explosives? The men buy their own explosives?—The question does not arise so much in metalliferous mines.

181. Still they buy their own explosives anywhere?—I cannot say.

182. (*Mr. Ainsworth.*) I think it is the case, as a rule, that the explosives are supplied by the employers, and are charged to the men?—I do not know the practice in metalliferous mines. It is frequently the case in coal mines.

183. It is the safest way because you have the best stuff?—We are strongly in favour of it.

(*Mr. Greaves.*) In the vast majority of cases it is the rule, I think, that the proprietor supplies the explosive.

(*Chairman.*) One point is that we can trace them if there is an explosion owing to a bad explosive, and see that the explosive manufacturer supplies the proper material. If you do not know where it is bought it is difficult.

184. (*Mr. Greaves.*) That is the object of the employers in doing it?—Then there is the very important question of dust and miners' phthisis. The Home Office would be glad if the Commission would investigate the working and effect of the Special Rules in the Cornish mines and also in the ganister mines of Yorkshire where similar Special Rules have been established. Perhaps I might put before the Commission the results in the Cornish mines, so far as we know them. Since the Special Rules were made in 1905 we have obtained from the registrars in Cornwall the particulars of the death of every miner, and those particulars have been classified in tables which appear annually in the report of the inspector for the district. I have the figures up to the present year, which I will read out. The total deaths among miners from lung disease and other causes are as follows. The average for the year 1900 to 1902 was 77 deaths from lung disease and 28 from all other causes, a total of 105. In 1907 there were 82 deaths from lung disease, and 36 deaths from all other causes, a total of 118. In 1908 there were 73 deaths from lung disease, and 39 from all other causes, making a total of 111. In 1909 there

* See Minutes of Evidence taken before the Royal Commission on Mines, Vol. I. (Cd. 3549-1907), Question 245.

were 71 deaths from lung disease, and 29 from all other causes, making a total of 100.

185. (*Mr. Greaves.*) Are these the people in the mines?—Miners.

186. Can you show how they compare with a similar class of men not working in a mine; say out-door work?—I have not the figures for the last three years, but you will find that comparison made in Dr. Haldane's report. Then as regards the number of deaths among the men engaged in rock-drilling work, which is the dangerous occupation against which the Special Rules are directed, the number of deaths was as follows:—The average for the years 1900 to 1902 was 44·7; for 1907 the number was 48; in 1908, 31; and in 1909, 30; so that the deaths do show a considerable decrease.

187. Underground men only, or does it include the men in the open?—Underground men employed in rock drilling.

188. (*Mr. Lewney.*) What was the first year of the Special Rules?—The Special Rules were made in 1905.

189. Since then there has been a declining death rate?—A marked falling off in the number.

190. (*Chairman.*) I suppose that is complicated by the further question that some years ago there was a considerable addition to the men by those who had been working in the Transvaal who may have had that disease already?—Yes. I have a table* which distinguishes the cases, where the men have been employed in Cornwall only, in Cornwall and Transvaal, in Cornwall and elsewhere abroad, in the Transvaal only, in the Transvaal and elsewhere abroad, and elsewhere abroad. The figures show that among men employed in Cornwall only 12 men died from lung disease in 1909, and of those three had only worked since the regulations had come into force. One was an old man who had worked only at rock drills for six months, and whose death could hardly be attributed to this work. Of the other two, one had been discharged from the Navy on account of ill-health and had afterwards returned to mining, and the other had worked for some years in the Transvaal as well as in Cornwall, and may have inhaled much dust previous to his employment on rock drill work in Cornwall.

191. They were the figures of phthisis in the Cornish country generally?—We would suggest that the Commission should consider not only the working of the existing rules, but also in what classes of other metalliferous mines, if any, similar rules are required.

192. These rules only apply to that set of Cornish mines?—Yes, and similar rules to ganister mines. Among the minor points, I have mentioned the hours of employment of women and young persons above ground. If the application of the Factory Act to pit banks is repealed some provision will have to be inserted to take its place. Then there is the question of sanitary accommodation. That has been dealt with by the other Royal Commission in their Second Report, and I think perhaps I need not refer to that any further. Then lastly there is the question of the fencing of shafts of abandoned mines. That is at present a duty placed partly on the inspectors of mines and partly on the local authority. It is a duty which sometimes gives a good deal of trouble to the inspectors, and is somewhat alien to their proper work of inspection. We suggest for consideration whether that is not a duty which should be placed wholly on the local authorities of the district in which the mine is situated.

193. (*Mr. Lewney.*) Do you suggest that the control of sanitary accommodation should be transferred to the local authority?—The sanitary accommodation below ground I was referring to. That remains under the mines inspector.

194. What about on the surface?—At present the Factory Act applies to pit banks, and requires sanitary accommodation to be provided on the surface, but where the local authority have adopted section 22 of the Public Health Act, 1890, they are the authority for seeing that sanitary accommodation is provided. We have not any special views on the point. That is all I have to say.

195. (*Chairman.*) That is all on the metalliferous questions. Now will you go on and deal with the quarries? Will you please outline for us the views you wish to present with regard to quarries?—Yes. The history of the question of the regulation of work in quarries really began in 1894, when the Quarries Act was passed. That Act followed on the Report* of the Departmental Committee called the Open Quarries Committee. Before that date quarries were only regulated by the Factory Act, and they came under the Factory Act as factories or workshops, factories if power was used in aid of the process of quarrying, and workshops if no power was used, or only used for hauling or pumping; but quarries in which no power was used (or only for haulage or pumping) and only adult males were employed, which constitute, of course, a very large proportion of the cases were practically exempt from the Act altogether. There are no complete statistics available before 1894, but a few will be found in the Appendix to the Report of the Open Quarries Committee.

196. They would have been workshops where no power was used?—If no power was used and only adult males employed they would be men's workshops.

197. Practically exempt from that Act?—Yes. Men's workshops are more under the Act now than they used to be. Then came the Act of 1894. There are two points which require to be noticed on that Act. The first is that it only deals with quarries over 20 feet in depth, and the second is that it applies to quarries certain provisions of the Metalliferous Mines Act, of which the most important are those relating to the reporting of accidents, the framing of Special Rules, making annual returns, inquests, and so on, but it left the application of the Factory and Workshop Acts untouched except as regards the accident provisions of those Acts, which were no longer to apply. So that the situation at the present time is this. Quarries over 20 feet deep are subject both to the Quarries Act of 1894 and to the Factory and Workshop Act, 1901, excepting only the provisions as to accidents, and they are under the inspection of the mines inspectors. Then, secondly, quarries 20 feet deep only or less are subject to the Factory and Workshop Act only, and are under the inspection of the factory inspectors. Perhaps I may add that the Home Office is advised that the Act of 1894 only applies to the actual pit or hole or excavation where the mineral is being got, including all work in connection with getting, loading, conveying, and preparing the mineral inside the actual pit. Works outside the pit in connection with dressing or preparing would not be under the Quarries Act, but would be under the Factory Act. The mines inspectors have been given the powers of factory inspectors to inspect such works.

198. Under the Coal Mines Act the word "mine" would have a wider signification?—Yes. The Home Office has found in administration that the application of the two sets of Acts is very confusing. The fact that the inspectors have to enforce two sets of Acts, and that the occupiers and workmen have to observe two sets of Acts, hampers administration on the part of the inspectors, and makes observance of the law difficult on the part of the workmen and the owners. The inspectors have long recommended that all the legislation relating to quarries should be contained in a single Act. Then as regards the limit of 20 feet, on which the application of the Quarries Act turns, it appears to be rather anomalous, and also it has been found by experience a source of difficulty. It was impossible at the time the Act was passed to have placed the inspection of all quarries on the inspectors at once. They would have been swamped, and some arbitrary line had to be drawn, but the 20 feet limit does not work satisfactorily. It brings in many places of no particular importance, and excludes many which are important, both from the point of view of danger

* *See* Reports of Joseph S. Martin, I.S.O., H.M. Inspector of Mines for the Southern District for the year 1909, p. 38, [Cd. 5177X], 1910.

* C. 7237, 1894.

and production. I will hand in a table* which shows the output of certain important classes of minerals from open workings which do not come under the Quarries Act on account of their not reaching the 20 feet limit.

199. If the mineral was not for the purpose of sale they would not be a factory?—Those places would be factories.

200. They would not be under the Factory Act if the mineral was not sold?—I think so.

201. They are under absolutely?—Yes, and the Special Rules which are established under the Quarries Act do not apply to them. The Home Office does hear from time to time of fatal accidents occurring in these shallower quarries. Apart from that, great difficulty was experienced in determining how the 20 feet limit was to be calculated. So many difficulties arose that the Home Office had to consult the Law Officers on the subject, and a rough-and-ready rule was drawn up which has served fairly well, but the difficulty does remain that there are so many border line cases in which it is difficult to say whether the Quarries Act does apply or not.

202. (*Mr. Redmayne.*) A quarry may be 19 feet at the beginning and 21 feet at the end?—Yes, but that would be under the Act.

203. (*Mr. Lovett.*) In the case of a quarry 300 or 400 feet in length, less than 20 feet deep, that would come under the Factory Act?—Yes.

204. Suppose the same company are about to open a quarry about 35 yards away, 30 feet deep. In one case they might employ 100 men on a face less than 20 feet. In the other case they might employ 15 on a face 30 feet deep. They would be coming under the Quarry Act and the Factory Act?—If they were connected we should hold that they were the same quarry.

205. I have in mind a place in Northumberland which is in point?—I can tell you the line the Home Office has taken in cases of that sort. This is the instruction we have given to the mines inspectors: "Where there are "several excavations belonging to the same owner and "forming substantially one quarry they should be "treated for the purposes of the Act as one quarry, "and if any of the excavations is more than 20 feet "deep the Act will apply to all of them."

206. (*Mr. Greaves.*) In the case of a quarry 15 feet one end of the face and 25 feet at the other end, it would all come under the same Act?—Yes. The Home Office would put before the Commission for its consideration some suggestions as to the way in which these difficulties might be met. It seems important that the administration should be simplified, and that the legislation for quarries should be contained in a single Act, and that the difficulty of the 20 feet limit should be got over.

207. (*Chairman.*) Have you any suggestion about what can be done to exclude a quarry that was 2 feet deep at the bottom of your garden, and consisted of where the gardener went to get some gravel, which technically might be a quarry?—I think it is difficult to lay down any form of words which will bring in all the quarries you want to bring in and exclude those you do not want to. I think the Home Office view would be that you should bring in nominally all quarries; abolish the 20 feet limit as being on the whole the simplest course, but it is obvious you could not require the exhibition of the abstract in the case of a small quarry in a man's garden.

(*Mr. Ainsworth.*) What about the parish quarry?

208. (*Chairman.*) We shall have to devote our attention to that. Perhaps if we arrive at some conclusions we can have your criticism upon them?—The Home Office suggestion would be that the question whether the abstract should be exhibited or not should be left to the discretion of the inspector.

209. You would have to give regular orders, rightly or wrongly, so that a man would know what to do?—You would say the abstract need not be exhibited except when the inspector requires it.

210. (*Mr. Redmayne.*) Giving the number of persons?—I will come to that. You will find that quarries are in very much the same position as metalliferous mines. The vast majority of the quarries employ very few persons indeed. The suggestions we put before the Commission are, first, that the 20 feet limit should be abolished. We recognise that it will bring nominally under the Act a very large number of places of no importance, which ought not to be allowed to occupy the inspector's time, but practically, we think that difficulty might be got over by saying that the inspector must have the discretion whether or not to require in any particular case the provision about the abstract to be complied with, for example. Secondly, we suggest that quarries should be excluded entirely from the Factory Act, except in the case of brick works—it does not seem necessary to bring a brick-field under the Quarries Act—and possibly the china-clay works. We also suggest that the definition of "quarry" should be extended to include works outside the pit, where the mineral is being dressed or prepared for sale, but leaving works in which any article is being manufactured to the ordinary operation of the Factory Act.

211. (*Mr. Jones.*) Does that mean bring the quarries under the same rules as the metalliferous mines?—Practically. I do not know whether I have made the point clear, that the works outside the pit in which the operation is merely that of dressing or preparing the mineral should be part of the quarry, and regulated by the Quarries Act. Works outside in which an article is being manufactured, bricks, tiles, cement, &c., should be treated as factories or workshops, and be regulated by the factory inspectors acting under the Factory Act.

212. (*Mr. Greaves.*) I think it will be necessary to define what is manufacture and what is preparation I understand those are the words you use?—There may be some border line cases which the Secretary of State should have power to settle departmentally.

213–14. (*Chairman.*) You would have to leave power in cases of doubt for the Secretary of State to settle?—I think he should have such a power. There is a similar power in the Mines Act, where the Secretary of State has power to determine whether a mine falls under the Coal Mines Act or the Metalliferous Mines Act. We also suggest that as in a great number of quarries it is impossible to establish the Special Rules, on the ground that they are not applicable to the circumstances of the quarry, the work being small and unimportant, you should include in the Act a few General Rules to deal with the dangers common to all quarries, large or small; for example, danger from falls and explosions, and leave the more important places to be dealt with by Special Rules. Then we suggest that some provisions as to hours of employment, as in the case of metalliferous mines, will be necessary. Those are points on general administration, and do not touch safety or danger except indirectly. I do not know whether you would like me to refer to the difficulties which have arisen under the Act with regard to certain special classes of quarry. The question has come up under the Act of 1894 whether quarries which are worked by persons not having any exclusive right of working, but only working under a licence from the owner, come under the Quarries Act, or rather whether the observance of the Quarries Act can be enforced against the person working with such a licence. The High Court has held that a man who works a quarry under a licence from the owner, and has no exclusive right, is not subject to the Quarries Act. That has been rather a serious matter, because a man may work under a licence and carry on extensive operations, and yet be subject to none of the responsibilities of the Quarries Act.

215. (*Mr. Greaves.*) I do not understand what is meant by working under a licence?—A man obtains a licence or permission from the owner to get, say, chalk or stone or gravel from his land. The owner does not part with the occupation of the land, and does not give the man exclusive right of working that quarry against anybody else, but gives him a licence to get what mineral he wants. He may employ men and carry

* Appendix B., Table XIII.

on operations for years, but at any time the owner can allow anybody to work there too.

216. (*Chairman.*) There was a case where the local authority some years ago employed wholesale a quantity of men. They had not the exclusive right, but they were held not to be under the Act?—The case came up with the Newhaven Harbour Trustees.

217. They ought to have been liable if they were working in a dangerous manner, but they could not be called owners within the meaning of the Act, as they were not exclusive licensees. Some authority, a magistrate, or the Secretary of State, ought to have power to say whether, with regard to some particular person, he ought to be treated as the owner. Suppose you have a quarry worked by a lot of different people where they go to get gravel, who are we to consider the owner?—The Home Office is advised that the owner of the soil is responsible in those cases, but he has no practical control over the workmen of the licensee.

218. Nor can he dismiss any of them?—It is difficult for him to exercise control.

219–20. It may be somebody living away, or it may be an infant for whom the quarry is kept in trust?—He does not dismiss the workmen. It is the direct employer who is the person who has effective control. The owner of the soil can make it a term of the contract that the regulations of the Quarries Act shall be observed.

221. (*Chairman.*) That would not enable the State to punish him, the mere fact that the employer had made a contract with the contractors to observe the Act?—You cannot punish the contractor, but you can proceed against the owner of the soil if the Act is not observed.

222. The owner is in prison. He goes for damages against the contractor?—We have never tried it. I do not know what the result would be. Then there are the cases where quarries are worked by local authorities for the purpose of getting road material. There are a vast number scattered over the country, and the local authorities have certain rights under the Highways Act. Under section 51 of the Highways Act of 1835, local road authorities responsible for the maintenance of the roads are entitled to take stones from waste land and common lands and other lands of that class. The Secretary of State is advised in such cases that if the local authority is the only person working the particular quarry, they can be held to be responsible. There is a second class of case where the road authority is enabled to get stone, under a licence granted by justices, from private lands. If they cannot get enough material from waste lands or common lands they are entitled to ask the justices for a licence to get stone from private lands. In this case the Home Office is advised that they are not owners, that they have no exclusive right of working on those private lands. On the other hand it is impossible to make the owner of the land, who is perhaps an unwilling party to the proceeding, responsible for the observance of the Act. It seems clear that the road authority ought to be responsible, but legislation is wanted to give effect to that.

223. Ought not the Secretary of State to have powers, after making proper and due inquiry, to decide who and to what extent any person must be treated as the owner and employed for the purpose of carrying out the Act. Is there any other way of meeting all conceivable cases but to appoint some authority to say, having regard to the complication of the contractual relations with regard to these things?—I think it would be rather a difficult duty for the Home Office to undertake.

224. Supposing you have a regular inquiry and somebody to decide it. A lawyer would have no difficulty in case of dispute in saying: "I consider that "so-and-so must be treated as the owner for that "purpose, and so-and-so for another purpose." Is there any other way of doing it?—As a general rule I should have thought the people who are working the quarry and employing the men should be the responsible party.

225. Supposing half a dozen are getting stone from a quarry, who is to put up an abstract?—In those cases you may require to have a division of duties.

226. That is the point that occurs to me. At all events we will think of the question?—Then there is a third class of case, the parish quarries, of which there are a very large number. They are quarries where any parishioner or the owners of certain lands in a parish are entitled to dig any mineral they may require. In some cases this is done under very old custom, and in other cases under some allotment or inclosure award. In some of those cases we have been successful in inducing the persons entitled to that right to accept responsibility. If it is not delaying the Commission, I can give one or two instances. Under a Common Act, at a place called Castle Sowerby, in Yorkshire, an award set apart certain parcels of land as common limestone and free stone quarries for the use of owners of land within the manor, the landowners to elect landgraves and the landgraves to have power to make orders and rules and regulations concerning the working of the quarries. It is a very old Act of 7 George III. The question was raised who was responsible. They were important quarries, and the Home Office decided to treat all the landowners as jointly and severally responsible and the landgraves as agents of the quarry. No practical difficulty as a matter of fact arose, but if it had been a question of incurring expense in order to carry out the requirements of the Quarries Act the landgraves had no power to raise money, and would have been unable to incur any expenditure that might have been required. That is a practical difficulty in all these cases. Then under the Great Torrington Commons Act, 1889, there was a common vested in conservators but subject to certain rights of quarrying stone at the will of those entitled. The conservators had no control over the quarrying and no money to pay the expenses of enforcement, if they had the power. In other cases where the land originally may have been vested in the overseers, or the churchwardens and overseers, the ownership would have passed to the parish council. How far the parish council have power to regulate the operations of the parishioners in getting stone is a very difficult question. There are other similar cases in which nobody appears to be the owner of the quarry. I cannot say that these cases are important, but they are anomalous. We cannot get returns from them, and if an accident were to happen or dangerous operations to be carried on there would be great difficulty in fixing the responsibility upon any one person.

227. Could not they be dealt with by a special rule? Could not you decide who should be responsible for such and such a quarry, and when it has been decided everybody who does not like it can appeal, and that ends the matter? After all, the Home Office must feel the difficulty?—I am afraid there are very many of these cases. It would be a large volume of work.

228. That suggestion would be feasible having a special rule applicable to any quarry or set of quarries. It would be perhaps specifying who was to do what, and everybody would have a right to be heard, and there could be an appeal?—You would have to investigate the conditions.

229. If they could agree the Home Office could make a special rule at once. I put that forward in order to hear your view?—I have not considered that. I mention these cases as difficulties that have come to the notice of the Home Office. I do not know that they are of great importance practically. They are anomalous, and if we had to take a case into court we should probably be in difficulties.

230. Will you give us some information as to the number and distribution of quarries?—In 1909 there were 7,132 quarries on the Home Office list, employing 53,064 inside—that is in the actual excavation—and 30,873 outside. I will hand in a comparative table,* showing the figures since 1894.

231. (*Mr. Greaves.*) When is a man included in the quarry? Take a man dressing stone in the quarry.

* Appendix B., Table I.

Although not an excavator would he be counted as a man working in the quarry?—Yes. All the men employed in the actual pit are counted as employed inside.

232. Take the side of a hill where there are only galleries, and one side is open, and the gallery is a few yards wide, a set quarry. Sets would be manufactured on the gallery close to the working face?—I cannot answer that off-hand.

233. That makes all the difference?—Yes. I think that they would be inside workers, but you will have the inspector before you. Perhaps you will ask him. I will hand in a comparative table,* which shows a gradual falling off in the numbers employed since the Quarries Act came into force. In 1895 there were 53,915 persons employed inside, which rose the following year to 56,000, and in 1898 to 62,752, but it has now fallen back again gradually to 53,064. In the first two years the returns were probably incomplete.

234. (*Chairman.*) I suppose that is due to the falling off of building operations in this country. The building trades have largely fallen off, have they not? There were town halls to be built after the Local Government Act was passed. I think there was a great quantity of them?—I think the use of other materials such as reinforced concrete for building has had something to do with it.

(*Mr. Lovell.*) And the introduction of machinery to crush it. Most of the macadam is crushed by machinery, whereas there used to be a lot of hand-breaking.

235. (*Mr. Greaves.*) And there is a large quantity of stuff brought in from Norway?—Norwegian granite?

236. And large quantities of Belgian come in, I know?—Yes. May I add two notes here? First, not all these persons are at work regularly. A very great number in the quarries only work intermittently, and the numbers employed are not the same indication of the extent and importance of the industry as they are in coal and metalliferous mines, where the work is much more regular. The second point is, that when we speak of a quarry one does not mean places where hard material only like stones and slate is got, but every kind of material, including fireclay and gravel, comes under the Act, and the figures I have given include places where such minerals are got. I have got out figures with regard to the size of quarries similar to those I gave for the metalliferous mines. The number of quarries employing only 10 or less inside is 6,115 out of a total of 7,132, and the number employing more than 10 persons inside is only 1,017. The former figure would be largely increased if you brought in quarries less than 20 feet deep. If you take the limit of 30 persons employed, the limit in the Coal Mines Act for the requirement of certificated managers, the number employing 30 only or less inside is 6,798, and the number employing more than 30 is 334. I hand in two tables,† showing the distribution of the quarry industry according to the counties and the numbers employed and the minerals worked. That is all I have to say on the question of distribution.

237. (*Chairman.*) Now will you tell us what the Home Office action has been in regard to quarries?—The Act of 1894 consisted very largely in a change of the system of inspection and the application of different machinery of administration. There were no provisions in the Act which directly bear on the question of safety, such as the general rules in the Coal and the Metalliferous Mines Acts. One of the first things the Home Office had to do when the Act was passed was to prepare a set of special rules for use in quarries. This was done, and a code was drawn up which has been very largely applied throughout the country with just a few variations in some of the districts. The number of quarries where the code is now in force is 3,794. So that practically almost all the important cases have been covered.

238. You will put in a copy of those?—That is in the volume of special rules‡ that has been handed to the members of the Commission. Then, as regards the inspection of quarries, this is undertaken by the staff appointed for the inspection of mines, and an increase of four inspectors was made in 1894. A considerable number of these 7,000 quarries are not visited annually. The standard of inspection for mines is at least one underground visit in the year in ordinary cases, but this standard is not reached in the case of quarries. It is obvious with 7,000 quarries that it is impossible for the present staff of inspectors to pay a visit every year to every quarry. There are twice as many quarries as mines, and not only is the number larger but they are more scattered; they are not concentrated in districts like coal mines. Another difficulty is that many of these quarries are only worked intermittently. I think it is clear from the nature of the work carried on that not so much inspection is required. The questions for the inspectors are fewer and simpler. The conditions of work in the majority of cases are simple, and the questions therefore arising for the inspectors are fewer and simpler. In a great many cases you will see from the figures that the numbers employed are very small.

239. There always is a visit in the case of an accident?—Yes.

240. An accident would not be left unvisited?—No, an accident would be investigated.

241. (*Mr. Greaves.*) I suppose a serious accident is meant by that?—No accidents except serious accidents are reported to the inspector. The seven-day accidents are only furnished to the Department in returns at the end of the year.

242. (*Chairman.*) I mean those unvisited quarries would be ones in which no serious accident had occurred?—Certainly.

243. (*Mr. Lovell.*) Is it not the case that some quarries are never visited until after a fatal accident has taken place?—I should not like to say that.

244. That is my experience?—Much has to be left to the discretion of the inspector. That is a question you should rather put to the inspectors. The inspectors are expected to devote as much time as possible to the inspection.

245. (*Chairman.*) The next heading is accidents?—I have prepared somewhat similar tables for quarries* to those I have handed in for metalliferous mines.

246. They show an improvement?—Yes, both absolutely and comparatively. The average of fatal accidents inside the quarry for the 10 years, 1895 to 1904, was 95, and in the five years since the number of fatal accidents inside quarries has been 85 in 1905, 85 in 1906, 75 in 1907, 76 in 1908, and 73 in 1909, so that there is a distinct if not a large falling off. Taking the death rates, which are more important still as a guide, the average for the first 10 years for inside accidents was 1·57. That is, the death rate per 1,000 persons employed. For the five following years it was 1·42, 1·46, 1·34, 1·39, 1·38. So that an improvement has manifested itself.

247. Your tables, I think, give separate rates?—I hand in a table which gives separate death rates for different kinds of mineral worked.†

248. Now as to causation of these accidents?—Falls of ground again are the chief cause. They account for nearly 50 per cent. of the total accidents.

249. The same as coal mines and metalliferous mines?—Yes. The average for the 10 years 1895 to 1904 was 44 accidents due to falls out of an average of 95. When I say accidents, I mean deaths from accidents. Last year, 1909, there were 32 due to falls out of a total of 73. The other important causes were blasting, men falling from ledges, movement of wagons; but accidents during descent or ascent, breakage of ropes and electricity, were quite unimportant. A rather interesting point is the heading of sundries, that is, accidents which do not fall under any large group. They are the next important cause to falls of ground. The average number of deaths from this cause from 1895 to 1909 was 14·6, and it rather suggests an insufficiency of proper supervision and discipline in quarries as compared with mines. They are a class of accidents which

* Appendix B., Table I.

† Appendix B., Tables III. and IV.

‡ Codes of Rules in force in Mines and Quarries in the United Kingdom, 1908.

* Appendix B., Tables V.–X.

† Appendix B., Table XI.

probably would largely depend on the way in which a quarry was managed, the control, and so forth.

250. You cannot expect in a quarry the same extreme training a man gets in a coal mine?—I think that is a very important consideration, that so much of this work is casual, and the men employed do not get the same training, and have not the same experience as a man who is regularly employed in a coal or metalliferous mine. Probably also they do not get the same trained supervision when a quarry is only casually or intermittently worked. The works, and the management, and everything else are much more liable to be improvised. There is not much difference in the death rates between quarries and coal mines. The death-rate for all inside workers was 1·38 last year for quarries, and in coal mines 1·43, so that in quarries it was rather less.

251. You have given us the non-fatal accidents?—That is the next heading. I give you the same figures of accidents which disabled for more than seven days* —as in the case of metalliferous mines. In 1909 there were 4,856 persons injured by such accidents, out of a total employed of 83,937. That means about one in every 17 to 18 persons injured to the extent of being disabled for his ordinary work for more than seven days. This is not such a good figure as the figure for metalliferous mines, but favourable when compared with the figure for coal mines.

252. I think there have been some individual cases to which our attention ought to be called in which the rate was higher?—In some of the slate quarries of North Wales the attention of the Secretary of State has been called to the higher rate, especially at Dinorwic and the Penrhyn quarries. I am instructed to say that the Secretary of State caused inquiry to be made by Mr. Hall, the inspector in charge of the district, into the subject, and he has reported on the subject, and I presume the Commission would wish to call him to hear his conclusions, and any suggestions that he has to make.

253. Now as to the general health of the quarriers. That exhausts what you have to say on the heading of accidents?—Yes. The same point arises, I think, in connection with quarries, as to the necessity of, if not a certificated manager, at any rate some responsible person being appointed in every important case.

254. (*Mr. Redmayne.*) A quarry master?—Yes. As regards the question of health, I refer the Commission to Dr. Tatham's report, in which he says that quarriers experience an excessive mortality from respiratory diseases and phthisis. No inquiry has been made into this subject in regard to quarrymen. Dr. Legge, the Medical Inspector of Factories, has been instructed by the Secretary of State to make inquiry into the question so far as it affects stonemasons, and he tells me that touches very closely on the question of dust in quarries, and he might perhaps be able to give some useful information to the Commission. Of course, there is a considerable difference in the character of the stone worked in quarries. The dust of the Bath and Portland stone is soft, whereas in Yorkshire grit the stone is hard and the dust much more dangerous. The danger is not among the men engaged in the operation of quarrying the stone, but among the men engaged in the preparing and dressing sheds.

255. (*Mr Lewney.*) And crushing?—I do not know whether in those cases they crush the stone.

256–7. For road purposes largely.

258–9. (*Mr. Lovett.*) That is the most important item. It will be a startling revelation if we could get the exact mortality rate of men working in the crushers. They die off from lung diseases?

(*Chairman.*) Perhaps you will give the names of the places afterwards. We will have inquiry made into that.

260. (*Mr. Lovett.*) Most quarries have crushers now?—The question presents several difficulties. The ordinary means which are in use in factories for the removal of, or prevention of the inhalation of, dust such as hoods, respirators, and watering are difficult of application in some of these cases.

(*Chairman.*) The crushers have no hoods.

(*Mr. Lovett.*) Some are covered in and some are not.

261. (*Chairman.*) We have not much knowledge of that. It is a new trade coming in, and we will inquire into that?—It has to be borne in mind that the men work under conditions of greater exposure than other classes of workers.

262. You mean from the inclemency of the weather. They are not more exposed than ploughmen?—I was rather thinking of them in comparison with Cornish miners.

263. Quarrymen get into a sweat much more than an agricultural labourer. Coming out of a hollow or a mine they would get the hot air blowing on them?—Through the Foreign Office we have obtained the regulations in force in other countries with regard to the subject, and I propose to hand them to the secretary for the information of the Commission. I think that is all I have to say.

(*Chairman.*) I think we must all thank you for the short space of time you have taken to develop the subject, and also for the help you have given us.

* Appendix B,. Table VIII.

SECOND DAY.

Thursday, 23rd June 1910.

PRESENT:

SIR HENRY HARDINGE SAMUEL CUNYNGHAME. K.C.B. (*Chairman*).

RICHARD AUGUSTINE STUDDERT REDMAYNE, Esq.
JOHN SCOTT HALDANE. Esq., M.D., F.R.S.
JOHN STIRLING AINSWORTH, Esq., M.P.
RICHARD METHUEN GREAVES, Esq.
RICHARD ARTHUR THOMAS, Esq
ROBERT THOMAS JONES, Esq.
WILLIAM LEWNEY, Esq.
URIAH LOVETT, Esq.
T. E. BETTANY, Esq., (*Joint Secretaries*).
G. W. CHRYSTAL, Esq., (*Joint Secretaries*).

Dr. JOHN SCOTT HALDANE, F.R.S., called and examined.

264. (*Chairman.*) You are a professor at Oxford?—Yes, I am reader in physiology in the University of Oxford.

265. For many years you have paid attention to miners' phthisis, among other things, and with special reference to the Cornish mines?—Yes.

266. I think there is a large number of deaths in the Cornish mines owing to phthisis?—Yes.

267. And there has been in the past?—Yes.

268. I will ask you about that presently. In consequence of that you were employed by the Home Department, in conjunction with Mr. Martin and

Mr. Thomas, to make an inquiry into this subject*?—Yes.

269. That was in what year?—In 1902; it was the trouble which we found to be due to ankylostomiasis, which was the immediate cause of the inquiry.

270. The terms of reference were: "To inquire into "and report upon the health of the miners employed "in mines in Cornwall with special reference to the "injurious effects alleged to be produced by the state "of ventilation in the mines, the dust arising from the "use of rock drills and the introduction of impurities "into the working places through the use of compressed "air." It was begun by you and Mr. Martin in October 1902?—Yes.

271. Then ankylostomiasis having been called attention to, that was added to the inquiry?—That was the original ground, the illness from ankylostomiasis, which immediately led to the inquiry. It was rather mixed up with miners' phthisis. It was not known what the cause of the ankylostomiasis was.

272. For the purpose of our evidence this morning we will deal with the phthisis question and keep that apart. Will you please tell us what phthisis is in very simple language?—Phthisis is a disease associated with wasting of the body generally and with destructive changes in the lungs.

273. Its cause is the blocking up of the pores of the lungs?—No, its cause as a general rule is invasion of the tubercle bacillus in ordinary phthisis.

274. The effect is to block up the pores of the lung and prevent the blood being properly oxygenated?—The tissue of the lung is destroyed.

275. And becomes solid?—It becomes solid or suppurates away.

276. In a healthy state the tissue of the lung is spongy and the air goes into it like a sponge?—Yes.

277. It permeates everything and gets into contact with the blood?—Yes.

278. If that spongy character is destroyed the person dies?—Yes, if sufficient of it is destroyed.

279. That condition of things can be produced without dust?—Yes, it commonly is.

280. That is ordinary consumption?—Yes.

281. What part does dust play in the production of the disease of phthisis which would be like ordinary consumption; how does the dust come in?—So far as it is known at present the inhalation of certain kinds of stone dust renders the lung so unhealthy that it falls a prey with the greatest ease to the attacks of the tubercle bacillus.

282. So that the stone-miners' or the stone-masons' phthisis is a kind of consumption, but induced by the breathing of certain kinds of stone?—Yes, the predisposing cause.

283. Supposing you kept the contagious bacillus away from him, would you get consumption even with the stone dust?—No, not the cases of miners' phthisis we see in Cornwall. You would get men short of breath and with a tendency to bronchitis, but not the serious fatal illness known as miners' phthisis.

284. That is produced by a combination of dust irritating the lungs combined with catching the consumptive bacillus?—Yes; I should add that the consumptive bacillus is probably everywhere.

285. Probably the consumptive bacillus is in this room for that matter?—Yes, most people are probably proof against it.

286. I think you examined various possible causes of miners' phthisis. You dealt with them in a paper by you and Mr. Thomas that was read before the Institute of Mining and Metallurgy. You examined the various alleged causes of miners' phthisis and tried to locate which was the right one. First there was the absence of sunlight: you came to the conclusion that had not much to do with it?—Yes; that is a condition common to coal mines, iron stone mines, and metalliferous mines.

287. Had it been the cause one would expect to find this disease where there was absence of sunlight?—Yes, in coal and iron stone mines.

288. Whereas you do not find it to the same degree?—No.

289. What about exposure to a high temperature and sudden variations of temperature; how far would that bring about consumption?—We considered that. We investigated carefully the effect of high temperatures, and we found no relation between the temperature and the liability to phthisis in the hottest mines in Cornwall. In one, for instance, there appeared to be less miners' phthisis, and probably that was due to the mine being very wet.

290. Did you examine into the question whether the consumption bacillus could be caught by men from working together; if you have a man who is suffering from consumption, is he likely to give it to the man working near him? Have you any views on that?—It is possible a man may be infected in that way. If he has inhaled a lot of dust it would be dangerous to be nearer a source of infection. The younger men, the men who have not had time to inhale much dust, are singularly free from phthisis in Cornish mines as well as elsewhere. It does not look as if infection by itself were a serious cause.

291. If there is dust, infection might play an important part?—Yes; but, on the other hand, the infection is universally present outside the mine. It is almost impossible to escape infection. In a public-house, for instance, tubercle bacilli are flying all over the place constantly.

292. And in the cottages where the miners live?—If there is a case of phthisis, that is so. A great many miners die of phthisis, but we could find no extra liability to phthisis among their wives and children, or very little. That is a very marked feature in Cornwall.

293. There was once an opinion that climbing ladders made a difference. Did you investigate that?—That has been so in many mines in Cornwall, but in the most important mines ladders have been eliminated as a means of going to and from work, yet the phthisis at the time of this inquiry was worse than ever.

294. How far do you think insanitary conditions above ground would have to do with the production of phthisis?—I think very little, or not at all. The death rate from other causes than phthisis is low amongst the Cornish miners. It has diminished very much during the last fifty years, as the general conditions have improved.

295. Do you think that gaseous impurity in the air underground can be adduced as a cause of phthisis?—We came to the conclusion that had no influence, at any rate in this country. Gaseous impurity in Cornish mines, where there is a great deal of miners' phthisis, is considerably less than in average coal mines or iron stone mines.

296. The gases are carbonic acid and carbonic oxide in Cornish mines?—Carbonic acid and a deficiency of oxygen. It can be demonstrated by analysis.

297. There is very little carbonic oxide?—Carbonic oxide has done very little harm in Cornish mines. We were not able to hear of any fatal case of carbonic oxide poisoning due to blasting, but it is a danger which is serious in the Transvaal mines, where they use larger quantities of dynamite in blasting.

298. What other gases are there produced from explosives that you can remember besides carbonic oxide and carbon monoxide, which are dangerous to health?—Nitrous fumes are produced along with carbonic oxide if the explosive does not detonate quite completely. If the dynamite burns up to any extent instead of exploding, it produces large quantities of nitrous fumes which are excessively dangerous.

299. Is there reason to believe that the miners' phthisis you found depends to any large extent upon the explosives used in Cornish mines?—It is certain, I think, it does not depend to the smallest extent on the use of explosives.

300. How about the CO_2, the carbonic acid, would that have any effect, or is that negligible?—I think that is perfectly negligible.

301. As far as consumption is concerned?—Yes. The presence of carbon dioxide in small quantities used to be considered, and is still considered by authorities a serious matter; but I am absolutely convinced

* *See* Report on the Health of Cornish Miners by J. S. Haldane, M.D., F.R.S., J. S. Martin, and R. A. Thomas (Cd. 2091, 1904).

personally until the quantity becomes very large—3 per cent. or something like that—it has no effect.

302. The reason why in factories rules are made about carbon dioxide is more as an indication of the bacteriological condition of the air than any harm the acid itself will do?—It is a convenient indication. It indicates the general amount of smell and unpleasantness and the amount of moisture in the air, which is rather an important factor in rooms.

303. In cotton and cloth factories, where the air is bad, the taking of the carbonic acid is rather a test of the bacteriological state of the air, than of any evil that the acid itself will do?—Practically, it is more a test of the amount of moisture in the air. All the evidence seems to indicate if you keep a room cool and the air fairly dry the amount of carbonic acid does not matter until it gets very high,—2 or 3 per cent.

304. Is there such an amount of carbonic acid in any of these mines as calls for interference?—There may occasionally be cases where the carbonic acid gets too high. It is too high when a light does not burn, as occasionally happens, but I think the standard recommended by the Coal Mines Commission might apply.

305. Will you tell us what that standard is?—The standard agreed on was, that in places where men are working the percentage of carbon dioxide should not go higher than 1¼ per cent.

306. (*Mr. Greaves.*) That is CO_2?—Yes, and the oxygen should not go below 19 per cent. That should be regarded as a standard of air in which a light will not burn well; it begins to be evidently dimmed.

307. (*Chairman.*) You think that standard should be applied to all places where people work underground as a general standard?—I think so. It would meet the case. There is often air which is bad from other causes—heat and moisture—but that is a different thing altogether.

308. You found when examining this question, which you did at considerable length, that on the whole the Cornish mines were more free from gaseous impurities than coal and iron stone mines?—That was so.

309. The conclusion you arrived at on the whole was that the carbonic acid and the other gaseous impurities could not be assigned as substantially causing miners' consumption?—No, we were quite clear about that.

310. There are no more bacteria in mines than in other places on the surface. You could not say the miners had got impregnated with consumption apart from the stone dust?—No, certainly not; you can say that with certainty.

311. In consequence of this exhaustive way of treating it, you came down upon dust as one of the leading causes of the phthisis that was prevalent?—Yes.

312. In fact, as the principal cause?—The men most exposed to hard stone dust were the men who suffered most from phthisis.

313. Dr. Ritchie made some investigations for you in connection with that inquiry?—Yes.

314. Will you indicate what they were?—We visited a large number of cases of miners' phthisis and obtained samples of the sputum with the object of seeing whether the phthisis was due to invasion of the tubercle bacillus, that is to say, whether the tubercle bacillus was in the sputum.

315. What was the result?—It was clear the tubercle bacillus was present in nearly every case. In the cases where it was not present it might have been the accident of the day or the sample. You find the same in ordinary cases of phthisis which are certainly tubercular. You do not always find the tubercle bacillus.

316. Did they make microscopical examinations of the lungs of the men who had died of miners' phthisis?—We tried to get lungs, but in Cornwall there was an insuperable objection to post-mortem examinations, in fact.

317. That is a very deplorable thing. With most respectable motives people have put themselves very much in the way of scientific investigation; difficulty has been created from that cause?—Yes; they have not understood the reasons for it.

318. It would be a good thing if the miners' relatives could be made to understand that by allowing this analysis they would be helping to save the lives of other men?—Yes, it would.

319. Is there anything we could do to get their prejudice removed a little?—We tried. I was in communication with the coroners. The Home Office tried also, and there was one post-mortem examination made in Cornwall, but at the next there was practically a riot and no further attempt has since been made. It was always such a trouble, going down there and finding that it was impossible to do anything.

320. That examination is a very important one, if you can make it, in the interests of science to see whether there is stone dust in the lung and what the character of it is?—Yes.

321. It is almost an indispensable part of the inquiry?—It throws a lot of additional light. There is no doubt about stone dust being a predisposing cause of miners' phthisis, but a great deal more might be ascertained.

322. The same examination has been very valuable in the case of steel dust, showing the kind of dust that does lead to trouble?—Yes.

323. (*Mr. Thomas.*) Examinations have been made in some cases of the lungs of miners from the Transvaal?—That is so. Dr. Legge succeeded in getting one or two examinations in the case of ganister miners.

324. Examination of the lungs of deceased miners from the Transvaal by the time they could get to England would not indicate whether they were tubercular or not, such a long time after?—They might, but it introduces great difficulties.

325. (*Chairman.*) So far as examination of lungs has gone, it seems to show that some dusts are more pernicious than others?—The prevalence or non-prevalence of phthisis among workers in different kinds of dust gives much more clear evidence. Some dusts seem to be absolutely innocuous as regards phthisis, and others extremely dangerous.

326. As an example of innocuous dust we might take coal dust?—Coal dust, or cement dust, as far as is known, is innocuous, or dust from lime.

327. Such dust as horn dust is said to be innocuous—the horn handles of knives?—I believe that is so. I have not seen any statistics.

328. At all events the dust that is dangerous is the siliceous dusts?—Yes, and any hard stone like quartz, sandstone, ganister, and hard rock of any kind.

329. (*Mr. Jones.*) Do you call slate dust dangerous?—I have no personal experience. I think this Commission has to determine whether there is any danger in slate dust.

330. (*Chairman.*) You are able to give us some tables* which were first furnished by you and Mr. Thomas at the Institution of Mining and Metallurgy. They are given in this paper. You will be able to put them in. Those tables are as valuable to-day as they were then?—I think they had better be modified a little. We had not the data from the census of 1901, but they are now available.

331. Those tables you can bring up to date?—Yes.

332. The tables show some remarkable facts. They are compiled from the Registrar-General's Returns?—Yes, and from the investigations of the Home Office Committee.

333. Table 1 shows the deaths from all causes per 1,000. It shows the men living at each age; that is the way it is done?—Yes.

334. Tin miners between the ages of 25–35, 35–45 and 45–55, show rather high figures?—Yes, much higher than ordinary.

335. When we turn to Table 2, the number of deaths from lung disease, we find that between the ages of 20 and 25 it is not very abnormal, but when we get up to 25–35 35–45, 45–55, the number of deaths from lung disease becomes relatively very heavy?—That is so. Between 35 and 45, for instance, the deaths from lung disease are fourteen times higher among Cornish miners.

* *See* Appendix F(a), tables 1–6.

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who include gold miners from the Transvaal, who have worked in the Transvaal, than among colliers or iron-stone workers.

336. When you come to Table 3, which gives the deaths from accident, you do not find the relative figures big at all?—No, the deaths from accidents are very small compared with the deaths from phthisis.

337. It is the same with deaths from all other causes?—Yes. The whole increase in the mortality among the metalliferous miners is due to lung disease.

338. I think Table 5 you also put in, showing that of the miners the rock-drill men were by far the most affected?—That is so.

339. So that you have first, that Cornish miners suffer most from lung disease, but it is the rock-drill men who are the most hit by it?—Yes, it is the rock-drill men who swell the death rate in Cornish mines at the middle periods of life, from 25 to 45, as shown in Table 6.

340. Just when the effect might be expected to be greatest if it was stone dust?—Yes.

341. You put in Table 5. I will read a passage from the paper to which I have already referred, and will you tell me if you agree with it. It is: "It "was found in the first place that the death rates at "different ages for all miners in the Redruth district "were practically the same as for all miners in the "whole of Cornwall. Out of 320 deaths, 142 were of "men who had previously worked rock-drills at one "time or other. Of the 142 who had worked rock-"drills 133, or 94 per cent. died of lung disease, and "the average age at death was 37·2 years. Of the "178 men who had not worked rock-drills 116, or 65 "per cent. died of lung disease, while the average age "at death," instead of 37·2 years "was 53." That points to an abnormal death-rate among the rock-drill men?—Yes.

342. It was that circumstance chiefly which led you to the conclusion that dust was the cause of phthisis?—Yes, it was very largely that, and all the other known facts with regard to miners,' potters' and grinders' phthisis pointing in the same direction.

343. Many of them had come from the Transvaal, had they not?—Yes, a large number.

344. How far had their Transvaal work affected the question?—It was quite clear many of the deaths were due solely to work in the Transvaal. The duration of the rock-drill work they had done was ascertained in a number of cases, and it was found for men who had worked rock-drills in the Transvaal the average duration of work was four to seven years before they died.

345. That is a very bad state of things?—It was a very bad state of things. It had got to be pretty well known by the miners. We have often talked to them about it. They were getting enormous wages for going out—the best of the men would not look at it—wages which ran up to about 1,000*l.* a year.

346. I recollect it was 70*l.* a month on one occasion, but not more than that.

(*Mr. Thomas.*) Yes, I have known more than 100*l.* a month paid in the Transvaal when I was there.

(*Chairman.*) Mr. Redmayne says he has known a man who drew 1,200*l.* a year in wages.

346*a*. (*Mr. Redmayne.*) They die of phthisis?—In about four or five years. They quite understand what it means.

347. (*Chairman.*) The risk was the cause of the high wages?—That was partly the cause.

348. (*Mr. Thomas.*) Is there any evidence in regard to the Transvaal miners, that phthisis was purely tubercular, or to show that they died from silicosis?—Non-tubercular phthisis.

349. I remember your saying that each tube of the lungs was furnished with ciliated epithelium; the inhalation of hard stone dust destroys their functions, resulting in a gradual closing of the lung and ultimately followed by chronic interstitial pneumonia or silicosis?—Yes, there may be a form of miners' phthisis of that kind, but I do not think it would prove fatal. A man would get more or less short of breath. In these typical Transvaal cases one sees in Cornwall, a man gets what appears at first a little asthma, and you know he will be dead in three months. His lungs are full of tubercle bacilli.

350. Would the tubercle bacilli be fatal in the Transvaal if he stayed there?—Personally I think they would. I do not believe there is any difference, but that is only my personal impression. I have not been there, and I cannot say from absolute knowledge. I believe the disease is the same all over the world, and the end comes through tubercular infection.

351. (*Chairman.*) We now pass to the means of preventing the breathing of this dust. In the paper you read, on page 12, four different methods are called attention to: first, respirators, then, preventing dust being given off into the air, then carrying it away by ventilation, and, lastly, arranging the work in such a way that the dust given out into the air is avoided by the men. We may take them in order. Take respirators, for instance: how far are they practicable?—Our experience of them was, although they are practicable, the men dislike them. They are inconvenient because they cannot talk to one another.

352. What form of respirator was generally used there?—A number of forms have been tried, an aluminium one ——

353. With flannel in it?—Flannel or cotton wool. A sponge is the commonest form—a flat sponge over the mouth and nose.

354. Have you tried severe exertion with a respirator on, working for an hour or an hour and a half?—I have, not for so long, but sufficiently long to make me aware it was a great nuisance.

355. I tried working in the day with it, and I was obliged to take it off after one hour; I could not stand it any more. The same thing has been found; you may describe it as more than an inconvenience; it becomes such an inconvenience that a man can hardly work if doing severe work?—Especially work in a hot place.

356. A man in very severe work requires much more air to breathe?—Yes.

357. As you are an expert on that point, perhaps you could give us the proportions roughly, giving us a rough idea of the difference between what we are breathing here as we sit at the table, and what a man would breathe if doing hard work?—In the amount of air breathed?

358. Yes?—He might breathe five times as much while doing work.

359. The proportion is one to five?—Something like that. If a man were running a race he would breathe 10 or 12 times as much.

360. The experience of people who wear respirators in the pottery trades where they are painting articles is not quite the same as in the case of a man doing severe work?—No. If a man is handling a rock-drill it is very heavy work. It may be very heavy work, but it may not, if he is engaged in the dust. It is likely to be in a mine.

361. I believe no satisfactory respirator for use in heavy work has been devised?—I do not know of any. The only ones which men seem to be fairly satisfied with are respirators which let the air come in by the side of the nose quite freely without being filtered at all.

362. It is really a sham, not a respirator at all?—Yes.

363. A really effective respirator which will thoroughly filter dust from air for a man in severe work has yet to be found?—I think it has yet to be found.

364. The second method you were going to deal with embraces all forms of wetting and spraying?—Yes, to prevent the dust from being given off into the air.

365. One of our members, Mr. Thomas, of the Dolcoath Mine, is an expert on that?—Yes.

366. And his evidence will be valuable on that, describing the way it is done?—Yes.

367. I believe it is feasible by a proper spraying apparatus to make a rock-drill innocuous?—It is, if done properly. It wants a good deal of attention. Men are very apt not to wet the hole when the drill

begins to work, and a lot of dust is given off. It wants a lot of water at that point.

368. (*Mr. Greaves.*) When driving a hole upwards in a heading you cannot water it?—You water with a jet; you do not pour water.

369. (*Chairman.*) If you use proper forms of jet the amount of water is very small to do the work, relatively?—It is quite small, the amount of water. It prevents the dust absolutely, as shown by the analysis in a paper by Mr. Thomas and Mr. MacQueen.

370. If you put a crude jet out of an ordinary nozzle with a hole in it, you might spend a great deal of water; whereas if you put the proper kind of jet with a very small amount of water and forced, it will do the work?—Yes.

371. The best machines are those founded on the same principle as they use in insecticides, for spraying roses?—That we found to be a good form at the time. I daresay there are improvements on that now.

(*Mr. Thomas.*) The drill manufacturers have put on the market some very satisfactory sprays which they attach to the drill, and which are extensively used.

372. (*Chairman.*) A number of them comprise this principle, that the water, instead of being shot straight into the nozzle, is shot on an incline, so as to form a vortex inside. Instead of coming out like the jet of a fire-hose, it comes out in a fine and wide spray?—I do not know whether that principle is adhered to.

373. (*Mr. Thomas.*) That is the jet we use?—That was the jet we used in our experiment.

(*Mr. Thomas.*) Subsequent to that they have patented a more practical jet.

374. (*Chairman.*) We will get Mr. Thomas to tell us about those details presently. It appears it is no use telling them to inject water by statute or otherwise. The great thing is that it should be done in a skilful manner?—Yes, it wants to be done in a skilful and intelligent manner.

375. Everything depends on the way it is done for its effectiveness?—Yes.

376. For effectiveness on the one hand, and cheapness on the other?—Yes.

377. If you do it effectively it is not a very costly thing?—I think Mr. Thomas will be able to say that it is not a costly thing relatively to the advantages to be got. The cost is nothing, I think.

378. (*Mr. Ainsworth.*) Do you consider—I understand you do—that some forms of mining dust are more injurious than other forms?—Certainly.

379. What is the cause of that?—That is exactly one of the questions which I think this Commission ought to investigate. It is not definitely known yet why coal dust is so innocuous relatively, and ironstone dust as far as it is known.

380. Has it anything to do with the chemicals in the dust, or is it more to do with the constitution of the particles?—That is the question which we ought to institute an investigation upon. If you examine coal dust it looks very spiky, as if it would irritate the lungs very much, but it does not, apparently.

381. It rather seems as if the hardness of the particles had something to do with it?—Yes, perhaps the specific gravity, but we are not sure yet, and it requires further investigation. One cannot tell just now in any way for certain, except by the known effects on the men, what dusts are dangerous. That is what it comes to.

382. Has there been any examination of the particles to ascertain whether the hardness or the shape has anything to do with it?—That question has never been decided yet. There are plenty of opinions expressed, but it is not evidence.

383. (*Chairman.*) How do you suggest we can find out the quality of dust?—I think by a careful comparison of the different kinds of dust which are known to be either innocuous or nocuous.

384. By referring to the known deaths of men from phthisis in different mines?—We know some kinds of dust which are very bad: for instance, the quartz dust from the Transvaal gold mines, or the dust from the Cornish mines, or the dust in ganister mines, and probably sandstone dust. Some sandstones are known to be dangerous, for instance, the Edinburgh Craigleith hard sandstone, is proverbially dangerous.

385. What can we do to make that more clear? *Primâ facie* it seems to be established and pretty well known that certain dust is dangerous, but what can we do to make it more precise?—I think we ought to find out what are the qualities in the dust which make it dangerous.

386. By what means are we to do it? I should have thought that post-mortem examination was the only thing?—That will not solve the question. We ought to know what the qualities are in the dust which make it dangerous, so that we may be able to say with regard to any dust off-hand whether that dust is dangerous or not.

387. How are we to proceed to find out which dusts are dangerous?—I think a comparison of the qualities of the known dangerous dusts would bring that out.

388. That would result in a certain law?—Yes. To a certain extent it can be decided by experiments on animals, by seeing whether certain kinds of dust do them harm or not.

389. Would that develop itself in a short time within the limits of the sitting of a Commission? Could you get in a couple of months the effect on an animal?—I think so. There is a great gap in our knowledge as regards these points. There is a lot of knowledge about points which are not of much practical importance, but not knowledge such as would be of assistance to this Commission or to the Home Office Factory Department in dealing with different sorts of dust. It is evidently not worth while to take enormous precaution to prevent the inhalation of dust which is quite innocuous.

390. We know enough to be able to say with regard to certain mines that there ought to be proper spraying?—I think so. For instance, the question of slate quarries I do not know anything about.

391. (*Mr. Greaves.*) It was proved at the time of the enquiry that there was less phthisis amongst the men working underground in the Merionethshire mines than a similar class of men working outside?—The men outside might be more exposed to dust.

392. I mean outside the quarries altogether?—That is good evidence if that is so.

(*Mr. Jones.*) The medical evidence was that slate dust was most dangerous.

(*Mr. Greaves.*) For the men in the mill. For the men inside that was not so. The men working in the mines were less affected.

(*Mr. Jones.*) The men in the mill were more affected.

(*Mr. Greaves.*) I am talking of the men working underground.

(*Mr. Jones.*) They were less affected.

(*Witness.*) But the mills might be more dusty.

(*Mr. Jones.*) Practically the slate mines are damp. You cannot get that amount of dust there.

393. (*Mr. Thomas.*) Is there any published statement from America, because they use an enormous quantity of rock drills in America. Do you know if they have any records in America similar to what we have here?—I do not think so. I have not heard of them. They are not very careful about health statistics in American industrial pursuits.

394. (*Mr. Redmayne.*) The deleterious action of these dusts is limited to siliceous dust, quartz dust, ganister dust, sandstone and steel dust. I am thinking of miners' dusts?—Yes. At the same time colliers, when they get beyond the age of 60 have a somewhat excessive liability to lung troubles.

395. They get asthmatic?—Yes. They do not get phthisis, but they get bronchitis rather in excess of ordinary men.

396. Do you think coal dust might have an antiseptic effect?—No, I do not think so. There is no reason to assume that. The reason why colliers are so free of phthisis is that they have a very healthy life, I should say. They are well paid, and they are not starved.

397. Do you think the fact that in metalliferous mines, I am not speaking of those mines that are

working lead, but the Cornish mines, the tin and copper mines, the fact that ventilation is more or less bad, compared with the coal mines, has any injurious effect in the way of assisting phthisis or otherwise, or bringing about the ailment?—It is difficult to make any dogmatic statement. I do not think it has anything to do with miners' phthisis. We could not discover that the effects of excessive heat were injurious to the men. It was very injurious to the work; it prevented the work being done; the men could not work.

398. From an economic point of view it would be advantageous if the ventilation of the metalliferous mines was put on a higher level, so to speak?—From an economic point of view, in a hot metalliferous mine the ventilation is of enormous importance, no doubt.

399. Do you think that has any effect on health?—It may have, but we could not discover that it actually had. The men working in a very hot and damp and ill-ventilated Cornish mine seem to be rather more healthy than those working in a better ventilated mine. It was so damp that there was no dust.

400. It had a good effect?—Apparently it had a good effect, so far as we could judge.

401. There is a great movement at the present day in the Transvaal to ventilate metalliferous mines properly?—The conditions are very different. The amount of fumes from explosives is very serious in the Transvaal.

402. They fire charges very much?—They fire 20 lbs. at a time of dynamite in a close place, and they have many cases of gassing.

403. Very serious bronchial effects?—Yes, from nitrous fumes.

404. Is it heavier than in this country?—Yes. These are heavier than usual in Cornish mines, but there was an accident to which you drew my attention in Yorkshire, where the charge was about the same as they use in the Transvaal.

405. And the effects were about the same?—Yes.

406. This case was referred to you, and you reported, and the effect of your report was that carbon monoxide was accountable to some extent for the symptoms, but that the nitrous fumes led to bronchitis, which killed some of them?—Yes.

407. Which was evidenced a few days afterwards?—Yes.

408. The outcome of the case in Yorkshire which you have spoken of was that better ventilation was required in shafts. It was only 40 feet from the surface?—Yes. There were steam pipes in, and they naturally thought that was sufficient to ventilate the place. They had not reckoned on the very dangerous and poisonous character of the nitrous fumes.

409. You wrote a paper, or contributed some remarks to the "Transactions of the Chemical and Metallurgical Society of the Transvaal," in which you drew attention to the injurious effects of firing these large charges?—Yes, in the discussion on an excellent paper on the subject by Drs. Irvine and Macaulay, of Johannesburg. We drew attention to the subject in our report on Cornish mines, and we pointed out that there had been no such cases. There had been no trouble from it hitherto in Cornwall.

410. Better ventilation would be the remedy, would it not, if you did fire large shots?—Better local ventilation.

411. (*Mr. Thomas.*) Or perhaps a better appreciation of the quantity of explosive to be used for the ground to be taken out?

(*Mr. Redmayne.*) Both possibly.

(*Witness.*) There is an enormous difference as regards ventilation between the Transvaal mines and the mines in this country, which arises from this fact: the rate of increase of rock temperature downwards is very much less in the Transvaal. In the Transvaal it is only about one-fourth of what it is at Dolcoath. For instance, the rock temperature increases one degree in 60 at Dolcoath, and about one degree in 220 feet in the Transvaal. The consequence is that there may be almost no natural ventilation in the Transvaal mines. The increase in rock temperature as you go down in the Transvaal is less than the increase in the air temperature due to compression of the air as it goes down the downcast shaft. The consequence is that, as far as temperature is concerned, there should be no ventilation at all.

412. The higher motive column?—The motive column for ventilation is greater in this country in metalliferous mines than in the Transvaal, consequently the natural ventilation in the Transvaal is very much less as a general rule. The natural ventilation in the Cornish mine is tremendous if it is given a chance, as Mr. Thomas can explain.

413. Would you advocate improvement in the ventilation of the mines in Cornwall?—There are some mines badly ventilated, and there are others where local ventilation, the ventilation of rises and dead-ends where there is no through ventilation, requires attending to.

414. In Cornwall there is a considerable difference in the ventilation as between mine and mine?—Yes. The ventilation of the deep mines in the Camborne district is extremely good in my experience, but there are other mines where it is anything but good.

415. (*Mr. Thomas.*) In those mines the men, although they ought not to be well, are uncommonly well?—That is so.

416. Bad ventilation appears to agree with them?—The bad ventilation is associated with damp and mud, and conditions which prevent dust, and also with sea-water, which prevents ankylostomiasis. The salt in the sea-water kills the ankylostomiasis germs.

417. (*Chairman.*) We may gather that this question is complicated by a different one. It is difficult to say with regard to a mine whether it will be healthy until you have made a good deal of examination?—Yes.

418. It is not simply a question of ventilation. It is ventilation combined with damp and dust?—Yes. Of course, dust is by far the most important, and the character of the dust. All the others are simple.

419. Is there any explosive which is particularly dangerous with regard to these nitrous fumes?—As to that, the information is very defective at present.

420. (*Mr. Lewacy.*) In reply to Mr. Redmayne you suggested where air was damp it was not very dangerous to have dust. I take it that is what you suggested?—Yes.

421. What would be the effect of blasting in an atmosphere of that sort?—In a damp atmosphere?

422. Heavy damp, where a candle would hardly burn?—I did not say where a candle would hardly burn it was healthy. Where a candle would hardly burn the air is bad. It will affect your breathing as a general rule.

423. My experience has been that in a heavy damp atmosphere that was one of the attendant qualities, the air was bad, and would make it difficult to keep the candle alight?—The moisture will help, especially in a hot place, to make the candle go out, but if the air was chemically pure the candle would burn all right. You would not notice the difference.

424. That is a thing which rarely happens, where this occurs. You can hardly find pure air in a damp atmosphere of that description, and the blasting is particularly dangerous when this occurs, and it indicates rather what Mr. Redmayne suggested, want of ventilation?—There is often want of ventilation where blasting takes place. I grant that, but you may have a steamy hot atmosphere where the air is quite pure except for the damp in it.

425. You stated in an atmosphere of this sort carbonic acid gas was generally prevalent. Do you not think where that was prevalent in a damp atmosphere the best remedy would be to have it thoroughly ventilated?—If there is any serious proportion of carbonic acid gas have it ventilated, certainly, but if only a comparatively small proportion, I do not think there is any necessity to interfere.

426. I suppose you have never been in any of the soft hematite mines?—No.

427. It is more obvious there than in hard ones, the damp atmosphere you speak of, where a candle will not burn?—If a candle will not burn, the air must be very impure.

428. And it would be dangerous to health?—Yes, it would not be good for health. If there was blasting, the poisonous gases would not get away. That is the most serious thing, to my mind.

429. In regard to phthisis, you suggested that this disease was infectious. Do you think it is as infectious as ordinary consumption?—Yes. These cases of miners' phthisis are certainly infectious. I do not think that either an ordinary case or a case of miners' phthisis is so dangerous as people imagine nowadays. For instance, in Cornwall, as I mentioned before, the miners nearly always die at home. You meet men in various stages of miners' phthisis, but their families at any rate very seldom seem to catch the infection from them.

430. You think that this arises partly from the hard nature of the rocks?—Yes, from inhaling the dust of hard stone.

431. Lead is a very soft material?—Yes, lead ore.

432. And yet you find that disease prevalent among miners?—Yes. The rock-drill is not working in solid lead ore.

433. The same thing evidently struck Mr. Ainsworth, when he asked whether it was not something in the nature of the materials, either the shape or the hardness of the materials, or something in the composition of them?—Do you mean the presence of lead might be important?

434. Yes?—I do not think so in the case of lead miners, because lead poisoning seems very exceptional among lead miners, any symptoms indicative of lead poisoning. I have never seen a lead miner who had the look of having too much lead. The smelters, of course, are a very different thing.

435. Some of our doctors tell us (we have lots of men who have been in the Transvaal and come here and die) that the lung becomes hard-coated over, which prevents the men breathing. It is not so much wasting, but it prevents the man breathing, this hard substance coated over the lung. Do you think a case of that sort would be dangerous to those associated with the person suffering from lung disease?—I think if he has miners' phthisis of the ordinary type he is infectious. Some have enormous quantities of tubercle bacilli in the stuff they bring up. But tubercle bacilli are flying about everywhere, to such an extent that I do not think one need trouble one's self. I should never consider, personally, whether a case was infectious or not. I know the infection is all about every day everywhere. I do not think it makes much difference.

436. (*Mr. Lovett.*) Could you give any idea as to what extent quarrymen are affected by miners' phthisis?—I do not know of any statistics on that point, unless they are in the Registrar-General's decennial reports.

437. I have not been able to find any statistics on the point?—They may not publish them.

(*Chairman.*) We will have that looked into.

(*Mr. Lovett.*) I ask because rock-drills are employed to a large extent in some of the granite quarries, and the sett-makers are working among dust continually, and the stone-masons, and the crusher-men. It seems to me if we have something on this point it would help in deciding to what extent better ventilation would help in the mine, or obviate the diseases we are considering.

(*Chairman.*) If you wet the rock-drills, but how about blasting? Does not that throw dust into the air?

438. (*Mr. Lewney.*) Assuming the ventilation was not good and you had a blast, how would you lay the dust?—If you look at this paper, you will see the method adopted in Cornwall, and recommended in our report for dealing with blasting. Perhaps I may describe it.

439. (*Chairman.*) By all means?—The method was invented by Mr. James, an underground agent at Dolcoath. Supposing the blasting is at an end, if that is one of the cases you are considering in development work——

440. (*Mr. Lewney.*) Not necessarily?—What sort of blasting? That is one case where you get thick smoke. If the blasting is in an end, the air is cut off before the blasting. The compressed air is cut off, but the pipe remains, led along to within 30 or 40 yards of the blasting. There is a water-pipe attached to the air-pipe, so that you can fill a piece of air-pipe that is left empty just before the blast, with water, and just after the blast you turn on the air suddenly, and it shoots the whole of the water right along the whole place, and wets everything, the rock broken, and brings down the dust in no time, almost.

441. That would only apply where the rock-drill was in use?—That applies to a place where there is a rock-drill. Are you thinking of an ordinary case of blasting in a stope?

442. No; as a rule stopes are well ventilated, but rises and ends?—It is the same in a rise. You have your pipe full of water there, too.

443. (*Chairman.*) I should gather that ventilation would not do instead of wetting, because the ventilation would only carry the dust everywhere?—It carries it through the mine.

(*Chairman.*) You want to lay it at once.

(*Mr. Lovett.*) I do not think it would, but I have not known a single case of miners' phthisis in open quarries.

(*Chairman.*) That raises the question of the character of the dust again. It is known that some dusts are not dangerous.

444. (*Mr. Lovett.*) I was thinking of granite dust?—Granite quarrying is not dangerous, but granite dust in a mine is dangerous. Open quarrying, you say? I have made some inquiries in Aberdeenshire, and they said that it was not dangerous, but, on the other hand, mining in granite is dangerous if the men inhale the dust.

445. Is there dry hole boring in mines?—That is what has caused the trouble.

(*Mr. Thomas.*) Technically called "back holes."

446. (*Mr. Lovett.*) We do not get any dry hole boring. They start the hole, and they ought not to do that, I contend, without using water, but they are careful. In fact it is compulsory, as far as the manager's power goes, to use water at regular intervals. They do not have the constant spraying. They have a bucket of water by the side, and press on a handle, and it shoots the water into the hole at regular intervals?—Yes.

(*Mr. Thomas.*) They do that partly to lay the dust, and partly that they may drill more quickly.

447. (*Mr. Lovett.*) It cuts better, undoubtedly?—That is all right. Then there is no danger from the dust.

448. I have not known a single man to suffer?—They would not under these conditions, whereas, of course, in boring a dry hole upwards in a rise in a metalliferous mine you are covered and choked with dust in no time.

449. (*Chairman.*) In consequence of your report, we have the terms of it, special rules were made?—Yes.

450. Mr. Martin will be able to tell us how far those have been successful?—Yes.

451. Have you any general views upon how far the special rules, which provide for the spraying, have been successful? Mr. Martin will give us the exact statistics. My recollection is that we had good results the first year, but afterwards there was a falling-off again?—Have you got the last report? I analysed the statistics, and I have written pieces about them for Mr. Martin for the last two or three years, and they are summarised in the last report.*

452. The first year the results were very good, and then there was a set-back?—I made a table showing the number of deaths of men who worked rock-drills during the last three years. In 1907, which was the first year for which it was any use trying to get a record, there were 48 deaths in the Redruth District, which was the one taken as a sample. It includes the most important mines in Cornwall. There were 48 deaths of men who had worked rock drills at any time during their lives. In 1908 there were 31, and in 1909 there were 30.

* *See* Report of Joseph S. Martin, I.S.O., H.M. Inspector of Mines for the Southern District, for the year 1909, p. 38 (Cd. 5177x—1910).

453. That is a steady falling-off?—They are falling, but it is not quite clear whether the rules have been successful. It takes some years before you could expect any effects, and the men who have died are all men who worked under the old conditions. In the last year two men died who worked under the new rules, and that is what made one a little doubtful about their success. Of these men, one had worked in the Transvaal for a considerable time at ordinary mining. Probably he had got a lot of dust there, and the other had been discharged from the Navy for ill-health as a stoker. I do not know what was wrong; he may have had phthisis before, it is quite likely, so that if these men had died in spite of the new regulations, as the effects of four or five years' work under the new regulations, the new regulations were a failure; but if, as is much more probable, they were ill before or had inhaled so much dust before as to endanger their lives, it is a different thing.

*Mr. Henry Hall, I.S.O., called and examined.

454. (*Chairman.*) You have been for a great many years inspector of mines for the Lancashire district?—Yes, a great many years.

455. How many years were you so acting?—About 36 or 37.

456. You were the oldest inspector of mines?—I do not know that I am the oldest inspector of mines, but I have been a district inspector longer than any other.

457. You have just retired?—Yes.

458. Under your care there were both metalliferous mines and quarries?—Yes, but of course only during the last 12 or 14 years.

459. You have had experience both of the inspection of metalliferous mines and quarries?—Yes.

460. You and the gentlemen serving under you?—Yes.

461. I think there are also in your district mines that are not metalliferous. There are a few slate mines?—Underground slate mines.

462. It will become a question for us I suppose how to classify the mines, whether to treat a metalliferous mine as different from a non-metalliferous mine and whether to rank the latter as an underground quarry or not?—I am disposed to think that you ought to take the underground slate mines out of the list of metalliferous mines, and either call them quarries or a separate name, if you like, underground quarries.

463. The set of rules and regulations that would be applicable to the various classes would probably fit best if non-metalliferous mines were grouped under the same heading as quarries, whether you call them quarries or not?—I think it would simplify matters.

464. That would leave three classes, the coal mines, the metalliferous mines, and the non-metalliferous mines and quarries, altogether in a group?—Yes.

465. You are going to make some suggestions, and I wanted your view upon that?—The only ones it would be necessary to group alone would be slate. The best plan would be to treat all the slate alike, and call them quarries, whether worked underground or not.

466. The division would be the division of the substance got to a certain extent. You would have coal, metalliferous ores, and the non-metalliferous ores, and make that your classification?—You might do it in that way.

467. You are in favour of some simplification and codification of the present law, so that a quarry or metalliferous mine owner would have in one code what he had to observe?—My own view is that the simpler you make the rules and the more definite they are made, so that ordinary people can understand them, much better is the effect you get from inspection. I think it is a very bad plan to have an Act of Parliament which refers to several other Acts of Parliament.

468. You prefer that a code for each class of mine should be devised?—Yes.

469. Self-contained?—Yes, complete in itself. The inspectors understand these rules with a good deal of study and consideration, but the people who have to put them in force, the quarry managers and the quarry men, very seldom know much about them. They know some of them, but some of them have not an idea of them. That is all due to complication.

470. It would be better now, as we are on metalliferous mines and quarries, that the Acts of Parliament dealing with those subjects should have appended to them a set of general rules, applicable generally, to come into force without being brought in as Special Rules?—Yes.

471. You understand the point?—I agree, certainly, especially with regard to the quarries. You should have the Act of Parliament so drawn to include everything necessary.

472. Everything thought to be necessary at present?—Everything thought to be necessary anyhow. You need not have a code of Special Rules for the quarries. That would simplify matters and save trouble to everybody. It would save an immense lot of trouble at the Home Office.

473. Would that be the same with regard to metalliferous mines, a code of General Rules in the Metalliferous Mines Act?—I have not thought of it in that way, but I should carry it as far as the quarries, anyhow.

474. (*Mr. Greaves.*) By quarries you include underground quarries?—Yes, if classed together in future.

475. (*Chairman.*) You have general rules for coal mines in the Act of Parliament?—But we have a special set of rules in addition. I want to avoid the special set of rules in the case of quarries. I think the legislation as to quarries is rather more than is necessary. Quarries, as a rule, are rather a simple kind of operation, and I do not think there is any great need for them. Fatal accidents are not very frequent. There is no need to have a very intricate system.

476. There is one particular case in the Dinorwic Quarries which I will deal with presently. On the whole, in quarries in general, the accidents are not very numerous. They are less than in coal mines?—The simpler quarries are, although they approach the coal mines in the number of fatal accidents.

477. And metalliferous mines, how far do they approach the coal mines in this matter?—So far as my recollection of the figures goes for underground fatal accidents in coal mines, the percentage is 1·46 per thousand, and for the inside workers in quarries it is about 1·30.

478. We have had those figures already put in by Mr. Delevingne. You heard the evidence of Dr. Haldane about miners' phthisis and the dangerous dusts. Have you had much experience of that in your district?—No, I do not think it is a serious matter in the Welsh metalliferous mines. The mines are generally damp, and rather cold, and wherever there is drilling going on they are in the carboniferous limestone, and as a rule the open fractures let down the water and the place is fairly wet, so that the dust is not noticed.

479. You wet the drill?—They wet them by hand with buckets of water, but there seems to be no special method of wetting them. It is only the up-holes there is any difficulty with.

480. (*Dr. Haldane.*) Which mines are you referring to, the slate mines?—No, metal mining, lead mining, and so on.

481. (*Chairman.*) At all events, the question Dr. Haldane was dealing with of phthisis in mines has not come up so prominently in that part of the world as in Cornwall?—We are rather in the dark. There has not been a similar inquiry in Wales to what has been carried out by Dr. Haldane in Cornwall. Things may be worse than we imagine they are. I believe there was an inquiry at one time in the Holywell district.

482. In the Merionethshire slate mines there was one in 1895, and Mr. Greaves was on it. I do not know

* Now Sir Henry Hall.

whether he is any relation to the Mr. Greaves we have here?

(*Mr. Greaves.*) He is my brother.

(*Chairman.*) Professor Le Neve Foster was on the inquiry.

(*Mr. Greaves.*) You are alluding to the one in the metalliferous mines in the Halkyn district.

(*Witness.*) I think that was the one. The dust question is less serious in the slate mines and quarries than in the metalliferous mines, lead mining, copper mining, and so on.

483. (*Chairman.*) You are of opinion that metal mines should have some form of certificated manager. At present it is not the law. Would you introduce some new provision about the manager?—I think it is very desirable that there should be such a man. When a man has a certificate and is recognised in that way, the management of the mine he is charged with is left more in his hands, and there is less interference on the part of the owners. He has a better chance of carrying on the mine satisfactorily, but I do not know whether it is worth while requiring a man to have a certificate in all the very small metalliferous mines. I think there should be some point at which a certificated manager should be called in; perhaps about 30 men underground at one time might call for a certificated manager. In every case there should be some man definitely appointed to be the manager.

484. Even in a small mine there should be somebody to look after it and be responsible?—Yes, in the coal mines, for instance, where there are less than 30 men employed, we hardly know who is the manager. They are not called upon to name a manager in any way.

485. A certificate in the case of the metalliferous mines might be granted on a lower standard than in the case of coal mines, or would you have the same high standard?—I do not think there would be any difficulty in examining anyone who proposed to be a metalliferous mine manager along with the examination of coal mine examiners. The coal mine examination might include both.

486. Does it take such a high standard of man to manage a small metalliferous mine as it does to manage a coal mine, or is it equally difficult?—I think he must know quite as much of that particular work as a coal miner.

487. When you speak of having a certificate for managers of mines where there are over 30 men, you mean it should be equal in standard to a coal mine manager's certificate?—Yes, except he would be a metalliferous miner in place of a coal miner.

488. In the small mines you would have some humbler form of certificate?—No, I should ask the owner to name the man who was responsible.

489. In the small mines there are men managing who do it very well, although they would have a difficulty in passing a written examination?—Yes. If you made a change of that kind you would have to give the existing men a certificate, as we did when the coal mines certificate came in, and then it would mend itself as time went on.

490. Now about shafts for metalliferous mines, there is no requirement that there should be more than one shaft?—No, there is no legal requirement. If I take the mines I know in Wales, there are generally two or three shafts.

491. Do you think it could be made compulsory to have more than one shaft?—Where there are many men underground, metalliferous mines or otherwise, there should be more than one shaft.

492. It might not be as necessary, perhaps, as in coal mines, because you would not have the danger of explosion and the need for the men to escape. You would not have such a tremendous fall?—No, but you have big pumps, and things of that kind.

493. You might get inundations of water?—You might get blocked in that way.

494. How far would that be likely to put an end to the working of the mines? Are some in a bad pecuniary condition in your part? I do not want to insinuate that they are in that condition?—Lead mining seems to be the best at present. With copper mining, and things of that kind, it is simply a struggle from day to day.

495. Would the two-shaft requirement stop the working of some of the mines altogether?—I do not know that it would. I would only require it in the case of a considerable mine where a number of men were employed underground. If it was worth while to have a lot of men underground it would be a mine where it was worth while having it.

496. Are these metalliferous mines deep in your part? Would the shaft have to be a long one?—They vary very much. Offhand I should think 50 yards down to 300. I do not suppose there are many more than 300 yards.

497. It would be rather a costly thing to put a new shaft in?—Yes. You may assume that it would cost 5*l.* or 6*l.* a yard, perhaps more.

498. You could meet special cases by giving a power of exception, or do you not like that idea?—If a mine was nearly worked out where there were a lot of men you might give an exception. I think you would have to leave the door open.

499. (*Mr. Greaves.*) You are referring to the desirability of two shafts for the escape of men?—An adit would do.

500. A place a man could walk up would answer?—Yes; not walk up ladders in the same shaft.

(*Mr. Greaves.*) A separate means of egress.

501. (*Mr. Thomas.*) That might be a shaft or an adit?—With two shafts you would not only get greater safety against the place being blocked, but you would get better ventilation. I do not think you can ventilate well with one shaft.

502. (*Mr. Redmayne.*) Some of the slate mines are more than 300 yards?—Yes; I was not thinking of the slate mines. The slate mines go down to 1,400 feet.

503. (*Mr. Greaves.*) It depends. What do you mean by "depth"? Do you take a vertical line?—Where your inclines go down to if you put a line straight up.

(*Mr. Greaves.*) Yes, as much as, or more than that.

504. (*Chairman.*) We will ask you about quarries separately. I was dealing with mines and their ventilation. Do you say the ventilation of the metalliferous mines is on the whole fairly good in your part, or bad?—It is very moderate in some places.

505. Not sufficient?—No.

506. Is the standard of ventilation better in coal mines than in metalliferous mines?—Yes, very much.

507. In coal mines on the whole it is not unsatisfactory. The general trend of the evidence was that it had improved, and was not unsatisfactory?—Recently in coal mines it has become the fashion to put up big mechanical fans, and that means large quantities of air are got into the coal mines. I do not know Wales, but I do not remember seeing any kind of mechanical ventilation at any of the metalliferous mines.

508. On the other hand, the ventilation is less necessary to a metalliferous mine than to a coal mine?—Yes. All you want is that it should be healthy. There is no danger of any explosion. There are two or three exceptions, but you want the air to be healthy.

509. There is not the same necessity for ventilation in a metalliferous mine as there is in a gassy coal mine?—Not at all.

510. With regard to shot-firing in metalliferous mines, are there small accidents which might be prevented due to clumsiness?—I think there are more shot-firing accidents in the metalliferous mines and quarries, considerably more than in the collieries.

511. Would you be in favour of having an authorisation in writing necessary before a man is allowed to handle explosives in quarries and mines?—Yes.

512. If a man were recklessly careless he would be afraid his authorisation would be taken away?—I do not mean that a man should be entirely devoted to shot-firing as we have them in the collieries, but merely one of the gang should be the man who is responsible.

513. The fact that a man knew if he was recklessly careless he would lose his authority, would make him cautious in firing shots?—Of course it would, but the

advantage would be if you had authorised a particular man in a gang of three or four, and there was a breach of the rules, you would be able to get at the right man.

514. That does not appear to be likely to put a difficulty in the way of working the quarries?—No; it is merely a matter of discipline and arrangement.

515. Will you tell us about the examination of the working places?—There is a provision in the Coal Mines Act for the examination of the working places. Is there anything corresponding to that in the Metalliferous Mines Act?—There is in the Metalliferous Special Rules.

516. You are going to take your own code of Special Rules?—Yes.

517. There is nothing in the General Metalliferous Mining Rules?—I do not think there is.

518. It is entirely in the Special Rules. There is nothing in the General Rules or the Act about the examination of working places?—No.

519. Are you in favour of having a General Rule about working places being examined?—Yes. These Special Rules, in which a rule of that kind appears, have been made since I was in the district. We had a good deal of difficulty in pleasing everybody as to what the rule should be.

520. Which are you alluding to?—To the Ore Mines for North Wales, Special Rule No. 6, "General Safety."

521. The rule is this: "Every working place or "travelling road in every part of the mine in which "persons are at work or along which they have to "pass, shall be inspected at least once every working "day by the owner or agent, or some competent "person appointed for the purpose, and the result of "each such inspection shall be recorded without delay "in a book and signed by the person who made the "inspection." Does that rule work well with you?—Yes.

522. You propose that rule to be a general one throughout the country?—Something of that kind.

523. In very small mines would it be possible to carry this out?—In that rule "or some competent person appointed for the purpose," that competent person might be one of a particular gang, because these places where they work are at such a distance apart that for the same man to have to make the report seems almost impracticable, so it is laid down in that way. One of the gang is the competent person to examine that place.

524. This rule is equivalent to a great deal of Government inspection if carried out?—Yes; you get the report. The generality of men do not like to make a report unless they have seen what they are reporting upon.

525. It enables the inspector, when he goes round and finds something wrong, to ask why the place has not been inspected as it ought to have been.

(*Mr. Greaves.*) What is meant by "every working place"?—Are we considering metalliferous mines?

526. I do not know?—I rather think we are.

527. Then I will not ask that question?—These are headed "Special Rules for Ore Mines."

528. (*Chairman.*) You think that the exceptions in the case of metal mines employing 12 persons or less, as to notices of opening, abandonment, and the depositing plans which come under sections 12, 14, and 19, should be withdrawn?—I certainly think so. There is no reason to make exceptions. If you do not have the places reported you cannot find them. There is generally more carelessness at these little places than at the larger ones.

529. How about boring against water? Is that provided for in the General Rules?—No.

530. That ought to be provided for?—It is provided for in the Special Rules, at any rate in the Welsh Special Rules. I do not know about the others.

531. That is one of the cases in which the Special Rule provision ought to be transferred to a General Rule?—Yes. It is No. 13 in these Ore Mine Rules we are looking at: "Where a place is likely to contain "a dangerous accumulation of water, no working "approaching it shall at any point within 40 yards "of the same exceed 8 feet by 8 feet, and there shall "constantly be kept, not being less than 6 feet in "advance, at least one bore hole near the centre of "the working, and a sufficient number of flank bore "holes around it." It is very much the same as our coal mine rule against water.

532. There ought to be a provision where a place is unsafe that the workmen shall be withdrawn. There is not such a provision for metalliferous mines, either in the Act or in the General Rules?—There is to this extent in the Special Rules you are looking at. It is No. 7: "The roof and sides of every travelling "road and working place shall be made secure, and a "person shall not, unless appointed for the purpose of "exploring or repairing, travel or work in any such "travelling road or working place which is not so "made secure."

533. That ought to be transferred to the General Rules?—Yes.

534. Are accidents required to be reported to the certifying surgeons?—A certain number of the accidents have under the Factory Act to be reported to the certifying surgeons.

535. You would do away with that double system?—I suggest you should get quit of the Factory Act altogether and put it on the same footing as our Coal Mines Act.

536. Which is found to act perfectly effectively?—I imagine that the accidents required to be reported to the certifying surgeons was instituted when the factory inspectors could not cover the ground, but now the ground is covered and the accidents might be reported to the inspectors.

537. Your idea of having complete codes for metalliferous mines and quarries would involve doing away with the present application of the Factory Acts *qua* Factory Acts to those places, and with the necessity of the mines inspector acting as a factory inspector?—That is my suggestion.

538. Have you had any ankylostomiasis in the metalliferous mines in your part?—Not that we know of.

539. What is the financial condition of metalliferous mining at the present time? Is it the fact that coal-mining in the country is more pecuniarily prosperous than a good deal of metalliferous mining?—Hardly that, I think. I should think a good deal of the lead-mining, for instance, is probably more money-making, considering the amount of money invested in it, than many collieries.

540. No objection would arise on the ground of expense to the additional restrictions or regulations which might be suggested for metalliferous mines?—It is not so serious as to need any consideration. Of course, there are mines being carried on that are unprofitable, no doubt, and do not pay, but taking the slate and lead-mining in North Wales, it may be said to be fairly satisfactory.

541. Generally speaking, the answer you gave about two shafts applies all along the line, I mean the recommendations you have been making. If necessary you could deal with it by exception?—Yes.

542. How about the labour of women and children in metalliferous mines? Have you any observations to make under that head?—In looking up these things I was rather struck by the fact in our metalliferous mines in North Wales, taking them together, I believe there are only seven boys employed under 16 in the whole of the field. About the women, I suppose there are some women employed on the dressing floors, but not very many, I think.

543. Are their hours regulated by the Factory Act—in quarries, at all events?—Outside the heap, outside the metalliferous mines, the banks are under the Factory Act, and outside the quarries.

544. In a metalliferous mine on the surface they have no regulations for women?—Yes, if there were any women they would be under the Factory Act. We should apply the Factory Act.

545. Your suggestion would be that the provisions of the Factory Act regarding women working on the surface should be done away with, but a correspond-

ing provision should be put into the codified Act to apply to metalliferous mines and quarries, to get it under one roof as it were?—Yes.

546. You have no particular suggestions to make as regards amendment of the law with regard to women and children? The factory provisions are enough?—Off-hand I should make them follow the provisions with regard to women at the collieries as to hours, and so on.

547. (*Mr. Jones.*) Are there any women employed in the slate mines at all?—I never saw any.

548. I do not think there are any?—Not at the slate mines.

(*Mr. Greaves.*) I think not.

549. (*Mr. Lewney.*) The employment of women would be less now than it was some years ago?—Not at the coal mines in Lancashire.

550. More particularly the dressing floors of metalliferous mines?—Yes. I do not remember seeing any women. We can easily refer to our statistics.

551. (*Chairman.*) It is not an occupation very suitable for women?—I do not think so.

552. It is rather like coal sorting: it is rough work?—There are only five women employed in the counties of Anglesea, Carnarvon, Denbigh, Flint, Lancashire, Merioneth, and Montgomery.

553. They are almost non-existent?—Yes. I expect they are in the office, or sweeping out, keeping the office clean.

554. I think the definition of "owner" of a mine in the Metalliferous Mines Act is in some confusion?—I think it is more with reference to the quarries.

555. With reference to the quarries, the definition of a "quarry" ought to be altered, in your view, to include both the quarry hole and the machinery of all kinds situated beyond the margin?—Yes. At present the definition only applies to the quarry hole. I expect it was intended to apply to outside the quarry as well, but the Law Officers said the Quarries Act as it was defined must be confined to the quarry hole, that is inside the margin of the quarry.

556. You would make it, like the Coal Mines Act, include the space round it?—Yes; there is no necessity for the complication.

557. There is a distinction which has grown up inside and outside a quarry, but if that is done that distinction would vanish?—Yes.

558. That distinction, I suppose, has arisen from the fact that the outside is a factory and the inside a quarry?—Yes, and the decision that the Quarries Act only applied to inside people. At one quarry the dressers and all these people who are dressing stone are doing it within the quarry margin, the part that is included in the inside quarry, and at another place they are doing it outside, so that we get the same class of people put under two different headings, so that statistics mean nothing. The distinction between inside and outside means nothing—nothing useful, at any rate.

559. (*Mr. Jones.*) How many do you get dressing the slate inside the quarry in North Wales and Lancashire?—We are talking more about the metal mines just now. Your dressers are further away.

560. That is just what I was thinking?—The sett-makers are sometimes making the setts inside the margin, sometimes outside.

561. (*Mr. Lovett.*) Sometimes dressing the setts under the face of the rock, but at other times they are a quarter of a mile away?—Yes.

(*Mr. Jones.*) That does not happen with the slate.

562. (*Mr. Ainsworth.*) How would it be if you made it apply to everything in connection with the mine or quarry under the same employment, because the same people are responsible?—Yes.

563. Whatever the men are doing, everybody under the same employment?—We have it in the Coal Mines Act defined. It includes adjacent sidings, works, tramways adjacent to the mine.

564. And in connection therewith?—Yes, something of the same kind you would follow. In all three Acts it is better, as far as possible, to follow the same kind of thing.

(*Mr. Lovett.*) It would simplify matters considerably if the same thing applied to quarries.

565. (*Chairman.*) The quarries are regulated by the Act of 1894?—Yes.

566. The Act does not contain any General Rules?—No. The Metalliferous Mines General Rules do not apply to quarries.

567. Do you think it would be a good thing if you put a simple arrangement of a few General Rules in a schedule and made them applicable by Act of Parliament at once?—Yes, in the Act itself, to do away with the necessity for establishing special rules.

568. Besides, in this way they can be made uniform throughout the country, and therefore easier to be observed?—Yes.

569. When would you make it necessary to send notice, in the case of the existence of a quarry, to an inspector? How big a quarry should it be? Would you have every little gravel pit where the gardener digs gravel considered a quarry?—At present the quarry has to be 20 feet deep before it comes under inspection. They are not called upon to report to the inspector the fact of starting a quarry of that kind. If you do not intend to bring all quarries under the Act, which would give rise to difficulty, assume you leave the Act as it is, it only applies to quarries 20 feet deep, then the owner must give notice, I should say, when it reaches 20 feet deep.

570. He is not under any liability to do so?—No.

571. You have to find out how you can?—Yes. That would be a way of doing it, when it gets to 20 feet deep, give notice.

572. Would you go further than 20 feet? Would you bring smaller quarries under the Act? Where would you stop?—Personally, I would not bring smaller quarries under the Act than those that are under, but I have not sufficient information. I believe there are in some parts of the country rather large quarries where there are a lot of men employed who are not under the Act because their quarrying is not 20 feet deep.

573. You might say if they are over 20 feet deep or employ more than a certain number of men?—You would get at it in that way.

574. (*Mr. Redmayne.*) When does a quarry become 20 feet deep?—When any part of it measures 20 feet deep.

575. (*Chairman.*) Your idea is to have the number of men or the depth?—Yes, both.

576. If they exceeded one or the other, they would come in as a quarry?—Yes.

577. Do you think all quarries less than 20 feet deep which do not employ a certain number of men had better be left alone?—That is my impression, judging from what I know from my part of the country. Other people may have better information. I would not say anything definite.

(*Mr. Lovett.*) What applies in Lancashire and North Wales would not hold good in Northumberland and Durham and Cumberland?

(*Chairman.*) It is a difficult question where to stop.

(*Mr. Lovett.*) I think the best way would be to say a quarry employing more than 20 men.

578. (*Chairman.*) That is Mr. Hall's suggestion: either more than that depth or employing more than a certain number of men?—Yes. If a quarry was very high and there were only a few men there, I should say it was a quarry that should be inspected. If it was very low and there were 30 or 50 men employed there, I should say that quarry should be inspected.

579. As for the number of men, you have not given a definite notion how far we ought to go?—No. The small quarries generally are carried on by the municipal authorities in the towns for road-making, and so on. They are in pretty good hands.

580. There ought to be a better definition of an owner of a quarry or the person responsible?—Yes; it would be better to stick to the word "occupier."

581. Supposing there is an ancient quarry where people have been accustomed to take stone or gravel as of right, you may have 50 occupiers?—We are in that difficulty.

582. Would you treat them all as occupiers?—There were one or two cases taken by the late Dr. Foster, and the Home Office did not succeed. Three or four people came to the same quarry, and the court held none of them were occupiers in the true sense of the word.

583. Would not the only way be to make a Special Rule for such a quarry, specifying who was to be considered the owner, and for what purpose? You could deal with a quarry according to the facts in each case They vary so infinitely?—However you do it, it wants to be done so that you can take action against someone. At present you cannot take action against anyone. We only get the rules carried out by persuasion.

584. (*Mr. Ainsworth.*) How would you do it, if you had the power, with a number of occupiers? Take a parish quarry which anybody can go to. Could you not make the parish authority responsible, because those people only work there with the leave and approval of the parish authority? In that way you could make the parish authority responsible for the quarry being properly worked and fenced?—It wants thinking out. I believe there are quarries which are not the property of the council, where the owner of the quarry has for years given a right to the people to the stone to build a house or put up a wall. One has worked the quarry for a month, and then someone else.

585. You could make the proprietor responsible?—I do not know all the particulars of the case, but the difficulty did arise. It wants putting right somehow.

586. (*Chairman.*) You are of opinion that shot firing in quarries should be done by an authorised person as well as in metalliferous mines?—Yes, in the same way. I do not mean a special man, but one man in a gang. The shot-firing comes out rather bad.

587. (*Mr. Lewney.*) Do you mean a person accustomed to the use of explosives?—Pick the best man of the gang, and give him an authorisation in writing to fire the shots, and an instruction that no one else must fire them but himself.

588. (*Mr. Thomas.*) Who would give that authorisation?—The manager.

589. (*Chairman.*) You were going to give the number of accidents by blasting in quarries as compared with collieries. It is very much larger in proportion to the number of men employed?—Yes.

590. In 1908, 10 persons were killed by blasting accidents in quarries as against 26 in collieries, whilst the number of persons employed inside quarries was only 54,449, as compared with 796,329 underground in collieries. Therefore the percentage is very much higher?—And the same applies to the non-fatal blasting accidents.

591. What are the figures for those?—The non-fatal blasting accidents in quarries numbered 102, in collieries 283. That is worse in the quarries than in the collieries considering the number of men. In the collieries there were used 25,000,000 lbs. of explosives roughly, whilst at the quarries only 5,500,000 lbs. of explosives.

592. The proportion of accidents from explosives in quarries is enormously greater than in collieries?—Yes, very seriously greater. I am constantly receiving notices from quarries and metalliferous mines, quarries especially, of blasting accidents, and from the collieries you hardly ever receive one.

593. That is due to inexperience or inefficiency in arranging the shot when firing it?—To a large extent.

594. What fuses do they use in your part?—A running fuse, a gunpowder fuse. Some of them fire electrically now.

595. Has the time come when we might condemn the old gunpowder fuse, or has it not?—Not in quarries. I do not think there is any need to. It is a fairly safe way of firing shots, apart from any gas.

596. Do they put the gunpowder in a straw?—I never see them doing that. They buy the fuse and use the ordinary thing.

597. (*Mr. Thomas.*) Do they buy it themselves, or have it from the proprietors?—Some of the proprietors will supply it to the men. Many of the men in places buy it themselves. There is no regulation.

598. The custom is generally in a big quarry that they get it from the proprietors?—I should think very likely.

599. (*Chairman.*) That is the usual course, to have the proprietor or some responsible person to supply the explosive?—The explosive they have to keep in a store or magazine, and in that case it will belong to the owners, and they sell or give them to the men.

600. That is a better system than the men buying the explosives at a village shop?—Yes, much better; you know what the men are using. It is not so important in quarries as it is in collieries.

601. (*Mr. Jones.*) With regard to that system of one man being responsible for the firing of the shots, would you find it convenient for slate quarries and slate mines?—There are difficulties, no doubt. Mr. Williams is coming to-morrow. I do not know what his view is, but he will give a better opinion on that particular point than I can. The thing cannot be allowed to go on as it is. I am strongly of opinion that many of the blasting accidents in quarries might be prevented, and would be, if there was a more strict regulation.

602. Is it stricter regulations or better carrying out of the regulations now in force that is required?—It is this way. If you have certain regulations and you have a particular man who is responsible for carrying out those regulations, you can get at him if they are not carried out; but if everybody has to carry out the regulations the matter is much more difficult. You cannot enforce the regulations in the same way. If everybody in the quarry has to be watched it is a more difficult business than to watch half a dozen.

603. But the manager should supervise all the workmen?—The difficulty is the same with him as with me. He has to watch everybody, instead of having to watch half a dozen. Besides, when a man does it regularly he becomes very skilful at it, and the proof of the pudding is in the eating, anyhow. When anybody was allowed to fire shots in collieries these accidents constantly happened, but now the law is very strict, and there are special men, and the few times that they happen is most extraordinary. In about 3,000,000 shots in my district last year there was nobody killed. There were only three or four people who got slightly hurt with stones flying. It is almost miraculous how they can fire those shots without more harm.

604. I agree with you it is serious, but in the collieries they have a certain man going round the district who is paid for that alone. In the slate quarries the owners would say they could not afford to pay a man to go round. In the slate mines they are not firing at the same time. Different chambers fire at different times?—That is why I suggest the authority should be given to one man in a gang.

605. Supposing he was the partner in the system of working in certain cases, he would have to go round some distance to get to the top of his chamber, and that would mean half an hour or an hour. That is time lost, and the man is working by contract. He gets so much for every pound of slates?—You would have to meet that by compensating him in some way for the time he lost. They would allow him something. That is the only way to get over it.

606. (*Mr. Thomas.*) You could meet that by the provision of one or more in the gang of men?—The fewer the better.

607. (*Mr. Greaves.*) In case of illness, if that man was not able to go, the whole gang is stopped?—They are entitled to put a man in his place.

608. (*Chairman.*) Your proposal was not that only one man should do it, but that the firing of the shot should only be done by a man specially authorised in writing?—Yes.

609. Not that necessarily one man should do it, which is a different proposition. They are two different things. We may have both for aught I know. First, nobody shall fire a shot unless authorised in writing?—Yes.

610. That prevents an incompetent or a young man doing it. Secondly, the number of persons allowed to do it shall be as few as reasonably practicable?—Yes. That is what I suggest.

611. Without tying yourself down to one, there should be as few as reasonably practicable, and the fewer the better?—Yes; and if found to have a tendency to do away with the accidents, then you can extend it to fewer still, but as a beginning I suggest one of the gang.

612. (*Mr. Redmayne.*) You do not suppose there will be more difficulty in carrying regulations of this kind into effect in the metalliferous mines or the slate mines than in the coal mines?—In the slate quarries there might be more trouble involved.

(*Chairman.*) It probably would be met by saying one or as few as reasonably practicable should be employed.

613. (*Mr. Jones.*) Do you understand the custom in the slate quarries in regard to blasting?—I cannot say I do particularly. I am familiar with the accidents they send me, and it strikes me many a time that they are brought about by simple carelessness.

614. Is a man allowed to work on the rock before gaining experience in the quarry? Does the rock-man who uses this explosive go to work before gaining experience?—You think by that that the rock-men are all experienced enough to be able to fire shots?

615. No, I am not thinking anything of that sort. I am asking you a question; if they work on the rock before they have experience. A man coming from the land is not allowed to work on the rock in three months time?—No, he would not be. He would serve his apprenticeship on other jobs before they put him on the rock.

616. How long after starting on the rock is he allowed to fire explosives? What is the custom in the quarry?—I do not know. You can tell me better.

617. (*Mr. Lovett.*) How do you deal with cases where every man has to get his own stone? In some quarries, particularly small quarries, a sett-maker will be responsible for getting the rock and blocking it, and making into setts; he is entirely on his own responsibility as far as the whole thing goes?—Not with us. The rock-men in sett-quarries are distinct from the sett-makers.

618. That is so in North Wales, but in Northumberland it is different?—He quarries it, blocks it, and makes it into setts, the same man.

619. It is possible that a sett-maker in a particular quarry of this kind, who has never had any experience on the rock in getting stone, would have to go and get the rock and blast it himself. I think some restrictions ought to be brought to bear on cases like those——

(*Chairman.*) Some exception about it.

(*Mr. Lovett.*) I should restrict them to a considerable extent. I would not let them go without experience.

(*Chairman.*) That is Mr. Hall's view, as few as possible.

620. (*Mr. Greaves.*) You think a licence should not be granted until a man has had some experience?—It goes without saying. A manager would not appoint a man to do work unless he thought he could do it properly.

621. How is he to get the experience if he cannot fire the shots?—We use the word "competent." The manager would satisfy himself of his competency.

622. (*Mr. Redmayne.*) The word "competent" would cover it, as in the Coal Mines Act?—Yes. There are very great difficulties, but I have watched the thing for years, and there are a good many accidents apparently caused by carelessness at the quarries.

(*Mr. Greaves.*) Probably you would find some of these apparently most careless acts are performed by the most experienced men.

(*Mr. Lovett.*) That is so.

(*Mr. Greaves.*) The difficulty is this: When the man is tamping and going to fire his shot, he is of necessity by himself, and there is no witness, and one never knows what has happened.

623. (*Chairman.*) You think the reporting of accidents to the certifying surgeon might cease just as in metalliferous mines?—Yes.

624. How about the daily examination by a competent person of the quarry, or one or more if there are many different places, and the record in a book?—I do not know how it is to be done, but every working place should be examined by somebody in authority every day. I think it is only reasonable.

625. Where there was a big and extended quarry, it need not be at the beginning of the day, but a man might go down with a book and note the working places, and put whether in a good or bad condition?—They have all day to do it in.

626. You do not mean necessarily before the work is commenced?—No; that we require in the coal pits, but I do not think it is necessary in quarries. You may have all day to do it, but let us have a written report on the general condition of the quarry.

627. (*Mr. Greaves.*) That applies to quarries and underground quarries?—Yes.

628. In many mines it would take a good many men to go over it all?—It would. You have foremen of different divisions.

629. To examine every place there would have to be a good many men doing nothing else. Take several slate mines: a man could not do it without walking 20 or 30 or 40 miles, to go through the whole workings?—I do not intend that the same man should do it.

630. A number of men doing nothing else?—No; the foreman of the division probably would be the man to make a report of his part, and so on. It would be divided up into sections. The man would be viewing his men and doing other work. In fact, a good man going round regularly, even with the additional work put on him, would be able to make the report, so far as I can see.

631. Take a chamber in a slate mine. To examine the whole of it carefully would take some hours in many cases?—That is what I intend by the examination. You mean if he had to get up to the roof?

632. That would take days?——

633. (*Chairman.*) Your idea is not so much exhaustive examination as a note of each place where the men are working, to see whether each place is good, bad, or indifferent, or whether there were any remarks to make?—Yes. My object is chiefly to get responsibility on to certain individuals who really ought to have the responsibility. There is too much left. It is the habit both in the metalliferous mines and the quarries to leave men very much to their own devices. They work in gangs and by bargain, and there wants to be something more in the way of discipline.

634. The number of small accidents, particularly in quarries, is large numerically, at least in some of the quarries?—Very large.

635. You are of opinion that some provision ought to be made for better fencing of the quarries. That is a big subject?—At present the quarry has to be fenced whilst it is being worked, for the security of the people who work there. There is nothing which requires the quarry to be fenced against the public in any way, that is a working quarry. There is a difficulty about that. The workmen generally all come from a certain direction, and it is only necessary to fence that side. We want to have the quarry properly fenced, also disused quarries properly fenced. At present the disused quarries within 50 yards of a high road are under the Nuisances Removal Act, and the fencing is required by the local authority, but old quarries beyond the 50 yards have to take care of themselves.

636. (*Mr. Greaves.*) I thought under some Act every quarry had to be fenced. I have been under that impression?—You may be right; you have cases which come before you sometimes. I think that is so; if they are not on common land and not within 50 yards of a turnpike road, nobody is responsible.

637. (*Mr. Jones.*) It is required by the Metalliferous Mines Act for disused levels?—Yes, not in quarries.

638. How do you find that carried out in slate mines, fencing off a gallery underneath?—Underground?

639. Yes?—We have sometimes to complain of the fences not being put up.

640. It is necessary for some protection of the galleries in open quarries to be put up to prevent rubbish falling over?—We are talking about the surface. All those fences you speak of must be put

up. Where anybody can fall over, it stands to reason it ought to be fenced.

641. (*Chairman.*) I will ask you about the Dinorwic Quarry. You are acquainted with that slate quarry very well?—Yes.

642. It is the quarry on the other side of Llanberis?—You see it from the high road. It is the quarry that stands out.

643. You say, "This quarry is the largest slate "quarry in the kingdom, and 2,802 workpeople are "employed there. The method adopted to win the "slates is by a series of open terraces or galleries, "each 70 feet high, rising one above the other on "the mountain side to an altitude of 1,500 or 1,600 "feet, and thus the whole of the work has the "advantage of being carried out by daylight." How do they get the slate? Do they blast it and throw it down by explosives?—They have a series of galleries, as shown in the picture you have there.

644. It is blasted?—First they blast the rock forward.

645. As soon as it is split it is broken up with sledge hammers?—And got into proper pieces.

646. And loaded into wagons?—Yes.

647. A large portion of it is useless and left on the spot. Only a small proportion is used for slate?—I do not know.

648. 5 per cent., I think, is the amount?—Do I say 5 per cent? That seems rather small.

649. At all events the amount is small?—Yes, but probably more than 5 per cent.

650. What is the official return of accidents at Dinorwic during 1909? I will give you the figures. There were four fatal and 502 non-fatal (corrected number, 491), which disabled a week or a period exceeding a week?—Yes.

651. That is a proportion of one non-fatal accident to every 5·7 persons employed?—That is so.

652. Those figures appear alarming at first sight. What is the character of the smaller accidents?—A very large part of them are cuts.

653. Three hundred and twenty-eight, or 65 per cent. of the whole of the accidents above-mentioned, are described as cut or bruised hands. 100 more are cut and bruised legs and feet, 30 injuries to eyes, 22 cut heads, and 11 various. That is the division of the accidents?—Yes.

654. When that is analysed it makes the figure less formidable than it might at first sight appear?—Yes. The disablement for 491 accidents averaged three weeks and six days.

655. That is rather a heavy figure for accidents; it is too heavy?—Apparently it is.

656. Will you consider the accidents in classes. Take the most frequent form, cut hands. Is there any suggestion that could be made to remedy that?—I think you would get better suggestions from the workmen than from me. I suggested to the manager that some of the men might at any rate wear gloves, but you know the kind of feeling there is against a man doing his work in gloves. They think it rather a laughable proposition.

657. Hedgers and ditchers wear gloves?—I have quoted the same thing to them. There are many avocations where men use gloves. I believe in America a good deal of the quarrying is done with gloves, but whether it is a protection against cuts or extreme cold I do not know.

658. Would it be possible to use fingerless gloves, consisting of a thick piece of hide folded in the palm?—Some of the men wear them in Wales.

659. They do not need the fingers to handle the slate. I mean something like the modern motorist's winter gloves, which have no fingers. You are inclined to think as the result of your inquiries that gloves would be a good thing. It is worth while inquiring into, at least?—I think so. Some of the work might be done as readily with gloves, and it would prevent the hands being cut.

660. Do these cuts lead to poisoning?—Very often.

661. What will the poisoning be due to? It seems curious that slate should poison the wound?—I submit with that report particulars of about 100 cases as a sample of these accidents that we are dealing with.

662. A great many of them are cut hands while working. I was asking whether the disablement was due to the suppuration of the wound?—Will you allow me to read two or three of these, because they are very instructive, as to how the accidents come about. I take them as they come in the list sent to me. Here is a rock-man whilst breaking up a piece of granite, a piece of the same flew up and struck his eye. That is a granite man, not a slate man. It was a piece of hard rock, although it was at the slate mine. The next man sprained his hand whilst unloading block at the shed. The next one cut his hand whilst working in his bargain. The next one also cut his hand whilst working in his bargain. The next bruised his leg whilst pushing a car. The next cut his wrist whilst unloading blocks at the shed. The next cut his hand whilst working in his bargain. The next crushed his finger while preparing blocks. The next blistered his finger whilst drilling. The next cut his hand whilst working in shed. The next cut his head whilst loading a wagon. I suppose a piece fell off the wagon on to his head. In the case of the next man, slate-dust got into his eye whilst working in the shed. The next man cut his finger whilst working in his bargain. The next man sprained his wrist while lifting a wagon on to the rail. The next bruised his foot whilst cross-cutting a block. The next cut his hand whilst unloading a wagon. The next bruised his hand whilst working in his bargain. The next bruised his leg whilst working in his bargain. The next cut his hand whilst loading a wagon. The next bruised his leg whilst working in his bargain. The next cut his finger whilst working in his bargain, and so on.

663. A large number of the accidents are of a very minor character?—Yes, and all within the individual workman's control. It is the kind of accident no amount of inspection and no number of rules would have any effect upon. It is the method in which they do their work. The only suggestion I can make is that in many cases a pair of good gloves, something like those we use in gardening, might save them. You will find a good many have suppuration set up, which makes the time they are off much longer.

664. (*Mr. Lewney.*) Do you think that is due in any case to explosives?—The hand going wrong?

665. Yes, ordinary blood-poisoning?—Blood-poisoning is generally caused by the wound not being properly cleaned and dressed at the beginning, and by the man, instead of nursing it, going about with it. It may be he gets beer and that kind of thing, and that would have a tendency to make his hand go wrong, or when he gets it he is in a weakly state of health. It is difficult to say what causes a wound to go wrong. With some people a wound would never go wrong. I never had a wound on me that went wrong, but other people, if they get the slightest hurt, it keeps them for days before the thing gets better. It does not develop into blood-poisoning, but still they are taken differently. I suppose it is constitutional.

666. (*Mr. Greaves.*) What are the provisions for treating these accidents when they occur? Is there a hospital?—At the larger quarries the provision is excellent. At the quarries we are speaking about, the Dinorwic Quarry, the doctor is found for the men free of any cost, and there is a hospital fitted with nurses and every requisite, and they stay in the hospital as long as they are ill without any cost to themselves. So far as dealing with the accidents after they have happened, there is no complaint to make at the larger quarries.

667. (*Mr. Jones.*) If you took the workers inside, the proportion would be more than 1 in 3?—At Dinorwic it would be hardly fair to take the workers inside, because many of them work some of the time inside and some of the time outside. You cannot draw a distinction very well.

668. They get injured inside; they never get injured outside?—You think they get injured outside.

669. They get injured working inside?—You think they do?

670. Yes. You made a special inquiry into the matter, so that you have an opinion?—I suggest to you, in the case of Dinorwic at any rate, you cannot draw a proper distinction as to which of the men I have on this list could be called inside workers and which outside workers, because one week they are inside and the other week outside.

671. No, one month inside and the other month outside?—That does not matter very much.

672. (*Chairman.*) At all events, the majority of these accidents are in the handling of the jagged rough slate?—Yes.

673. If that could be done with some form of glove, that ought to bring these figures down enormously?—I do not know that it would enormously.

674. Most of the cut hands could be stopped?—Very often it would.

675. The cut hands are 65 per cent. of the whole?——

676. (*Mr. Jones.*) Would it not be natural to expect cut hands from workers outside, because they handle the slate blocks in a smaller size?—Yes, the men filling rubbish.

677. And the men dressing the slate which has a keen edge? The men inside do not get it?—They are more liable to get something coming down.

678. Is not the cut hand due to something falling down and not the sharp edge of the slate?—I imagine it is the sharp edge of the slate often. I asked a man to go through the process of filling his slate on to his barrow and taking it to his quay and unloading them on to his quay. He had never had an accident to his hands at all, he said, and he got them on to the barrow all right and to the quay, but in taking a handful off the barrow to put them on to the quay he cut his hand against what was left on the barrow.

679. That is an outside worker?—Yes.

680. (*Chairman.*) How many accidents out of these 500 accidents might be saved by gloves, I wonder?—I do not think gloves would be a panacea, but gloves in many cases would prevent accidents from time to time. If I had a cut I would rather it went through a glove than straight from a slate. If you get a bit of a cut with shale underground in the coal pits, it has a very smarting effect, as if there was something about the stuff you were cut with different from a knife, for instance.

681. Of a poisonous character?—Yes.

682. (*Mr. Greares.*) Do you suggest that applies to slate?—That is a kind of shale.

683. Only it has not the same hydrocarbons in it?——

684. (*Chairman.*) Do the men use ointment to rub their hands that are cut?—Do you mean after they have had them cut?

685. If you take a mixture of 1 in 40 of carbolic acid, that among agricultural labourers is effective to prevent suppuration and takes the inflammation down at once?—Workmen have lots of little dodges they carry out when they are hurt. One man will rub it with tobacco, and another man will put whisky in it, and so on.

686. Generally speaking, is there anything else besides gloves that might be used? It is rather rough and dangerous work at any time getting the slate down?—It is dangerous work on account of these cuts, and that kind of thing, but the slate rock is a very even kind of rock. I was struck by the galleries at Dinorwic. There was little sign of any of the galleries coming over unexpectedly. The rock is very compact and regular.

687. Do you consider the quarries are skilfully worked by the men and masters?—Yes. I should think Dinorwic Quarries are very well looked after, and worked as well as it is practicable to work them.

688. The large number is unsatisfactory. If we can reduce it, it would be a good thing?—The large number of these small accidents?

689. Yes?—It is the same at Lord Penrhyn's quarries, which are the next largest. They are a little better than Dinorwic, but not very much. There are nearly as many there. When you come to the smaller quarries the percentage of accidents is very much less, but, as I pointed out, that arises to some extent from the different way in which the men are allowed to come under the Compensation Act. At the larger quarries they are much more generous in that way, and particular cases are not inquired into in the same way as at the smaller quarries.

690. A man is allowed to go off for the 7 days, I am not suggesting improperly, but on rather easier terms than he would be at a smaller place?—At a smaller place they are put through more cross-questioning, and the manager knows all his men, and so on. He has a better eye upon them. Probably they dare not face him with a very small thing. They would be rather afraid to face him if it was very small.

691. By going off a man makes a sacrifice of a portion of his wage. What will he get as a rule when he is off, counting his benefit and everything?—He will get half wages from his employer, and it will depend upon what clubs he is in with regard to the rest. Some are in a good many clubs, and others are not.

692. Generally speaking, you would not think it fair to put down the number of accidents at Dinorwic to bad working of the quarries by the men and masters, or to the faults of either side?—No, I do not think so. All these small accidents seem to be a part of the operation that cannot be avoided, or they would not be so universal.

693. Except for the suggestion of wearing hand protectors of some kind?—I do not want to make any great point of it, but I think there is work at these places that is done with bare hands that, if I had to do it, I should prefer to have gloves to do it with.

(*Chairman.*) It would be an interesting experiment to see whether gloves would prevent that class of accident.

694. (*Mr. Greares.*) These cut fingers are in a larger proportion in open quarries than underground works?—That is so.

695. It is curious, the material being the same?—Yes.

696. (*Chairman.*) Is there any other point which you want to bring to our attention?—The only point is, and perhaps it is more a departmental one, I do not know whether you care to go into it, the way minerals are valued in the statistics.

(*Chairman.*) I do not think that is in the terms of our reference. That is a Board of Trade question.

697. (*Mr. Ainsworth.*) With regard to the double shaft in metalliferous mines, under what circumstances do you think that is possible? There are many cases in which it would prevent the working of the mine if you were bound to incur the expense. Under what circumstances do you think the double shaft would be possible?—I suggested where there were more than a certain number of men employed underground at the same time. As a test figure I mentioned 30, but where there are more it is reasonable that they should have two shafts or outlets.

698. With regard to the cost of the second shaft, if it was an expensive matter it might make working the mineral an impossibility?—It might, but the same applied when we required double shafts at the collieries.

699. There is a great difference between a coalfield, where you can prove your coal for a good many square miles before you sink a shaft, and a metalliferous deposit, which may be a vein or a deposit, but at the same time it is a thing which might cease at any moment. It is a deposit about which you have no future security. How can you face the cost of a second shaft when you have a variable deposit of that kind to deal with, instead of a certain deposit which you have in a coalfield?—You would say you are proving all the time you are working?

700. Yes?—We have an exemption under the Coal Mines Act; for the purpose of proving you are not required to have two shafts.

701. Have you any experience of the hematite mines in Furness or Cumberland?—No.

702. You may often spend 20,000*l.* or 30,000*l.*, or 50,000*l.* or 60,000*l.*, developing a single shaft and its accessories, and that is for a variable deposit that may

cease to be payable within a very short time. How are you going to face the expense of a second shaft?—As I said before, the same question has arisen in collieries, only you say the ironstone is variable. You have it one day and not the next.

703. It is not as short a notice as that, but your deposit may be paying at one time, and six months after it is in a different condition?—I suppose the idea is if everybody was made to go to the expense of two shafts it would not affect an individual very much.

704. It would largely affect the taking of royalties. The mines would remain unworked?—I put it more from a safety standpoint. It strikes me if you have a large number of people underground that there should be more than one way of escape.

705. It is an eminently desirable thing if you could do it. On the other hand, you said in metalliferous mines you have not the risk of explosion. There is no reason why anything should happen to the shaft or the main roads?—You have the danger of water, and so on.

706. In your district, under what circumstances have you found the second shaft possible in metalliferous mines?—I think most of the metal mines of North Wales have more than one shaft.

707. How deep are they?—They vary very much.

708. Have you anything over 100 fathoms?—Yes, we have up to 300 yards, I think.

709. At what do you put the cost of a shaft there, how much a fathom? How large are they?—Not very big, 7 or 8 feet.

710. In the case I am thinking of the shaft is a considerable size. There are two drawing shafts and a pump shaft, and you have shafts from 100 to 200 fathoms deep?—Yes. How many men are underground at the same time.

711. It depends entirely on the capacity of the mine and what there is to come out of it. You might say 50 to 200, or something like that?—You will have some witnesses from Cumberland.

712. I do not expect you will be able to tell me, but I wanted to know under what circumstances in your district you have found it possible to insist on the second shaft?—We have never insisted on the second shaft, because we have no right to. Most of the mines have two or three shafts, more by accident than anything else.

713. Because of a vein?—Yes.

714. The vein may extend a good many miles?—Yes.

715. A deposit of the kind I am speaking of is measured by fathoms and not by miles?—I suppose it is a good deal thicker.

716. That is entirely a question of circumstances. It often is, of course, thicker?—I admit it is more by accident we have the shafts in North Wales.

717. Everybody would have them if they were economically possible, if only for the sake of ventilation?—You can ventilate much more simply.

718. I do not mean to say they are not desirable, but in letting a royalty of the kind I speak of, if you insist on two shafts at once, as you would in a coalfield, it is a question of whether you would get anyone to undertake it?—Yes.

719. (*Mr. Greaves.*) You say an authorisation in writing should be required for every man who fires a shot—that is more for fixing responsibility. You think more skill is required in the firing of shots?—Both.

720. In rocky countries like North Wales, every agricultural labourer is used to firing shots. In clearing the fields you have to fire shots in the boulders. It is a regular agricultural operation?—Yes. They seem to get off scot-free. I do not hear of any accident to those men. It is only at irregular intervals they have it to do.

721. Every winter the majority of farmers are doing a certain amount of clearing. As to the inspection of every working place, you think there is too much left to the men. It occurs to me the man whose life is dependent on it would look at the place carefully; the man is going to work there?—You would expect so, but it by no means follows.

722. You do not think you can trust the working man?—Often the opposite; he wants to get on, and hurries. He is probably the worst man to do it.

723. (*Dr. Haldane.*) Where there is only one shaft to a mine, how do they ventilate it; is it a divided shaft?—Where they have only one they sometimes have a division in it and sometimes not. Sometimes they have a division in the metal mines and they do not trouble to keep the division separate from the other sides, so that it is still dependent on natural ventilation.

724. (*Mr. Thomas.*) Unnatural ventilation in that case, I should imagine?—Yes. There is always a certain amount of natural ventilation going on in metal mines. It is cooler below than on the top.

725. (*Dr. Haldane.*) Warmer below?—In our case I think it is cooler below, on account of water.

726. Then there would be no ventilation?—Yes, there might be.

727. If it were cooler below there would be no tendency for the air to circulate?—If you have two different temperatures you seem to set up currents of air. They leave and pass each other.

728. Is it not the case in mines of this kind, with no definite system of ventilation, that the air gets very stagnant in summer?—Often it does. The metal mines rely upon their drills chiefly, the exhaust air from the drills.

729. But a fairly shallow mine, a hematite mine with one shaft—you were referring to a hematite mine?—Yes. I presume they have a regular division in their shaft and a regular system of ventilation.

730. (*Mr. Ainsworth.*) It is not necessary. As a rule the workings are not more than a reasonable distance from the foot of the shaft, and there are also varying levels, and you have access from one level to the other, consequently they ventilate themselves. It is an object in mining to have good ventilation, but under those circumstances it can be easily done from the single shaft as a rule?—If you have a shaft and the sides are rather wet, you get your air to go down pretty well.

731. (*Dr. Haldane.*) The evaporation of the sides of the shaft would cool the air and make them go down?—Yes.

732. That is so in the Transvaal mines?—If the shaft is wet you have a better chance of getting air where you have only one. But it is all a makeshift. Unless you have a regular system the whole thing is a makeshift. It is not ventilation. It is diffusion, the gases diffuse.

733. In a deep metalliferous mine there is very good natural ventilation?—I know you have told me that is so in Cornwall, but I suppose they have fans.

734. They nearly blow you away. I think, at Dolcoath. You can hardly stand against the air.

(*Chairman.*) Is that natural ventilation?

(*Dr. Haldane.*) Yes.

(*Witness.*) As far as my observation goes, their chief reliance is the compressed air from the drill.

735. (*Mr. Thomas.*) In what kind of mine?—Cross-cuts and places of that kind.

736. Blind ends?—Yes.

737. (*Chairman.*) You told us generally in point of ventilation that there are some metalliferous mines that leave something to be desired in your district?—I think so. I have found some, several times, unsatisfactory.

738. (*Dr. Haldane.*) Is the air apt to be foul in hematite mines? I have never been in one, and I do not know anything about them?—I have been in one, in South Wales, but it is a very long time ago. It was a hematite mine a north countryman had. I have not much recollection of it.

739. As to whether the air was foul or not?—In these low mines there is something to be desired in our Welsh methods in the way of ventilation. They succeed in getting the smoke away from the face, but it is hanging about the road further back. People have to pass backwards and forwards. If you depend on a drill, say you have a drill, and it is drilling, it would exhaust 100 or 120 cubic feet of air per minute, an ordinary drill. That is not very much in a biggish

place. Of course when they stop drilling and are going to fire the shot they generally leave the pipe partly open and let it blow, to keep the place ventilated. That is efficient at the face.

740. It drives the smoke back into the rest of the workings?—Yes, if they happen to branch off, it would.

741. It does not remove it from the mine?—No.

742. In making your recommendations as regards there being two outlets to a mine, you had in view to some extent the case of fire, the event of a fire in the shaft, for instance?—There are several dangers. I do not know whether they are beginning to use electricity. I suppose they are in some of the larger places. It seems to me there is a greater danger of fire now than there was a few years ago.

743. There have been disastrous fires in metalliferous mines?—There have, from time to time.

744. (*Mr. Redmayne.*) Do you think that the Metalliferous Mines Act might be strengthened with regard to the mode of keeping plans?—They keep their plans very well, I think.

745. The same as the requirements in the Coal Mines Act?—Yes, put them on the same lines.

746. With regard to the keeping and depositing of plans?—Yes; many of them are excepted because they do not employ 12 men. I would do away with that and put the plans on the same footing as the Coal Mines Act. Plans are very important in mines, naturally. You want to know where you are, and where your neighbour is.

747. Particularly where your neighbour is. In answer to the Chairman's question about the necessity of having managers for metalliferous mines where more than a certain number of men are employed, do you extend that to underground quarries, such as slate mines?—Extend what?

748. The desirability of having them under certificated managers?—Yes, and slate quarries, open quarries, employing more than a certain number.

749. You mentioned that there were extremely few women employed on the dressing floors in North Wales?—There seem to be only five in the whole.

750. They are much more numerous in Cornwall?—I am not familiar with Cornwall. You will get that from the Cornwall Blue Book readily enough. I have never been further than Devonshire in that direction.

751. In regard to the employment of the ambulance in metalliferous mines, do you think it might be put on the same footing as the Coal Mines Act, seeing that the accident rate is about the same?—Yes, I think so.

752. It would not be a matter of great cost?—It is no expense. It is just a little arrangement, splints and those things.

(*Mr. Thomas.*) It is customary now.

753. (*Mr. Redmayne.*) Yes, but not enforced. Do you think any good would result from an inspection of the mine by the workmen, for the workmen to inspect in the same manner as the inspection is carried on in some coal mines under the Coal Mines Regulation Act?—People look at that very differently. We have that permission under the Coal Mines Act. The men have permission to inspect if they think fit, but I have been 36 years in Lancashire looking after the coal pits, and I am sure half-a-dozen inspections by workmen during that time is all that have taken place.

754. If you went to Northumberland and Durham you would find it in every colliery?—It may be a good deal due to me, because my opinion has been strongly that the people who should look after the colliery are the officials and not the workmen. I think any regular inspection by workmen at stated intervals, once a month, or whatever it is, will do harm rather than good.

755. Why?—Because it takes away, naturally, the responsibility from the officials, and it takes away the responsibility from everybody. I remember at an inquest in one of the South Wales big explosions the reports made by the men a fortnight before the accident were laid before the jury, and, as they generally do, they had reported everything safe, and to all intents and purposes the inquiry came to an end. There was very little more interest taken in it. The men said it was safe.

756. It is a mode of inspection very largely operative in some districts in Northumberland and Durham?—Is that so? What does the manager do?

757. The manager accompanies them, at least I think so. We used to like it. It satisfied the men?—If I were the manager I should like it very much.

758. It satisfied the men that the mine was being well managed?—I should sleep much sounder if I knew the men had reported everything safe a week ago.

759. (*Mr. Lewney.*) You gave us figures relative to the number of men injured in coal mines and metalliferous mines, but you did not give the proportion of explosives used per man. I take it there are about 14 times as many men employed in coal mines as there are in metalliferous mines, but the quantity of explosives used does not exceed five times as many, so that there is nothing extraordinary about the accidents when you compare the amount of explosives used in the metalliferous mines?—Yes there is.

760. (*Chairman.*) Twenty-five million lbs. in collieries and 5,500,000 in quarries. The point is you must take into account the amount of blasting done. It is much more in quarries than in collieries?—In the collieries, roughly speaking, there were 25,000,000 lbs. of explosives used, and only 5,500,000 in the quarries.

761. Are the quarries included in the metalliferous mines or not?—I think so.

762. (*Mr. Redmayne.*) Each individual charge in a quarry would be rather heavier than in a coal mine?—Yes.

(*Chairman.*) You must put that on the other side.

763. (*Mr. Lewney.*) I do not accept that in all cases?—What kind of charges do you put in?

764. They vary. The charges in the metalliferous mines are not so excessively heavy as you would imagine?—In your hematite?

765. In the quarries where they use heavy charges they use powder?

(*Mr. Redmayne.*) Gunpowder?

766. (*Mr. Lewney.*) Yes. They use dynamite and gelatine for smashing up the stone. If they want to blast a big quantity of stone they put a deep hole down and fill it with powder and explode it two or three times before they give it the final charge, to make room for holding a considerable quantity?—Put in 50 lbs. of gunpowder, or 100 lbs.?

767. That is so. My point was that if you consider the quantity of explosive used in comparison with the number of men, you can understand the difference in the proportion of accidents?—No, it is all against you. If you use big shots there are fewer shots fired.

768. (*Chairman.*) He says your figures of 5 to 1 for explosives show that in the quarries each man fires in proportion a much greater number of shots, and therefore there is a greater number of accidents?—We use from 12 ozs. to 1 lb., and he uses 100 lbs.

769. (*Mr. Lewney.*) That is an exception. I am only speaking of what we might call extremely heavy holes. Nearly all the material in metalliferous mines is got by blasting. You get a considerable quantity of coal you do not blast?—Yes, but we still use 25,000,000 lbs. against your 5,000,000.

770. And you have 14 times as many men employed as we have.

770*a*. (*Chairman.*) On the average one man uses 100 lbs. of powder in a quarry, whereas he only uses 30 in a mine, so that he says if the shots were equal, the chances are 3 to 1 in favour of the quarries. Even allowing for shots with more explosive in them, it leaves a balance. The number of shots must be per man considerably greater in quarries, and therefore you expect more accidents?—Yes, but we have fewer proportionately in the collieries.

771. No?—We have only 26 against 10. We have an industry employing 800,000 men.

772. Work out the number of lbs. of explosive a man uses in a quarry and a coal mine respectively. It is 100 lbs. a man uses in a year in a quarry, roughly speaking, and only 30 in a mine, on your own figures. You have a great many men and a small amount of explosive used in coal mines, and a great many men to

use it?—The men who get hurt are the men who fire the shots. We are firing 3,000,000 shots.

(*Chairman.*) That is the answer.

773. (*Mr. Lewney.*) We do not use excessive quantities of blasting material other than the powder. We do not charge heavier than in the collieries. I have had experience of lead and iron mines, and they are the same as to the quantity of blasting material used, and I take it where you have the blasting it will not be different, except in the deep holes in the quarries where you want to bring down 300 or 400 tons, or perhaps 1,000 tons at once. That is where they have used large quantities of powder?—Yes, 100 lbs., but in Lancashire we do not allow a shot of more than about 20 ounces as the limit—ounces, not pounds.

774. In regard to the desirability of having a double shaft, I take it that it is mostly for ventilating purposes and safety in the event of fire?—Or water.

775. We have not had a great many accidents from fire?—No.

776. We might consider it more important as a question of ventilation?—Yes.

777. In putting this question I am putting it for this purpose. I would not like the Commission to make a report recommending a restriction that would hamper the industry and throw hundreds of men out of work. I wish to ascertain your view upon this matter. We have in the North several companies that are being worked on a minimum of capital. It would be a question, in case this double shaft system was enforced, of closing down these places altogether. Do you think it would be desirable to restrict these people, or compel them to close down? Would it not be equally as effective if you could obtain some system of ventilation that would suit your purpose—enforce a standard, for instance?—Do it by bratticing the shaft.

778. Dividing the shaft, separating one part for ventilation, rather than compel two shafts. I am speaking from the working men's point of view, and I would not like to impose something on the employer which would compel him to close down?—I would not either, but bear in mind what brought about the double shaft in the collieries was the Hartley accident, where the shaft was blocked up and 300 men or more killed. If the same thing happened in any of these metal mines I imagine you would get the same rule.

779. The danger of it happening is very remote?—Yes. Cannot you join one up to another?

780. They do in some cases. I have in mind a shaft about 210 fathoms deep, far removed from any other shaft, and it is questionable whether these people would be in a position to put down a second shaft.

(*Dr. Haldane.*) Is it a divided shaft?

781. (*Mr. Lewney.*) Yes. If any system of ventilation could be devised apart from the second shaft, would you insist on the second shaft as being desirable or necessary?—I have the other two dangers in my mind, fire and water. You can make your shaft safer against fire by having nothing in the shaft of wood; make it of iron. That would be a step in the right direction, but it would be a dreadful business if your shaft got on fire.

(*Chairman.*) Is the shaft lined with wood?

(*Mr. Lewney.*) Yes.

(*Chairman.*) Is it dry or wet?

(*Mr. Lewney.*) In time they get dry.

(*Chairman.*) It would be extremely dangerous if anything caught fire on a dry day.

(*Mr. Lewney.*) It would be reasonable to have that wet.

782. (*Chairman.*) Suppose a rule was made that in a mine which had one shaft lined with timber, and they could not, by reason of circumstances, afford to put in a second shaft, that they should be compelled to keep the timber wet, do you think that would make a difference to fire?—I do not think it would be very reliable. I would rather, if they had only one shaft, that they were compelled to brick it and keep only iron in it.

783. That would be an expense, substituting iron for timber?—It would be made safer against fire.

784. If a single shaft was allowed, it should be under conditions to be settled in each case?—They have had the same thing in the Transvaal. I had one of the Government officials over some time ago, and he was fighting the same question. Up to 400,000*l.* some would have to spend to put their second shaft in.

785. (*Mr. Thomas.*) Assuming you have a standard of ventilation, you could secure it either by bratticing the shaft or fixing an air pipe. You could also secure your shaft against fire. You would appreciate the danger arising from a fall of ground in the shaft of metalliferous mines is very remote as compared to collieries?—Yes.

786. Therefore there would be no need of a second shaft on that score. There would be no danger of explosion, and no necessity on that score. What is in your mind is fire and water?—Yes, and better ventilation.

787. There have been no circumstances arising in your district which would cause you to make any recommendation of that kind?—No, nothing of that kind has happened at metalliferous mines whilst I have been inspecting.

788. (*Mr. Redmayne.*) There may be fire in the mine as well as in the shaft?—Yes.

789. (*Mr. Thomas.*) If you had adequate ventilation?—The shafts are rather small.

790. Really the number of undertakings working with one shaft is very small indeed?—Yes. In Wales nearly all have three or four.

791. It appears to me your suggestion of a second shaft being compulsory is a most serious matter for the industry?—We want to bring them up to the standard.

792. You would increase the expenditure of capital on mines beyond a paying limit unless you were careful?——

793. (*Mr. Greaves.*) Is there much danger of fire in metalliferous mines?—No.

794. (*Dr. Haldane.*) There was a fire in your district before your time?—It is not in the Lancashire district now. That was in the shaft?

795. No, in the workings. The downcast shaft was not properly divided from the return, and the poisonous gas got round?—And filled the shaft?

796. About 25 men went down the shaft not knowing there was anything wrong, and simply tumbled over and were killed.

(*Mr. Thomas.*) It is a common thing to use steel girders in the Transvaal to secure the sides of shafts.

797. (*Mr. Ainsworth.*) With regard to the single shaft, might not we say in all cases where you have a single shaft that shaft is also a pumping shaft?—I suppose it is so generally.

798. Where you have a pumping shaft, the risk of danger from fire is small, because you have only to turn on the water. If you happen to be pumping water in your single shaft, and any portion gets on fire (and it could only get on fire from the lamps at the bottom) it would be easy enough to put the fire out by allowing the water to go down the shaft?—Yes, as long as you get it down in time.

799. That could be provided for. The danger of fire in a shaft is a thing which by a small amount of foresight could be provided for, because the single shaft must be also the pumping shaft?—I would not like the shaft to get on fire, whatever provision you had. Whatever contrivance you had it would be a serious business.

800. How could the shaft of a metalliferous mine get on fire?—You often have a wooden brattice in.

801. How could it get on fire?—By friction, and things rubbing.

802. As a rule the shaft is far too wet for anything of that kind?—Has there not been anything of that kind?

803. It simply happened from the signalman at the bottom having been careless about his lamp. That was the cause.

(*Mr. Lewney.*) We have had cases where there has been fire in the mines, not in the shaft. We use a mass of timber in the hematite mines, and I have known fire in them, but never in the shaft.

(*Mr. Greaves.*) Is there any danger of cutting off men?

804. (*Mr. Lewney.*) No. It has mostly occurred whilst the men have been away, the men going in and not knowing of the fumes. In reference to the question for a certificate for the manager, what was the standard? For instance, if a man attended the technical classes and got a certificate, would you recommend him as competent to manage a mine?—No; I think it would be better to have a special examination.

805. I have in mind a young man who worked at the smithy; he attended the classes and got a certificate, but he was never down a mine at all. I should say a competent person would be sufficient, instead of insisting on having a certificate, so long as you had a provision that proper plans should be kept. That would imply that a mining engineer would have to do that, but the practical working of the mine could be entrusted to a competent person who had a long experience of mining. Would that meet your view?—No. I think the certificates at collieries have acted very well.

806. Collieries are different altogether from metalliferous mines. You must bear that in mind. Do you not think so?—There are more dangers of big things.

807. Explosions from gases?—Yes.

808. Have you had experience of a fair amount of rising?—Do you mean putting in winzes?

809. We generally speak of a winze as going down?—They do from the top or bottom now and again.

810. It is rather a dangerous method of mining?—To go up?

811. Yes?—They always have the roof over them, as it were. They are more liable to falls.

812. Do they as a rule carry anything with them in these rises?—You mean a pack?

813. In our district we call it a stole or middling. They divide off the rise into two and put the material into this. All this forms a stage for the men to work on. The ladder-way can be covered over and protected in the event of blasting. Do you think a provision ought to be made in the General Rules to make that compulsory in all cases?—You also get the air to go up one side and down the other.

814. It allows a circulation of air, that is one of the purposes. It is not compulsory. Do you think it desirable that it should be included in the General Rules?—Is it not compulsory in this way, that they have to provide proper ventilation.

815. If it is compulsory I am afraid it is being overlooked. I know mines where they do not work on that system, with the result the men may be up 50 or 60 feet on a plank, and if anything comes down, away they go to the bottom. In an accident that occurred two years ago that was the result?—The other is the proper way.

816. You think it desirable to include that in the General Rules, and make it compulsory, both from the point of view of safety and ventilation?—I think so. I think anything that will make the place patently safer should be done.

817. You consider a rise without that provision of safety would be dangerous?—It would, if the whole thing depends upon fixing planks at the other end instead of having anything under.

THIRD DAY.

Friday, 24th June 1910.

PRESENT:

SIR HENRY HARDINGE SAMUEL CUNYNGHAME, K.C.B. (*Chairman*).

RICHARD AUGUSTINE STUDDERT REDMAYNE, Esq.
JOHN SCOTT HALDANE, Esq., M.D., F.R.S.
JOHN STIRLING AINSWORTH, Esq., M.P.
RICHARD METHUEN GREAVES, Esq.
RICHARD ARTHUR THOMAS, Esq.
ROBERT THOMAS JONES, Esq.
WILLIAM LEWNEY, Esq.
URIAH LOVETT, Esq.

T. E. BETTANY, Esq. } *Joint*
G. W. CHRYSTAL, Esq. } *Secretaries.*

*Mr. HENRY HALL, I.S.O., re-called and further examined.

817A. (*Witness.*) May I make one remark before we start. I thought, perhaps, some misconception might arise as to what I meant by my remarks on the examination by the workmen under the General Rule in the Coal Mines Act. You asked whether it ought to be applied to metalliferous mines. I look on the position in this way; the men no doubt ought to have the liberty and the permission to examine the mine when they have any good reason to suppose that there is any special danger, and I think they are wise in exercising that right when it arises. What I wish to point out, and perhaps warn them against, is instituting any periodical examination of the mines by the workmen. It is my strong opinion if the mines are examined once a month by the workmen, the manager and officials will be relieved of a lot of the responsibility they ought to bear. That is the position.

(*Chairman.*) It will have a tendency to make the men responsible.

818. (*Mr. Lewney.*) Would not that apply to Government inspection as well? Supposing it were considered necessary or beneficial to increase the number of Government inspectors, would that also relieve the employers of the necessity of taking precautions against accidents?—I think if inspection is overdone it would have the same effect. The regular inspection by the men would not only relieve the managers, but also the Government inspector.

819. So that inspection is not a good thing in any case?—I think it is an excellent thing in its proper place.

820. When I was putting a question to you yesterday about rising, I think you agreed with my opinion in regard to that. You answered the question in the affirmative, that you were of opinion in rising it would be less dangerous, and contribute to better ventilation, to carry up a stole in every rise?—It really means a stool.

821. Perhaps it is a local term?—You put the rubbish on the top of the platform and keep rising it up. That is the proper way.

822. That is not compulsory?—No.

823. Do you think it would be beneficial if it were made compulsory?—I think it would if it is the best way, and it is not done in that way.

824. It would contribute to the better ventilation of these workings, and to their safety?—To their safety, and there would be a way up and down for the air.

825. There was one matter I was much struck with. You have been, more or less, brought into contact with

* Now Sir Henry Hall.

the metalliferous mines. Have they anything like a universal system of signalling? Are there mines grouped in a district where there is one system of signalling?—They generally adopt the same system, but there are variations. They are at liberty, under the rules, to fix their own signals. You mean at the winding shaft.

826. Yes. In a district where there are several mines, do you not consider that it would be an advantage to have one system of signalling. I am aware that you have to have special signals for special purposes; but, as far as the men are concerned, do you not think it would be an advantage that one system of signalling should prevail in a district—say an inspector's district?—Yes, I think it would be better throughout a district to have the same signals for riding in the shaft.

827. (*Mr. Redmayne.*) By a system you mean a code?—I do not think you could extend it to the whole country, because the customs are difficult to get over.

828. (*Mr. Lewney.*) I was nearly contributing to an accident on one occasion through the want of that system, and that is what impressed it on my mind. Engine-men do not remain always in the same employ?—No.

829. If they go to another place where there is a different system it might contribute to an accident?—Yes, that is the reason why there should be the same system.

(*Chairman.*) The same thing has been recommended by the Coal Mines Commission in their report.

(*Mr. Lewney.*) I have found from experience that it is a good thing to adopt.

830. (*Mr. Lovett.*) With regard to blasting, do you not think it would be desirable for workmen to inspect the face of the rock after the blasting operations?—Certainly. That is required under the Coal Mines Act. After a shot a man has to examine the place and pass it before the colliers are allowed to go in. It would apply more strongly in the quarries.

831. Do you suggest that it should be made compulsory?—If you do not get it done I should make it compulsory.

832. It has been my experience that a large number of fatal accidents have occurred owing to laxity of inspection after firing?—Yes, it is the most dangerous time after firing.

833. With regard to ambulance, do you find in quarries that there is some laxity in this matter?—I do not think that my attention has been directed to the ambulance much in quarries. The next witness will be able to tell you about that.

834. (*Mr. Jones.*) You made the suggestion that an official should make a daily inspection of all mines and quarries, or that some person should?—That some person should examine each of the working places in the quarry I think once a day, any time during the day, not before they commence, but while work is going on. It cannot be done without a good deal of trouble, but it seems reasonable that the working places of the mine should be examined by an official. They are rather dangerous.

835. Does that mean a thorough inspection of the roofs and pillars in a slate mine?—No, just an inspection to see that everything is right as far as you can in the time allowed.

836. You would not hold that man responsible for the district he was inspecting?—Yes.

837. That is the point, to get one person responsible?—Yes.

838. As regards open quarries, where do you expect to find the highest galleries, at the top or at the bottom?—They do not vary very much in height unless they run one into another, generally about 50 feet.

839. Some 30 or 35 to 40 yards?—Where they have not run into each other; where they have not two together.

840. That is only one. The quarry owners are not allowed to work one gallery into another. Would you favour a rule to limit the height of the gallery?—There is a great deal of difficulty about that, I understand, because the stone varies. Sometimes it is good and sometimes it is bad. That means the gallery will advance slower or quicker as the case may be, and the men vary very much in the speed they do the work. I should not suggest that unless you had good reason, unless there was a good result to be obtained.

841. Do not you find the fact that one gallery of good rock has been worked faster than another is due to more pressure being put on to produce slates?—I should think it is by the men themselves or the foreman. The men have the bargain. Does the pressure come from the men or do they hurry up because it is a good bargain, or does it come from the foreman?

842. I put it to you that it comes from the foreman. The quarry is carried on for the purpose of getting slates; there is no doubt about that. The tendency is to work the gallery if good blocks are to be got and leave the other part. Do you not think it better to have a rule to take good and bad together, and work them systematically?—I could not answer that question.

843. They are bound to get the bad rock from the quarry?—Yes, but at times they have to keep up a fairly regular supply of slates. In the coal trade they have to. You cannot tie their hands unless there is any great danger.

844. There is a rule in a slate quarry in Scotland as to the width of the floor of every gallery. Would you apply that in North Wales?—The width of the floor?

845. Yes?—You might have a rule and some kind of exception, so that if there was any great difficulty they need not be tied to a foot or two. I imagine it would be difficult if you tied them up too fast.

846. You think so?—That is the impression I have in mind from viewing these places.

847. I take it you particularly leave the North Wales mines to the assistants?—I have not very much time to go to them. Mr. Williams will be able to tell you better than I can, I think.

848. (*Mr. Ainsworth.*) With regard to the second shaft in metalliferous mines, you understand no one objects to it. Everyone is in favour of having a second outlet, or as many as you can get, but in metalliferous mines if you make that essential before you sink, as is the case in collieries, you would prevent a great deal of mining property being opened up. The way to meet the difficulty in metalliferous mines is that it should be a matter after a mine has been opened up for consideration between the employers and the inspector. The inspector would have the power, if he thought a place dangerous without a second outlet, to say so, and, if you like, stop the working of the mine till remedied, but to make the matter compulsory would have the result, in our opinion, of preventing a great many royalties being opened up. You would not wish that?—Of course not. Under the Coal Mines Act, with regard to two shafts, you are entitled, having sunk one shaft and proved that the coal is not sufficiently good, not to pay for the expense of opening a second shaft. You can work the portion of coal out with the one shaft, and your other suggestion is that the inspector, if he considered any metalliferous mine dangerous because it had not two outlets, might have the power to say there must be two.

849. Something of that kind?—Yes.

850. (*Chairman.*) Two shafts are not essential in a coal mine until you begin to work?—Not till you prove to some extent.

(*Mr. Ainsworth.*) So long as it is understood the circumstances in coal mining and metalliferous mining are different. In coal mining you know what you are going for practically within a reasonable certainty, but in metalliferous mines your shaft may be looked upon as an exploration. Therefore to insist on two would be a hardship.

(*Chairman.*) We may assume that metalliferous mines are not so subject to catastrophes as coal mines, to great falls that block the mine up, but on the other hand there is the danger of fire in shafts in metalliferous mines.

(*Mr. Ainsworth.*) Hardly. In coal mines there is the risk of explosion which sets everything on fire. In metalliferous mines the only possibility of fire is from

a lamp or a candle left burning, an accident which may be easily prevented. We are free from risk of explosions. Your shaft is your pumping shaft, and therefore you always have the command of water.

(*Chairman.*) We very likely shall have a metalliferous mines manager before us to go into these points.

(*Mr. Ainsworth.*) I think you agree with me, Mr. Lewney.

(*Mr. Lewney.*) Yes. It struck me probably something on the lines suggested by Mr. Ainsworth would meet the witness's view.

(*Chairman.*) We shall be able to consider that when we consider the evidence.

(*Mr. Lewney.*) If the inspector for the district were not satisfied he could report to the Home Office, and the Home Secretary should have the power to compel the employers to put another shaft down.

(*Mr. Ainsworth.*) I approve of that.

(*Mr. Redmayne.*) Would it meet the point if it specified any mine employing more than a certain number of persons? If it employed 40 persons it would presuppose that there was a considerable amount of metal, and that it would be likely to continue.

(*Mr. Ainsworth.*) It would hardly apply in the metalliferous mines Mr. Lewney and I have had to do with, because every step you take is exploration. You hardly ever arrive at a large amount of proved ground.

(*Mr. Redmayne.*) Owing to the irregularity of the mass.

(*Mr. Ainsworth.*) Yes. I was talking over the point with a gentleman who has had much experience of mining in our part of the country, and he said it struck him in dealing with the matter of metalliferous mines as they were instead of being tied up with Act of Parliament Regulations, the matter should be left as much as could be done to the judgment of the inspector, which, as Mr. Lewney has pointed out, would mean a reference to the mining authorities at the Home Office. If it could be worked on those lines it would meet the difficulty.

851. (*Mr. Greaves.*) If you stereotype the system of signalling it will close the door to all improvements in the future?—No, I do not think so.

852. If you say the signalling must be done in one way you cannot change it?—You can, if anything cropped up that was much better, a better means of signalling, which required an alteration, I suppose it could be done.

853. It could be done by applying to the Home Office?—I should think so.

854. (*Mr. Thomas.*) The code should be the same all over the country?—The code should be the same.

855. It is the custom presumably in the district to which you are referring for there to be an agreed system of signals, but special signals may be adopted, and they would be indicated at the engine house; there ought, therefore, not to be any possibility of confusion arising with the engine-men.

(*Mr. Redmayne.*) Is not the point this. You may have a man who has been used to one code in a district for a number of years, and he goes to another district where there is a different code, and he has the other code so fixed in his mind that he may bring about an accident by adhering to the old code, whereas with a universal code he could not do that, and miners are a migratory class.

(*Mr. Lewney.*) They go in our district from one mine to another.

856. (*Mr. Jones.*) Do you think it would be an advantage to have a universal code for slate mines and quarries, as far as it could be applied?—Do you refer to the haulage part and not the winding?

857. I refer to the whole thing. The only exception would be as far as inspection of tillers and ropes?—Where a man is winding at an engine where men are carried.

858. I am not referring to winding. The slate quarries are under the Quarries Act, and the metalliferous mines under the Metalliferous Mines Act. I mean bring them both under the same Act?—Yes.

859. Do you think that would be an advantage?—To bring them both under one Act?

860. Yes?—I think the slate should all go together.

Mr. Griffith John Williams called and examined.

861. (*Chairman.*) At present you are acting as Metalliferous Mines Inspector in North Wales?—Yes, and Quarries Inspector.

862. At present you are not dealing with coal mines?—No.

863. You have had considerable experience of metalliferous mines and quarries and questions connected with them?—For the last 16 years.

864. You acted as interpreter for the Departmental Inquiry in 1894?—I did.

865. That was an inquiry in this very matter?—Yes.

866. Will you begin by giving us a short description of the mines and quarries in your district without going into too much detail?—The metal mines and quarries of North Wales are scattered over the district, and are rather difficult of access, some being as much as 18 miles from the nearest railway station. The largest mines are in Merionethshire; the largest quarries are in Carnarvonshire. The most extensive slate mines in the world are in Merionethshire, and the most extensive slate quarries in the world are in Carnarvonshire.

867. I suppose Carnarvonshire is the greatest slate quarrying place in the kingdom?—In the world.

868. I think nine-tenths of the slates in the British islands are got out at Carnarvon?—At Carnarvon and Merioneth.

869. If we turn our attention to that district, as far as the slate mines are concerned we are dealing with far the largest slate mining industry in the country?—Yes.

870. There you look to ascertain the conditions of slate mines?—Yes.

871. For metalliferous mines how does it stand? Will you give us an idea of the metalliferous mines in your district, as compared with the metalliferous mines in different parts of England?—The metalliferous mines in the district are not in a very flourishing condition. The most extensive lead and zinc mines are in Flintshire, around Holywell and Mold. They are worked to some extent in Carnarvonshire and Montgomeryshire. At present some pisolitic iron ore is worked in Carnarvonshire, and occasionally they come upon rich pockets of gold ore near Dolgelly, in Merionethshire.

872. That is an important mining district as regards Great Britain. That will be the next most important to Cornwall and the southern parts?—Yes.

873. Have you anything to say about the general geology of the districts?—Will you have quarries and mines together?

874. Yes?—The slate quarries of Carnarvon are worked in the lower Cambrian beds. The slate beds lie immediately on the basement conglomerate of the Cambrians. They are interstratified with grits and intersected by dykes of diabase, locally known as granite. The slate beds of Carnarvonshire are not overlain by younger rocks, and consequently they are worked as open quarries. I have some photographs to show what I mean (*producing photographs*). That will show the character of the Penrhyn Quarry. This one shows how essential it is in working the slates of Merionethshire to work them as mines, because they dip at an angle of 30 degrees under the mountains, so that the slate of Carnarvonshire is worked in the open—open to the sky—and the slate of Merionethshire is worked underground, as a rule. Then the igneous rocks of Carnarvonshire supply the bulk of the setts and macadam of the district. Those are situated mostly around Penmaenmawr, Trevor and Pwllheli. The limestone quarries are in the carboniferous system,

and are worked on the borders of Carnarvon and Denbigh, about Llysfaen and Llanddulas, and also in Anglesey.

875. In the district do you meet with rock that is of the siliceous character which produces siliceous dust?—Yes.

876. What is the number of metalliferous mines and slate mines and quarries worked in your district?—90 mines were at work in 1909. I should explain that in 1908 we had 105 mines at work, but in 1909 we omitted for the first time those mines which had only a caretaker in charge.

877. Do you include the slate mines?—Yes, but not the quarries. I am dealing with mines only—metalliferous mines and slate mines.

878. You are dividing them into metal mines, slate mines, and quarries?—Of metal mines last year we had 58, and 32 slate mines; the rest are quarries.

879. What is the character of those metal mines in proportion, roughly? What are the most important metals?—We had 1,905 men working in the metal mines, and 3,116 in the slate mines.

880. What metal is produced in the greatest number of mines?—Lead ore and zinc ore.

881. They comprise nine-tenths of the metalliferous mines of the district?—I should say seven-eighths.

882. (*Mr. Greaves.*) What is your district? Do you go down to Aberystwyth?—No; North Wales, Cheshire, and Lancashire.

883. Do you go as far as Dovey?—Yes.

884. (*Dr. Haldane.*) Not the Isle of Man?—No; I am confined to Merioneth, Carnarvon, and Anglesey.

885. (*Mr. Greaves.*) That is what you are telling us about?—I include the whole except Cheshire and Lancashire. There are only salt mines and somewhat small quarries in those counties.

886. The six counties of North Wales?—Yes.

887. (*Chairman.*) It strikes me the mines you have in that district may be divided into three groups: coal mines, metalliferous mines and quarries, and I should be inclined to group a slate mine with a slate quarry. Sir Henry Hall was of the same view yesterday. The best way of looking at the thing is to divide it into coal mines, metalliferous mine, and to group the slate mines with the slate quarries?—I should think otherwise.

888. How would you arrange it, supposing we had to draw a line?—I think the best system is, unless you can separate the slate mines, to include them with the metalliferous mines. I do not agree to putting them with the open quarries. The conditions are different.

889. For codification purposes. I am not sure whether Sir Henry Hall said so. For inspection purposes it would be better to group the slate mines with the metalliferous mines?—Yes.

890. Is there a sharp line of demarcation between slate mines and quarries?—Yes, very sharp.

891. What is the difference?—As far as the getting of mineral is concerned, one is worked under ground and the other open to the sky.

892. Have you places where it is open?—I have two cases. There is Mr. Greaves' quarry and the Oakeley's, where there have been big falls and the underground workings have collapsed, and they are partly open to the sky. They are uncovering in Mr. Greaves' mine and at Oakeley's portions of the top, but finally those will be worked underground. It is only in very exceptional circumstances.

893. For codifying the law I should have thought it would be better to put slate mines and quarries together and consider metalliferous mines as another class, and coal mines as a third?—In the case of slate mines you have the ventilation.

894. You would have provision for ventilation where it was a mine, but if there is to be a series of codes it would be a matter for consideration what would be the best classification for the convenience of inspectors, the employers and the men.

895. (*Mr. Redmayne.*) The support of the roof and sides as well would be important?—Yes, and storing explosives.

896. (*Mr. Greaves.*) In the two cases you have mentioned these two quarries or mines would in future work under two separate Acts, with two separate rules, the open parts and the underground parts?—No; I would have them under the Mines Act, but have certain rules relating to the surface workings. You only require the blasting rules to be different, perhaps.

897. You do not think that the rules in the open part of these part mines part quarries should be the same as the rules for the open quarries?—Where practical they are.

898. The Chairman's view is that you would have the rules for the open quarries which would apply to open workings, and the rules for the mines would apply to the underground workings in the same Act.

899. (*Chairman.*) It is not so much what the rule should be, but how they should be arranged. Now will you give an outline of the inspection work in your district?—Before going on to that I should like to say, in estimating the quantity of mineral, it only gives an inadequate idea of the quantity of rock removed in slate mines and quarries. For instance, in the slate mines of Merionethshire only 5 per cent. of the rock gotten is manufactured slates; in the open quarries of Carnarvonshire only 3 to 4 per cent.

900. (*Mr. Redmayne.*) Five per cent. is sent to market?—Yes, and only 3 to 4 per cent. from the open quarries.

901. (*Chairman.*) Now, will you give a short outline of the inspection work?—From 1905 to 1909 the number of inspections of mines I made was as follows:—In 1905 there were 125 underground inspections and 26 surface inspections, without including the underground. When I mention underground inspections it includes surface inspections, and when I mention surface inspections it is visiting for surface inspection without going underground. As I say, there were in 1905 125 underground inspections and 26 surface inspections; in 1906 there were 127 underground inspections and 60 surface inspections; in 1907 there were 133 underground inspections and 30 surface inspections; in 1908 there were 121 underground inspections and 31 surface inspections; in 1909 there were 111 underground inspections and 60 surface inspections. Will you have the open quarries now?

902. No. Do you say, as the result of your experience, that the law is fairly carried out in your district?—It is.

903. Is the work competently done, and on the whole well done?—Yes; a good deal of care is being exercised.

904. Will you point out, before you go to the details, what is the weakest point in the mining in your district. What is the most important point to look to?—Examining rocks to prevent falls of ground.

905. The neglect of that is the cause of the greatest number of accidents?—I believe it is. I have a table showing the accidents from falls of ground.

906. (*Mr. Greaves.*) Are you referring to open and closed?—Both.

907. (*Chairman.*) Does this apply to quarries and mines—metalliferous?—I am referring to slate mines and quarries. These figures (*handed in*) are for the mines from 1895 on. Those are for the quarries for the same period. Since the special rules for slate mines were established in 1900 there has not been a single accident, with one doubtful exception, from falls of roof or of the pillars. They are simply from the working face.

908. Were those due to falls from the working face—not making it secure before starting?—That sketch shows the method of working, and you will see the difficulty of preventing falls.

909. There is no compulsion to examine working places regularly?—Yes, under the special rules.

910. For the whole of the metalliferous mines and slate mines and quarries?—There is a code of rules for metalliferous mines and for slate mines which are exempted under the Slate Mines (Gunpowder) Act, and a code for slate mines which are not exempted, simply differing as to explosives.

911. I think I gathered the compulsory inspection of working places was not at present the law——?

912. (*Mr. Greaves.*) It is in the special rules?—Yes, for mines and open quarries.

913. (*Chairman.*) There is no general rule. It is in the special rules?—Yes.

914. You are in favour of that being made a general rule throughout the country?—I am.

915. You think greater care in that respect is the greatest need of all?—Yes. Some mines and quarries are more unfortunate than others. I have made a list of slate mines showing the fatal accidents from falls for the last 15 years.

916. You think the Acts ought to be amended with regard to some person being responsible as manager of the mine or quarry?—I do, to be responsible for the whole of it.

917. At present there is no necessity to have a certified manager, or one person as manager?—No. If there is a person, manager or agent, he need not be responsible for the whole of the mine. He may be responsible for part only.

918. There are two questions: first, having one man responsible for each mine or part of the mine; and secondly, that the man should have certificated qualifications. You are in favour of having one man responsible for each mine or portion of a mine?—Yes, for the whole mine. There is no mine in North Wales either slate or metal, which is too large for one man to be responsible as head.

919. With men to assist him in the work?—Yes.

920. You want one man to look to?—Yes.

921. As regards qualifications, how far would you insist upon a certificate of some kind being held by every manager of a mine, from the largest to the smallest?—I would let no one be agent of a fairly large metal mine or slate mine without a certificate of competency, and I would allow no one to be foreman without an elementary certificate.

922. What would you do for the very small mines? Would you require some form of easier certificate to be obtained?—Yes. I find, in open quarries especially, foremen who do not know the special rules, and they are in charge of men.

923. Are they competent for their duties otherwise? Do they know about machinery and windlasses and ropes?—Not in many cases in the smaller ones.

924. You would like some form of humble certificate for the small mines?—Certainly.

925. The big mines are as difficult as the coal mines to manage?—Yes.

926. You want a certificate equal in difficulty of attainment to the coal mine managers' certificate?—Yes, quite as high, but different.

927. (*Mr. Redmayne.*) You use the word "agent." I take it you mean manager?—"Manager" is not recognised under the Metalliferous Mines Act.

928. Manager is a well-understood term. It is employed in the Coal Mines Act?—Under the Metalliferous Mines Act it is "agent." We have no manager.

929. But you mean manager?—Yes.

930. (*Chairman.*) With regard to the quarries, is it not the fact you get into difficulties about ownership?—Very frequently.

931. It is impossible to invent a hard-and-fast rule by which to say who is the owner of a quarry worked by different people?—Yes. I suggest that whoever employs a man working at the quarry should be held responsible.

932. Supposing you had a quarry visited by the men of a lot of different employers?—I would hold every employer responsible for his own men. The fencing I would leave to the owner of the land, but for the explosives and providing stemmers and a proper receptacle for the explosives, I would hold whoever employs the men responsible, even if there are half a dozen.

933. You require some method of specifying the person responsible, and think it is necessary?—Yes.

934. What suggestion have you to make about plans?—It may seem ridiculous, but first I suggest that all plans should be made in ink when made by a professional surveyor. In one slate mine some time ago a professional surveyor made his six-monthly plans in lead pencil. I complained to the owners, and this is what the surveyor replied: "As long as I adhere "to the requirements of the Mines Act I have no "concern with the individual requirements of any "mines inspector." But finally I got the plans made in ink.

935. That was rather a foolish answer?—I think it was. With the permission of the owners of the mine, I quote it to show the difficulty.

936. I should think for their own sakes they would keep it in indelible ink?—They insisted on the surveyor making it in ink after that.

937. You would not have a professional surveyor for every tiny quarry?—Not for the quarries, but I would require a correct survey of every mine, whatever the size.

938. (*Mr. Jones.*) What is the general custom as regards slate mines? Do they employ a surveyor for each mine? Do not a number of mines employ one surveyor?—There is a surveyor in the district employed by a good many.

(*Chairman.*) All the large ones ought to be carefully surveyed.

939. (*Mr. Greaves.*) All the large ones, as a matter of fact are?—Yes.

940. (*Chairman.*) Have you any complaints to make as to the method in which plans are actually kept?—Yes. In some cases I find that the plan of the mine is not made on one sheet, which I do not approve of. I think it should be on one sheet.

941. (*Mr. Thomas.*) You are chiefly referring to the slate mines?—Yes.

942. Do they draw their plans to any set scale or each to what scale they determine?—To what scale they determine. They are all on a large scale.

943. There is no fixed scale?—No.

944. Are they drawn to the magnetic north or to the true north?—I ask them when not to the true north to put the date.

945. No regulation exists as regards that?—No.

946. Is the plan in any way connected to the nearest Ordnance Survey bench mark?—No. The late Mr. Warren Roberts, of Blaenau Festiniog, did in one instance.

947. There is then no regulation in regard to these matters, but simply a statement to the effect that a plan should be kept?—Yes, not less than two chains to an inch.

948. (*Chairman.*) Have you the question of subsidence arising in slate mines?—Very often.

949. (*Mr. Greaves.*) By different sheets, do you mean different parts on different sheets or the whole of the working shown on one sheet. When different veins are worked you prefer them on one sheet?—The plan I complained of was inaccurate in one portion. Instead of making the whole plan, they made the part I complained of on another sheet, but did not make the whole plan.

950. You object to the different veins being kept on different sheets?—I object to the different parts of the mine being on different sheets. I should prefer them on one sheet. You might have supplementary plans.

951. The object of different sheets is for the sake of clearness?—I think the agent could have that for himself.

952. (*Mr. Thomas.*) Would not you have overlapping, and would it not be difficult to indicate the workings?—In some cases.

953. A plan means an underground plan, I take it?—Yes.

954. There is no regulation that that plan should be further developed by cross-sections?—"Plan" includes map and section.

955. Longitudinal and cross-sections?—It does not say so, unfortunately.

956. The regulations in regard to mine plans are then hazy?—Yes.

957. (*Mr. Redmayne.*) Have you known the plan of one vein of slate to be on two sheets?—Yes.

958. The plan of one individual vein?—Yes.

959. That is what you object to?—Yes.

960. It is equivalent to having the plan of a seam of coal on two sheets, whereas the plan of every seam of coal is on a different sheet. You object to splitting an individual vein?—Yes.

961. (*Chairman.*) Generally it is the same thing with coal-mining plans?—I do not know much of coal mines.

962. (*Mr. Redmayne.*) Supposing you were drafting rules with regard to plans, what would you require should be kept?—First of all, that the same seam or bed should appear on the same sheet, that faults should be put on the plan, that a longitudinal and a cross-section should be insisted on, and that they should be made in some waterproof ink.

963. What do you say with regard to Mr. Thomas' point about the magnetic and true north?—Plotted to the true north.

964. (*Mr. Greaves.*) Referring to the longitudinal and cross-section, you mean one on the strike and one on the dip?—Yes.

965. (*Chairman.*) Do you think it would be convenient that power should be given to the Secretary of State to prescribe the method in which plans of these mines should be kept?—I think power should be given to him.

966. (*Mr. Thomas.*) What scale are they generally drawn to?—I could not tell you.

967. (*Mr. Greaves.*) Generally a chain to an inch?—Not less than two chains to the inch. I think the custom is a chain to an inch.

968. (*Chairman.*) Are these plans of abandoned mines deposited by law just like coal mines?—They are.

969. There is a law to that effect?—Yes. I should like that to apply to suspended mines, especially metal mines, because for some years before the mine is abandoned but few men are employed and we cannot insist on the plan being kept up unless there are 12 persons employed underground.

970. It is the same difficulty as with the coal mines. You do not know when they are abandoned. There ought to be some rule that when the mine has not been worked for a certain time, so far as the deposit of the plan is concerned, it should be considered abandoned?—It should be considered abandoned, and a plan should be sent within three months of the suspension.

971. There ought to be similar powers to get the plans where a mine becomes bankrupt and there is nobody to look to?—Yes.

972. (*Mr. Ainsworth.*) With regard to the plans you want kept—no matter how kept—you want when you go to the office that you may be able to judge in as short a time as possible what has been happening since you were there before, and the condition of the mine at the moment?—Yes.

973. So long as the plans will give that information as shortly and simply as possible, that is what you want?—Yes, and that they should be a guide as to the future.

974. (*Mr. Greaves.*) How can a plan be a guide to the future?—Supposing a mine is abandoned and the plan deposited, it would be some guide to those re-opening the mine.

975. (*Mr. Redmayne.*) The position of faults, and so on, would be some guide to the future?—Of great importance.

976. (*Mr. Thomas.*) Hence my question, whether you would not make it compulsory, in plans of abandoned mines, to connect some point in the mine to the nearest Ordnance Survey bench mark?—I think they ought to.

977. It would not take a surveyor long to do it?—No.

978. They should be connected?—By all means.

979. (*Mr. Greaves.*) They are mostly indicated on the Ordnance map?—No.

(*Mr. Thomas.*) There are no regulations existing for it.

980. (*Chairman.*) Do you get mines left with water in them?—We have had some.

981. For adjoining mine owners working near, it is important in the interest of safety to know where the workings are full of water?—Very important.

982. Therefore for that reason the correctness of plans of abandoned mines may be very vital?—Yes, and from an economic point of view. I may mention the gold of the Dolgelly mines. It occurs in rich pockets, and if these were put on the plans and sections it might be of some use from an economic point of view.

983. In preventing people working down to them and finding nothing?—Yes, and also they might be some guide. Possibly there might be some law regulating these things, and they would know in what direction they carry.

984. You have told us what you had to say about accidents and falls of ground. That ought to be made the subject of further inspection?—Yes.

985. Have you anything to say with regard to explosives?—Yes. There are a good many accidents with explosives owing to the ignorance and carelessness on the part of the men.

986. Are you in favour of everybody who is allowed to use an explosive—that is, to charge a shot hole or fire it—being authorised in writing?—Yes.

987. That would be sufficient. You need not have any examination?—Authorised by the agent, and the agent would be held responsible.

988. If he authorised a person who was careless?—Yes.

989. (*Mr. Greaves.*) Limiting the number of those who are authorised to fire shots?—Yes. In slate mines and in metal mines, as far as I know them, I would have one man in each gang responsible for the explosives.

990. In each shift?—Yes.

991. (*Mr. Lewney.*) Supposing a man was ill is the gang to stop work, or supposing he overslept?—A case like that could be managed by the agents.

(*Chairman.*) You must have an understudy.

992. (*Mr. Greaves.*) An understudy would be allowed?—Yes.

993. Then you would have two?—Yes; in the absence of the one you would authorise the other man.

994. (*Chairman.*) We may sum up your opinion that you would allow as many men as necessary for the purpose of carrying on the work, but you would like them to be as few as possible?—Yes.

995. (*Mr. Redmayne.*) And they should be competent?—Yes. Another thing I should like would be to discourage the use of explosives that are liable to congeal or freeze. The majority of accidents with these occur in the winter months.

996. (*Mr. Thomas.*) You want to prevent the use of them?—Provided there are others on the market to answer the purpose. There is a non-freezing gelignite, and since such is to be got, the use of the freezing gelignite should be forbidden.

997. (*Mr. Greaves.*) If it is as good?—Yes. If an explosive which answers the same purpose as a freezing explosive is to be got which is non-freezing, I think we should forbid the use of the freezing explosive.

998. (*Chairman.*) You have known accidents from that freezing?—Most of them occur in that way. They occur in the winter, and although the men will say the explosives are plastic, they are not.

999. How is the thawing done?—In warming pans used at the mine.

1000. Do accidents occur in doing that?—No.

1001. It is only in the use of explosives when they have frozen again or not properly thawed?—Yes.

1002. (*Mr. Redmayne.*) All explosives containing nitro-glycerine are liable to congeal at a fairly low temperature. You would do away with those nitro-glycerine explosives in metalliferous mines?—As far as possible. There is an explosive now on the market which is claimed to be non-freezing.

1003. Supposing none of these explosives were allowed to be used unless they had been thawed, could not you make the thawing by warming pans compulsory?—We have that now, but it is not generally done.

1004. With the permitted explosives?—Yes.

1005. There is no general rule?—We have the special rules.

1006. Would not you incorporate that in a general rule?—By all means.

1007. (*Chairman.*) Are there explosives which are non-freezing to be got at a reasonable rate?—Yes, I believe so. There is a firm of explosive manu-

facturers that claim to have a non-freezing gelignite now.

1008. That is a point for the explosive officers of the Home Office?—Yes.

1009. And to enforce the use of explosives that do not freeze, if possible?—Yes. Then there is another point I want to mention. Explosives should undergo some test before being used in metal mines underground. In 1906 four men were overcome by the fumes of a new explosive when the makers' own expert was demonstrating with it. Although the men waited 1¼ hours before returning to their working places one was unconscious for four hours.

1010. Was not that rather in the nature of an experiment?—I think they should experiment with their explosives somewhere else than at the mine.

1011. The explosives officer should have done it?—Yes. There was another case last year where the expert chemist of a company experimented underground, and he was overcome. The matter was reported to the Inspector of Explosives and he was informed by the makers that they were experimenting again with the explosive. I am anxious that the experiment should be done elsewhere than underground.

1012. (*Mr. Redmayne.*) You ask for a permitted list of explosives for metalliferous mines?—Yes, in a way. Last year a man was overcome, and he brought a case against the makers of the explosive, and they settled it out of court the night before, so that there is something in it.

1013. (*Chairman.*) Just as there are permitted explosives in coal mines, you are of opinion that there ought to be a permitted list for use in mines and quarries?—I am.

1014. (*Mr. Greaves.*) You think the experiments should be made on somebody other than the miners?—Yes.

1015. (*Mr. Lewney.*) In an open quarry?—I do not say anything about that.

1016–17. (*Mr. Greaves.*) You could not test it. You could not test the fumes so well?—No. The Inspector of Explosives could do that.

1018. (*Dr. Haldane.*) Do you recommend that they should include an account of the gases?—By all means. In this case Captain Desborough, who allows me to quote from his letter, says: "As the "chemist of the factory was overcome, they will "doubtless take the necessary steps to remedy this "state of affairs, and I gather they are already experi-"menting with different combinations of ingredients."

1019. (*Mr. Lewney.*) Would it not meet with your views if it was made prohibitive to use any explosive underground that had not first obtained the sanction of the Home Office?—That is what I mean.

1020. (*Dr. Haldane.*) As regards their poisonous character, as well as the other?—Yes.

1021. (*Chairman.*) Each explosive when permitted should be accompanied by a short description of its qualities and properties as found by the Home Office?—Yes; and I think also the description supplied to miners, of explosives, should be submitted to the inspectors of explosives. You find makers say that the fumes are not injurious or unpleasant. I do not think there is any explosive which is so.

1022. A great deal depends on the way it is used. If you burn an explosive or imperfectly explode it it is dangerous?—No doubt.

1023. The accident you speak of may have been due to the burning instead of a proper explosion?—If so, I fail to see why, as stated in this letter, the chemist of the factory should make experiments for altering the composition of the explosive.

1024. (*Mr. Redmayne.*) You have alluded to the burning of the explosives. Have you known explosives used as a means of lighting to examine the roof and sides?—No. It has not happened in my experience.

1025. (*Chairman.*) How many accidents have occurred through the misuse of explosives?—In mines, two fatal and six non-fatal. In open quarries, one fatal and 13 non-fatal last year.

1026. That is too many?—Yes, by a long way. We have in our tables "when using wooden, brass or copper tools." Men use copper or brass tools for stemming high explosives, and the notion prevails that if they use copper or brass they can ram as hard as they like and there will be no explosion. When we have done away with the iron ones the danger of too hard ramming should be pointed out, I think. In using high explosives the instructions issued by the makers should be followed.

1027. We should have some control over the issue of those instructions?—Yes.

1028. There would be no harm in having a small circular prepared and distributed among the men as to what to do and what not to do?—No, it would be very desirable.

1029. With regard to the annual returns, I think, we are not called on to go into that question?—May I draw your attention to the crane accidents at slate mines and quarries? We have had a good many accidents with cranes from time to time, and they are generally serious. In lowering the blocks the handle flies back and hits the man on the forehead. There have been several fatal ones, and the non-fatal often result in fracture of the skull. The difficulty was to have adequate brakes.

1030. I should have thought that the ratchet would have prevented it?—The ratchet will when they raise the stone, but not in lowering, when the accident occurs. At Dinorwic and Penrhyn safety brakes have been supplied, and there has not been an accident since, although there were many before. I am anxious that a general rule should be included to make safety brakes compulsory on all hand cranes.

1031. Are they easy to fit on to old cranes?—Several of the managers of the slate mines were willing to adopt them, but the difficulty was to adapt them to the present cranes, but I believe it can be done now.

1032. (*Mr. Greaves.*) When the Departmental Inquiry was held at Blaenau Festiniog some question was raised, and certain brakes were recommended which proved to be impracticable?—Yes. What I suggest has been in use at Penrhyn and Dinorwic for five or six years, and applied to every crane, and there has not been a single accident since.

1033. (*Chairman.*) Is this a patent?—It was not patented so that it might be used generally.

1034. Then there is no reason for not having it?—None whatever.

1035. We should like to have a sketch of the apparatus?—It has been improved since. In the photograph shown a man had to throw a ratchet-and-pawl arrangement out of gear. Now by applying the brake it automatically gets out of gear.

1036. About the annual returns, there is a misunderstanding as to the term "dressed" mineral?—Yes. In the case of gold ore all the rock put through the mill is included in the "mineral dressed." In the case of copper ore, lead ore, and zinc ore the dressed mineral ready for market is entered; in the case of slate mines the finished product, which is only about 5 per cent. of the whole. I am right about that, I think.

1037. (*Mr. Greaves.*) Yes, if you include the open workings, but from the mines proper it is higher?—In the Slate Mines Commission some managers estimated it at 5 per cent.

1038. Including the open workings?—Including the waste in dressing.

1039. If you take the mines proper it would be higher, but it is that practically?—Yes.

1040. (*Chairman.*) Now about education in mining. Have you any remarks to make?—Yes. In North Wales there is no provision for education in metal mining or quarrying, with the exception of one class at Rhosesmor, in Flintshire.

1041. What is the local authority doing?—Nothing whatever. In Carnarvonshire, in the slate quarrying districts, these are the subjects taken. In one, shorthand; in another, commercial arithmetic, algebra, geometry, book-keeping, citizenship, music, and shorthand; and in four of the quarrying districts, singing only.

1042. That is very useful, but you would like to add a little elementary instruction?—We have a good deal of singing in Wales already, but I think we could do with a little less and more education in mining.

1043. (*Mr. Lovett.*) What do you suggest in regard to the instruction in mining in quarries?—There is the Board of Education examination in metal mining (*producing document*).

1044. (*Chairman.*) This illustrates the kind of instruction that might be given to the men?—Yes. The late Sir Clement Foster and myself drew this out for the City and Guilds Institute. Very few have gone in for the examination, and not a single class has been formed for the purpose of instructing the men in the art of slate quarrying.

1045. If the teachers were paid to come, and came, do you think that the men would listen to them?—Yes, if you make certificates for managers compulsory. Young men have gone to the Camborne School of Mines and have come back to Festiniog, but they could not get anything to do, and they have gone away, one to America and one I know has gone to India. If there is some inducement for a man to improve his position by study, he would go in for it, but there is none.

1046. Is there any form of instruction that would be useful for the ordinary miner who does not aspire to become a foreman or leader?—No. I hope some of the educational authorities in Wales will draw out a scheme for it.

1047. They have received a grant?—They receive a grant for singing.

1048. They have received a technical grant, but your complaint is that they have spent it on singing instead of mining?—Yes.

1049. (*Mr. Ainsworth.*) One of the subjects you mentioned was citizenship?—Yes.

1050. How do you teach that?—I do not know. I have seen some text-books on it.

1051. (*Chairman.*) At all events, it comes to this: If we have a system of certificates for mining, it is desirable that the means of obtaining the certificate should be provided, and that a fair chance of education should be put within the reach of the men?—Yes.

1052. And that assistance should be given by the local authority in the way the law has provided for it?—Yes, by a technical instruction grant.

1053. (*Mr. Thomas.*) There is no difficulty in obtaining a technical instruction grant if the inhabitants of the district so desire?—At present there is the difficulty of getting teachers in that subject. If it is made worth men's while they will study it.

1054. Do you think they would?—I think so.

1055. (*Chairman.*) What language is used in the schools, Welsh or English?—Up to Standard II. it is Welsh; then they take English.

1056. It is good for their future prospects for the men to learn English?—They should learn English at the expense of everything, I should say.

1057. The quarries are the largest in the world?—Yes.

1058. What is the number of persons employed in quarrying?—Last year the number employed in quarrying was 13,408, and out of those 10,169 were employed in Carnarvonshire.

1059. The numbers have rather fallen off the last few years?—Yes, for the last four or five years, owing to depression in the slate trade.

1060. Is that due to the use of tiles and materials of that sort instead of slate for houses?—Mostly, and very little building done in the country.

1061. Is there an export of slates?—Yes.

1062. They are sent abroad?—Yes.

1063. That trade has not fallen off so much?—Yes, very considerably.

1064. (*Mr. Greaves.*) How does the export compare with the import?—I cannot tell you. I have not the figures with me.

1065. (*Mr. Redmayne.*) The French export them?—They are not doing so much. Not so many French slates are coming in.

1066. (*Mr. Greaves.*) Have you the figures for the last quarter and the corresponding quarter of last year?—I have not.

1067. The method of working quarries in North Wales is by means of galleries and pits?—Yes; you have the system of galleries and pits. I have some photographs here to show you (*producing same*).

1068. (*Chairman.*) That must be rather a wasteful method. You leave a quantity of material behind in working with galleries. They leave columns?—You work all the mountain side.

1069. You do not let the roof fall in?—We are talking of quarries. There is no roof.

1070. I was thinking of mines?—Here is a photograph showing the ladder by which we go down the pit.

1071. That open method is less wasteful than the underground method?—Where they work underground it is impracticable to work otherwise; they would have to remove so much surface rock.

1072. I have heard it stated that there are many mines worked as underground mines which might have been worked more profitably open to the air?—There is not one in Merionethshire. There is such an enormous thickness of worthless rock on top.

1073. Do you consider the present working of the quarries in your district entirely satisfactory, or can you suggest any improvements?—Yes, I can suggest improvements.

1074. (*Mr. Greaves.*) Do you consider it satisfactory? That is the question?—Not quite.

1075. (*Chairman.*) Do you consider it satisfactory, or are there any points to call attention to?—There are.

1076. In quarries?—Yes. The quarries producing igneous rocks are generally worked in galleries about 60 feet high, some with a sheer face. In Carnarvonshire the slate quarries are worked in three centres, around Llanberis, where the great Dinorwic quarries are, Penrhyn, quarry at Bethesda, and a group of quarries in the Vale of Nantlle.

1077. (*Mr. Lewney.*) What height are the separate galleries?—I am coming to that. At Dinorwic these are worked in galleries on the mountain side; taken in a line, 23 galleries from top to bottom. The height is about 70 feet vertical. Now they aim at getting them 60 feet, but this was the old method of working, and for economical reasons they cannot reduce them to 60. The new galleries are all opened at a depth of 60 feet.

1078. (*Mr. Jones.*) Is that the average height?—70 feet was the average. Up to 26 years ago every gallery was 70 feet deep. Since then they have been trying to open them of 60 feet.

1079. Then 70 feet is an average?—Yes.

1080. (*Chairman.*) Will you go on to point out some inconveniences?—These are worked in bargains each 7 yards working face, so that there are 100,000 square yards being attacked. One difficulty is to get the floor wide enough. They aim at it, but there is a difficulty which I admit.

1081. That would mean you want greater height if you are to get the floor wide enough. The very short height would mean rather a narrow gallery?—Yes. The difficulty is this. The mountain side is steep, and they begin quarrying at the bottom and work the galleries upwards. It is difficult to get the galleries to be wide enough.

1082. You could only do it by having an enormous height of the gallery. If you want a considerable width you must have the height?—Yes; but if you increase the height you gain nothing, because a stone falling from such a height would go over.

1083. There comes a danger the other way?—Yes.

1084. (*Mr. Lewney.*) What do you consider a sufficient width for the gallery?—I should not like to say. They try to have them equal to the height, but it is difficult.

1085. 70 feet?—Yes.

1086. (*Chairman.*) You were going to point out something that could be done; some alteration you thought would be for the better?—They could build walls on the edges or leave big blocks where the galleries are narrow to prevent things falling over to the galleries below. There have been only three fatal

accidents within 15 years, from things falling over from one gallery to another.

1087. (*Mr. Jones.*) Is there not a rule already to have that protection?—That is when they are at the edge of the gallery.

1088. (*Chairman.*) That rather points to the method being as good as can be?—They are doing the best they can, but I should like them to be wider in some cases, if possible.

1089. (*Mr. Greaves.*) Only three cases in 15 years from rocks falling over the gallery?—Yes, from one gallery to the other.

1090. (*Mr. Jones.*) Can you give the number of non-fatal accidents?—I think only three or four.

1091. (*Chairman.*) From that cause?—Yes.

1092. (*Dr. Haldane.*) Is not it dangerous during blasting?—Yes; but they have shelters in open quarries, except where the men leave the quarry according to the special rules. There are shelters the men have to use at time of blasting.

1093. (*Chairman.*) As far as the working is concerned there does not appear to be anything the State could do to force the galleries to be wider?—I am afraid not.

1094. The accidents seem to me to be comparatively few from that cause?—Yes.

1095. The accidents arise from other causes?—Yes, a good many from explosives.

1096. That you have dealt with already?—Not in open quarries.

1097. (*Mr. Greaves.*) These walls you speak of, which you would like to have built at the edge of the galleries, would have to be continually moved?—Yes.

1098. They might only last a day or two?—No, unless the gallery is exceptionally narrow they need not put them near the edge.

1099. You would move them forward in steps?—Yes. We had one accident this year which might have been prevented by a thing of that kind. They were clearing an old fall, collapsed workings, and there was hardly room for the wall, it was a very narrow one, and the wall was built after the accident. If it had been done before, the accident would not have happened.

1100. (*Mr. Jones.*) What quarry was that at?—At Cloddfa'r coed.

1101. (*Chairman.*) Do you think it would be desirable to do away with the distinction of inside and outside?—Yes, very.

1102. So as to include in the meaning of the word "quarry" the mounds and approaches, as you do in coal mines?—Yes. In the case of an inclined plane, you may have a man committing a breach of rule on one incline, and if he walks 10 yards to the top of another he may ride down without committing a breach. One is under the Quarries Act and the other is under the Factories Act.

1103. With regard to fencing, have you had accidents from want of fencing?—Yes.

1104. Have you had accidents to the public as well as the men?—Yes.

1105. The public are supposed to be looked after by the Highway Authorities?—They are, and I do not think our special rules are intended to provide for the public. That is my difficulty. They are for the discipline of the persons employed.

1106. Have you had many accidents?—Through people falling?

1107. Yes?—Some.

1108. (*Mr. Redmayne.*) In working quarries or barren quarries?—In working quarries; in those near the sea, through sailors falling over at night.

1109-10. (*Chairman.*) What are the notices that are required to be posted up?—As to the inside, and outside, respecting the Quarries Act if a person under 18 works inside a quarry that (*indicating a notice*) must be put up. Outside a quarry that (*indicating another notice*) must be put up as well. I think with very slight alterations the Quarries Act would do for the inside and outside.

1111. Do you find those are washed away by rain much?—Yes, when put outside they are.

1112. Is it not possible to protect them with glass?—They do in some cases. In Mr. Greaves' quarry, for instance, they enclose them and frame them.

1113. (*Mr. Greaves.*) They are bound to be stuck outside?—In a conspicuous place; but we generally ask to have them outside, if possible, so that the men can see them

1114. In some cases the men have been handed copies?—Yes; not of the abstract.

1115. Of the rules?—In the slate mines every man has been supplied with a copy of the rules.

1116. (*Chairman.*) Are there any other rules which especially occur to you as being inadequate except those you have mentioned?—Yes, the explosive rules.

1117. Those you have dealt with?—There are others here. In the rules "so far as reasonably practicable" is in the preamble, but we have several instances of "if dangerous." I think the "if dangerous" should come out.

1118. Those are smaller points of drafting?—Yes.

1119. You are speaking now of special rules applicable to this district?—To the North Wales district. Then I want detonators kept in locked boxes apart from everything else. That is not so now. They may be kept in secure boxes where there are candles or other articles. I think we should have a rule that every workman or gang of workmen should possess their own stemmers, wooden, or some metal other than iron or steel.

1120. (*Mr. Lewney.*) That is a thing that devolves on the management. They would have to see to that?—No, we should have it by rule. The rule says that every workman or gang of workmen must possess his own explosive chest. I think it might also state that every gang of workmen should have their proper stemmer.

1121. (*Mr. Redmayne.*) Or be provided with it?—Yes.

1122. (*Chairman.*) Do the men buy their explosives at small shops?—No. There are magazines at the quarries and the mines, and they get them there provided by the owners. Then I suggest that the working places should be inspected twice daily, instead of once, by the official in charge.

1123. (*Mr. Redmayne.*) Before work and during work?—During work.

1124. Once before and once during work?—I am afraid they cannot do it always once before work in the open quarries.

1125. (*Mr. Lewney.*) You are speaking of quarries?—Yes.

1126. (*Mr. Greaves.*) Do you think that applies to the mines?—No.

1127. (*Chairman.*) I suppose you would be in favour of at least one inspection during the day in all mines?—Yes.

1128. Some of the more dangerous ought to be doubly inspected?—Yes.

1129. Would you require double inspection for all, whether dangerous or not?—I would, in open quarries.

1130. Independent of the nature of the material?—Yes, because they have officials enough to do it.

1131. Stone quarries are not so dangerous as slate. Would one be enough, or would you have two?—I think I would have the two, because the man goes round as timekeeper in the morning and afternoon, and if that was added to his duties he could do it.

1132. You put stress on that?—Yes.

1133. Sir Henry Hall also did?—I don't know.

1134. (*Mr. Redmayne.*) With regard to inspection, it is possible to make an inspection before commencing work in a coal mine. Why is it not possible to have an inspection before commencing work in a metalliferous mine?—I am talking of the quarries.

1135. Why not in quarries?—Because in winter they begin working at daybreak. It would be absolutely impracticable.

1136. It is the question of light and darkness?—Yes.

1137. (*Mr. Greaves.*) Also it would mean the employment of another inspector or overseer, if he had to go round the whole quarry before the men came?—Yes, more than one.

1138. It would entail the employment of more overseers or inspectors?—Yes.

1139. (*Mr. Redmayne.*) As in the case of coal mines?—Yes.

1140. (*Mr. Lovett.*) It would be impracticable to inspect the quarries before the men started to work?—Yes. They start at daybreak in winter.

1141. Before you can see the face of rock?—Yes.

1142. (*Chairman.*) You were telling us about the accidents in slate mines. There are a good many cut hands?—Yes.

1143. Do you think that the wearing of gloves would be a good thing for these men?—No. I should like to show you the nature of the things they have to handle, which will help you to get an idea. These are small specimens (*producing pieces of slate*).

1144. Supposing you had a glove with small pieces of iron across it, it would wear an enormous time?—If a man has to turn a stone several times before putting it on to a wagon, I do not see how he could use gloves, I do not see that gloves would be practicable for the kind of work. On a wet day there would be greater danger.

1145. (*Mr. Redmayne.*) They would be slippery?—Yes.

1146. (*Mr. Jones.*) You got that stone from a dressing mill?—Yes.

1147. Not from inside?—No. It is the same thing.

1148. (*Chairman.*) It does not appear that anything can be done to prevent the cuts on the hands if gloves are useless?—I cannot suggest anything. I am afraid gloves are quite impracticable. The men who load dressed slates use pieces of leather on the fingers and a part of the palm. They put a hand like *that* and load it but with rough blocks when they have the glove on the hand it is out of the question.

1149. How about eye accidents? Do you use shields, to prevent those?—Yes, I think so. Most of those happen when the men smash big pieces of slate up with sledge hammers. Under those circumstances a man might wear goggles to advantage, and also when gouging a slate.

1150. Would you have a goggle with glasses in front and gauze round it?—I would not have glass at all, I would have gauze.

1151. Gauze over the whole front?—On both eyes, just as the stone-breakers have.

1152. Would you have the gauze only at the bottom and the shield open at the top, or enclosing it?—Just the same shape as ordinary spectacles with wire gauze instead of glasses, open at the sides.

1153. Like a pair of spectacles, with gauze instead of glass?—Yes. I accompanied Mr. Mottram to Dinorwic the other day, and the manager there is prepared to try them. He selected a number of men to see if it was practicable.

1154. Why not have good thick glass, convex or concave, or flat? Such glasses are very cheap. Would not they be better than the gauze?—A splinter would break the glass, and might injure the eye more.

1155. There is too much force?—It would break the glass.

1156. In shooting, they have glass to stand shot from a shot-gun?—Would not they be expensive?

1157. No, they are very cheap. An ordinary convex glass costs about 1½*d.* in the market. I can produce you a number of plain glasses which are cheaper still?—I would sooner see the gauze tried than the glass.

1158. It would be safer. Can they see through the gauze well?—When a man perspires the glass would be cloudy.

1159. (*Mr. Greaves.*) You would use the goggles when using a mallet and when gouging?—No, not when using the mallet. At Dinorwic quarries they do a good deal with the sledge-hammer.

1160. (*Mr. Lovett.*) Do some companies keep these in stock and sell them to the men?—They are going to do so.

1161. I know one granite firm that sells them to the men at 6*d.* a pair?—These can be got for about 4*d.*

1162. (*Mr. Jones.*) Is it the man who is actually gouging that gets injured, or the man working some distance away?—I have a table of them at Dinorwic and Penrhyn. I have taken the gouging and the sledge-hammering. At Dinorwic they were nearly all using a sledge-hammer; at Penrhyn they were gouging. There is only one instance of a splinter flying from another man and striking one in the eye.

1163. How many have actually happened to the men gouging?

(*Chairman.*) Under the Truck Act it would be illegal for the employer to charge more than the value of the spectacles.

(*Mr. Lovett.*) I do not think they do in this case.

(*Chairman.*) It is difficult to say who ought to pay for them, but if he charges more than the cost price to him it is illegal.

(*Mr. Lovett.*) In this case they do it for the convenience of the men.

(*Chairman.*) They propose to provide them at Dinorwic.

1164. (*Dr. Haldane.*) They are used by stone-breakers on the roadside?—At Penrhyn in 1909 there were six accidents whilst using a sledge-hammer, eight whilst gouging, two while splitting. At Dinorwic there were 10 whilst using a sledge-hammer, five when splitting, four when driving a wedge, and five when dressing with a hand knife. I have not gone into the others, but they are various.

1165. In answer to Mr. Jones's question whether it was the man who is doing the work or someone in the neighbourhood, what do you say?—The man who was doing the work, with the exception of one instance. There is one from another man's hammer.

1166. (*Mr. Jones.*) What proportion does the number of men actually gouging bear to the total number?—At Penrhyn, 25. Eight were injured whilst gouging. That is just a third. At Dinorwic, 29. We had them as 30, but one was only disabled a week. Ten of those were injured whilst using sledge-hammers, and none while gouging.

1167. (*Mr. Greaves.*) Are all those injuries in the eye?—All to the eye—29 at Dinorwic, and 25 at Penrhyn last year.

1168. (*Mr. Lovett.*) Can you give the proportion of accidents to the eye in granite quarries? It strikes me as being larger than that?—Twenty-four.

1169. It is larger in proportion?—In the granite quarries?

1170. Yes?—They are rather, because there are fewer employed. You would expect it, because the men dress so much with the hammer in making setts and breaking stones.

1171. (*Chairman.*) While we are speaking of Dinorwic, what is the reason of the very large number of accidents that happen?—It is about one in three men who are off under the Workmen's Compensation Act every year. They are off for an average of three weeks?—They are off on an average from two to three weeks.

1172. That looks a formidable figure when put down on paper. Can you tell us how they can be minimised?—I cannot. I have gone through them carefully, all these cuts on hands and other slight injuries. There were 205 which disabled men for two weeks and less than three weeks out of the 491 accidents.

1173. Could we get some method of working which would get rid of those?—I am afraid not.

1174. It is rather unsatisfactory for us to feel that there is a large figure of that sort and that you are unable to suggest anything that we can do?—I hardly like to make the suggestion, but if it had not been for the Workmen's Compensation Act a good many of those 205 would be working.

(*Mr. Jones.*) How do you make that out?

1175. (*Chairman.*) There is no reason not to say what you think. It is natural that a man who has got compensation should go off and take a rest when, perhaps, he would not if he had no compensation?—I will give one instance. There was a man who met with an accident. He had been disabled a month and a day. In making investigations as to the cause of the

accident I had a conversation with him and asked him about the nature of the work, and he said they had been doing badly for some time. "We only earn 12*s.* 6*d.* a week." I said, "That is low." He said there was no loading. I said, "You did better with the compensation." He replied, "With my two clubs and compensation I received over 22*s.* a week."

1176. You think that to a certain extent that would explain these abnormal figures?—Again, these men are mostly disabled from two to three weeks. No compensation is got unless a man is disabled for two weeks. If a man can go back to work on the tenth day it is only human nature to try and make it into a fortnight.

1177. (*Mr. Redmayne.*) In old days a man would return to work before the cut was healed, at the risk of getting blood-poisoning?—Yes.

1178. Are there less cases of blood-poisoning than there were?—Yes.

1179. (*Chairman.*) In not returning to work there is nothing to be said against the man?—Not in the least.

1180. It prevents his getting blood-poisoning, probably. At the same time, you think that the other point you mentioned explains to a certain extent the large number of injuries at Dinorwic?—These men, I believe, would have made an effort to work before this had there been no compensation.

1181. (*Mr. Lovett.*) It is not permissible to build up a case on supposition?—No, but one cannot help drawing an inference.

1182. One swallow does not make a summer?—No. But out of the 491 accidents you have 205 which disabled for two weeks or less than three.

1183. (*Mr. Jones.*) The quarry owners pay for the hospital and the doctor?—Yes.

1184. No one gets compensation unless he is certified by the doctor?—No.

1185. (*Chairman.*) It is desirable, apart from the wage question, that a man who has a cut should stay away till it is healed?—Yes.

1186. As far as the risk of blood-poisoning is concerned?—Yes.

1187. The point you make when I asked why the figures were high is this: you think that the staying away has some effect in raising the total of the returns?—Yes. I have gone carefully into this at Dinorwic and other quarries. I do not see anything in the method of working at Dinorwic which makes it more dangerous than in Nantlle.

1188. Again, in point of education, you have the same remarks to make with regard to quarrying that you had to make with regard to mining?—Yes.

1189. There is not much chance for a man to improve himself by education?—I believe the number of accidents would be lessened considerably if the men were better educated.

1190. How is that?—I do not think they know the nature or the dangers of their occupation, especially with explosives. If a man knows the nature of the joints, the cleavage, the bedding, and the other incidental joints he meets, he could guard himself better against accidents.

1191. You look rather for a diminution of the accidents to more careful working?—Yes.

1192. (*Mr. Greaves.*) More careful working on the part of the men or on the part of the management?—On the part of the men, and more superintendence often on the part of the foremen. The foremen are not observant men in many cases.

1193. (*Mr. Lewney.*) Do you find a larger proportion of accidents among illiterate men?—I cannot tell, but I should expect it.

1194. You never have had practical experience? Have you worked as a miner?—Yes.

1195. Did you not find so at that time?—I was young when I did that. I had not commenced observing.

1196. (*Mr. Greaves.*) Are they all practically illiterate men working in the Welsh quarries and mines?—I will not say "illiterate," but they are ignorant of the principles of mining and quarrying.

1197. They must learn something about the principles of mining and quarrying when they have been working there some years?

1198. (*Mr. Jones.*) Do you consider that theoretical knowledge of slate quarrying is better for a man than practical knowledge? It shows him the danger of quarrying better than actually working, does it not?—In my opinion he wants both.

1199. You made the suggestion that he ought to have the theoretical part?—I think there should be a chance within the reach of every boy who works at a slate quarry or mine of knowing something of the theory of his work if he wants to.

1200. (*Mr. Lovett.*) It is incomprehensible how a knowledge of theory would prevent accidents. I thought a good knowledge of the actual method of working would be a preventive rather than a knowledge of the theory?—I think both of them would be.

1201. I am not suggesting anything against a knowledge of theory?—Certainly he wants the other.

1202. (*Chairman.*) When you speak of a knowledge of theory, you mean very simple theory?—Yes.

1203. Such as the way slate is found to cleave, and so on?—Here is a photograph of the face of a working bargain at the Dinorwic quarries. There is a bedding plane, there is a cleavage plane, there is a back joint, a foot joint, a bevel joint, and incidental joints.

1204. (*Mr. Redmayne.*) Would not the workman learn those joints from handling the slate far better than out of a text-book?—Yes; but if he knows these theoretically and observes, in addition to his practical knowledge, it would help him to avoid some of the dangers.

1205. (*Mr. Jones.*) Would not a practical man give points to a theoretical student on joints, and matters of that kind?—Yes, if the other man does not know them.

1206. Could not a practical man show a theoretical student things? A man must know the things before he can take the rock down in a satisfactory manner?—I do not want theory without the practice.

1207. (*Mr. Redmayne.*) Does not the theoretical man get these points from the practical man to put in the book?—If he does not go and see them for himself.

1208. (*Chairman.*) In other words, you say a man who has got a thorough practice in addition to this theory, is better than the man who has practice only without any theory?—Yes.

1209. The lack of educational facilities results in not giving inducement enough to young men to learn and better themselves in quarrying?—Yes.

1210. There is no inducement for a young man to study, because there are no opportunities?—None whatever.

1211. It would be desirable that young fellows should make themselves good miners, because there are openings in the Colonies and places where they can go to?—It would. It is important for them.

1212. You wish to see chances offered to everyone?—Yes.

1213. Again, in the same way you desire to see the agents or managers of the collieries obliged to take some form of certificate to raise the standard?—Yes.

1214. With regard to working in pits, here (*indicating a photograph*) is an example of a pit at Talysarn Quarry. At some quarries it is impossible to work except in this manner?—Yes.

1215. It looks a dangerous way of working a quarry with this immense cliff and these ladders running down?—Yes. They are liable to accidents from falls of ground from a place beyond the person's working place.

1216. Wherever a quarry can be worked in galleries or steps this ought to be done. It should not be worked in this pit fashion?—Yes. It is to the owner's own advantage to work in galleries, but in Nantlle the quarries are grouped together in such a way that they encroach the one on the other, and when the man gets to his boundary he has only to work it as a pit or abandon it.

1217. Why could they not work this face in successive galleries?—They have worked it in galleries till

they came to the boundary. They have worked on to the boundary and left it.

1218. It is a question of ownership?—Yes; there are different owners. Those people have gone to the boundary of their property. They cannot remove more of the top, so cannot have a gallery, and they have worked the rock in galleries until the boundary is reached and then work along the boundary.

1219. It seems rather a pity that some arrangement is not forced upon the owners to make it possible to work these things in galleries?—It is a pity.

1220. If the pit fashion is a dangerous way of working, it ought to be discouraged?—There is another thing to be said. They come to enormous beds of grit. The beds are often on end. When they come to a bed of grit of that kind, from an economical point of view it is out of the question removing it, and they work the slate up to it and leave it.

1221. The point is this. Where you can work in galleries it ought to be encouraged?—Yes.

1222. And working in pits in this way ought to be discouraged?—Yes.

1223. Have you had any experience of stone-crushing?—Yes.

1224. There is a good deal of dust from that?—Yes, but the provision for getting rid of it in North Wales is one of the best in the kingdom.

1225. Perhaps you have a drawing of it?—No. I can get you drawings and photographs if you like.

1226. I should like to have a sketch showing how it is done. Will you describe it?—Yes. Mr. Darbishire at Penmaenmawr was the first in the kingdom to introduce fans into the crushing mills, 21 years ago. He has now a perfect system of exhausting dust. The stone, before it enters the breakers at the top, is damped by water supplied under pressure. It goes from the crushers to the rolls underneath. The rolls are covered with grooved and tongued boards. From the rolls it passes into the riddles to be sorted into different sizes. Here there is an intake of 7 feet to the exhaust fans, so that the dust is collected at the breakers. It goes from the breakers and the riddles and the rolls to a passage. The riddles are tightly covered in with a casing of grooved and tongued boards again, so that any dust caused by revolving stones inside the riddles is carried to a chimney by means of the fan. None escapes into the mill. There are four mills altogether of this type, and the draught is so great that it draws not only dust but fine sand along with it. There are settling chambers for this sand, and only the fine impalpable dust leaves the settling houses; this enters a chimney 6 feet by 7, and 70 feet high, and is thus dispersed.

1227. That describes the machine, a sketch of which you will send us?—Yes.

1228. That is suitable only for large works?—Yes.

1229. Is there anything on a small scale suitable for small crushers?—In justice to the neighbours of Mr. Darbishire, Messrs. Brundrit, I should say they have two Sturtevant fans.

1230. (*Mr. Lovett.*) Are they both at work?—Yes, each 3 feet in diameter, revolving at from 600 to 700 revolutions a minute, and anyone going by rail can see the dust flying in clouds on the heaps outside.

1231. (*Chairman.*) Do these fans arrange to draw the dust downwards or upwards?—In the latter case downwards. It gets into the rubbish heap.

1232. That is the safest way, instead of drawing the dust upward over the men's heads, to take it where it is generated and draw it down?—When at the height of 70 feet and no men in the neighbourhood, it is safe.

1233. It depends on the circumstances of each case a good deal?—Yes. In the smaller places the stones are sprayed before they enter the breakers. I do not see that they can do more.

1234. Could you not spray the crushers?—They have a pipe with either a spray, or small jets here and there along the pipe, and the water drops on to the stone as it gets into the crushers and breakers, and damps it.

1235. Is it your opinion, where machine crushers are employed, that some means ought to be taken by spray or blasts, or otherwise to remove that dust?—Most certainly.

1236. (*Mr. Greaves.*) Do you think that is the case in these ordinary road crushers working in the open?—I do not think it is worth while when they are working in the open. With road crushers they do not crush so much, but with mills I think it is absolutely necessary.

1237. (*Mr. Jones.*) You are practically responsible for the inspection of the slate mines and quarries?—I do it. My chief is responsible, I am afraid.

1238. That is your part of the duty?—Yes.

1239. Did I understand you to reply to Mr. Lewney that you were a practical quarryman?—Yes, I think so.

1240. Do you mean by that you have worked at a quarry?—Yes.

1241. Was that during your boyhood days?—Yes.

1242. How long?—Three years. Since then, when I lived at Festiniog I frequently visited the quarries, and I made geological plans and sections of some of the underground mines while I was schoolmaster at Festiniog, and I taught geology and mining. I got my qualification as teacher of slate-quarrying before I took the inspectorship.

1243. That is a theoretical knowledge?—Yes.

1244. Do you think any man that works at manual labour for three years is entitled to call himself a qualified workman in that particular industry?—Yes, when he takes an interest in it afterwards.

1245. As far as the slate mines go, and the slate quarries, do you find the chambers are worked in such a way that there is an open space from one chamber to the other, to the floor above?—Yes; they generally drive a roof. That is the first thing to do from the gallery below to the one above. They do that as soon as they can, and there is communication from one floor to the other for ventilation.

1246. After driving a roof, are they widening under the clay slant or under the igneous rocks?—It depends on the bed. You have no igneous rock over the old vein, but you have a clay slant. You have the 2 A vein coming on the old vein without any igneous rock between, only the clay slant.

1247. You take the vein you get on the top of the old vein. You get the igneous rocks. Do they widen under that?—Yes; and sometimes under a whinstone dyke, which is an intrusive rock.

1248. What about the width of the pillars?—They generally make their chambers 40 feet wide, and the pillars generally about 30, but if there are any bevels in the pillars they make them wider. In the new vein at the present time at Oakeley Quarries they aim at making the chambers 30 feet wide and leave the pillars 50 feet wide.

1249. That is very low down, I take it?—Yes, that is the lowest slate bed in the district.

1250. That is due to the fact that they have had tremendous falls in the upper chambers?—I cannot say, but they do it because they think it safe.

1251. Are the pillars widening as they go down from floor to floor?—They aim at that, but you must understand in olden times the walls were not left one under the other at these mines. For instance, at the Oakeley Quarries one wall may be over the middle of a chamber. There was no system, and the people working the slate mines now have to suffer for the sins of their predecessors.

1252. I am talking of now. How do they work pillars now? You mentioned it was due to surveying?—No surveying at all, perhaps.

1253. How do they work them now? Are the pillars widening as they go down from floor to floor?—I believe so, generally. It depends on circumstances. If the rock is good, without any joints or bevels, they do not always widen, because they consider it safe without that.

1254. Could you get bevels or joints in a pillar without having them in a chamber, or seeing them on the side of the pillar?—If a level is driven in advance, the manager can see if there are bevels or faults in his level before he comes to where the chamber is to be placed. If he sees a bevel or a fault he leaves his pillar wider.

1255. (*Mr. Redmayne.*) Do I understand as you go down in depth, so proportionately you increase the size of your pillar?—That is what he means, I believe.

1256. Is that done?—Yes, they do it. In the instance I mentioned they have their chamber 30 feet wide, and walls 50. In the other case the chamber was 40 and the walls 30.

1257. (*Mr. Greaves.*) If you increase the pillar or wall by that amount you must decrease the chamber?—Yes.

1258. Then it is a question of time; it becomes no chamber and all wall?—Yes.

1259. (*Mr. Jones.*) There is no definite rule as to the width of the pillars?—No. We have no right to interfere, provided we do not think they are dangerous.

1260. Your business is to inspect the pillars to see that they are safe. You do not mind about the width?—No.

1261. Who makes the inspection of the pillars and roofs in the slate mines?—One of the assistant agents as a rule. They do it with a special light, according to the Special Rules, once in six months.

1262. That is carried out?—Yes.

1263. In blasting the rock from the chamber, is there a rule requiring the bargainer to make an inspection of the face of the rock?—Yes.

1264. Does he make an inspection of any part of the pillar?—No.

1265. Is he required to do so?—He is required to make an inspection of what is within his reach, but not what is beyond.

1266. During the time he is channelling?—During the time he is working, whatever he is doing.

1267. He is only at the side of the pillar when he is channelling?—No, he may be cutting a free side.

1268. That is what I mean?—Channelling is applied to a different kind of work.

1269. Free side, then?—Yes.

1270. Do you find any deficiency in discipline at the slate mines?—Yes, occasionally.

1271. Is that due to the management or the workmen?—It may be due to both, to a certain extent.

1272. Did you make a thorough inspection of one of the slate mines from top to bottom?—Yes.

1273. Which one?—All of them.

1274. At what time?—I cannot tell you. I can give you the dates from my diary. I do not always make an inspection of a whole mine at the same time; in some cases it would take several days. I make inspection by sample. I take two or three galleries.

1275. You do not go and inspect until after an accident, to inspect the place of the accident?—No. I have been doing that occasionally when there was no time for anything else. If there is an accident with explosives, for instance, however busy I am, I try to go at once if it is anything where I think there may be carelessness on the part of a workman or an agent. If it is an accident where I cannot learn much by going at once, I leave it till I make my ordinary inspection, and make inquiries then.

1276. By that time everything will be all right?—I know the nature of the accident. If a block at the bottom falls on to a man's leg and breaks it I do not run to see if it is a block on the ground.

1277. What about a fall from the roof or a pillar?—We have not had any for years.

1278. As regards dressing machines, have you any suggestions to make?—I have a suggestion if it is practicable. A man at Nantlle has made a guard which is now on trial. It is patented.

1279. (*Mr. Greaves.*) You have a drawing?—Yes (*produced*).

1280. (*Mr. Jones.*) Would you favour a rule compelling them to adopt that in the dressing machine?—Not unless I know the man can dress a slate with it on.

1281. You have not examined a machine with this on?—Yes.

1282. How did you find that?—The men complained of some difficulty. It is on trial at Penyrorsedd Quarry now.

1283. Do you think the number of accidents with a dressing machine justify making a rule to have this compulsory guard on?—Yes, if it is practicable.

1284. Do you get many accidents?—A good many.

1285. As far as the pits go you do not favour that method of working a slate quarry?—Not if it can be avoided.

1286. Do you know many of the quarries that are worked as pits are on Crown property? There are the Alexandra, the Moel Tryfan, the Cilgwyn, if not others, in the Nantlle Valley?—At several you have mentioned there are galleries. There are at the Alexandra and the Moel Tryfan, but they are not altogether on the pit system.

1287. Is there a clause in the lease that those quarries should be worked in galleries?—I know nothing about that.

1288. You mentioned that Moel Tryfan and Alexandra are worked in galleries. Is that a fact?—There are galleries there. There are galleries at Moel Tryfan and at Alexandra, but when they come to their boundary they have to work at sheer side.

1289. Where does the boundary of those quarries come to? They have the mountain in front of them and touch each other at the side, and they have the mountain to go to?—True, but coming to the Cambrian conglomerate, there is no slate beyond. They have come to the slate boundary, not the boundary of the lease. They come to the grit.

1290. Which?—The Alexandra and Moel Tryfan.

1291. They had a fall at Moel Tryfan?—Yes.

1292. That came down in the igneous rock?—Yes.

1293. On the other side of the quarry they have galleries now. Are they allowed to work those into one?—Yes.

1294. They are not in the boundary as far as the slates?—Not on that side.

1295. On that side you allow those quarries to be worked into pits, although you are against pit working?—I cannot prevent that.

1296. (*Chairman.*) He has no power to stop it?—I have no power to interfere with the method of working.

1297. (*Mr. Jones.*) Would you favour a rule that every quarry must be worked in galleries if it is an open quarry, only with the exception of such pits you mentioned that cannot, on account of the boundary?—As far as practicable.

1298. There are many versions of "as far as practicable."

1299. (*Mr. Redmayne.*) Are there many cases where it is not practicable?—I think so.

1300. For instance, where?—You come to a case where it is a difficult question. There may be reasons from an economical point of view which I do not know of. If we tax these people to such an extent that the quarries will not pay for working, we ruin the industry.

1301. There may be beds of hard material. That is the answer. I was wondering if there were more impracticable causes?—You may have a worthless slate rock.

1302. (*Mr. Jones.*) They are bound to cart it away some time or other as they come down. They are bound to clear the top?—Not until they work underneath.

1303. The tendency is, if you are going down, for the pit at the bottom to be like a cup?—Yes.

1304. You must clear the top if you are going to open the quarry. There is no slate beyond the hard rock. In the case you mentioned about the poorer slate on the top, they are not bound to clear that off before they work the quarry?—No, I know similar cases. They sink a shaft.

(*Chairman.*) Really the answer is, where practicable it ought to be done.

(*Mr. Jones.*) I agree, but the difficulty is this: Where you are going to apply what is practicable Mr. Williams and I will not agree.

(*Chairman.*) It is impossible for us to decide between you.

(*Mr. Jones.*) If I try to get some basis I can agree.

(*Chairman.*) Do you disagree with him as to where it is practicable?

(*Mr. Jones.*) I do in the two quarries. I know the places as well as Mr. Williams; I know the objection of the boundary, which does not apply to those quarries.

(*Chairman.*) We cannot go further, on a Commission like this, than recommending that it ought to be done, leaving it to the future to determine what is practicable if it is to be carried out in that way. I do not want to stop your questions for a moment, but I think he has gone as far as he can when he says it becomes a difficult question in a quarry.

1305. (*Mr. Jones.*) He goes with me so far, but when it comes to applying what he says, he goes to another point?—Every owner of a quarry, wherever possible, from an economical point of view would work it in galleries, because when a slate falls from a height of 80 or 100 feet, as is often the case, it is worthless for working. No doubt in his own interest every man will work his quarry in galleries whenever he can.

1306. (*Mr. Jones.*) Have you not seen instances of the open pits, of a few men taking hold of the pit and rushing as much slate as they can out of it and leaving it?—Yes.

1307. Is not that the fact as far as the Crown quarries go? They do not care about working the quarry on a system. Do you not think it would be an advantage if there was a rule that anyone who worked a quarry must work according to a certain rule?—Of course you must allow some discretion.

1308. (*Chairman.*) He is giving you an instance: would that quarry be better worked in steps than galleries?—Yes, but this is a matter which belongs to the Woods and Forests Department.

(*Chairman.*) There are quarries which ought to be worked in steps which are now being worked in pits. That is enough for you.

1309. (*Mr. Jones.*) Yes. You say it would be an advantage for the inspectors to have the power they have not, of instructing any manager to work that quarry according to what he thinks is the best way?—We advise, but I do not think it is right that we should have the power.

1310. (*Mr. Redmayne.*) If there was a General Rule that where reasonably practicable quarries should be worked in steps or galleries, and in your opinion it was practicable, you would tell the man?—Most decidedly, if that is what you mean.

1311. (*Mr. Jones.*) You know this Blondin business?—Yes.

1312. Have you any improvements to suggest under this?—They have a newer method. There is the old method and there is the new method (*photographs produced*). These pits have been working 100 years. If they had been started now many things could be done differently, but they have to make the best of the system.

1313. What did they have before the Blondin?—It is an incline really.

1314. Could you suggest any improvement on the present machinery?—I do not know that I could. If the traffic could be got to one end it would be much better. The men work in different places and on different levels, and it is difficult to devise a method which would answer.

1315. A suggestion was made to the Committee that sat some years ago that a shaft should be sunk and a tram road to the bottom of the shaft?—It would be very desirable where practicable.

1316. (*Mr. Greaves.*) It has been done in several cases, I think.—They do not use it now. At Penrhyn they do it all in that way. They have the shaft in the underlying rock.

1317. (*Mr. Jones.*) Are the rules with the aerial rope business carried out fairly strictly?—I am afraid not. There have been seven accidents from stones falling from wagons, but it is a difficult rule to observe. During the last 16 years, on the other hand, it is fair to say that in several cases the man was not working immediately under it, but the stone fell on to a rock and rebounded and struck him.

1318. You remember that fatal accident which occurred three or four weeks ago. You were at the inquest?—Yes.

1319. You asked the man whether he knew a certain rule that instructed them not to work underneath the ropes?—Yes.

1320. There is another rule after that rule, 22 or 23, requiring an inspection to be made of the ropes every day, and a record kept in the office?—Yes.

1321. Will you tell me the reason why you never asked the management had they carried out that rule, the same as you asked the men?—Because I generally look at the books at the office. You were at the inquest, and you were asked by the coroner to put any question. If you thought there was a question omitted by me, why did you not put it?

1322. (*Chairman.*) Do not get into an altercation. I think you have answered the question?—The question never occurred to me, or I should have asked it at once.

1323. (*Mr. Jones.*) You had satisfied yourself that this inspection had been made?—No, I did not ask on that day. The inspection had nothing whatever to do with the cause of this accident. The signalman gave the wrong signal, or gave it too soon. The wagon was not hoisted high enough, and it came in contact with another rope.

1324. That did not come out at the inquest?—It is not my duty to call witnesses. The flagman was not called. I saw the flagman at the quarry, and he told me that he had spent many a sleepless night over it.

1325. You had seen the flagman before the inquest?—Yes.

1326. The Coroner asked that he should adjourn the inquest, and you said there was nothing more to be said, and it is not fair to make a statement now you did not make at the inquest?—I do not think I made that remark that there was nothing more to be said. The Coroner made it.

1327. Anyway, that is how it happened. My point is this. You had not satisfied yourself that this record was kept at the quarry?—Not on that day.

1328. I put it to you that generally happens in the pits. Is it a general thing to disobey the rules as far as inspecting the aerial ropeway goes?—No.

1329. How do you find that out? Do you make an inspection of the books required to be kept at any time except after an accident?—Certainly.

1330. You did not in this case, although a fatal accident had happened?—No.

1331. Do you not think that is a neglect of duty?—No, because it had nothing to do with the state of the ropes.

1332. If this ropeway had been examined would the accident have happened?—Precisely the same.

1333. What was the cause of the accident?—I have told you what the flagman told me. I went there after the accident. Can I explain this? Will you hold that piece of tape. There was one ropeway for the wagon to travel in *that* direction; there was another for the wagon to travel at right angles above it. There was a flagman stationed *here* to give a signal when the wagon had gone high enough, and the man stopped hoisting and let it travel. In this case I must not accuse the flagman, but he admitted he lifted his flag too soon, and this wagon was not hoisted high enough and went against the rope and partly toppled over. The state of the ropes had nothing to do with it. If the rope had broken I should have asked for the rope book at once.

1334. What was the distance between the ropes?—I cannot say, but it was admitted that there was a clearance of 4 feet.

1335. It was given as a reason that the heat might have affected the ropes to the extent that the pressure brought them together?—I suggested that.

1336. Is that a reason for the accident?—They might have been a bit nearer than usual.

1337. Would not an inspection of the rope have shown the effect of the heat?—No.

1338. Then inspection is no good?—Yes, it is the state of the rope as to wires and winding, and things of that sort.

1339. As regards Dinorwic, 2,800 men work there. That is a fair proportion of the men in your special inspection?—Yes.

1340. There are 2,000 at Penrhyn?—Yes.

1341. Do you make an inspection one day in every year? I do not believe the inspectors should make a thorough inspection often, but did you make an inspection for five years consecutively at Dinorwic Quarry and Penrhyn Quarry, I mean a thorough inspection from top to bottom?—Yes.

1342. Will you give me the records of those visits?—In what way do you mean?

1343. A complete inspection of Dinorwic Quarry, and a complete inspection of Penrhyn Quarry?—I can tell you this. I have it in my book. I visited Dinorwic Quarry on the 4th February, the 12th February, the 17th April, the 23rd April, the 17th June, and the 29th June last year. I have been there several times after that.

1344. You go there after most fatal accidents, of course, or what you call serious accidents. That record comes in it. That is not what I mean. Did you make a thorough inspection of the quarry yourself, so that you can give instructions or suggestions to the manager?—Yes, and I have given them suggestions repeatedly about things.

1345. Are the highest galleries in Dinorwic at the top or the bottom?—There is one at the top, above which another gallery will be worked. That is high, but the others are much about the same.

1346. What is the height of the highest galleries at the top?—I could not tell you.

1347. Forty yards?—Possibly the top one may make something near.

1348. That is higher than the average of 70 feet?—There is no gallery beyond. When they come to the surface of the rock it is highest because there is no room.

1349. Take the second; is it 35 yards?—I did not measure it.

1350. Is it 30 yards?—I cannot say.

1351. Is it 12 yards at the bottom? Did you measure that?—No.

1352. Then your inspection consists of looking at the place?—It consists of a good many things.

1353. As regards Dinorwic, you do not measure the galleries, you do not know the height. Do you know the width of the floor?—Yes.

1354. It is a pure guess?—No, it is judgment.

1355. In your judgment, what is the height of the lower gallery?—You mean where they have sunk?

1356. You have got one *here*, and another gallery coming up all the time. What is the height of that gallery?—It may be 70 feet. I could not say.

1357. Do you think it would be an advantage to have a Rule that the height of a gallery should not exceed a certain number of yards? I do not expect you to say the number, but say 30 or 25?—For new galleries?

1358. For the Rule?—I could not interfere when a gallery is 70 feet high. To ask that to be reduced to 60 would disarrange the whole working of the quarry.

1359. I am asking you to suggest a new Rule. You cannot have a new law, of course, without consideration being had for past things. Do you think it would be of advantage to have a new rule that no gallery should exceed 25 yards in height?—I see no objection to it.

1360. Would it be an advantage?—I could not say it would be always—yes, generally.

1361. Would it be an advantage to have a rule that the level of the floor should be half the height?—There would be no objection to that. It would be an advantage where practicable.

1362. That comes in with every rule, it seems to me?—There are circumstances where you cannot avoid it.

1363. Is it the safety of the men who are working, or the cost to the owners, that you take into consideration in saying whether it is practicable?—In that case I take both, because I have to consider both.

(*Mr. Redmayne.*) As to the width being half the height, do you mean in proportion, or 12½ feet?

1364. (*Mr. Jones.*) I mean in proportion?—I think they generally are, and more than that in most cases.

1365. There is a rule in the slate quarries in Scotland that no gallery should be narrower than 12 feet. Would you apply that to slate quarries in North Wales?—Yes.

1366. Where would you measure the 12 feet from, from the rail nearest the rock, or the face of the rock?—I do not think we have any quarries where it is as narrow as that.

1367. I think I could come with you through some of the quarries and I could show you many. Where do you measure the 12 feet, from the rail nearest the rock, or the face of the rock?—I should measure it from the bottom of the rock to the edge of the gallery. Whatever width you give, I should take it from the bottom of the fore-breast to the edge of the gallery.

1368. Do you think that a fair measurement from the bottom of the rock to the edge of the gallery?

(*Mr. Redmayne.*) That would be the width.

(*Mr. Jones.*) My idea is that the measurement should be from the rail of the tramway.

(*Mr. Redmayne.*) If *that* is the gallery and *that* the wall of the next gallery, I should say the width was from *there* to *there*.

1369. (*Mr. Jones.*) You do not get it that way?—There is the bottom of the facing that projects. Then I should take it from there to the edge of the gallery.

1370. That piece might have been left. That is hard rock and they are not working at that. That is not a working face in the sense people are working.

(*Mr. Greaves.*) That would be a case of "reasonably practicable."

1371. (*Mr. Jones.*) If you had a rule from the rail of the tramway nearest the rock, would not that be fair? That is the rule in the Scotch mines. Why not apply such a rule to the quarries in Wales?—I see no objection.

1372. They use ropes in quarries. Who buys the rope?—Generally the men.

1373. Do you not think it would be better if the owners supplied the ropes to the men?—I believe the men buy them from the owners.

1374. In the slate mines the owners supply the chains?—I cannot say.

1375. That is so.

(*Mr. Greaves.*) Yes, I know we do.

1376. (*Mr. Jones.*) If a working man has to pay for a rope, do you not think he does not take the care he should to see that he has a good rope?—You should have an official to see that the rope is good.

1377. The official does not see all the ropes. You must admit he cannot go round every corner in the morning and the afternoon. You make a remark about the accidents and say that men belong to a club and get compensation. You suggested that they stayed away for that reason. You admitted that the doctors at Dinorwic and Bethesda were doctors appointed by the owners and paid by them. Would it not be natural for anyone to think that that doctor would send a man to work sooner than a doctor paid by the men?—He has no right to send a man to work.

1378. All these things depend upon the certificate of the doctor. A man cannot get compensation and club benefits unless the doctor certifies that he is unfit?—I did not accuse the men; I expressed it as an opinion.

1379. They cannot get club money or compensation unless the doctor certifies that they are unfit for work?—No.

1380. (*Mr. Greaves.*) Have they the club system at Dinorwic, of the men joining a doctor's club and paying so much a month?—No, the quarry owners supply all that.

1381. (*Mr. Jones.*) If the doctor favoured anyone, would he not favour the owner?—The doctor is a very fair man. I remember a case where he thought a case was probably a natural death, but said, as he represented the owners, he would give the man the benefit of the doubt.

1382. You said it was a natural thing for the workmen to do. What is the natural thing for the doctor to do?—I do not know.

1383. You can pass an opinion on a workman; why cannot you on an employer? You have made an

insinuation that the workmen stop at home because they get club money?—I say it is natural.

1384. Is it not natural that the doctor should send the man back to work before he gets well, because he gets paid by the other side? I want you to say what is natural on both sides?—I will not admit that.

1385. (*Mr. Greaves.*) He gets a fixed salary, does he not?—Yes.

1386. Does it make any difference to the doctor?—No.

(*Mr. Redmayne.*) I think we may take it that the doctor does his duty. He would not favour master or man.

(*Mr. Jones.*) The doctor is very skilful, and but for his skill the results of the accidents would have been much more serious than they are. Mr. Williams makes a statement of what is natural on the one side, and I want to know what is natural on the other side, and he will not make it.

1387. (*Mr. Lovett.*) How many men are there employed in the granite and limestone quarries in your district?—A considerable number. I have not gone into those figures.

1388. Would you suggest that all open quarries should be grouped together for inspection purposes, and that they should come under one Act?—They do now.

1389. Some come under the Factories Act?—Yes, certainly. I would suggest they should all come under one Act, irrespective of the depth of the quarry.

1390. What number of inspections have you made in your district in these particular quarries, the granite and limestone quarries, during the last five years?—I could tell you by looking up my diaries.

1391. Do you make a thorough inspection of these quarries?—Yes.

1392. You visit them?—I visit them and go round. Once a year at least I make in all quarries an inspection of the explosive boxes, and of the ropes, and the rock, &c.

1393. I am thinking particularly of the granite quarries. Would you recommend that a certificated manager should be employed for those quarries?—I would, for every quarry of any size.

1394. (*Mr. Redmayne.*) The point was what number of persons?—I suggest a different class of certificate for a man who manages a quarry where 30 men are employed, or any number you like to fix, and a higher certificate to a man who has a large number employed under him.

1395. They would be equally dangerous?—Yes, but you have more machinery in one, and a good many things which do not come in a small quarry.

1396. Merely an extension of the one?—Yes.

1397. (*Mr. Lovett.*) You would be prepared to advise that all foremen should be supplied with a copy of the Rules operative in the respective quarries?—Yes, and every workman who enters the quarry should be supplied with a copy. I have had that done in several quarries lately.

1398. You have had considerable experience in the use of rock drills?—Yes.

1399. Is spraying practised to any considerable extent when they commence drilling operations, or do they leave spraying till they get two or three inches deep?—They spray very little at all. They use small pneumatic hammer drills.

1399*a*. I am thinking of compressed air and steam?

1400. (*Mr. Redmayne.*) They do very little spraying?—They do not use the spray: they water it. A man with a can waters it.

1401. (*Mr. Lovett.*) They do not usually commence to use water till two or three inches deep?—No.

1402. Would you not make it compulsory to commence using the water at the outset?—It would be a great improvement.

1403. It would be advantageous if this was made compulsory, it seems to me, because the dust is thicker than when they get deeper in the dry-hole drilling. That gets on the lungs and sets up serious effects?—Yes.

1404. With respect to the crushers, you have mentioned two quarries, both having very large crushers, crushing 1,000 tons a day of road metal. I understand you to say at the Brundrit Quarry the dust comes out underneath, or is sent to the rubbish heap. Some is coming out of the roof at present?—No. There is one at Mr. Darbishire's quarry where it comes off at the roof.

1405. There is a considerable amount of dust in the mill, although using these fans?—Yes, some, but not much, especially at Mr. Darbishire's.

1406. Have you made a thorough inspection of any of these crushers, going into every part in the absence of the employer or manager?—No—or the foreman.

1407. Do you not think it would be advisable that you should go in on your own sometimes? You would find that you would get into some of the more dusty and more dangerous parts than if you had the foreman or the manager with you?—No, I go where I like, and they accompany me. I think it is only fair that the foreman or agent should accompany me always.

1408. Would you be favourable to one of the men accompanying you on these visits?—I do not mind in the least, but I think it is fair when I visit a quarry or mine to tell the agent or the foreman, and give him an opportunity of coming where I go.

1409. When about to visit a quarry for inspection, what notice do you give the employer before going?—Never any, unless I want to see him on some particular business.

1410. It is customary to sweep up these mills once per day?—I do not think it is.

1411. (*Mr. Redmayne.*) One of the instructions to inspectors is to pay surprise visits?—I never give notice unless there is some particular reason for doing so.

(*Mr Lovett.*) I was aware of that, but I have a shrewd suspicion that employers sometimes get notice. There is no need to go into a particular case, and I do not know the witness.

(*Mr. Greaves.*) I am certain in our case it never happens. I have never known when an inspector is coming.

1412. (*Mr. Lovett.*) Do you think there should be any improvement with regard to the working of the crushers to obviate the dust? Can you make any suggestion?—None in these two cases, but they have experts to advise them as to a new one.

1413. Is it working now?—It was when I was there last.

1414. Do you not think that sometimes the fans are put, not in the best place, at any rate?—It is quite possible, but they get the advice of experts.

1415. Brundrits have shifted theirs?—Yes.

1416. And have you found on the floors of the crushers one-eighth of an inch of dust after the day's working where they have fans?—I have seen a good deal of dust. When they had swept the floor last I could not tell.

1417. In most places they sweep it once a day. If there is an eighth-of-an-inch of dust after a day's working, it is not satisfactory?—I do not admit that I have seen so much.

1418. I have.

(*Dr. Haldane.*) In the place where the men are working?

1419. (*Mr. Lovett.*) Yes. I agree that these two quarries are as far advanced from the health point as any crushers, but at some of the crushers they have no fans. If the fans are necessary and advantageous in these crushers, ought it not to be compulsory for them to be used in all crushers?—Yes. I believe in some method of getting rid of the dust.

1420. That is where a crusher breaks more than a given quantity a day?—Yes.

1421. Would you agree to make spraying compulsory, that is over the jaws, spraying the stone, the rough metal, when it is going into the jaws?—I see no objection. They do it pretty generally.

1422. At the two quarries you mentioned, do you think that there is sufficient spraying? It strikes me that it might be sprayed to a greater extent than at present?—I cannot answer off-hand. I will see to it.

1423. (*Mr. Greaves.*) As a general rule, is water available? I think so, because they use it for the boilers.

1424. (*Mr. Lovett.*) We have been speaking of the galleries. Do you think that there ought to be a maximum height for the working of granite quarries? You have several quarries where you may have 140 or 150 feet high?—Yes, I think it would be an advantage where they were worked in galleries.

1425. At Trevor Quarry two serious accidents happened last December, and I think you investigated the cause?—I forget.

1426. One man is starting work to-day?—I forget. Very likely I did.

1427. You have no idea whether reasonable precautions were taken?—I forget the case.

1428. It was an injury to the head in both cases?—From falls.

1429. In one case?—I remember making investigations as to that. In one case where a stone from a corner had fallen. I remember the case.

1430. (*Mr. Lovett.*) With the permission of the Chairman, I would like to raise another point. I think it comes into the question of health rather than safety, that is, as to the provision of shelters for the workmen?

(*Mr. Redmayne.*) I think it does come within it.

1431. (*Mr. Lovett.*) It seems to me it is important. It is a question that should be looked into. Have you had complaints that insufficient shelters are provided by any firm?—For blasting?

1432. No, for meals and blasting?—I do not recollect.

1433. Did you not on one occasion have complaints, and you said there was no Rule which would allow you to interfere?—I believe I did, as to eating-houses, but in that case, and where I have had any complaint, I have tried to persuade the owners to do it, and in many cases I have succeeded. I have no right to interfere. I could compel them.

1434. Would you suggest that some Special Rule should be brought into operation with regard to shelters for meals?—Yes. I suggest strongly that where there is more than a certain number of men employed there should be eating-houses. We have them in most of the slate quarries.

1435. I had a conversation with a doctor, and he suggested that we were extremely careful in safeguarding the men against accidents, but we allowed them to herd together like animals in these sheds and shelters, so-called, places not fit for animals, and the injury in consequence to their health was beyond calculation?—We have not many of those. In some cases there are eating-houses being constructed. I suggested it to the management of one quarry three or four weeks ago, and I think they are building them now. I object strongly, too, to men having meals in boiler-houses.

1436. That is practised to a considerable extent in your district, or anywhere they can get?—Yes, but not often in the boiler-houses. I try to prevent it.

1437. (*Mr. Redmayne.*) You agree it is desirable that there should be some specified shelter?—Yes.

(*Mr. Redmayne.*) That meets your point.

1438. (*Mr. Lovett.*) Yes. Then during blasting operations there is not adequate provision in all quarries?—I cannot think of one where there is not, except where all men leave the quarry.

1439. I know some where they are packed together like herrings in a box, and if anything happened they could not move. That is not a satisfactory state of things?—No.

1440. Ought there not to be some legislation on the point?—We have a rule that sufficient shelter shall be provided.

1441. It has not been put into operation?—Yes.

1442. You have power to interfere at the present time?—Yes.

1443. If we have complaints, we will lodge them with you?—I should be glad if you would.

1444. With regard to the equipment of ambulance, have you had any complaints from any of the workmen in any of these quarries?—No.

1445. Have you power to investigate these matters?—Yes, if more than 25 men are employed.

1446. In the case of some accident, at any rate serious more or less, is it not the fact that the ambulance baskets have been empty and not a bandage or splint or anything to be found?—It is possible, but not to my knowledge. I have seen that the baskets have been supplied with bandages, but I do not always see if they have the baskets full. I might do that, perhaps.

1447. (*Mr. Redmayne.*) If there was any deficiency, the same thing would hold good, a complaint sent to the inspector would be investigated?—I shall be glad to investigate any complaint.

(*Mr. Lovett.*) I have known where accidents have happened and there has not been anything.

1448. (*Mr. Redmayne.*) It is the duty of the operatives to make the complaint?—Is that in my district?

(*Mr. Lovett.*) Yes. The men fight shy of this because they might suffer in other ways.

1449. (*Mr. Redmayne.*) The inspector will be on the look-out?—I wish you would let your men know that if they make a complaint their name will never be disclosed unless it is disclosed by themselves.

1450. (*Mr. Lovett.*) Is there any rule calling for unbaring of the quarries?—Yes.

1451. How far should they be unbared?—So as to prevent danger.

1452. Is there any rule on this point?—No.

1453. I have heard that they should be unbared 4 feet back from the face of the rock?—No, we have no rule.

(*Mr. Redmayne.*) You suggest that it would be a good thing to have a rule?

(*Mr. Lovett.*) I think so.

1454. (*Mr. Redmayne.*) And you agree?—Yes.

1455. How far unbared?—It depends on the nature of the overburden.

1456. (*Mr. Lewney.*) You have been dealing largely with quarries. May I bring you back to metalliferous mines? Is it customary to provide dressing houses in your district?—Changing-houses, yes.

1457. There is a special rule for dressing rooms?—Yes.

1458. Is that practice universally adopted?—Yes, when more than 12 persons are employed, except in slate mines.

1459. I was referring more to the metalliferous mines?—Yes, it is enforced.

1460. Do you not think that even if there are 12 persons employed that some provision ought to be made in a matter of this sort?—If a mine is wet, provision ought to be made whatever the number of men employed.

1461. Whilst sinking operations are carried on you will agree with me that they are generally attended with water, and the men get wet, and some provision ought to be made for changing their clothes when they come out of the mine?—Yes.

1462. (*Mr. Greaves.*) Would that apply equally to a quarry, because the men get equally wet?—It is a different kind of wetting.

1463. A different sort of water?—Yes. The man is thoroughly drenched in sinking a shaft, but if it is very wet in an open quarry the men do not remain out.

1464. (*Mr. Lewney.*) You and Sir Henry Hall seem to be in agreement about the necessity for every one in authority having a certificate. Will you give us some reason for that?—If it is for safety, my reason would be that the death-rate is higher in metalliferous mines and slate mines and quarries than it is in coal mines, and if a certificate is required in one case I think it is required in the other.

1465. You make no distinction between the metalliferous mines and coal mines?—Yes.

1466. How do you draw the distinction?—First of all, the nature of the mineral they work and their methods of working.

1467. In the one case you have gases to deal with; in the other they are absent?—No.

1468. Practically?—We have had what is supposed to be firedamp at one metal mine. I do not know that it is. Dr. Haldane will tell you.

1469. It is the exception rather than the rule?—Yes, except we get carbonic-acid gas and lack of ventilation.

1470. You fix your requirements so high that it would be necessary for men holding responsible positions of this sort to attend a technical school to acquire this knowledge?—I should try to arrange it in this way, that the various education authorities in the mining districts should provide courses. I do not think there would be any need in the slate mines, the metal mines, and the open quarries, to make the standard so high that a man by attending evening classes could not take the certificate.

1471. Have you known a person get a certificate who had never been down a mine in his life?—No.

1472. Would you consider anyone who had obtained a certificate in this fashion qualified to take the place of a foreman or underlooker?—No.

1473. And yet you would exclude a man who has been all his years a miner and had a thorough practical knowledge of mining because he happened to be illiterate. Many miners to-day are illiterate?—Yes.

1473*a*. Then you are excluding the best men, I can tell you?——

1474. (*Chairman.*) I presume in any change you would consider the existing men?—There are advantages now which were not to be got when the men you mention were made foremen or agents. Now there is no excuse for it

1475. I presume you would protect the vested interests in the way they were protected when a similar clause was brought into the Coal Mines Regulation Act?—Yes.

1476. The existing men may lose their situations?—Not in the least. I agree with Professor Louis in the remarks he makes in "Some Unsolved Problems in Metal Mining," that it is important that both men and officials should have better technical training.

1477. (*Mr. Lewney.*) In what way would it be an advantage to have a knowledge of all the technical points? How would that assist him in getting iron ore or lead ore or slate?—It would prevent a man from trying for coal in silurian rocks.

1478. Is not that a question for the owners rather than the workmen?—For all. Whatever benefits the owner will benefit the workmen.

1479. A knowledge of this on the part of the workmen would not prevent a mine owner going into a sandbank if he thought fit to do so. So long as he pays the man wages it is a matter of indifference to the workman where he is put?—He will not be put there long unless it pays.

1480. A knowledge of all the technicalities would not prevent the employer sending the men there if he thought it beneficial?—No.

1481. In what way would it be an advantage to the man to have that knowledge?—It would keep the works going longer, at any rate, than if he tried to mine for a mineral when it was not there. It is necessary a man should know the direction of faults, and that kind of thing, in mining.

1482. Mr. Jones put a question to you which I am not clear upon. Do you find that the number of accidents has increased since the Workmen's Compensation Act came into operation?—The number reported has increased.

1483. (*Mr. Jones.*) You have a new system of reporting?—Yes, during the last two years. With the exception of this there would be no difference, so far as I know.

1484. (*Mr. Lewney.*) You think it is not because of the greater stringency in accordance with the requirements and having matters reported since the Workmen's Compensation Act come into operation. In the old days it was a haphazard fashion. If a man had a leg or an arm broken there was very little notice taken of it. Now an accident, however trivial, has to be reported to the employer, at any rate. If the man gets his finger cut the employer requires a notice to be given?—Yes.

1485. Do you think the increase in the number of accidents is not due to that requirement rather than a desire to impose on the employer through the coming into operation of the Workmen's Compensation Act?—I do not think there is any increase in the number of accidents.

1486. (*Chairman.*) I do not think the witness talks of imposing on the employer?—No.

(*Chairman.*) Only if a man gets compensation and is able to retire till the hand is well, it is natural he should do so. There is no imposition. He has a right to, and he does it. I feel I should do the same thing.

(*Mr. Lewney.*) I accept that explanation.

(*Chairman.*) Only it does lead to a larger average.

(*Mr. Lewney.*) My point was that the Act compels people to report cases which were formerly unreported.

1487. (*Chairman.*) We have had evidence of that kind before the Coal Mines Commission. I am sure nobody intends any imputation on the men. It is the natural effect of the Act?—Certainly not. The reason we have had so many reported from the quarries mentioned is that there is extra care taken with the men.

1488. I presume that has been the effect of the Workmen's Compensation Act generally. In some respects it has diminished the accidents by forcing everybody to take greater care of the men in consequence of the damages?—I have not noticed much difference either way.

1489. (*Mr. Jones.*) As a matter of fact I think the workmen in Festiniog are better looked after as regards compensation than at Dinorwic and Penhryn. In most of the slate mines the employers and the men understand each other, and there is no bother about compensation. I admit that at Dinorwic, but not at Penrhyn. That is a wrong statement, that they are better looked after?—I mentioned those places because they have been so often referred to.

1490. (*Mr. Lewney.*) In this limitation as to the number of men authorised to blast holes, will you state your reasons for that?—Have you had reason to believe that inexperienced men were allowed to charge holes?—I have know a man to take a stone to break up a frozen cartridge, with the natural consequence.

1491. Is that an infringement of the Rule?—Yes; but the man was ignorant. Any man who knew the nature of a high explosive would know that was wrong.

1492. Do you think that the manager of the works would not be failing in his duty if he did not punish that man for not only running the risk of his own life but the risk to others?—The agent did not prosecute him, and I prosecuted the agent.

1493. Do you not think whatever you did in regard to the limitation of the number of men, you would always find some men who are reckless?—Yes. I think we ought to do what we can to reduce the number of accidents.

1494. (*Mr. Greaves.*) Familiarity breeds contempt with regard to that as in many other things?—Yes.

(*Mr. Greaves.*) The man who does it frequently is careless.

1495. (*Mr. Lewney.*) That is my idea in regard to specialising. Now with regard to shelters. As we have these provided in our district it occurred to me when Mr. Lovett was putting the question whether it was not possible to make some provision for the number of men by requiring so much space, not have them overcrowded?—Yes. The numbers vary considerably, but the men are only in eight minutes during blasting operations.

1496. You would not like to crowd 20 men into a space capable of holding 10?—No. I see no objection to the rule.

1497. Do you think it would be advantageous to have a rule that would leave it open to the inspector to suggest to the management more shelters should be provided if in the opinion of the inspector of the district sufficient provision was not made, and that he should have the power to enforce it on the employers?—We have it now. "Sufficient shelter" is stated in the rules, and we attend to it.

1498. (*Mr. Redmayne.*) Van Mine is in your district?—No; my colleague, Mr. Jones, goes there.

1499. There is a considerable amount of firedamp given off?—I do not know what the gas is. It gets the name of "firedamp."

1500. You know the rule with regard to ladders in quarries. It says "A ladder permanently used for the "ascent and descent of persons in the quarry shall not "be fixed in a vertical or overhanging position, and "shall be inclined at the most convenient angle, and "every such ladder shall have substantial platforms at "intervals of not more than 10 yards." What do you regard as the most convenient angle of inclination? I have seen ladders which are not vertical, but they did not seem to comply with the expression "convenient angles"?—I do not think we have them so. I should say somewhere about 60 degrees.

1501. I agree with you, but 98½ struck me as rather near the vertical. What do you regard as a substantial platform at intervals?—You can see by that photograph. They generally have bars driven into the rock and have a platform at the foot of the ladder with rails round it.

1502. You would regard such a platform as being necessarily horizontal?—Yes, and a place where a man can rest.

1503. I have seen them off the horizontal and ample room for a man to stand?—They should be horizontal with room for two or three.

1504. (*Dr. Haldane.*) Are you aware of any evidence as to whether miners' phthisis or any similar disease is prevalent amongst slate quarries or any class of men employed in the slate quarrying industry?—Not amongst the slate quarries. One was reported to me from a metal mine, but on making inquiries I found that man had been working in South Africa.

1505. At a lead mine?—Yes.

1506. You are aware in the English lead mines as a rule there is a good deal of phthisis, and has been for the last 50 years?—Yes.

1507. You would not throw any doubt on the prevalence of miners' phthisis in lead mines?—No.

1508. I was asking about slate mines just now?—No; some of the medical men at Festiniog wrote papers on the slate dust, but they did not come to any definite conclusion.

1509. As to whether it is safe?—Injurious or not.

1510. To a certain extent the question is open?—Yes.

1511. It certainly is not very injurious, in your opinion. It is not a matter of common knowledge that it does harm?—No. It is not to be compared with siliceous dust.

1512. You have not gone into the question of the men employed in crushing machines. Do many of them die?—No. I have been making inquiries of the men at the crushers. Many have been there many years, and they suffer no inconvenience, but as far as I possibly can I get them to wear respirators when there is dust.

1513. (*Mr. Greaves.*) At the inquiry in 1895 it was shown that there was less phthisis among the men employed in the slate quarries than people not so employed?—I think it was.

1514. You recommend that detonators should be kept in separate boxes?—Yes.

1515. What advantage is that?—They are kept in separate boxes and secure, but I am anxious to get them kept in boxes where nothing but detonators are kept. We have had two or three accidents through men dropping detonators and treading on them and there was an explosion.

1516. How would keeping them in separate boxes prevent a man dropping one?—They keep them in the same boxes as the candles or clay, and they may get among those. If a man keeps them in a box where there is nothing but detonators he is not likely to miss one.

1517. You would not allow them to be kept with other explosives?—No.

1518. (*Mr. Lewney.*) In regard to ladders, we are told that the platforms should not be more than 10 yards apart. Are they always amply stayed? You understand what I mean by a stay; a ladder put against a wall in *that* fashion, 10 yards long, without something behind to keep it from swaying would be dangerous. Are you always sure that these ladders are amply stayed?—Some sway, and I have had props put under some. Some are strong enough not to sway at all with 10 yards.

1519. I intended to ask Sir Henry Hall whether it is not a dangerous thing to be climbing a ladder which was swaying about. I take it it will not be less dangerous in a quarry. It is dangerous underground; we have accidents. Do you not think this rule might be amended with advantage, and words added to have such a ladder securely stayed?

1520. (*Chairman.*) Where necessary?—Yes.

(*Chairman.*) You need not stay it if two feet long.

(*Mr. Lewney.*) No.

(*Chairman.*) Therefore, where necessary. You need not in many cases where they are 10 yards. They are perfectly stiff sometimes at 10 yards.

1521. (*Mr. Lewney.*) But when you have them 10 yards you may have three or four men on at a time. If it is not stayed it may come down?—It is a valuable addition to the rule.

1522. You agree that would be a benefit?—Yes.

FOURTH DAY.

Thursday, 7th July 1910.

PRESENT:

SIR HENRY HARDINGE SAMUEL CUNYNGHAME, K.C.B. (*Chairman*).

RICHARD AUGUSTINE STUDDERT REDMAYNE, Esq.
JOHN SCOTT HALDANE, Esq., M.D., F.R.S.
JOHN STIRLING AINSWORTH, Esq., M.P.
RICHARD METHUEN GREAVES, Esq.
RICHARD ARTHUR THOMAS, Esq.
ROBERT THOMAS JONES, Esq.
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Mr. JOSEPH SAMUEL MARTIN, I.S.O., called and examined.

1523. (*Chairman.*) You have been one of His Majesty's Inspectors of Mines from May 1873 to the end of June 1910, when you retired?—Yes.

1524. During that period you were concerned with the inspection of mines under the Metalliferous Mines Act as well as the Coal Mines Act?—That is so.

1525. You have also had, during the time you were in the Manchester and Ireland district, experience of the extensive metalliferous mines in Ireland?—Yes.

1526. You have been in charge of the South Western and Southern district, where most of the tin and copper mines in this country lie, since 1887?—

At that time, down to the year 1892, the tin and copper mining district of Cornwall was not in that district.

1527. Number 14 District comprised Cornwall, Devon, Dorset, and part of Somerset?—Yes.

1528. That was under a different supervision?—That was under an inspector of purely metalliferous experience.

1529. We are entitled to say, as far as experience goes, probably there is no inspector who has had greater experience in these mines than you?—I do not think so. I may say I originally attended the Royal School of Mines in Jermyn Street, and since then I have taken considerable interest in metalliferous mining.

1530. The minerals under your inspection consisted of arsenical pyrites, barytes, chalk, clay, copper, gold, gypsum, iron ore, manganese, lead, salt, stone, tin uranium, wolfram?—Yes.

1531. The quantities of the last-named mineral are very small, I suppose?—Yes. I can give you the figures for last year if you wish to have them.

1532. The figures are to be found in the returns?—Yes, in my report of last year.

1533. While the principles of mining are much the same, there is a great deal of difference in detail?—Yes, there is.

1534. Do the mines vary very much in size?—Under the Metalliferous Mines Act, yes, very considerably.

1535. The smallest will be those in the Isle of Purbeck?—Yes.

1536. They vary from small mines where the workings only extend a few yards from the entrance and in which one or two men are employed underground, to the extensive stone mines of Wiltshire and the tin, &c. mines of Cornwall, employing up to 670 persons underground?—That is so; that is the largest mine in Cornwall.

1537. The depths of the mines vary in the same way, from those entered by levels from the side of a hill, and having 9 or 10 yards of cover, to Dolcoath Mine, in Cornwall, 1,000 yards deep?—That is so.

1538. What are the Acts in force with regard to metalliferous mines?—The Metalliferous Mines Act, 1872, which was subsequently amended by the 1875 Act as to date for making returns; the 1891 Act with reference to its application to the Isle of Man; the Slates (Gunpowder) Act, 1882; and Prohibition of Child Labour Underground Act, 1900.

1539–40. The Act of 1872 is then the principal Act?—The 1872 Act was the first legislative enactment for the purpose of bringing mines other than those comprised under the Coal Mines Regulation Act under Government inspection. The Act was passed to meet the circumstances and to bring the mines gradually under restrictive measures, which was also the course followed with regard to coal mines from the year 1850. It was looked upon as a tentative Act, to be followed in a few years by further legislation. It, however, has continued in force owing to Parliament not having been able to afford time for the consideration of a new Bill. The Act did not enter into the details of management which the 1872 Act for coal mines did. The variety of conditions existing among the mines with which it dealt, renders it difficult to do so. There appears to be a consensus of opinion that it is time for it, that is the 1872 Act, to be reconsidered. It will, however, be necessary in framing future legislation to be careful that the provisions are not made so burdensome that the result will be to legislate an important (although not remunerative to investors of late) industry out of existence in this country.

1541. You consider it would be possible by too strict legislation in some cases to put an end to the industry?—It appears to me Cornish mining would be seriously hampered, and very possibly reduced considerably in extent, if it was too extensively legislated for.

1542. Have all those mines paid a dividend?—At present only three or four mines are paying dividends in Cornwall.

1543. Do you know the amounts of those dividends, roughly, that have been paid?—One last year was I think 15 per cent., one was 5 per cent., and the other somewhere about, I cannot speak exactly from memory, but about 5 per cent.

1544. (*Mr. Thomas.*) You may put that at 7½ per cent.?—That is only a small mine.

1545. (*Chairman.*) I suppose with a 5 per cent. dividend it would be difficult to attract capital to mining, on account of its uncertainty?—Yes.

1546. On the other hand, when you get to 15 per cent., you would get capital?—If there were any considerable number paying 15 per cent. money would be attracted into Cornwall.

1547. There have been crises in the tin mining industry?—Yes, the Cornish tin mining has passed through some very serious crises during the period mentioned; so much so, that had I not used discretion with regard to enforcing the Act, and chosen to do so in a harsh and extreme degree, some of the largest mines working at present would probably have been closed down.

1548. Consequently, in the case of these mines, there is a necessity for looking at two sides of the question in the administration of the law?—Undoubtedly.

1549. It is more necessary than in the case of coal?—Yes, coal mining has been more regular, and it is not so speculative.

1550. By closing the mines you could have remedied the accidents?—Yes.

1551. On the other hand, a large number of people would have been thrown out of employment?—Yes, a very large number.

1552. I think you could suggest some points on which the Act might be strengthened and improved. First, you would like to consolidate the Acts, so that a mine owner and the men would have one Act to look at, and they would know where they were?—That is so. I consider it unreasonable to expect persons in charge of mines and working in mines to keep *au courant* with the Metalliferous Mines Regulations Act, 1872, and the Amending Acts—the Factory and Workshops Act, the Explosives Act and the Orders in Council, the Education Act, the Employment of Children Act, Notice of Accidents Act, the Alkali Works Regulation Act, and others—and the consequence is that there is confusion.

1553. There is, you think, the want of something like a code which people can understand?—Yes.

1554. I suppose it would be impossible to put all those different subjects in one Act, but it would be possible to draw up some form of code for metalliferous mines with the provisions extracted from the different Acts, and as far as possible included in one Act, so that owners could better understand what they had to do?—I think they ought to be condensed into one Act.

1555. Do you think the Alkali Regulation Act could be brought into the Mines Act?—Yes, that portion of it that refers to that subject.

1556. If you turn to page 5 of your statement, in the middle of it you say you think it desirable that the date for making returns of the number of persons employed and the quantity of mineral wrought ought to be altered?—I think it should be altered to agree with the date specified in the Coal Mines Regulation Act, 1887, and I further think if that could also be altered they might all be made to date, instead of on the 20th January, to the 15th or even 10th January, with a view to expediting the publishing of statistics. My experience is, that there being so much time allowed for making the return that the form sent out, when received, is merely laid aside, and in many cases overlooked in consequence. The larger firms are seldom behindhand, and I have, at times, had the majority of the returns in before the 12th, when I asked for them, especially from the large firms. It is also desirable to provide for the information now asked for on the forms as voluntary, being required to meet the cases of some cranks who omit or decline to give it. We have had some difficulty with one or two who have refused. They have said, "It is not compulsory, and we are only one or "two out of a large number." I think they might be compelled to do it. It is also desirable that the requirements of the Notice of Accidents Act should be comprised in the Mines Act for the purpose of bringing them directly under the notice of those engaged in mine management, and for easy reference. It is

desirable that notice to the inspector of the district should be given in all cases of commencement of mining, where sinking, with a view to working mineral, is done, or where working in from the surface or shaft under cover is done. It would be well to define a mine to distinguish it from a quarry, as, for example, "any "shaft, or underground works for the purpose of "working any mineral in which artificial light is "required," or some such definition. That seems a satisfactory definition from my experience, and is what I have followed, where artificial light is required, that should be considered a mine; where open daylight is found, that should be considered an open quarry.

1557. There is an old judicial decision to that effect?—I am not prepared to say; I do not remember it; it may be from that my information came, but I cannot fix it. It is also desirable to provide for notice being given of any cessation of work for three months, which might be deemed abandonment for the purposes of the Act.

1558. The present difficulty is that you often do not know whether a mine is abandoned or not?—That is so; further on I make a reference to that. This would not interfere with the resumption of work at any time, notice of which should be given. I have known a case where a mine has been alleged to be suspended and not abandoned for 12 years. The result was that no plans could be demanded as record plans, and ultimately when it was brought to a crisis the plans could not be found, therefore they were lost. Notice of the change of owners, managers, or name of mine should be provided for, and not limited to where twelve persons are employed. Exploration is a point, under metalliferous mining, which has to be allowed for to a certain extent, because if you are costeening, for example, that is, sinking through the surface and trying to get on top of a lode, a yard or two, that might not necessarily require notice to be given, but still it could do no harm. If the three months' cessation of work were taken to constitute abandonment, plans would not be lost, as is the case at present, in consequence of "suspended" being indefinite. The period within which the plan can be demanded after abandonment should be in no way limited. Under the Metalliferous Mines Act it has to be sent in within three months after abandonment. Under the Coal Mines Act an inspector can at any time require a plan to be sent in, but if he overlooks the fact that it has not been received within three months after he has asked for it he cannot afterwards compel it. It is lost unless it is given as a matter of grace. Receivers or liquidators of companies should be required to supply record plans, returns, notices, and if carrying on the mines, to have all the responsibilities of ownership.

1559. As far as plans are concerned, you mean?—And working. At present when a receiver or liquidator enters upon the scene there is no one responsible.

1560. He is not an owner, on the one hand, and yet is supposed to be working the mine on the other?—Yes. Provision for the keeping of plans of all mines is desirable, and it should be required that working plans with longitudinal and cross sections on a scale of not less that whatever may be fixed upon should be kept in a complete and proper manner, and that in addition the workings should be laid down on the Ordnance sheet of 25 inches to the mile where such maps are completed, or otherwise on a map of not less than that scale prepared for the purpose, showing sufficient of the country around to allow of the location of the mine being readily fixed.

1561. That is of great importance. It would render identification easy and save people from making useless prospecting in future years?—That is so. At present we have, especially in olden times, plans of mines which, unless some of the old shafts can be recognised, would be absolutely worthless. They might be in the North of England, as far as the reference is concerned, or in Cornwall.

1562. This state of things of course involves a loss to everybody?—Yes; they would be useless. All plans should be made and maintained in a neat and proper condition as well as accurate. I think they ought to be kept up within three or six months. That should be the requirement.

1563. These provisions as to plans are even more important than in the case of coal mines?—No, one is quite as important as the other.

1564. The abandoned ones, I mean?—No, I think one is quite as important as the other. The Act should in the context specify that plans and sections are required, so that there could be no misunderstanding about it. As at present prescribed it does not strike the eye that sections are required. The Act at present requires plans and sections to be kept; that is, a plan of the workings and a section of the workings, but it is not directly self-evident. I think the Act ought to specify that it requires both longitudinal and cross sections in words. Then the requirements as to record plans for the Home Office should be set out at length. I would here point out that in the Coal Mines Act the record plans are required to be certified as being correct, but that is after the mine has been stopped, and therefore there is no means of checking them, although the Act does provide for correct plans being kept. I think there is an anomaly there on that point.

1565. That covers all you have to say about mining returns and plans. What have you to say about the employment of boys on pit banks?—It is absurd that on a pit bank a boy may be employed under different conditions and a different Act from another boy in the same employ, on the dressing floors 40 or 50 yards away.

1566. There ought to be uniformity as to the employment of these boys?—Yes. The section as to payment of wages in public-houses, defining "wages," see the Stannaries Act, 1883, known as Conybeare's Act, in Cornwall.

1567. What have you to say about that?—It requires a little amplification.

1568. Now with the regard to second outlets to metalliferous mines, and second shafts. In the case of coal, as soon as the mere finding of the coal is done, when working is commenced, you have to have two shafts?—Yes—that is for working.

1569. How far would similar provisions be available for matalliferous mines?—It is a more or less difficult question, but might be made subject to the requirement of the Secretary of State, and perhaps be referable to arbitration. At present the Act does not provide for it or give power to require one. I do not think you can lay down in metalliferous mining a specific time when a second shaft should be required, or can be required.

1570. The reason of that is that the position of the lodes of metal is not so well known as coal?—They are not so regular.

1571. And employment is much more uncertain?—Yes.

1572. Evidence was given by a former witness to the effect that where necessary and possible the power ought to be given to demand an inquiry?—I think so. I think that might rest with the Secretary of State.

1573. The matter to go to arbitration in case of dispute?—And if demanded and opposed, it would be referable to arbitration.

1574. Now with regard to the responsibility of a manager of a metalliferous mine. There is no provision for a certificated manager at present?—No.

1575. Ought there to be, in your opinion?—I think the time has come when a manager's responsibility should be recognised and defined.

1576. For the big mines you would have a certificated manager?—Certificates should be granted recognising manager's qualifications, and this might be arranged for, considering the present day opportunities for study, by a qualifying examination in scientific subjects combined with practical experience, either at home or abroad, if satisfactory to the Secretary of State. I think the practical experience should not be confined to at home, because a very large number of our metalliferous mining men go abroad and have not got an opportunity of employment in this country; therefore, if the practical experience abroad could be shown to be satisfactory to the Secretary of State, I think it ought to be taken into account.

1577. In doing that he would have regard to whether those foreign countries gave similar opportunities to Englishmen?—That would be a matter of further negotiation. I do not see why our men should be excluded: I mean only our own men. I do not mean foreigners in this case.

1578. If a foreigner had had experience partly abroad and partly in England, and was a capable man, would you allow him to be a certificated manager?—Personally I would, if he passed an examination.

1579. I suppose if foreign service in a foreign mine was to count in getting an English certificate, it would be fair to ask in the same way in foreign countries that they should allow service in an English mine to count towards getting their certificates?—Yes. I think the English certificate ought to be exchangeable in that case.

1580. (*Mr. Redmayne.*) Without being a naturalised British subject, just as we would expect them to allow one of our countrymen?—Yes.

1581. (*Chairman.*) Your opinion is that naturalisation should have nothing to do with it?—Nothing.

1582. Would you require a certificated manager in all the small mines of the country?—I further qualify the granting of certificates. I think where parties possess the diploma or school certificate for the full mining course at any University or Mining School approved of by the Secretary of State, together with satisfactory practical mining experience of the general working of a mine, for a period to be fixed—in working I do not mean merely manual work in one department, I mean the general experiences which are met with in the management of a mine—a certificate might very well be granted. Of course the example of the Coal Mines Act would have to be followed in the first place, namely, that persons who have been acting as managers of mines employing a certain number of men would receive certificates of service.

1583. So as to protect the vested interests?—Yes; and those men who have the diplomas and experience which I have referred to might now be granted certificates, I think. The nomination of a certificated manager should be required for mines of sufficient importance, or for a group of mines if smaller. In many cases there are small mines that might be put down as individual mines, and yet they are grouped under one owner.

1584. There you would require a certificate?—Yes.

1585. For small individual mines you would like a competent person?—Yes. Certificated managers could not be expected for all mines, but even for small ones a competent person should be nominated as responsible.

1586. At present you have no definite person to look to?—No.

1587. (*Mr. Greaves.*) However small, that is?—A competent person should be nominated for that mine.

1588. (*Mr. Ainsworth.*) Do you mean he should be nominated with the approval of the inspector?—He should be nominated on the responsibility of the owner to the inspector.

1589. With the approval of the inspector?——

1590. (*Chairman.*) I do not think it is suggested the inspector should have any share in approving him. The owner has an absolute right to nominate a competent person. The only thing to be done is this, if he were notoriously incompetent, that would be a breach of the Act, and proceedings could be taken. Is not that your meaning?—Yes. It would be open to the inspector to object, the same as an ordinary danger not provided for.

1591. The inspector would not be put in the position of approving and being responsible for the appointment; that is for the owner?—Yes, that is my view.

1592. (*Mr. Greaves.*) This manager need not be certificated?—No, a competent person for the mine he is managing.

1593. (*Mr. Thomas.*) The suggestion of a nomination is that you may have some responsible man to refer to and such nominated man need not be for approval?—Yes, that is so.

1594. (*Mr. Redmayne.*) The term used in the Metalliferous Mines Act is "agent." At present there is no obligation on the part of the owner to appoint an agent. He may inferentially, under section 41, appoint an agent to look after part or the whole of the mine. Would you or would you not adopt something like the wording of section 28 of the Coal Mines Act which deals with certified managers? It says every mine shall be under a manager appointed by the owner?—Yes, under other words, I think.

1595. The present wording of the Metalliferous Mines Act is extremely loose?—You could not say a mines manager should be appointed under the Metalliferous Mines Act for every mine; it must be a manager or competent person. The wording would have to be drawn up to meet the case.

1596. Supposing there was a metalliferous mine, the owners of which let the driving of a water level to a contractor, who would be responsible?—The owners.

1597. But the owner may say, "I delegated the "overlooking of the work to a contractor, who is the "agent"?—No.

1598. It is a moot point?—That should not be so. That man is nothing more or less than an employé, in my opinion.

1599. (*Chairman.*) That is what he ought to be. There is no law at present?—If he nominates someone as the manager or a competent person to supervise it, that competent person would be responsible.

1600. (*Mr. Greaves.*) For that particular part?—That particular mine.

1601. That particular job, when let to a subcontractor?—Yes, but that would not do away with the owner's responsibility.

1602. (*Mr. Redmayne.*) I want to be clear about that, the difference between a particular part of a mine and the whole mine?—That would not remove the responsibility of the owner.

1603. The competent person must be manager for the whole mine?—Yes.

1604. And not of a particular part only?—No.

1605. (*Mr. Greaves.*) What is the practice in the question of railway contracts, a contractor undertaking to make a railway; is the railway or the individual responsible?—I cannot tell you. If you go into mining and say a contractor is to be a responsible person, you bring it down to the fact that every miner that is working there at 5*l.* a fathom for driving a level is a responsible person irrespective of the owner, which would be absurd. In the same way under the Coal Mines Act, if it were read or interpreted as under the Act that every contractor was the responsible person, every coal-cutter would be a responsible person without any right of supervision above him which would be absurd.

1606. Supposing a number of mines combined together to drive a drainage level, would each of the managers of those mines be separately and individually responsible, or would the contractor, supposing it was let to a big firm to drive a tunnel?—The syndicate would be responsible.

1607. Not the contractor?—The contractor would be responsible to the syndicate.

1608. In case of an accident?—The syndicate should provide supervision.

(*Mr. Redmayne.*) Through a manager.

1609. (*Mr. Thomas.*) When a company determines to sink a shaft, they let that shaft to a responsible contractor; does the contractor not undertake entire responsibility?—No, he is under the responsibility of the manager.

1610. But if they agree to take entire responsibility as far as workmen's compensation is concerned?—That is a matter between themselves. He holds the same position as a contractor for driving a level or getting coal in a working place. He is a contractor for that at so much a ton; the other is at so much a fathom. Supervision rests with the manager—the owner, agent, or manager.

1611. (*Mr. Greaves.*) In the case of a group of mines combining to make a railway and letting the construction of the railway, would the syndicate of the mines be responsible then?—That depends on whether it would be within the mine or not.

1612. (*Mr. Redmayne.*) Within the mine premises?—Within the purview of the Mines Act or not.

1613. (*Mr. Greaves.*) What is meant by "the mine premises"?—That must must be defined. I have not the wording of it. Under the Coal Mines Act it is "in "or about the coal mine."

(*Mr. Redmayne.*) Usually the railway branch ends are taken as terminating the mine premises.

1614. (*Mr. Greaves.*) Supposing they have no connection with any other workings?—Then it may come under another Act and not be under the Mines Act; if under the Mines Act, the syndicate must be responsible.

1615. (*Mr. Redmayne.*) It would come under the Board of Trade?—I am not prepared to tell you.

1616. (*Mr. Greaves.*) I find a difficulty in following what would bring it under the Mines Act?—If it comes within the definition of "the mine."

1617. A railway tunnel obviously would do that?—No.

1618. I thought you said a mine was a place where you used artificial light?—For working mineral.

1619. Only for working mineral?—Yes.

1620. A drainage level would not be a mine?——

(*Chairman.*) If it was a drainage tunnel which was ancillary to the purpose of working minerals, for instance, to drain a mine that was working minerals, it would be part of it. You must dig into the ground with the object of getting metal directly, or assisting to get metal.

(*Mr. Greaves.*) In that case a railway would apply, because the object would be getting the material away to the seaport.

1621. (*Chairman.*) No, getting the material, not getting it away?—Have you a copy of the Mines Act? You will find the definition of "mine" in the interpretation clauses.

(*Mr. Redmayne.*) In the Coal Mines Regulation Act it puts it succinctly: "'Mine' includes every shaft "in the course of being sunk, and every level and "inclined plane in the course of being driven, "and all the shafts, levels, planes, works, tramways, "and sidings, both below ground and above ground, in "and adjacent to and belonging to the mine."

1622. (*Mr. Greaves.*) The witness proposes to substitute "any place where artificial light is required"?—That would be a definition of a mine as against a quarry.

1623. That is to replace that definition in the Coal Mines Regulation Act?—No. There, as soon as you commence sinking a hole, or as soon as you begin laying down a tramway, you constitute a mine, anything that is for the purpose of working a mineral.

1624. (*Mr. Redmayne.*) In other words, you would adopt this definition?—You cannot do that very well; the circumstances are different.

1625. (*Mr. Ainsworth.*) Had not we the same point on one of the previous days, when I think we rather leaned to the idea that the best definition of "mine" as far as the responsibility of the owner went, was everything under his employment? If you stick to that you make the owner in the first instance, and through him his manager, responsible for everybody in his employ, in connection with any work under that pay. If you take employment as the criterion, not so much the particular work they are employed on, then you get everybody. The point was raised as to who, if two or three mines joined in making a railway, would be responsible. Two or three people joining is a different employment to each employer carrying on his own work. It is a new concern?—That is so.

(*Chairman.*) You must have some reference to the nature of the work, otherwise a painter who came in would be at once a miner, or a man who was papering the walls of the agent's house.

(*Mr. Ainsworth.*) Supposing he is painting the engine-house, he is as much under my employment as a miner.

1626. (*Chairman.*) You would hardly call that a mining operation?—Yes, employment in or about a mine.

1627. Even if papering the agent's house?—If it is on the ground it would be so, if in or adjacent to.

1628. You are introducing the qualification of which I speak; it is in connection with mining work. You must have some connection with mining work?—I think the last Commissioner has expressed it very properly; in driving a tunnel by a combination of several owners you constitute a new ownership and a new mine.

1629. (*Mr. Redmayne.*) Who is responsible for seeing the work carried out?—It would be a new mine, therefore there would have to be a manager or competent person appointed for it.

1630. (*Mr. Greaves.*) Would it be somebody in the employ other than the contractor?—That is a matter I must leave to the Commissioners to decide.

1631. They are your recommendations. Of course you are only recommending?—I think it ought to be. The object of a contractor is to get his work done as cheaply and as quickly as he can.

1632. Is not that the object of an ordinary mining manager?—No.

1633. His object is to do the work as cheaply as he can?—Yes, but his pocket is not affected. He has responsibility, and has not the same inducement to run the risks.

1634. If he was a shareholder he would have it?—It would be very small.

1635. I know many managers who are very largely interested?—I do not think it would have the same effect.

1636. (*Mr. Redmayne.*) The competent person who is to look after the work should not be the person who is receiving pay for the work?—I think not.

1637. (*Mr. Greaves.*) That means the appointment of another official?—For supervision, for responsibility. He need not be constantly in attendance. He would have to hold the contractor and those working under him responsible, just as a manager cannot be in every part of the mine at the same time.

1638. An official would have to be appointed and paid for the purpose?—Nominated.

1639. (*Mr. Leuney.*) Would it not be sufficient if a number of mining companies combined to drive a level under a hill, that one of the managers might be delegated by his employers to act as the manager for the combined syndicate?—So far as the Act was concerned, yes, but when you take it practically into account, that owner or manager would expect to be remunerated from the syndicate.

1640. Decidedly?—That is what I mean. It would be sufficient if one were nominated.

1641. That would be extra to his ordinary duties?—Yes, it would be another appointment.

1642. (*Chairman.*) I think that has cleared that subject so far as questions are concerned with the witness. Now, will you go on with your statement. The next point is with regard to fencing of old shafts?—Yes. The provisions for secure fencing of old shafts require defining as to what secure fencing means as a minimum.

1643. The next point is as regards notice to be given by coroners?—In view of the size of the district and the outlying places where some of these mines are found, the notice to be given by coroners should be continued at 48 hours, and not be reduced to 24, as in the Coal Mines Regulation Act. Inspectors would require to be sitting at the end of the telegraph wires if they are to attend inquests upon 24 hours' notice, of which 8 or 9 hours or more have expired before an inspector gets it, if delivered shortly after he leaves home in the morning.

1644. How far do you think it necessary that a coroner's jury should see the bodies before the inquest?—Not at all; it is an absurdity.

1645. Is it that necessity of actually seeing the bodies that causes the hurried meeting?—That is so, generally.

1646. That causes a great deal of inconvenience, not only inconvenience to the inspectors, but prejudice in getting at the facts?—It is inclined to hurry the the inquiry. Having opened it, if it can be managed, it is generally considered that it is as well to close it at the same sitting.

1647. Inspection of the body could be done by a medical man?—Anyone that can prove death. First of all you have identification. There may not be one of the 12 jurymen who knows the individual, therefore for the purpose of identification it is useless. With regard to the cause of death, you have the cause verified

in evidence: therefore it seems to me that the jury viewing the body can decide nothing as to that. It is a waste of time and absolutely unnecessary.

1648. What is the plan you would adopt with regard to coroners?—My practice generally was by arrangement that the coroner should give me as much notice as possible, but that, if in order to suit his own or the family's convenience, he opened the inquest within the prescribed period of notice, he should close it, even if I or my assistant were not present, unless he or the jury considered it desirable to adjourn for the attendance of one of us, and that he should let me see the evidence given.

1649. There are a great many cases of inquests in which you could do no good, in which a coroner and an intelligent jury could say how the whole thing occurred?—Quite so.

1650. It only takes you away from work you would be usefully employed at to where you would not be required?—It gives an inspector an opportunity of ascertaining the facts and practices that exist at the place.

1651. It is a good thing?—Yes.

1652. At the same time it is not absolutely necessary, as far as the giving of a correct verdict is concerned?—Not always.

1653. You found your plan worked very satisfactorily?—Very satisfactorily, and in only a comparatively few cases were we unable to attend. I should think 90 per cent. were attended.

1654. Where it can be managed you think it is desirable that you should attend?—Yes.

1655. (*Mr. Greaves.*) I think the inspector has a right to cross-examine witnesses?—He has a right to put questions.

1656. To cross-examine?—You may term it cross-examination.

1657. After the examination-in-chief?—He can put any questions he wishes to elucidate further cause.

1658. (*Chairman.*) I do not think an inspector has an absolute right against the will of the coroner?—He is subject to the authority of the coroner.

1659. (*Mr. Greaves.*) Do you think that the manager of the mine ought to have the same right?—He generally has, through the coroner.

1660. (*Chairman.*) They both have the same, precisely. They suggest a question to the coroner—no more?—The inspector puts it as a right. The representative of the owner or the representative of the workman, if authorised, is entitled to put questions.

1661. The representative of the workman because he represents the dead body?—He puts the questions through the coroner, and in most cases it resolves itself in effect into putting the question direct. Some coroners are very punctilious, and require it to be through them, but it resolves itself practically into the effect of putting the question.

1662. (*Mr. Lewney.*) Would you not give each of the parties a statutory right to do this?—The point is that the coroner must regulate it. He is the chairman and must maintain order and say what is right and what is wrong, the questions that are right and the questions that are wrong.

1663. Some coroners will not permit this sort of thing, and it occurred to me it might be valuable, now that the Act was under consideration, to consider whether it should not be made statutory?—There are a few, but my experience is that there are very few, as I say here. They might be in the case of what I would call old-fashioned coroners.

1664. (*Chairman.*) In the Coal Mines Regulation Act there is this clause: "An Inspector shall be at "liberty at any such inquest to examine any witness, "subject, nevertheless, to the order of the coroner." I suppose that meets the point?—That is so. I have been stopped in certain questions from time to time.

1665. (*Mr. Greaves.*) The word "manager" should be put in as well?—If you do that you must put in "workman's representative" likewise.

1666. He ought to have equal rights?—I do not see personally any reason why it should not be so. If you insert the representative of the manager or owner and of the workman, the coroner still has the same right.

1667. (*Chairman.*) "Subject, nevertheless, to the "order of the coroner"?—I have been stopped myself on various occasions.

(*Mr. Lewney.*) As the witness has been stopped by the coroner, I should like to ask this: Do you not think it ought to be made obligatory on the coroner to hear the inspector on all questions?

(*Chairman.*) I should like to answer that question subsequently.

(*Witness.*) It does not often happen.

1668. (*Mr. Lewney.*) On a few occasions?—Not very often. As a rule, they generally give a wide license.

1669. (*Chairman.*) The coroners, as a general rule, endeavour to meet your convenience?—Yes, with very few exceptions; I think one or two, at the outside.

1670. Then, with regard to the General Rules, what have you to say?—I think the General Rules might be amplified, and made to render Special Rules more or less unnecessary, or at all events restrict them to a few, more for the purpose of organisation at the mine.

1671. (*Mr. Lewney.*) What are the particular rules?—I should take the Special Rules of different districts, and take the points out of them, and include them in that way. For publishing at the mines, I think the General Rules, with a few matters such as the time of employment of young persons and females, would suffice. I would suggest that the information to be posted up should be as short as possible and only be such as is necessary for the guidance of the persons employed.

1672. (*Chairman.*) That is to say, what would be posted up?—Yes. The whole Act need not be put up in the abstract. There are many points that do not interest the workmen.

1673. Such as the keeping of plans?—Yes, and sending in notices.

1674. You think it is useless to post up an abstract of the whole Act?—It is useless, and at small places it is not practicable. You may have a place with six men working, and you have no place that will allow of these things being posted up. When the information is too extended the result is that no one tries to master it. I do not see how different mines, such as slate mines, can be legislated for separately.

1675. That would mean you would legislate for mines and legislate for quarries separately?—For open quarries.

1676. You would not legislate according to the substances got, but upon the nature of the place in which they were got—mine or quarry?—Yes. If it were attempted to do otherwise, questions would arise such as when is a stone not a stone.

1677. The metalliferous stones so shade into those that are non-metalliferous that you would get into endless confusion?—Yes. If it is a slate mine you want to define what slate is. In the Cotswolds we have thin sandstone, more like tiles, used for covering churches. They would not be intended to be slates, or intended to be sandstone quarries. You would have difficulty in defining the difference between one and the other.

1678. You prefer to have three Acts or three sections of one Act, one dealing with coal mines, another dealing with mines of a metalliferous character and slate mines, and a third dealing with quarries?—Mines defined, as I said, by the use of artificial light *versus* open cast mines where sunlight is available.

1679. A mine so defined to include, of course, the surface works that are in the light?—In or about the mine.

1680. (*Mr. Redmayne.*) Ore and stone mines?—Yes, equally so in quarries. Those parts outside the dressing department with quarries should also be in the Quarries Act.

1681. (*Chairman.*) In a case where it is doubtful you would leave the Secretary of State to determine it, as he does with coal mines?—Yes.

1682. (*Mr. Greaves.*) You would agree with Sir Henry Hall's view, would you not, that underground slate mines should be classed with quarries?—No difficulties would arise which would be insuperable.

1683. (*Chairman.*) What is your opinion with regard to the ventilation of metalliferous mines with which you have been acquainted?—It is not generally as good as in the case of coal mines, and in some cases

to course the air in metalliferous mines is impracticable, as in the tin mines where the levels are communicated to each other by great cavities. In some large tin mines you have currents, but traversing more or less irregularly. They vary to some extent as regards the quantity of air, but still not generally available for carrying into the faces of long levels behind brattices.

1684. What is the effect of defective ventilation in mines?—The men cannot return to their work so soon. After blasting they have to remain out for a considerable period, that is in driving ends, in order to allow the ends to clear.

1685. Do you think their general health suffers from that?—Yes, in some instances.

1686. There are places where the ventilation could be improved without closing the mine?—Yes.

1687. (*Mr. Redmayne.*) By coursing the air very much in the way as is done in coal mines?—There are some mines under the Metalliferous Mines Act where coursing the air is more or less practicable. I am referring here as an exception to mines such as the tin mines, where the cavities are very large and are connected. There is a difficulty in carrying the air and coursing it into certain points in those large mines in which such cavities exist. If a little blasting takes place the fumes and smoke are dispersed over a very large space, so that it has time to improve itself, and it does not vitiate the air to the same extent as in a confined end.

1688. (*Mr. Thomas.*) In a confined end is there not a provision in the Special Rules as to the lapse of time before a man may return after blasting?—I do not think there is a specific time, but the Special Rules vary in different districts. I might hand in a copy of the Special Rules which are in force in the metalliferous mines of Cornwall. Is this what you refer to: "If a hole has "apparently missed fire, no person shall be allowed to "go near it except in a case of emergency until after "the lapse of an hour at the soonest."

1689. After blasting, I think, if you read on. There is not much point in it except in regard to the time that has to elapse before the men may return to an end after they have blasted. It would be generally sufficient for that end to clear from smoke?—You could not lay down a definite rule for that. You could not lay down a rule to say the time a man must remain out after firing a shot. In one place he may well go back in five minutes, and another may not allow of his going back within one hour.

1690. It may be more a custom than a rule?—That may be so. I do not think you will find it in the Cornish tin mines.

1691. It may be my idea is suggested by experience rather than the rule?—You could not lay down a rule.

1692. (*Chairman.*) In the new Special Rules established in 1905, after your report and Dr. Haldane's, Rule 2 is: "After blasting in any end, rise or other "place no person shall return to that place until after "the lapse of at least half an hour unless the air in "such place has been cleared of the dust and smoke "arising from such blasting"?—I have probably overlooked that. I was thinking of the general code.

(*Chairman.*) It shows the confusion of things.

(*Mr. Thomas.*) That was a Special Rule introduced after an inquiry by Dr. Haldane and Mr. Martin, and myself.

(*Chairman.*) It illustrates the confusion.

(*Mr. Thomas.*) That is why I raise the matter, because there is a great deal of confusion.

(*Witness.*) There is an alternative. It says, "After "blasting in any end, rise or other place no person "shall return to that place until after the lapse of at least "half an hour unless the air in such place has been "cleared of the dust." As I have said, you cannot lay down a specifically definite time. Some places might be clear in a comparatively few minutes.

1693. (*Mr. Lewney.*) It depends largely on the number of holes blasted?—And the distance it is in beyond the air, the distance of the ventilation that is carried in, and whether the place is wet or not wet. It provides for a shorter time; is not that so.

1694. (*Dr. Haldane.*) Yes. If the place is thoroughly well ventilated and provided with means for laying the dust it may be safe in two minutes?—That is my contention.

1695. (*Mr. Thomas.*) I thought I understood you to say you would make some distinction as to the time for them to return?—No, I do not think you can do that in general terms.

1696. Then I misunderstood you?—Unless you put a proviso, as in this case.

1697. It would be absolutely impracticable to do it in every instance?—You may have in the same mine different conditions. If you lay down a time you must put in the proviso.

1698. As a rule when they blast in a close end they do it before they have their mid-day meal, and do not return till after?—Yes.

1699. (*Mr. Lewney.*) When practicable that is so?—What I have suggested is that something more definite is desirable, so that an inspector can require the air to be improved. That is what I have stated.

1700. (*Mr. Thomas.*) In metalliferous mines?—Yes.

1701. Have your inquiries into these matters indicated that the air in metalliferous mines is on the whole very good?—I am speaking of long ends.

1702. Blind ends?—Yes. There are some mines which are not as good as others.

1703. (*Chairman.*) Now with regard to the inspection of working places, what have you to say?—There is no provision in the Act requiring working places and roadways to be inspected daily, and, indeed, unless in general terms, I fail to see how such a requirement can be inserted. In the Cornwall Special Rules drawn out by the late Sir Clement le Neve Foster and Mr. R. J. Frecheville, there is the following rule:—"He (the Captain) shall frequently examine "the working places and travelling roads, cause every "place which he may find dangerous from want of "ventilation to be fenced off, so that it cannot be "inadvertently entered by any person"; also, "He "shall see that a proper supply of timber is provided, "and that the travelling roads are properly secured, "and he shall give general directions concerning the "securing of working places." In some mines it is quite practicable to require and expect working places to be examined daily, while in others it is quite impracticable, at least to do so carefully.

1704. Would it not be practicable to have a rule that every place where men were actually at work should be inspected once during the day? Do the words "working place" mean places where the men have been at work or are actually at work?—At work, and such places as (under the Coal Mines Regulation Act) affect them.

1705. Why would it not be practicable to make a rule that every place where men were actually at work should be inspected by somebody once a day?—Supposing you are working there at the window, it is impracticable for a man to inspect carefully that ceiling. He can look at it, but when you put the word "inspect" there is rather more expected. He is expected to closely examine it.

1706. That is what you meant by the general term "inspect." I suppose it would be enough to look at a roof every day and examine it carefully from time to time?—That is all that can be done. Even in some of those cases "from time to time" means a considerable interval. Some of those places are 40 feet high.

1707. So far as is practicable it is desirable to examine places where the men are actually at work once in the day?—Certainly.

1708. (*Mr. Greaves.*) In many cases it is over 200 feet high?—If you measure them in a certain way when very steep.

1709. Vertical, above the men's heads. In our mines they are in many cases?—In the slate mines.

1710. Yes?—I am not speaking for the slate mines.

1711. To inspect a roof of that sort means a fortnight's work, at very large cost.

1712. (*Chairman.*) I do not think they meant more than somebody should go and watch and see that everything is apparently in order, and not leave them

uninspected. I do not think it was intended a minute examination should be a condition of men being allowed to work, because it is impossible?—My view is that it is impracticable.

1713. But where practicable, and to the extent to which it is practicable, there ought to be a daily inspection?—Yes, and the workmen ought to be visited once a day at least.

1714. (*Mr. Thomas.*) Is it not a fact that the Special Rules in force in Cornwall put a great deal of responsibility upon the men themselves?—The workmen have reponsibility, but then the owners have the responsibility of enforcing it and seeing they do it reasonably, and also that it is done on their own behalf by their officials. A certain responsibility must necessarily rest with the workmen.

1715. If you refer to Special Rule 98, that says: "He shall, before commencing work and during the "course of it, especially after blasting, carefully examine "and sound the roof and sides of his working place, "and shall remove any loose stone or ground that "might be dangerous." These Special Rules define the responsibility of the workmen, putting it very clearly. (*Chairman.*) That is after blasting.

1716. (*Mr. Thomas.*) "He shall, before commencing work." The intention is that the responsibility of seeing that the man's working place is all right shall be laid on the man as well as the officials?—That must necessarily be so. The men must have responsibility in the working places, because the official cannot always be present, but the official would have, as it were, to see to his general safety, and to see that the men do their duty in regard to the examination and rendering the place safe. This rule is impracticable in the Cornish mines inasmuch as it requires a man to sound the roof when it is 40 feet high. How is any official workman to get up unless he erects a special staging for it? It is impracticable to do it.

1717. (*Mr. Greaves.*) Special Rule, No. 7 in the slate mines in North Wales is: "After the removal of "each thickness from the working face the sides of "the pillars shall be inspected by an agent and the "contractor, who shall not allow work to be resumed "until they are satisfied that the sides are secure." That was settled as being sufficient ten years ago, not a daily inspection. Nothing can happen between the removal of one thickness and another?—Surely anything may happen from day to day. It is impracticable to carry out the rule I have been referring to as here worded.

1718. (*Mr. Lewney.*) Applying it to every mine?—Yes.

1719. There are some mines where that rule ought to be applied?—Yes, for instance, such as the ironstone mines in Antrim, with which I was acquainted when I was in the Manchester district. There is no reason why an inspection might not be made of those mines just as in coal mines.

1720. Once a day?—Yes, and the roof examined. They are practically stratified measures. I wish it clearly understood that it is impracticable to make such an examination as is here set forth, that either a man or an official shall carefully examine and *sound* the roof and sides. I might refer to my note. In some mines it is quite practicable to require and expect working places to be examined daily, while in others it is quite impracticable, at least to do so carefully. If by "examination" is intended the looking at the roof with as good light as can be procured, of course, that can be done, but when the spaces are 20 to 40 feet high it is not practicable to do otherwise. I do not think I can express myself better than that.

(*Chairman.*) You say there is no provision in the Act with reference to working places approaching places likely to contain dangerous accumulations of water.

1721. (*Mr. Thomas.*) In the Special Rules there is something?—There is no provision in the Act, but in the Special Rules it is provided that such places are not to exceed 6 feet in width, that is for Cornwall, and to maintain a bore-hole in front at least 5 feet in length and sufficient flank holes to be judged by the character of the ground. By reference to the table that accompanies this, it will be seen that the deaths from irruption of water have been very few, with one exception, within the last twenty-seven years.

1722. And remarkably few of recent years?—None since 1893.

1723. To what do you attribute the fact that up to 1890 there were a number of these accidents, and after that we have had such remarkable freedom?—I am afraid I have had no experience of the conditions existing before.

1724. (*Mr. Redmayne.*) The reason you advocate 5 feet is on account of the very much harder material bored in?—That is what Sir Clement Foster and Mr. Frecheville decided on.

1725. The length is greater under the Coal Mines Regulation Act?—It is a different material, that is the point, and the boring and the drilling are quite different. You can drill a 20-feet hole in a coal seam in a comparatively short time, but to drill 20 feet in some of the metalliferous mines would take a week.

1726. It is a question of strength of material?—Yes.

1727. (*Chairman.*) This table, which is a very valuable one, shows that on the whole the fatalities are diminishing considerably in actual number, and even diminishing regard having been had to the total population employed?—I refer to that afterwards.

1728. We will deal with it presently. There is no definite provision for withdrawing workmen from dangerous places either in the Act or Special Rules?—No.

1729. There ought to be, in your opinion?—I think so.

1730. With regard to explosives there are provisions in the General Rules and also in the Special Rules?—Yes. There are provisions with reference to explosives in the General Rules, and these are amplified in the Special Rules. I speak of the Cornish Special Rules, not any other district. The number of accidents from the use of explosives in the Southern district does not appear to be very excessive when the quantity of explosives used and the number of persons using them constantly is considered. The quantities of explosives used in the metalliferous and coal mines were in 1909, in metalliferous mines 453,998 lbs., and in coal mines 602,297 lbs., being 84·26 lbs. per person employed below ground in metalliferous mines, and only 10·59 lbs. per person employed below ground in coal mines.

1731. That is in your district?—Yes. In regard to the returns made in my district, in 1908 the quantities are 423,781 lbs. in metalliferous mines, being 74·61 lbs. per person employed below ground, and 639,542 lbs. in coal mines, or 11·08 lbs. per person employed below ground. The quantity used per man employed underground in metalliferous mines is therefore 6 or 8 times larger than in coal mines. Then the number of fatalities and persons injured is as follows:—

	Metalliferous.				Coal.			
	Fatal.		Non-Fatal.		Fatal.		Non-Fatal.	
	Accidents.	Deaths.	Accidents.	Persons injured.	Accidents.	Deaths.	Accidents.	Persons injured.
1909	2	3	9	15	2	2	9	13
1908	–	–	1	1	–	–	9	10
1907	1	1	2	2	2	2	6	7
1906	3	3	2	7	–	–	3	4

Reference to the table which I have put in * will show what a great improvement in the matter of handling explosives has taken place in the last two decades, as compared with the previous 17 years. I do not see that further restrictions in the form of rules is requisite, as between the Act (General Rule 2) and the Special Rules they seem adequate. Compliance with them is what is required. Probably in the Act those two might be combined.

1732. Do you think generally that there is a laxity in the observance of the rules in your district as to

* Appendix C.

explosives?—I think familiarity sometimes breeds contempt, therefore it is very necessary to watch over them. At times some of the most experienced men get caught.

1733. After all, people are careless in crossing the street in the city?—That is my difficulty. I do not wish to say that it is absolutely general, but it is so in some instances. The human element comes in, hence the necessity for supervision.

1734. Would you say that there was abnormal carelessness, more than in other things, with regard to the use of explosives?—I do not think so. I wish, however, to draw attention to the necessity for the supervision and carrying out of the rules, and watching to see that they are complied with. One does find individual instances. I have found men carrying explosives underground in open canisters, and they take their explosives about in this way in the mine, and in charging a hole they put them down loose beside them and simply use what they require and then take the others back to their box. There is a liability to forget or miss taking a cartridge away in those cases, and such practices ought not to be allowed. Some men will do it and some men will not. Of the nine deaths which occurred in the past decade, three occurred through striking unconsumed explosive when clearing away debris from the shots; that is, in going back to clear away the debris, in breaking up a stone with a pick or hammer, they have struck, unseen and unknown, some explosive which had not been consumed in the shot itself. In one case I know of there were 17 or 18 shots in a sinking shaft, and when they went back they were breaking up the stone and material and struck the explosive, and caused two deaths. I do not see how an accident of that description is to be prevented, because if any of the explosive out of all those shots had not been consumed, which may occur, it would be covered up by that large amount of debris, and you might seek as carefully as you liked but it would be impossible to say that some of it might not be there. It is a danger which exists and which can only be reduced as far as practicable by care. Two occurred while charging or lighting shots. One was, as far as I can remember, a man trying to light two shots, and his fuse was rather short considering the time he took. Perhaps he fumbled over one lot. That is a case I do not think any management can deal with. The other was a man using a stemmer, and either pushing the gelignite into the hole with a copper stemmer or ramming it afterwards so as to cause an explosion. Two occurred while drilling out holes, which is contrary to the rules.

1735. (*Mr. Lewney.*) What was the explosive used? Practically always gelignite.

1736. And yet drilling it out?—Yes; he was removing it or drilling it out.

(*Mr. Thomas.*) Picking out, probably.

1737. (*Mr. Lewney.*) Do you not think it would be advisable in all cases to prohibit anyone using more than a certain quantity of stemming, say 2 inches?—I do not know about that.

(*Mr. Lovett.*) Would it be practicable to have a regulation of that kind?

(*Chairman.*) I thought the more stemming used the better.

1738. (*Mr. Lewney.*) Hundreds of holes have nothing but a bit of clay round the neck?—Water is sufficient in some cases.

1739. If water is sufficient why will not 2 inches of stemming be sufficient?—I do not think you can lay it down as a rule.

1740. My idea was that if it failed to go off you might drop another cartridge on the top. If you put 5 or 6 inches on, it would not strike through?—It is often done.

1741. I have seen it misfire?—I mean the second charge is often put in on top of a hole, and with effect. There is danger that some will not have been consumed below.

1742. That is why I suggest the amount of stemming used should be minimised?—It would depend upon the depth of the hole, and one thing and another.

1743. Water is considered the best of stemming, owing to its low resisting power?—I do not know that it is the best.

1744. It is considered the best among practical miners. The only thing is the danger of the cap getting damp through using the water?—I am not prepared to put forward a suggestion on that point.

1745. (*Mr. Redmayne.*) The practical point arising out of that rule is this. The Rule says a *hole* charged with powder or any other explosive shall not be unrammed, but it does not say the *stemming* shall not be unrammed?—It is a matter of wording. The stemming forms part of the cartridge under the Explosives Act.

1746. We failed to get a conviction in Scotland on that point?—It is not in the Mines Act, but under the Explosives Act, that the stemming forms part of the cartridge. You will find that Captain Desborough will explain that to you. Then one further accident was the result of drilling in a socket, that is a portion of a hole that was blasted and it was not blown off, and doing so contrary to the Special Rules without making sure there was no explosive remaining. There is a great temptation for a man in hard rock, if he has 6 or 8 inches of a hole drilled, to commence and re-drill. The Special Rules require, before doing so, that he shall fire an exploder in it to make sure that there is no explosive remaining.

1747. (*Chairman.*) One occurred while conveying explosives?—Yes, but the cause was never ascertained. The quantity of explosives used per man underground in my district in 1909 was 95¼ lbs. in metalliferous mines as against 10¾ lbs. in coal mines.

1748. That puts the explosive figure favourably with regard to metalliferous mines?—It accounts for more accidents from that source than in coal mines.

1749. Ought you to expect the accidents would be proportionate to the amount of powder used per man?—I should think so.

1750. If so, that more than explains the difference in metalliferous mines?—I think so, when you reduce it per 1,000 persons employed.

1751. (*Mr. Lewney.*) That is accidents from the use of explosives?—Yes.

1752. (*Chairman.*) Do you think it would be a good thing to make anyone responsible for examining places after blasting?—I think it would be a good thing to make it compulsory by the Act for the leading man of a pare, that means a company——

1753. (*Mr. Thomas.*) A gang?—Yes; it is a Cornish term. It would be as well to put it "pare or gang," and in his absence the senior man present responsible for examining the place after blasting. That is the case on the Continent in German coal mines, what they call the "Orts-alteste," the leading man is responsible for certain work.

1754. (*Chairman.*) At present nobody is responsible?—No, each man is responsible. It is everybody's business and nobody's business.

1755. (*Mr. Greaves.*) You say the senior man?—The taker to be the leading man, I put here—the man who takes the bargain.

1756. (*Mr. Thomas.*) It is all very well if he is there, but in big pares the men work in gangs of 18 or 20, and the taker could not be there every shift?—In his absence, the senior man present.

1757. You fix it on someone?—Yes.

1758. (*Mr. Greaves.*) Merely by age?—No, experience, I should think. That would have to be settled by the manager; it is a detail.

1759. (*Chairman.*) You do not appear to be in favour of having one man only as shot-firer?—He might, perhaps, also be responsible for firing. I am however, not sure that much good would result.

1759*a*. What is your view as to inspection by the men?—I think the men might have the power or right conferred upon them which coal miners have, under General Rule 38, of examining the mine. It might, perhaps, be made use of in some classes of mines under the Act, but I do not think it is likely to be made

much use of in the late Southern district, that is, my late district.

1760. The use of the inspection varies very much in different districts. It is done very much in Durham?—Yes, considerably in my district, and with very good effect, especially with regard to ventilation. I have always advocated it.

1761. (*Mr. Lewney.*) In the case of fatal accidents, do you not think it would be advisable that the deceased workman's representative might be allowed to inspect the place, irrespective of whether there was a general recommendation?—With limitations, I think it is desirable.

(*Mr. Redmayne.*) In company with the manager.

1762. (*Mr. Lewney.*) Decidedly?—Nobody should have a right to enter the mine without the manager's permission. That principle works remarkably well in the North of England. The only point is that sometimes there are strained relations on other matters between the representatives of men and the owners, and there is a liability sometimes for personalities to come in, which ought to be avoided. Therefore, it ought not to be the person who is at loggerheads exactly who should carry it out. There may be personal feeling which might be introduced. With that exception, I would advocate it.

1763. (*Chairman.*) The men who do this examination should not be interested in the examination itself?—No, the question is that a representative of the men should have a right to inspect the place where a fatal accident occurs. If the representative of the men has shown no personal animus, or rather if there is no personal animus between the workmen's representative and the manager, I think it is desirable, but if there is any such feeling, it should be someone else.

1764. (*Mr. Lewney.*) If that feeling existed, do you not think it would be made apparent to the jury?—It can also be made use of outside the immediate question. It is liable to be made use of outside for other purposes and to raise ill-feeling, but I do not think it would be so used except in the hands of a few extremists. It is only where I think there is animus that I think it objectionable. When framing special rules in 1887, I made this remark to the representatives of the men. I said I would be pleased to attend to complaints received at any time, but I preferred to receive them when the representatives of the workmen and the management were friendly rather than wait till some unpleasantness arose and then do it out of a matter of what might be considered spite. That is where the human element comes in.

1765. (*Chairman.*) You would be in favour of periodical inspection of shafts, ropes, chains, and machinery as in the Coal Mines Act, and the reporting upon them by some competent person?—Yes, I think that might be done very well.

1766. Have you much complaint to make as to the condition of things in that respect?—No, but whilst suggesting this, I think it is due to those engaged in the management of metalliferous mines in the district with which I have been connected, to say that the results under the present system with regard to these matters have been most satisfactory. I have not known, or at least I do not recollect, a serious accident due to the breakage of a rope or defective machinery in the shafts. I believe one of the Commissioners has had an unpleasant experience on one occasion. I may, however, say that the riding in shafts in Cornwall is as a rule like riding in their tramways—a rough amusement, comparatively speaking, both being open to improvement.

1767. Have you any suggestion to make as to ambulance requirements?—I think that some moderate requirements as to the providing of ambulance necessaries might be introduced into the Act, such as that at a mine in which, say, 20 men, or such other number as may be fixed, are employed underground, an ambulance case should be provided with the essentials for making a man comfortable and removal after injury, pending treatment by a doctor, or his being got home, and that the case and contents should be always in an efficient condition.

1768. In some cases the life of a man would depend upon it?—Yes.

1769. If you have a skilful apparatus to carry him, you can save a man much suffering sometimes?—Yes, a very great deal of pain might be spared, and also it might go as far as saving life.

1770. I believe the Government is engaged with the question of ambulance?—In the west of Cornwall, at all events, this ambulance movement is engaging considerable interest.

1771. You are in favour of uniformity of signals as far as practicable?—It appears desirable that the ordinary working signals and those for men descending or ascending, *i.e.*, men riding, should so far as practicable, be universal. I adopted this course in my late district in regard to coal mines when preparing special rules in 1887. Previously every mine made its own signals. My reasons were those indicated by some of the Commissioners. That is for those operations which are so common to all, the signals might very well be universal, and it would prevent confusion in the case of men going from one mine to another. That was the reason I put forward at that time. For instance, the signals "Go on," that is to go on for work; "Stop," "Pull up," that would be to pull up slowly or a short distance; "Lower"; and "Men about to ride." Those might, I think, be fairly well universal. Further signals to meet local requirements or working in shafts should be left for arrangement according to circumstances.

1772. What have you to say with regard to changing houses?—The rule with reference to changing-houses might go farther than it does, and provide that they shall be maintained in a clean and tidy condition. That at mines where, say, upwards of 20 persons underground are employed, suitable arrangements for washing so far as water, basins, trough or baths are concerned, shall be provided. At present all that is required is that men shall have an opportunity of taking off their clothes when going away.

1773. (*Mr. Jones.*) Would you apply that to slate mines?—I have no experience. Then it might be required that the men shall take their clothes away at the end of the week and bring clean ones back the following week. That would prevent what has happened in various changing houses, lice. They keep them there for an indefinite period.

1774. (*Mr. Thomas.*) Their clothes?—Yes.

1775. That means each man would have to have two suits of clothes?—Yes.

1776. (*Mr. Lewney.*) As a rule, when they are working two shifts they take their clothes away on the Friday night, and Saturday, as a rule, is a washing day, as far as pit clothes are concerned?—That is a matter of detail.

1777. Once a fortnight would be a better arrangement than once a week?—That is a matter which will be for you to decide yourselves. I am throwing out the suggestion. Then that at the end of the week the house shall be washed out or sluiced. It may not be so necessary in these mines as in coal mines, but it is desirable, and whitewashed every six months.

1778. (*Mr. Thomas.*) Generally speaking the mines in Cornwall you are referring to are kept clean?—Some of them.

1779. In the big mines, for instance?—You have to provide policemen, not for people who do what is right, but simply to bring up those who are behindhand. When I say 20 persons, it is only a suggestion. It is a matter for you gentlemen to decide.

1780. (*Chairman.*) Will you give us your views as to the relative dangers of coal and metalliferous mining?—It is, I think, a general opinion of persons not practically versed in coal and metalliferous mining that the danger in coal mining is much greater than in metalliferous mining, in consequence of the disasters which occur in the former through explosions. To those acquainted with both it is known that the danger in metalliferous mining is the greater of the two, and the death rates of the country are higher for metalliferous mining when calculated upon persons employed

underground than they are in coal mining. The figures also fluctuate more owing to the smaller number of persons employed in consequence of which, a few deaths make considerably more difference in the death rates than 100 or 150 would in coal mines.

1781. (*Mr. Ainsworth.*) Is not the increased number of fatal accidents in metalliferous mines due to the fact, that when a fall takes place in a metalliferous mine, the stuff being so much heavier, is bound to do more damage and often causes fatal injury, whereas a fall in a colliery is only a trivial matter because the stuff has not the same weight?—I do not think there is very much in that.

1782. I think there is a great deal in that?—In many cases a very small stone, whether coal or metal, will cause death. The height has a good deal to do with it. I propose now principally dealing with my late district, as I have been doing all through, and also the area formerly comprised under No. 14 metalliferous mining district. That is an area which formerly was a metalliferous mining district. I have a table showing for the years 1900 to 1909 the number of persons employed, the number of deaths, and the death rates per 1,000 persons employed respectively under-ground; above-ground and under-ground and above-ground for the United Kingdom. The Southern district and the former No. 14 district, which until merged into the Southern district under me, was under an Inspector with purely metalliferous mining experience. The Table is as follows:—

METALLIFEROUS MINES.

1900–1909.

Persons employed.			Deaths.			Death-Rates per 1,000 employed.		
Under-ground.	Above-ground.	Under-ground and Above-ground.	Under-ground.	Above-ground.	Under-ground and Above-ground.	Under-ground.	Above-ground.	Under-ground and Above-ground.
			United Kingdom.					
179,538	126,857	306,395	299	51	350	1·67	·43	1·14
			Southern District.					
52,954	38,600	91,554	112	13	125	2·11	·34	1·36
			No. 14 District.					
43,325	35,502	78,827	102	12	114	2·35	·34	1·45

1783. (*Chairman.*) Are those figures bigger than in coal mines in relation to the people employed?—From this table it will be seen that the Southern district, which includes No. 14 district, is considerably worse than the United Kingdom, and that No. 14 district area is worse than the whole of the Southern district.

1784. (*Dr. Haldane.*) Is No. 14 Cornwall and Devon?—Cornwall, Devon, Dorsetshire, and part of Somerset. Dorset and part of Somerset is comparatively small—practically it is Cornwall and Deven. Anyone practically acquainted with the mines will readily appreciate these facts and the reason, especially when the smaller number of persons employed respectively is taken into consideration. I also have a table showing for the same periods and for No. 14 district area the numbers of persons employed under-ground and above-ground and total, with the numbers and ratios of deaths, calculated upon the number of persons employed under-ground, under falls, shafts, explosives, irruptions of water, miscellaneous under-ground, totals under-ground, surface, and totals of under-ground and surface. That Table I put in.* From this Table it will be seen that "falls" and "shafts" largely predominate over the other classes of accidents, and that under the other headings there have been reductions, while under the falls there has been an increase. The falls are due to various causes: in some the men have been engaged in barring out rocks loosened by blasting, and have either pulled them on to themselves or have fallen in front of them owing to the bar they were using slipping and their overbalancing. In others the stones have fallen from gunnises fathoms above their working places and rolled down. The lodes lie at angles from almost perpendicular.

1785. (*Mr. Lewney.*) May we have an explanation of the word "gunnises"?—Vacant spaces, areas in which the ore has been extracted. It would be termed "goaf" in coal mines. In others from slips and so forth. The wonder is, under the conditions in some of the mines, where the cavities are 30 to 40 feet wide, that more accidents do not occur. The deaths from shaft accidents during the past decade numbered 33, and occurred:—13 while repairing or working in shafts, by falling from where engaged; 11 while ascending or descending, of which 5 occurred on ladder-ways, and 6 with gigs or cages; 5 by things falling and striking them while in the shafts; 2 by falling into the shaft from the surface and landings; 1 crushed between a cage or gig and the side, I believe it was; 1 while having a ride on a plunger pole in the shaft as a pastime while his comrade had to finish what he was engaged at.

1786. (*Mr. Redmayne.*) Why should the death-rate per thousand in shafts be so much in excess of coal mines?—The question is, why should these accidents have happened? In working in a shaft for example, in the underlying shafts in Cornwall they step across and either stand on a ledge, a piece of timber, or make a temporary scaffolding, and these used to give way.

1787. The answer is that the shafts are steeply inclined rather than vertical?—Yes, and instead of working on hung scaffoldings they work upon temporarily improvised scaffoldings.

1788. (*Mr. Lewney.*) Would it not be necessary to do more work in these shafts, than in shafts in coal mines? The shaft in a coal mine is bricked; in the others you have timber, which would undoubtedly require attention oftener than in a colliery. Is not that so?—But inspections take place in both. There may be a few more employed in the shafts, but there is more danger from the fact that they have to improvise scaffoldings to work upon.

1789. I was trying to suggest that in the colliery the shaft is bricked, and when once you have it bricked,

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that is practically an everlasting job?—There is timber.

1790. It requires inspection and repairing oftener?—There is a different system.

1791. (*Mr. Thomas.*) Particularly with regard to cage roads, which are very much used?—There is more repair on the cage roads in metalliferous mines than there used to be.

1792. (*Mr. Redmayne.*) Where the shaft is vertical there will be less accidents?—I think so.

1793. The tendency now is towards sinking vertical shafts?—In Cornwall.

1794. Elsewhere as well as Cornwall?—There is something to be said on both sides. Personally I like the perpendicular shaft whenever it can be had, especially for riding. During the same period 102 deaths occurred underground at 31 mines in the No. 14 district area, which comprised Cornwall, Devon, Dorset and part of Somerset (45 from falls, 33 in shafts, 9 from explosives and 15 miscellaneous causes). Of these mines 23 are now working, of which 12 are in Cornwall and account for 81 of the accidents (30 from falls, 30 in shafts, 7 from explosives and 14 miscellaneous) and of these accidents 67 occurred at five mines and 14 at six mines. The five mines at which accidents occurred are the largest and the deepest in the county. The lodes have very steep underlays and the workings of some are 20 to 40 feet wide and have wide and large gunnises or cavities above them. Of the 67 deaths, 27 occurred from falls, 21 in shafts, 5 from explosives, and 14 from miscellaneous causes. I have taken out these figures in order to show how far inspection is capable of being profitably extended. The fact is the number of mines in which the accidents occur is a comparatively limited number.

1795. (*Chairman.*) Are you of opinion upon the whole that mining in Cornwall is carried on with care?—There has been considerable criticism as regards inspection and the management of the mines, going almost as far as to attribute, if not actually doing so, callousness to the managers of Cornish mines and insufficient Government inspection, if not incompetency of the inspector. With the above figures I bring the critics and the managers face to face with each other, and if the critics who have written to the effect I refer to are in a position to prove their case, I think they should come before this Commission and put forward what they have to say. It may be that they can, from their *practical* experience, propound some means for the abolition of such things as accidents and deaths from them in mines, other than that known to me, namely, the stoppage of them, and if they can—the only way I know of stopping accidents in mines is the stoppage of them—I am sure the Commission will be grateful to them.

1796. (*Mr. Redmayne.*) The stoppage of the mines?—No, the accidents. It was suggested in one article that I read, that the gunnises should be filled up, as is done in the slate mines of North Wales, with which comparison was made; I cannot claim to much experience in those mines, but I do know that the conditions are totally different from the conditions existing in Cornwall. I wish it to be understood that I considered this method of filling up the cavities, and several years ago referred to it in my annual report. I, however, did not pursue it, as I found, when I considered the circumstances, it was not practicable. To have enforced it would certainly have been effective by killing the industry.

1797. (*Chairman.*) It would have been too expensive, in your view?—Quite. The shafts for one thing are not suited for sending material down. The material is also not at hand. It should be understood in considering the Cornish mines that the ore extracted is ground into fine sand, very fine in fact, and from that the ore is extracted. It is extracted by various mechanical operations till it leaves the precincts of the mine. It is afterwards manipulated again and again as it flows down stream; a considerable number of persons are employed in doing this and a livelihood is obtained for them. It would be necessary to bring that stuff back something like 5 or 6 miles to the mine in order to use it again for filling up these gunnises and spaces, and I think to all those present who have a knowledge of Cornish mining, that in itself would be impracticable. The conditions of Cornish mining do not and have not allowed of things being carried on as I would like to see them, but it would not have been in my province to enforce my own ideas or fads under cover of the Mines Act, to the closing down of the mines, which at one time I believe I might easily have done, so impecunious were the mines. I considered it my duty to consider matters from the point of view of safety combined with what was practicable, and I now consider that I was right in doing so and fulfilled my duty to the Home Office, the owners of the mines, the men who were found employment, and the community at large, and would be prepared to follow out the same course again. Mining is mining, and is and always will be attended with risk, and, in my opinion, the duties of inspectors are to see that no unreasonable risk is run, and if unreasonable risk exists, to take steps for its removal at whatever cost, but not to overdo things when the state of the industry will not stand it. If I had my own way, and philanthropy was the object of carrying on the mines, with ample capital behind me, I would require new shafts to be sunk at almost every mine in Cornwall, and have other things done on the same scale, but that would not be practical mining under the existing conditions.

1798. What have you to say on the question of falls of roof and sides?—The question of falls of roof and sides is a difficult matter, and I see very little that can be done in it. To make a close and careful examination daily or even monthly in some of the huge caverns is impracticable, and so far as I can see an inspection with the best light attainable is all that can be done. Accidents in these places are, however, only a portion of those which occur. Omission to examine after blasting and errors of judgment account for a number of them. Then again I fail to see what effect inspection can have upon the shaft accidents, which seem practically in all cases to be within the men's own control and action. Falling away from ladder roads is completely in the man's own hands.

1799. Would not you say the condition of the ladder roads has partly to do with it?—No, I think that the condition of the ladder roads as a rule is satisfactory.

1800. (*Mr. Redmayne.*) Are not some of them too near the vertical?—Not many. I do not think that is the cause of the accidents.

1801. (*Chairman.*) You would put it in this way, those accidents would occur even if the ladders had been ever so perfect?—I do not know about "ever so perfect." I think in most cases they are reasonably so at present. There are perhaps a few where they might be improved. I do not think it is on the steep ones that the accidents have occurred.

1802. (*Mr. Redmayne.*) Do you think that the limited standing room as between ladder and ladder has anything to do with it?—No, I think the sollars or platforms are sufficient. I speak as a rule; I will not say there are not exceptions, but they are very few comparatively.

1803. (*Mr. Thomas.*) The ladder roads are very little used?—Yes.

1804. Excepting for shaft work?—For shallow shafts they are.

Accidents from explosives in the same way are in the men's own hands. No rules should be necessary to cause men to avoid ramming nitro-glycerine with a heavy copper rammer, or forcing the nitro-glycerine down into holes with such an instrument, or if men cut fuses too short, or fiddle about lighting a fuse too long, unram a shot or bore in the socket of a hole already blasted without proving the absence of unconsumed explosive.

1805. (*Chairman.*) Still you would have rules for those things?—They are already provided; it is merely the carrying of them out. These are the causes of several of the accidents which I hold to be within the men's own action. You cannot expect an official to be

present with a man, when he is lighting every shot, to see if the fuse is too short or if he has taken too long to light two shots. That is what I intend to refer to. Two such accidents, with such a small number of persons employed, run up the ratio and cause the figures to look unreasonably high as compared with where larger numbers are employed.

1806. If mining became far more profitable than it is now, a good many improvements might be expected to be made and would be made?—Some might be. While referring to these accidents I, at the same time, appreciate the object of the critics, and I hope a turn in the wheel of fortune will soon bring the figures down again. It is a practical fact that eras or cycles of ill fortune and good fortune occur in mining.

1807. Can you propose any improvement as to the organisation of mines?—I think that perhaps an improvement in the organisation might be effected, in some cases the mine might be divided into distinct districts and be placed under the charge of an under-captain or shift-boss.

1808. (*Mr. Redmayne.*) I suppose that means several shift-bosses at one mine?—Yes one or more—who should be in the mine the whole shift and be responsible for all that takes place, and for having sources of dangers remedied, as far as practicable, in his district, similar to examiners or deputies in coal mines. This is carried out in some of the larger mines.

1809. (*Chairman.*) With advantage?—Yes. At small mines I think the captain himself might spend more of his time underground with advantage to everybody, as the places are generally too small to allow of deputies.

1810. Can you give any figures as to the size and importance of the mines in your district?—Yes, the following will show the sizes and importance of the mines under the Act in my late district as judged by the number of persons employed in them underground. Then I put in a Table which is as follows:—

	Number of Mines employing Underground			
	Under 10 Persons.	10 and under 30.	30 and above.	Total.
Cornwall	34	23	23	80*
Devon	11	8	4	23*
Dorset	52	1	1	54
Gloucester	11	2	—	13
Kent	3	—	—	3
Somerset	7	2	—	9
Surrey	2	2	—	4
Sussex	1	—	1	2
Wilts	12	5	6	23
Totals	133	43	35	211

* In the number of mines returned in my report some are included which are temporarily suspended but at which persons are still employed on the surface; hence these figures will not agree with those in the report.

1811. The largest mine employs about 600?—670 was last year's return.

1812. What inspections have been made of these mines?—Inspection has for years past been made at practically each mine annually, except some of the small ones, such as those in Dorsetshire, which, with a very few exceptions, it may be five at the most I think, do not employ more than three men underground, and similar ones, and these have been examined within each two years. Some of the larger mines have been inspected five and six times in a year and others accordingly. The mines vary in size from the small stone mines of the Isle of Purbeck, near Swanage, in Dorset as already explained. The minerals raised also vary from clay to tin-stone, which vary in value from 8*s.* or 10*s.* per ton to 60*s.* per ton as mined, or 90*l.* per ton as dressed tin ore.

1813. The minerals you have given us before?—Yes.

1814. What is the number of persons employed and the quantities of minerals raised?—I give the following Table for the minerals:—

	No. of Mines.	No. of Persons employed.	Quantity of Mineral.
			Tons.
Arsenic, copper, tin, wolfram, &c.	100	8,073	13,559
Stone	87	831	93,003
Chalk and clay	16	350	117,464
Gypsum	1	136	29,306
Iron ore	10	104	10,296

The number of persons employed under the Metalliferous Mines Act of 1873 in the United Kingdom and Ireland, when the Act first came into operation, was 37,378 under ground, 25,305 above ground, a total of 62,683, as compared with 16,735 under ground, 11,702 above ground, a total of 88,437 for 1909, showing a falling-off of 54·64 per cent.

1815. (*Mr. Redmayne.*) The Table is for the Southern district?—Yes. The number of persons employed in the No. 14 district—Cornwall, Devon, Dorset, and part of Somerset—in 1873 (then a separate metalliferous mines district and under a purely metalliferous mines inspector) was 15,718 under ground, 14,286 above ground, a total of 30,004 persons, as compared with 4,672 under ground, 3,926 above ground, a total of 8,688 for 1909, showing a falling-off of 71 per cent.

1816. (*Chairman.*) In the last 37 years?—Yes. The number of deaths in the United Kingdom in 1873 was 82 under ground, 22 above ground, a total of 104 as compared with 33 under ground, 7 above ground, a total of 40 for 1909, or a total death-rate of 1·67 per 1,000 persons employed in 1873, as compared with a death-rate of 1·40 per 1,000 persons employed in 1909, and comparing the under-ground death-rate per 1,000 persons employed under ground, they would be 2·19 and 1·97 respectively. The number of deaths in the Cornwall, Devon, Dorset, and part of Somerset district in 1873 (then a separate metalliferous mines district and under a purely metalliferous mines inspector) was 45 under ground, 15 above ground, a total of 60 as compared with 16 under ground, 3 above ground, a total of 19, in the same area for 1909, or a total death-rate of 2·00 per 1,000 persons employed in 1873, as compared with 2·19 per 1,000 persons employed in 1909, and comparing the under-ground death-rates per 1,000 persons employed, they would be 2·86 and 3·36 respectively.

1817. There has been rather a rise in the death-rate?—A distinct rise as between those two single years. From the Table* which I have put in, a distinct improvement is to be seen when taken over the period 1873 to 1879 and the subsequent decades.

1818. I thought it was increasing?—That is so when comparing the one year 1873 with the one year 1909, which was especially bad.

1819. Taking therefore the whole decade, although those two years show an increase, there has been a diminution?—Over the respective decades. If you look at the Table you will see that the period from 1873 to 1880, as shown for under ground, was 2·59; from 1880 to 1889 it was 2·77; from 1890 to 1899 it was 2·51, and from 1900 to 1909 it was 2·35.

1820. (*Mr. Redmayne.*) The first period not being a decade?—That is the period under the Act. That was the first time the Act came into operation.

1821. (*Chairman.*) You have put that in your next paragraph. I anticipated it?—The death-rates in the

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Southern district, as well under the Coal Mines Regulation Act, as also under the Metalliferous Mines Regulation Act show a steady decline in the ratio of deaths when taken out in decades, (for the latter Act *see* Table* put in, which however only deals with the area covered by the former No. 14 district; it however indicates what I say as if for the whole Southern district) although they both rose about six years ago from some unaccountable cause, and have not receded to the previous figures. I feel quite satisfied that they will do so in time. That is, they have had a run of ill-luck as it were; that is the only thing to account for it. To judge of the condition of things, if criticism is to be honest, each accident should be gone into in order to see where fault lies, if any. If this is done it will be found that many are purely accidental; others through errors of judgment; others carelessness on the men's own part through familiarity, and so forth; very few, if any, are traceable to any act of omission or commission on the part of the officials or managers, unless it may be said that they have not taken as strong measures as they should to enforce and thereby make known the rules, &c. Comparison has been made of the death rate of 17 deaths with 4,100 persons employed underground in Cornwall, with 1,308 deaths among 796,000 persons employed underground in the Kingdom. No one understanding the circumstances would think of comparing the figures on account of the difference in the mines, but also inasmuch as one death in Cornwall would alter the ratios in such small figures as 150 deaths in the coal mines would with such large figures.

1822. Do you think that there is a certain amount of ignorance of the rules?—Very considerable. Not long ago I came across a case where a shift-boss, that is, the under-captain in charge of an afternoon shift, knew practically nothing about the rules.

1823. You think any steps we could advise for making those rules better known would be beneficial?—Yes, certainly; especially among the under-officials.

1824. Now about the dressing floors, what have you to say?—The increased proportion of persons employed underground as compared with those above ground is very noticeable on the dressing floors of Cornish mines where machinery has been introduced; the absence of boys and females is striking when compared with 15 or 16 years ago and previously. It has, however, not made itself so noticeable for the mines generally, in figures, as might have been expected, but this is accounted for by the number of persons who have been employed in recent years in building and erecting machinery, and work connected therewith, more especially on the surface. The proportion for the United Kingdom was, in 1873, 59·6 per cent. under ground and 40·4 per cent. above ground, whereas in 1909, in the same area, the proportion was 58·9 under ground and 41·1 above ground.

1825. They have not diminished in fact or not much practically?—Not in that sense, although in the working of the mines or the dressing floors they have diminished very considerably at the larger mines.

1826. Can you give us the numbers for the area, Cornwall, Devon, Dorset, and part of Somerset?—In 1873 there were employed in the No. 14 district area—Cornwall, Devon, Dorset, and part of Somerset—15,718 persons under-ground and 14,286 persons above ground, as compared with 1909 when 4,762 persons were employed under-ground and 3,926 persons on the surface. The number of females employed in 1873 on the surface was 3,786 (namely, 1,467 under 18 years of age and 2,319 above 18) and in 1909 the number was 182 (namely, 16 under 18 years of age and 166 above). The number of persons employed at the metalliferous mines in the No. 14 district in 1873 was 30,004, from which year they steadily decreased until 1898, when the number over the same area fell to 6,383. Since then the numbers have increased, and in 1909 there were 8,431 persons employed. The table put in showing the number of persons employed and deaths in the No. 14 district area shows a steady reduction in the total number of deaths and the ratio per 1,000 of persons employed over the decades, &c. as made out since 1873, when inspection commenced. It shows that while deaths from falls have increased, deaths under all the other headings have decreased more or less, and that some of them have done so very materially and satisfactorily.

1827. Would you attribute this large number of deaths from falls to men trying to make money rapidly? It is natural enough; they are paid by piece-work?—No, I cannot say that I attribute it to that.

1828. (*Mr. Redmayne.*) Would you attribute it to the larger use of explosives?—I do not think so. The only thing I can attribute it to is that there is a very much larger amount of work done. The output of ore is very much larger now at the mines than it used to be, and the cavities or the gunnises and the sides of the working faces increase in size, and there is what may be termed a concentration of work in those places. There was formerly a larger number of persons employed in mines, the lodes were not so big, nor the gunnises so large, and therefore the death-rate would be distributed over a larger number of men in what might be termed under less dangerous conditions. I do not know whether I have made myself clear.

1829. (*Chairman.*) Yes. In the code of special rules in force in the Cornish mines, to which you have drawn attention, there is a mistake, I believe, to which you wish to call attention?—There appears to be a mistake in the code of special rules at present in force in Cornwall mines, which were drawn up by the late Sir Clement le Neve Foster and Mr. Frecheville, inasmuch as they have drawn up rules under the Metalliferous Mines Regulation Act, regulating the processes connected with arsenic manufacture, which come under the Factory and Workshop Act, and in no way under the Metalliferous Mines Regulation Act.

1830. That is one more illustration of the confusion which reigns with regard to these Acts and rules?—I think so. I do not understand how it arose. There were no direct rules regulating the thing, and they thought they might get them in in connection with mine work.

1831. Do you consider that the Special Rules need revision?—I have long considered that the Special Rules need revision.

1832. You are including those made in consequence of your work and Dr. Haldane's?—Yes. They all want amplification in certain directions, or better still, to be replaced by General Rules in the Act.

1833. It has not been done yet?—No. I put off doing it as I expected from year to year that a new Act would have been passed, and I did not see any useful purpose in taking the trouble myself, and worrying the mine officials, and having to go all through it again on the passing of an Act. Additional Special Rules have been established in relation to sanitary matters and the dust question in connection with the use of rock drills. Dr. Haldane has given evidence on those points and the results.

1834. I was going to ask a question or two at the end about them. Then there is the question of arsenic?—Some years back Mr. Gould, Deputy Chief Inspector of Factories, and I, reported specially on the effect of the manufacture of arsenic upon those employed at it, and in manipulating it for market, &c., in effect, that if the men were steady, and would only use ordinary precautions as recommended by us, and washing themselves thoroughly each day, they would suffer very little, if at all, from the work.

1835. (*Mr. Redmayne.*) Wearing things over their mouths?—We made recommendations which I will put in.

1836. (*Chairman.*) It is on page 18 of your Report of 1901?*—Yes. The recommendations are as follows: "(1) The room for changing clothes and for washing "should be kept constantly in a clean, well-ventilated,

* Appendix C.

* Report to the Secretary of State for the Home Department on certain alleged cases of poisoning in Arsenic Reduction Works, by Edward Gould, H.M. Deputy Chief Inspector of Factories, and J. S. Martin, H.M. Inspector of Mines, 1901.

" condition. It should be limewashed at least once " every three months, and should be regularly and " thoroughly swept out after each 'core' (change of " shift). The floors of the changing rooms should " be in all cases solid, *i.e.*, either boarded, concreted, " or paved with brick, stone, or tiles. A mud or " earthenware floor should not be permitted. (2) Ample " arrangements and facilities should be provided " for individual washing; that is to say, such as " would obviate the necessity of a man while per- " spiring from exertion, having to fetch water " from outside for the purpose, or even having to " wash in the open air, as is sometimes customary. " Either small troughs or large basins of enamelled " metal, provided in each case with water taps and " waste pipes, should be fitted in the changing room " by the employer in such a manner as to allow for " a certain amount of splashing without drenching the " whole of the floor thereby. (3) Overalls of suitable " material should be provided for all workers engaged " in (1) emptying the flues, (2) shovelling or wheeling " arsenic soot or refined arsenic, (3) grinding the " arsenic previous to packing. We conceive the best " form of overall for the work to be a smock or " blouse with trousers; 'combinations,' somewhat " similar to a boiler-maker's garment, but in any case " fitting close to the neck and opening *behind*— " jackets such as we have constantly seen in these " works flying open in front, with the trousers well " down about the hips, are absolutely useless to the " wearers as protection from dust. The overalls should " be kept in the changing house, dried, and shaken daily, " and washed every week at the expense of the em- " ployer. When they are worn, the ordinary clothes " should be left in the changing room and nowhere else. " (4) Flues should not be emptied until they have been " opened long enough to allow of the contents being " sufficiently cooled. For this purpose a fixed tempera- " ture should be specified at the works by the manager " in accordance with the weather conditions of the " season. (5) We think that the hours of working in " the flues both of the calcining and refining furnaces " should be limited. We do not, on principle, advocate " restrictions on the hours of adult male labour; but in " work of a kind which involves exposure to sulphurous " and arsenical fumes at high temperature, we cannot " help suggesting that two turns of three hours each " with an interval of an hour between them would " be a reasonable period of employment. (6) It is " desirable that the underclothing of all arsenic " workers should be washed weekly in order to avoid " possible irritation from arsenic dust on the body, and " the management should see that clean clothes are " brought to the works every Monday morning by each of " the men. (7) The provision of respirators, masks, or " other protections of the kind presents some difficulty, in " view of the variety of methods adopted in the different " works to guard the mouth and nostrils of those " engaged at the furnaces or flues from fumes or dust. " Some men prefer a flat sponge wetted; others layers " of flannel; a few use a mechanical respirator; but " probably the larger proportions use a handkerchief " tied over the mouth, while the nostrils are plugged " with cotton wool. There are objections to the hand- " kerchief in our opinion, besides that of its being " scarcely a sufficient protection. We do not, after " fully considering the question, think it advisable to " recommend any special form of respirator. We " trust that both employers and employed will con- " sider the question carefully in view of its great " importance; but we do not at present conceive that " uniformity in the pattern of a respirator or other " protection for the mouth and nose is necessary. (8) " It is desirable wherever possible to substitute me- " chanical furnaces for hand furnaces, which are at " present too extensively used for calcining, as thus " in our judgment will be removed an active cause of " the evils to which the workers at the latter are liable " —draughts, cold blasts of air alternating with high " temperature. In connection with furnace work, we " would suggest that each core should hand over the " work at any kind of furnace to its successor in a " perfectly clean condition, *i.e.*, that all 'wrinkle,' &c. " should be removed from the vicinity of the furnaces " by the outgoing core at every change. (9) Men of " sober habits should alone be selected for employment " in arsenic works. Excessive drinking has, we fear, " been too common among the class of men heretofore " employed in this industry, and more especially in " the calcining departments."

1837. Will you now go back to your statement?—Yes. We had men before us who had worked 15, 20, and 30 years at arsenic works, who showed no signs of injury to their health, and who informed us that they felt no discomfort. In other cases the men were lax in regard to the usual precautions, owing to heat or discomfort, and not feeling immediate effects, while others were not steady, and consumed more beer and alcohol than was good for them, and neglected precautions and washing. We found that these men suffered from a rash between the legs and under the armpits, due entirely to not washing. It might well be made compulsory that washing arrangements and facilities should be provided for men employed at arsenic works, which would enable the men to wash the whole of their bodies, and that they should be required to do so at least twice a week.

1838. Do you believe the arsenic got in through the skin or through the throat?—Not through the skin.

1839. Only through the mouth?—Yes.

1840. (*Dr. Haldane.*) Arsenic comes under the Factory Act. Can this Commission do anything on the subject?—It is practically and principally in combination with the mines, and in such cases is simply a portion of the dressing floors, although in another form, which all come under the Factory Act. My suggestion is that it should be brought under this Act, and that all work connected with mines should be brought under the Act.

1841. (*Mr. Redmayne.*) What about smelting?—We do not smelt at the mines.

1842. Arsenic is volatilised by heating the ores?—It is done on the mine.

1843. (*Mr. Thomas.*) And is now?—And is now, and on the mine premises.

1844. (*Mr. Redmayne.*) Smelting is done at some mines?—No.

1845. At a lead mine in Cumberland it is?—I am speaking of the Southern district. If that is so, then I should bring that particular work under it.

1846. Smelting?—Yes; there is no reason why it should not come under it.

1847. (*Chairman.*) How about the sanitation of the mines?—As regards the Sanitary Special Rules, they appear to be carried out in varying degrees at the principal mines. I have had occasionally to draw attention to their not being up to the minimum mark.

1848. What about the winding arrangements?—The winding arrangements at most of the mines make the removal more troublesome and unpleasant. That is, the winding arrangements make the removal of the sanitary provisions more unpleasant than if they could be loaded into trams and sent out in cases.

1849. Will you give us your observations generally on the question of phthisis. There has been a great deal of it in Cornwall, and I think you have had an opportunity of reading Dr. Haldane's evidence on that point?—Yes. The use of the spray in conjunction with rock drills is very fairly adopted by the managers, and so far as I am aware it has been considered satisfactory by the men. Omissions of application of the spray do occur when the carrying of water is very troublesome.

1850. Is there anything more you can add that we might recommend with a view to stopping phthisis?—I do not think there is anything more to be done than has been recommended already.

1851. At present we are not well able from the statistics to tell what the effect of the Special Rules has been since the report by Dr. Haldane and yourself?—Dr. Haldane has dealt with that, but in my opinion they are so mixed up with the foreign occupation of the Cornish miners that the statistics hardly allow of a definite decision being arrived at.

1852. As far as your observation goes, the application of the spray ought to be an effective way of stopping the dust?—Yes.

1853. You would agree with those views?—Yes, distinctly. The Cornish miner is a very wonderful person. He travels the world over, he mines in all parts of the world and under all conditions, and then he comes back home. There is no person with a greater intention or desire to come back home to his own country than the Cornishman. A number come back to die in a few months from phthisis.

1854. Now we come to the quarries. The Quarries Act of 1894 was the first legislative measure with a view of providing for the inspection of quarries?—Yes. It is a short Act which embodies certain sections of the Metalliferous Mines Act, 1872 and 1875. It provided for the establishment of Special Rules, but left it optional to the owners or the Secretary of State to propose them. It was found that it failed to provide for various questions which were met with when being administered. One of the principal questions is that of ownership.

1855. Have you read the evidence given about the difficulties of ownership?—Yes.

1856. I suppose you are in general accord with that, that the ownership of a quarry is a difficult thing to determine, and it would be a good thing if we could take steps to make more clear who is responsible for carrying out the rules? — Distinctly. It comprises all quarries having a depth exceeding 20 feet in any part.

1857. Has that been the subject of difficulty?—I have not found difficulty with regard to it myself. The method of ascertaining the depth has been the source of frequent discussion, and, although I have personally had no trouble, it should be provided for if the question of depth is to continue the definition of a quarry under the Act. I have heard it discussed, and I was given to understand that it had created difficulty in places.

1858. What difficulties have arisen with regard to ownership?—The question of responsibility has caused much discussion, and resulted, in some legal proceedings which were taken, and what appeared to me to be strange decisions. For example, a person is constituted the owner, as regards this Act, of a quarry who has no authority over the persons employed so far as employment or dismissal. It may be all right, but it seems a hardship. Thus the owner of the property receiving a royalty, if he grants a license only to work mineral, remains the responsible owner under the Act, although the licensee employs and dismisses the men over whom the owner has no authority.

1859. Are you of opinion that the Act should be amended and consolidated?—The Quarries Act should be amended and made complete in itself, and thus supersede the present Act, the Factory and Workshop Act, the Employment of Children Act, the Notice of Accidents Act, the Explosives Act, and any others which have reference to quarries. It is unreasonable to expect quarry officials or workmen to master all these Acts, or even know of them.

1860. Have you had difficulties about responsibility in regard to the question of quarry owners?—I have in various cases, and have been unable to find an owner in the case of parish quarries. Others in case of rights under Enclosures Act, &c., the Great Torrington Common Act, 1889, referred to by Mr. Delevingne. Again, in the Town Quarry at Weston-super-Mare, where I had complaints with regard to stone being thrown by blasting, to the danger of the public and damage to property. There were repeated complaints, and they went on for a length of time. I failed to arrive at a responsible owner, and ultimately the Home Office informed me that there is none, and to let it stand over for future legislation. In the case of a fatal accident in a parish quarry at Lancing, in Sussex, there was no one could be made responsible.

1861. The Quarries Act is sometimes mixed up with the Factory and Workshop Act?—Hopelessly so. It is most confusing as to where the one begins and the other ends.

1862. Especially as some quarries are very small, is it desirable that there should be a simple code applicable to them that people can understand?—The Act should contain General Rules which would practically do away with the necessity for Special Rules.

1863. What improvements would you suggest with regard to the returns of persons employed in quarries?—I would suggest that instead of returns of persons employed inside the quarry and outside the quarry, the division should be persons employed in quarrying and removal of the mineral to the place of loading for sending away, using, or dressing; and those employed in or about the quarry in dressing stone or preparing it for use.

1864. The returns should come on the 20th January?—Yes, the returns should be simultaneous with the Coal Mines Regulation Act and with the Metalliferous Mines Act, the 10th January might be fixed, and I think the returns would come in much better.

1865. Would that give time enough after Christmas?—I have no doubt it would, as the explanation of the lengthened period and not receiving them in time has been because they are laid aside and forgotten.

1866. The information as to explosives, which is voluntary, ought to be provided for by the Act?—Yes.

1867. Then as to returns from single quarries?—The returns should be required from single quarries where they are worked separately and independently, but in groups where the same men are employed in several, as, for example, in district council quarries, that is road quarries, in several of which the same two or three men work for a month or so more or less, and seldom three months, the returns are usually filled up for each, showing in these small quarries that the quarry was wrought by two or three men, who only worked perhaps a month in it, and then went to the next, where the same thing occurs, and thus 15 to 20 are returned as employed instead of two or three.

1868. The same man appointed over and over again?—Yes.

1869. You think the posting up of the abstract and Special Rules in small quarries ought to be done away with?—I think so.

1870. Why is that? Are the rules constantly washed away by the rain?—They are subject to the conditions of weather. They are posted up generally on a board or a sheet of zinc. That I have advised, and they are covered with varnish, but they become very soon defaced, and they are generally in the small quarries put up on a post 7 or 9 feet high, to keep them out of mischief's way.

1871. Which prevents them being read?—Quite so. They are useless.

1872. What can we do with regard to the rules in small quarries?—I would suggest that an owner should, on employing a man, give him a copy of the rules, and, for his own safety, or to show that he has done so, receive his acknowledgment in writing, and that, say, once a year, another distribution should take place.

1873. You would post them up as before?—Not in the small quarries.

1874. You think it is quite useless?—Quite useless.

1875. (*Mr. Redmayne.*) Could they not be stamped out on metal and put up?—They are generally stuck up so high.

1876. Notices such as I allude to would resist defacement?—Not if you get stones thrown at them. They are generally enamelled.

1877. I mean the stamped ones?—Then they are illegible.

1878. Not if the lettering is painted every now and again?—I cannot say that I agree.

1879. I have seen them done in that way?—They may be, but they are useless. It is a farce, in fact.

1880. (*Chairman.*) Could they not be put up with a little wooden boarded roof over them?—They put a shelter half the width of this over them.

1881. You want about 12 inches. If put up with a particular kind of paste they will stick a long time?—If you see a sheet like this stuck up 7 feet high, you look at it and say, "Good gracious me, what is the good of that?"

1882. (*Mr. Redmayne.*) Level with the man's eyes?—A boy takes up a stone, and it is a fine cockshy.

1883. Even if made of metal?—Yes; it will make more noise. I suggested the giving of the rules to the men years ago to the Home Office, but under the present Act it would not comply with the requirements, therefore it could not be put into operation.

1884. (*Chairman.*) One thing, I think, is clear. It does not seem to be necessary to put in those notices the whole of the Special Rules. You want such a selection as the workmen who are engaged in the work ought to know?—Yes.

1885. That is your strong opinion?—Yes.

1886. The shorter and more concise they are the better?—Yes; and if given a copy he has an opportunity of reading it at home, if he likes. The owner is safeguarded by having his receipt.

1887. (*Mr. Redmayne.*) Would you not do that as well as post them up, or post them up as well as do that?—I would not. You render the owner responsible for a 20*l.* penalty by this being defaced from any cause.

1888. Is not that a good thing?—No, it is unreasonable and useless.

1889. (*Chairman.*) You think it would be desirable that there should be a rough and ready method of deciding how far the overburden should be removed from the face of the workable part of the face?—Yes. It seems desirable that there should be some rough and ready method of deciding how far the overburden should be removed from the face of the workable part of the face. I have for years past considered the question, and the conclusion I have come to, and tried to get acted upon as a rough and ready principle, is that it should be approximately equal to the depth of the overburden.

1890. (*Mr. Greaves.*) What is meant by the "overburden"?—The loose. It is more or less what is above the stuff to be quarried.

1891. It has all to be quarried?—I mean which has to be quarried for commercial purposes.

1892. It would be difficult to find a boundary between the two in many places?—There may be some difficulty, in some cases, the principle would act more especially with loose material.

1893. And where the bed is horizontal I can understand it, but where strata are very steep it seems difficult to define it?—Yes, it may be, but it is all the more necessary in loose material that there should be a fair sized ledge for anything that dropped to remain on that ledge instead of dropping down over it. I do not know whether you appreciate it.

1894. I fully appreciate it, and we have had it before. Another witness said that the width of the gallery should be equal to its height?—I put the overburden because it is more or less very often gravel and loose material weathered more than the working face The Special Rules at present say it shall be moved back so as to prevent dangerous falls. That says nothing. When we were making Special Rules in the Forest of Dean it was suggested that there should be a ledge of 6 feet or 10 feet inserted in the rules. I objected. I said in some cases 18 inches would be sufficient, and in some cases 10 feet would not be sufficient. That is the reason I suggest some guide.

1895. (*Chairman.*) How many quarries were there in your district?—There were some 1,647 quarries in my list, in addition to which there were a large number not included, as so little work was done in them—perhaps one man for a week getting chalk for a farm and such like, but which, all the same, are under the Quarries Act.

1896. It is impossible to inspect the whole of those?—Absolutely, and useless if you did. If you go to some of those quarries, and road quarries particularly, you can go a dozen times and find nobody at work, inasmuch as perhaps they are only worked a week, and in some cases a month out of the twelve.

1897. How many people were employed in 1908?—In 1908 the number of persons employed at these quarries was 16,199 (9,307 inside and 6,892 outside), and in 1909 the number was 14,907 (10,069 inside and 4,838 outside).

1898. What is the cause of the diminution of employment? There is a considerable fall?—In some cases large works have been carried on the completion of which would stop large quarries. Then I think that it has a good deal to do with regard to the building trade.

1899. Building is falling off?—Generally building has fallen off.

1900. I think you can give us the death rate of the district since the Act came into operation?—Yes. The death rate has diminished steadily throughout the country since the Act came into operation, from an average of 1·57 per 1,000 for the first decade, to 1·38 per 1,000 in 1909. In the Southern district the annual figures were:—

Year.	Deaths.	Ratio per 1,000 employed.		Outside and Inside.
		Outside.	Inside.	
1895 - -	10	—	—	—
1896 - -	13	0·52	1·57	—
1897 - -	11	0·32	1·26	—
1898 - -	12	0·15	1·18	—
1899 - -	15	0·71	1·21	—
1900 - -	19	—	2·03	—
1901 - -	13	0·19	1·06	—
1902 - -	16	—	1·34	0·94
1903 - -	19	0·55	1·29	1·64
1904 - -	18	—	1·46	1·00
1905 - -	15	0·37	1·15	0·90
1906 - -	18	0·20	1·55	1·12
1907 - -	11	0·20	0·91	0·69
1908 - -	9	0·20	0·78	0·59
1909 - -	7	—	0·69	0·47

I have not worked out the ratios outside and inside for the years 1895 to 1901, but I give them after that. I give the ratio for persons employed inside the quarries.

1901. What is the number of accidents and persons injured?—The total number of non-fatal accidents and persons injured which caused absence from work for more than seven days were: in 1908, 667 accidents, 668 injured; in 1909, 670 accidents, 678 injured.

1902. That is not a satisfactory figure, because the numbers employed have fallen off considerably?—I am not giving decades; those are the last two years.

1903. From 1908 to 1909 there was a considerable falling off in employment?—Not very large.

1904. From 16,000 to 14,000?—Yes.

1905. And yet the number of accidents has not diminished?—No, that is so; but one must bear in mind that 1908 was the first year under which that return was made.

1906. The changes of reporting?—That was the first year that the Notice of Accidents Act came into force, and those figures were given. They may not have been as full as the second year.

1907. It has not got into its balance yet?—I have given the figures for what they are worth.

1908. I see what you mean. That possibly accounts for it. You must not rely too much on the figures?—At first the figures may have been incomplete.

1909. It is notorious that they were not so well reported during the first year?—At all events, I give the figures for what they are worth.

1910. What are the causes of these accidents?—Falls of ground account for a considerable proportion of the fatalities inside the quarries. Explosives and falling from ledges contribute a steady quota, the remainder being distributed over various causes. The undercutting in getting down overburden, particularly in such cases as brick clay, is a source of danger which is very prevalent; but I daresay causes considerably more deaths in quarries under 20 feet in depth than in those above that depth. I have known cases in a depth of 8 or 9 feet in which two persons have been killed simply by a fall under those circumstances, *i.e.*, undermining.

1911. I suppose ropes ought to be used more than they are?—The uses of ropes where men are working

on ledges or steep faces, as is done a good deal in the chalk pits in Kent, should be made clear and definite. The Special Rules say they shall be used on narrow ledges. I think the word "ledges" might be made to read more clearly. It should be understood that men are not expected to work with a rope 1 to 1½ inches diameter around them, that such ropes or chains where they are used are to hang down the quarry face where required, and that the men shall be provided with belts to which they should have a strong casting line, say, ¼ to ½ inch diameter of about 4 yards in length, such as the casting line from a ship when they put a hawser on shore as thick as one's little finger, and which they can lash at any convenient point to the main rope or chain. I found considerable objection on the part of the men to the use of ropes in consequence of not being accustomed to them, and they alleged that they impeded them in their work; but upon my making it clear that I intended that they should be used, and with this suggestion of short light lines, the difficulty was in a great measure overcome, and the ropes largely adopted in the Kent chalk pits, where several cases of falling occurred. The matter, however, needs watching, and the officials being reminded of their responsibility as to enforcing it as well as other points.

1912. When there are dangerous places should the men be withdrawn?—The Act does not at present provide for it, but it should in the General Rules require the men to withdraw from dangerous places where it is beyond their control, and report the matter to the foreman or manager.

1913. Would you have some responsible person in every quarry?—I would have some competent person.

1914. Who should be generally responsible?—Yes.

1915. The same as you suggested in metalliferous mining?—Yes.

1916. (*Mr. Greaves.*) Responsible for what?—For the general safety.

1917. A general manager of each quarry?—A competent person. Some practical man should be nominated who would be a competent quarry man.

1918. (*Mr. Lescaey.*) To act as foreman?—Yes; in the small places there would be nobody else.

1919. (*Chairman.*) What would you do with regard to quarries under 20 feet?—The withdrawal of men from dangerous places should also be required, and that no person should be allowed to work there except for the purpose of rendering them safe.

1920. With regard to quarries under 20 feet, what would you do?—I think instead of leaving quarries less than 20 feet deep under the Factory and Workshops Act, as at present, they might be comprised under the Quarries Act, with a view of having fatal or serious accidents investigated, even if the responsibility of owners in such cases were rendered less onerous just as they are at present.

1921. You could not bring in every little gravel pit at the bottom of a garden as a quarry; there would be a difficulty in classifying them?—So far as I know, accidents in such quarries, under 20 feet, are rarely investigated other than by the coroners in fatal cases; the Factory Department seldom investigates those cases, so far as I know. The notices of fatalities or serious accidents should be sent to the inspectors. The coroners' notices of inquests would ensure the fatal cases becoming known, at any rate. Owners of some small quarries would probably know little, if anything, about the Quarries Act, and they would have to be dealt with differently to persons working as a regular business, and who might be expected to make themselves acquainted with the requirements. Reports would only be required in cases of accident just as they are at present, in fact in cases of fatal accidents. You could not expect every little hole to be reported as a working quarry under ordinary circumstances.

1922. You have given us the next paragraph already?—No, there is a point in it I have not mentioned. To meet some of the difficulties with regard to ownership, I would throw out the suggestion for consideration that a prohibition be inserted in the Act as to work being carried on by any person inside a quarry, the owner of the mineral in which is unknown or irresponsible to the Quarries Act. That to meet such cases as parish quarries, the parish council be the responsible owner, and that it is allowed to levy such royalties or fees as may be required to meet the cost of supervision or working of the quarry. In other cases, that no mineral be worked unless those entitled to draw mineral, at a general meeting, duly called, appoint some efficient and responsible person to represent them as owners with reference to responsibility under this Act. That is only a suggestion. The parties so appointed should have control as if owners in all respects, and be entitled to levy charges in the form of royalties sufficient to cover expenses. Such party should, of course, be capable of removal under certain circumstances, and the mode should be provided for.

1923. Have you any suggestions to make as to blasting in quarries?—So far as experience goes in the district, I do not see that there need be many further restrictions than exist under the Special Rules at present with regard to blasting in average quarries. I think these rules might very well be embodied in the General Rules. It is necessary that men should gain experience, and so long as the number of accidents from preventible causes is small, I think it is desirable that men should obtain experience very much as they do.

1924. Have you anything to say as to the thawing of nitro-glycerine explosives?—The thawing of nitro-glycerine explosives is a most important question, and the necessity for it, as well as the reasons for it, and the dangers incurred by not doing so, should be made widely known, especially as to its freezing at a considerably higher temperature than water. Several accidents have occurred through ignorance of the danger from frozen nitro-glycerine explosives. In one case at a mine the manager and the men connected with the accident thought the only reason for thawing gelignite was that it should or would do better work.

1925. Could we be in a position to get rid of all explosives that require thawing?—I do not think you are in a position at present. There are some explosives which are alleged not to freeze, but I do not think they are sufficiently numerous, or that there has been sufficient experience up to the present to say you could do so. I may be wrong, but that is my impression.

1926. Are you in favour of a daily examination of winding ropes and machinery?—I think provision should be made for the daily examination of winding ropes, machinery, &c. Blondin ropes to be examined at the ends, and where they pass over pulleys, &c. The rope between points of rest or support should be examined periodically. The fencing of quarries, whether working or not, where *specially* dangerous from proximity to roads, footways, or open common or other causes, should be provided for further than is the case at present. When preparing Special Rules for my district the word "specially" in the phrase "specially dangerous" was inserted. It was thought when you got away in the wilds, the commons and many places, that you might have a crag and a working face in the front of a hill or mountain, the one would be a quarry, and the adjoining part would not, and to have to fence 50 yards because they were working stone and leave several hundred yards unfenced would be ridiculous. There are some such cases as those; therefore the word "specially" was put in. You could hardly require every quarry to be fenced.

1927. The inspector might have power to require it to be done?—The inspector might have the power to require it to be done in cases not already provided for, and, if desired, his demand might be referable to arbitration, in case it was thought unreasonable.

1928. You are not in favour of carrying the fencing of machinery as far as is done under the Factory and Workshop Act?—No. In my opinion it is carried to a ridiculous extent there. For example, the fencing or casing of cogwheels is insisted on in the case of hand cranes used in quarries, wharves, &c. In some cases I did not say not to do it. I have said I do not demand your doing so in the cases where I have jurisdiction. The letter of the law could perhaps be made to read that it is required, but my idea is that if an injury resulted the man deserved it.

1929. You mean it is not necessary to fence the cog wheels?—Not with a hand crane. Some parties informed me that having done as requested, they informed the inspector that they had carried out his request, but considered greater danger existed then than before. The speed of the wheels could only be compared to the progress of a tortoise.

1930. When you say greater danger existed than before, you mean the fence is likely to get a man's hand in?—That is what they informed me. I did not see it. You know some wheels are 3 to 4 feet in diameter, and the spur wheel is only 5 to 6 inches, and the man has to grind away for his purchase. To get once round that large wheel it would be 8 or one in 10 revolutions of the handle.

1931. What if it slips?—The fencing will not affect that.

1932. (*Mr. Lewney.*) It is more dangerous from the handles?—Yes.

1933. (*Chairman.*) If the hand gets under the fence you are worse off?—Yes; and a man may, while grinding away at his handle, put his hand into the cog-wheel, but if he does that I think he deserves it.

1934. You have compassion for him, I presume?—Yes, but at the same time it seems to me absurd to carry things to that extent.

1935. Certain qualifications you do not think are required for the manager of a quarry?—I do not consider that certificated qualifications are required for managers of quarries. I consider intelligence, experience, and common sense are the principal requirements for this class of work.

1936. You would not disagree with the opinion that in very large quarries a certificated manager ought to be appointed where you have a good many men at work?—I have had a case recently in which I considered the owners had not fulfilled this duty, the person in charge at the time not having had experience enough of quarry work, and but for my retirement I would have advised proceedings. I do not see where the qualification from an examination is to come in. What examination are you to put a man through?

1937. I should have thought if you had a large quarry with tramlines and a whole quantity of machinery it would have been useful for a man to have been educated as an engineer and received a certificate of competency?—I put down as essentials for quarry work intelligence, experience and common sense.

1938. That carries you a long way?—That, together with the responsibility of the owner to see that the man he appoints is qualified for the respective quarry. I put the responsibility on the owners that they should have such a man. I do not think you can exactly have a certificated qualification. There may be more mechanical qualifications required, but then it is a mechanic you want, of course if you can combine the qualifications so much the better.

1939. It is a more difficult subject than in the case of metalliferous mines?—That is so; the requirements are not so generally scientific.

1940. (*Mr. Greaves.*) You refer to one difficulty about grouping slate quarries and mines. That is the existence of oolite slates in Gloucestershire. I imagine none of those are mined. The difficulty is that of a definition of a slate?—No, they are quarried.

1941. Quarried only?—Yes.

1942. That would not constitute a reason for not grouping the slate mines and quarries?—I cannot see why slate quarries should be different from Bath-stone mines, for example. You would have the same point to arrive at between Bath-stone open quarries and Bath-stone underground quarries.

1943. As to giving the rules to men, you would have a man given a new set of rules every year?—Yes, to relieve the owners of the responsibility of keeping these things posted up. I do not think that would be excessive in the small mines.

1944. Is it not rather hard to expect the owners to provide a new set of rules every year for a man? Surely a man ought to be able to keep a set for more than a year, and, if not, should he not pay for them?—I have not raised any question about that.

1945. Referring to the overburden, the width of the gallery should be the same as the height of the overburden?—It is a rough idea. I have not laid it down specifically. I only give what I acted upon, and judged in various cases.

1946. If it was 100 feet high you would not think it necessary. It is impossible to have 100 feet high and a gallery 100 feet wide?—That is so.

1947. As to the ropes, as long as a man uses a rope you do not care how it is used?—No.

1948. You suggested a belt for convenience?—Yes, as being detachable. It is more convenient than hitching it around one's body or leg.

1949. You do not object to a man having it round his thigh?—I think the other way is much preferable and safer. He simply has it there, it is not in his way, and there is a ring at his back and he has *this* short piece of rope only.

1950. A light rope?—Yes. It allows of moving backwards and forwards for a distance of 8 or 10 yards.

1951. If a man has a big rope round his thigh he can walk about?—If that slips he is not fastened.

1952. It cannot slip?—It is a detail, but I have found the other more satisfactory to the men.

1953. (*Dr. Haldane.*) With regard to ventilation, you have seen what the recommendations of the Coal Mines Commission were with regard to impurities in the air of the mine. They recommend a chemical standard?—Yes.

1954. Do you think it would meet the case fairly well if the standard as regards carbon-dioxide were extended to metalliferous mines?—In a certain sense yes, but I think you want more for the purpose of clearing the dead ends of smoke. You can hardly say you would have tests for these instances.

1955. No, they would not be satisfactory. You have poisonous gases there which are far more serious than anything usually met with in a coal mine?—Usually met with at all events.

1956. On the other hand, one of the Special Rules recently established deals with that question?—Yes.

1957. If that were inserted in a new Metalliferous Mines Act do you think that something of that description would be sufficient?—I think that would probably meet the case, but from various points of view it ought to be made clear that something better than requiring the men to remain out for half an hour is required, not merely for the safety of the men, but for the advantage of the industry itself, as I think there is a good deal of time wasted in waiting. I think better ventilation on that account would be an improvement.

1958. They may or they may not. It might be cheaper for a man to ventilate an end or a rise efficiently, or it might be cheaper to let it be for some hours?—At the same time, if you allow it to be in that position it is very likely to be abused. I do not wish to propose anything unreasonable either against the men or against the owners, but in such cases I think that the requirement as to ventilation might be a little more than it is.

1959. You suggested that in cases where a mining engineer possessed a diploma of a Mining School or University recognised by the Secretary of State, he should be given a certificate provided he had a sufficient amount of practical experience?—Yes. I think that the examination might be omitted in those cases if he has the certificate for the whole course.

1960. You are aware that nothing is done in connection with the Coal Mines Regulations?—Yes, but I should be inclined to extend it to the Coal Mines Regulations.

1961. You considered that question from the point of view of the Coal Mines Regulations?—Yes. I would be inclined to grant it to both. I think the qualification is distinctly a higher one than the mere usual passing of an examination of the standard at present for managers.

1962. On the other hand, a manager's certificate usually has more reference to questions of safety than the diploma?—No. I think the object is to ascertain that a man possesses a proper education in the principal subjects that are required for mining. If there are

Special Rules or General Rules in an Act it takes a short time to work them up, and if he has had sufficient practical experience, to apply them. At present if a man who under the present course has made himself acquainted with the Special Rules in one district goes to the next district, he has to make himself acquainted with the Special Rules in that district. I think the same thing is applicable. I wish it to be understood that I desire the practice to be combined with the certificate.

(*Dr. Haldane.*) That is quite clear in your evidence.

1963. (*Mr. Redmayne.*) With regard to section 24 of the Metalliferous Mines Act, the owner may, if he think fit, establish Special Rules?—Yes.

1963*a*. If he does establish rules, and a change in ownership takes place, the next owner need not carry out those Special Rules?—Yes, they are established for the mine, not for the owner.

1964. That is the point. The new owner is not bound by the rules?—I am not prepared to say that.

1965. Will you take it from me that he is not?—No, I will not, if you will excuse me.

1966. Nevertheless I am afraid it is so?—I am not aware of any case having been decided in a Court of Appeal.

1967. Supposing it was so, and you were convinced that it was so, would you think that it should be remedied?—I suggest that the General Rules should be made to do away with Special Rules.

1968. You would have no Special Rules?—Not the present Special Rules. The Special Rules would not be absolutely necessary except for the purpose of organisation. That is my suggestion in another part of my evidence.

1969. You would have no Special Rules?—No, unless some special matter cropped up.

1970. Is not that rather a wide departure?—We are in the days of wide departures. It would simplify matters very much.

1971. Supposing Special Rules continued to be in vogue, would you adopt the wording of the Coal Mines Act to the effect that the owner must establish Special Rules, and that they hold good for the *mine* and not liable to change with the owner?—Yes, I should certainly do that, perhaps slightly modified if the General Rules are not sufficient, as I suggest they should be. It would be perhaps too much to expect a man where he is employing two men or a man and a half, to establish a code of Special Rules and have them published. I think it is too much to require.

1972. You would agree that the rules in existence should not change with the change of ownership?—I do not think that is necessary. The new owner should have the right to have them withdrawn or reconsidered.

1973. Would you extend the Electrical Special Rules to metalliferous mines?—To such mines as have electricity in use? I would apply suitable Electrical Rules.

1974. That follows?—No. We have them at some of the coal mines as a matter of form, but I would not make them generally necessary.

1975. But where there is an electrical establishment you would have it under the Electrical Rules?—Yes. Under Electrical Rules, not necessarily *the* Electrical Rules.

1976. (*Mr. Greaves.*) Not the same Electrical Rules as the coal mines?—Suitable rules. They ought to be open to the owners or the Secretary of State to propose.

1977. (*Mr. Redmayne.*) For instance, in respect of explosive gases, and so on, you would have modifications?—There are very few, perhaps only two or three metalliferous mines where explosive gases occur.

1978. If an accident happens in a boring operation carried on from the surface, it comes under neither the Mines Acts nor the Factory Acts?—Do they not come under the Factory Act?

1979. No?—I should have thought it would.

1980. Should not they come under some Act?—I should have thought that it came under the Factory Act.

1981. They come neither under the Factory Acts nor under the Mines Acts?—Indeed!

1982. I do not suppose there are other than very few such accidents, but I think they should be under some Act?—I think we might excuse them. If you brought in that the information gained by boring was to be reported to the inspectors or deposited at the Home Office, I would agree, but if there is nothing else except the question of an accident happening, on that I do not think I should trouble about it.

1983. It is a mining operation in one sense, but if a man is killed during it, it should be inquired into?—In a sense, yes. There are so many kinds of accidents happen, I do not know whether you should bring them all in under some Act.

1984. Boring is essentially a mining operation?—If you are going to bore out a shaft, as for example by the Kind-Chaudron system, it undoubtedly is a mining operation, but for ordinary boring for proving minerals I do not know whether it would be necessary to extend it to that. You complicate things very much if you do.

1985. (*Mr. Lewney.*) In regard to winding-engine men, do you think it would be a good thing to compel them to have a certificate?—I think it is quite unnecessary. In my opinion the winding-engine men of Great Britain are a very fine set of men at present, and do their work in an admirable manner, and I am rather inclined to think that certificates would do more harm than good. You do not want the class of man for a winding engine who is going to work out problems in his mind. His mind would then be abstracted from his work. You want to have steady men, men with nerve, and men accustomed to the work. That is much more important than any certificate that could be given. If you have scientific men on engines I am afraid you would have minds too much occupied with other things.

1986. I am with you that far, that scientific knowledge would not answer the purpose I had in view. I wanted to guard against incompetent persons being allowed to have charge of an engine where men were being wound?—I would much prefer to leave that to the responsibility of the manager, to make him responsible for his taking reasonable means and reasonable inquiries and making himself acquainted with the man he is appointing. I think it is a far greater safety.

1987. Of course it is necessary for a youth to learn, but when a lad is put to drive an engine early in his time, do you not think he should be there some time and have a knowledge of the engine before he is allowed to wind men up and down the shaft?—Certainly, to a certain extent.

1988. That is really what I wanted to arrive at?—That has to be decided on the responsibility of the manager, and he must be held responsible for it. A man always has to commence, and he must do it under the control of people that are competent. I do not think that certificates are either necessary or desirable from the point of view I am speaking of. No certificate can certify as to a man's nerve, nor as to his sobriety or steadiness, and those are things which are of much importance. They are of more importance than a high-class knowledge of mechanics. He should understand his engine and the stopping and starting of it, and, if anything occurred, should understand where it occurs on the engine. I do not think any class of men can beat the men that have hitherto been employed throughout the United Kingdom.

1989. I quite agree?—Of course if you give them certificates of any class you like, you will always find men who are not suitable.

1990. I was rather more referring to learners?—Learners must be learners.

1991. Before they were allowed to wind men up and down?—That must be done under the responsibility of the manager, I think.

1992. You refer to falls from the gunnises in the Cornish mines. In all roads where the men travel, the roof would be timbered. Between the roof of the working and the roof of the level there would be a covering over?—Generally, yes, but a large stone falling from the great height they sometimes have will carry away

ordinary timbering. They are at a very high inclination generally.

1993. All these will be driven on the vein?—They are working out a lode or vein, and if a stone falls where the men are working, it comes a good way and they cannot always get up there. It is 20 feet high, perhaps, 9 or 10 feet, and may be 20 fathoms up, where it is all abandoned.

1994. Is it not in the roadway?—It is not in the roadways that the accidents happen, as a rule. It is when working *here*, for instance.

1995. You are referring to underhand stopes?—Overhand in the same way. They work upwards to the level above. It still remains the same thing. *This* part is worked out. They take the whole thing out sometimes up to 50 or 60 fathoms, three and four levels up.

1996. In reference to the provision for proper washing, baths and tubs where 20 or more persons are employed, do you not think that you fix the number rather high?—I only made a suggestion. That is a matter for you to decide. You could not expect a person to be put in charge of one of these things for 4 or 5 men. You must fix a reasonable number and the place must be of a reasonable size.

1997. The Act requires that dressing rooms should be provided where 12 men are employed?—Yes, but it does not require anything else except places to change.

1998. If a man is compelled to change there is very little expense in having a bucket of water?—He is not compelled to change. He has the option.

1999. If the employer is compelled to provide the place to change, it is optional with him to provide water?—He does not need to have a person to watch it.

2000. He does not require a person to provide the water. It is to look after the clothes, and see they are perfectly dried. There would not be much additional cost in providing the water?—No. Sometimes in the country places the accommodation is very poor. The number is a matter you must decide.

2001. The point is in sinking a shaft you might have three men on a shift?—Then I think they dry in a boiler-house.

2002. It is prohibited?—Or in an engine house? I I think that is about the practice.

2003. I thought it was prohibited?—Perhaps, strictly speaking, it may be prohibited, but I think you will find that in such cases it is often practised. You have to look at it from more than one side.

2004. (*Mr. Lovett.*) Referring to the carrying out of the rules and regulations in mines, you said the Cornish tin mining has passed through some very serious crises during the period mentioned; so much so that had you not used discretion with regard to enforcing the Act some of the largest mines working at present would probably have been closed?—Yes.

2005. Do you suggest the same consideration should be extended to other industries?—Yes, I do not think it is the intention of anybody, the Government, or the owners, or the workmen, that industries should be legislated out of existence. I think common sense is required to be exercised under those circumstances.

2006. What do you suggest to prevent the carrying out of the regulations in varying degrees?—Common sense must be used. In all cases where I consider it necessary distinctly for the safety of the persons employed in the mine, I have required it.

2007. I agree with the idea, but it appears to me that we might get employers in different industries in different districts who would be treated differently. One inspector might insist on the carrying out of the regulations and rules to the letter, and another would allow of some elasticity?—That may be so. Of course, you will always have the difference of individuals. As a matter of fact, the inspectors were directly responsible to the Home Office, and now inspectors are responsible to different grades, you may call it, and therefore, it would emanate from one to the other. It would be checked and considered whether it was desirable or not.

2008. Would you legislate for slate mines along with other metalliferous mines, or would you classify the slate mines with the open quarries?—I have no experience of slate mines, or very slight experience, and I do not think I am in a position to give an answer. My opinion is that mines ought to be under the Mines Act and quarries under the Quarries Act. I will take stone mines and quarries in my district; I think they are separate and should be under separate Acts.

2009. Would you classify slate quarries with slate mines?—I would have open cast slate quarries under the Quarries Act, and slate mines under the Metalliferous Mines Act.

2010. Would not you include dressing departments in quarries in the Quarries Act instead of in the Factories Act, as it is at present?—Yes, distinctly. I think I have said that it is desirable to simplify the matter, and that workmen and owners should have one Act to refer to.

2011. With regard to blasting, I suppose from what you have said you would make it compulsory that the senior member of a gang should be made responsible for the examination of a place after blasting?—I think so. I have had two or three accidents in the last two or three years where irresponsibility occurred. In one case a lad was working with his father and after the shots were fired the lad was allowed to go back and commence work without his father going in. The result was that he caused a further explosion and was killed. He was only a boy of 16 or 17 years of age. The same thing happened in another case where a boy went back and the side came over and killed him. The man had not examined the place and the lad went back and commenced work. The case was put into the hands of a solicitor to take action against the man that was responsible, but without his own evidence there was no proof, and you could not prosecute, and therefore he got off, but he deserved punishment.

2012. With regard to the question of fuses, you referred to the fiddling about which sometimes takes place?—I had an accident where one or two men were killed. I had another one where a man was killed in a metalliferous mine. He was firing two shots and was lighting both together and something happened. Either his fuse was cut too short or he was too long in getting the other lit, and the first one went off and he was fatally injured.

2013. In the larger quarries the blasting man is sometimes called on to light 10 to 15 holes?—He would allow the length of his fuse accordingly. That is nothing uncommon. There was another case under the Coal Mines Act where the same thing happened. He was lighting four shots. The usual thing was two, the first one went off and injured him before he could get away. A comrade fetched him out, and in doing so he was injured by other shots going off. That man got a King's medal and well deserved it.

2014. The question of fencing has been raised. You would not make it compulsory that quarries should be fenced. You referred to a crag?—I should not require all quarries to be fenced. If a quarry was in such a dangerous condition as to require fencing, I would leave it to the Inspector to have power to call upon the owner to fence it.

2015. We have to take into consideration the men working in the quarry?—I am speaking as much of abandoned quarries rather than working quarries.

2016. I am thinking of the advisability of fencing quarries against accidents which might occur to the men working in the quarry by something coming down, which happens in many cases. They are working on the cliff and there are cattle about or boys or men push something down?

2017. (*Chairman.*) That was not present to my mind, fencing the quarry against something tumbling over?—That is working quarries.

(*Chairman.*) We are generally thinking of people falling over.

2018. (*Mr. Lovett.*) I have known a cart come down and kill somebody at the bottom?—I would keep the cart away.

2019. What are we to understand by a roadside quarry?—At present the Quarries Fencing Act specifies that quarries within 50 yards of a road or footpath require to be fenced. I call that a roadside quarry.

2020. Why do you discriminate, when speaking of certificated managers, between slate quarries and stone quarries?—I have already said that I have not much experience in slate quarries. Slate quarries are, I believe, on a very much larger scale. I have only had three or four large slate quarries in my district.

2021. On the last page of your statement you make a reference to slate quarries. "I do not consider that "certificated qualifications are required for managers "of quarries. I consider intelligence, experience and "common sense are the principal requirements for "this class of work. I allow that for the larger quar-"ries," and then you have in parentheses "slate quarries"?—"Slate quarries, perhaps"—I think the comma should come out—it should read: slate quarries "perhaps, of which I have comparatively little experi-"ence." It may be that the larger quarries require men of higher attainments.

2022. But you have granite quarries which are quite as large and which are much more dangerous than slate quarries?—I state that I have not much experience of slate quarries. That is all that that is intended for. At the last meeting you had evidence as to slate quarries.

2023. There are granite limestone quarries as large and as dangerous as the slate quarries?—I say for the larger quarries. Will you read it without the parenthesis—I allow that the larger quarries require a man of higher attainments than roadside quarries.

2024. I agree with that?—The other is put in to show that I have no experience of slate quarries.

2025. Would you like to delete slate quarries?—You can delete that. It is only in a bracket; I referred to it because there was so much discussion at the last meeting.

2026. In the new Special Rules for Mines in Cornwall, established in 1905, Rule 4 is:—"The owner, "agent or manager shall cause all stone-breaking "machines used at the mine to be provided and kept "provided with an efficient watering or other arrange-"ment to prevent the escape of dust into the air, and "no person shall work or allow to be worked any such "machine unless such arrangement is provided and "effectively used." Would you extend this rule to crushers in stone quarries?—I think in a great measure, yes. I cannot say in all cases. Cases would have to be judged.

2027. (*Mr. Jones.*) Do you not think that there is much more similarity between slate mines and quarries than between any other sort of metal mine?—One is mining and one is quarrying.

2028. But I mean in the method of working?—I have not sufficient experience with regard to slate quarries to express an opinion.

2029. There is no actual difference barring the fact that one is worked in the light and the other in the dark. Pillars in a slate mine are left to hold the roof up?—You have a roof in one case and a much higher roof in the other.

2030. And the pillars to hold it up. They are worked in galleries the same as an open quarry. We do not call them galleries, but they are worked one under each other all the way?—I am sorry to say that I have no experience of the Welsh slate mines, and I cannot express an opinion. I think it is a mine. I do not think you can distinguish. Mines ought to be mines and quarries, quarries in my opinion. In the one case you work with artificial light and the circumstances are in that respect different. That is where the difference comes in.

2031. I admit that, but I look at it in this way: The working is so similar, you can take the set quarries just the same. I include them with the slate quarries?—Then you get in the question of when is a stone not a stone, and where do you draw the line?

2032. That is a difficulty, I admit?—But where you decide that a mine if worked with artificial light is a mine, it comes under the Mines Act; that is a different thing.

2033. It is easier to have a definition. I believe it can be carried out otherwise?—I do not see any necessity for it.

2034. (*Mr. Ainsworth.*) In your experience of metalliferous mines, have you known a case of injury to life through fire?—I do not think I can call one to mind, but I know of them having occurred.

2035. Where they have occurred they could be easily dealt with?—The case at Snaefell, in the Isle of Man, is a case in question. That was when Sir Clement le Neve Foster was practically overcome. I cannot say that I know of injuries, but I know of underground fires in metalliferous mines.

2036. You have never heard of a case where there was danger to life?—There would be danger to life in those cases.

2037. We had the point of the second shaft discussed here, and one of the arguments brought before us was the case of fire. Have you known a fire in metalliferous mines that reached such proportions that anything of that kind would come into question?—I do not remember a case at the present moment. There was a case of a diamond mine in Brazil, where they had a fire which caused the mine to cave in, and they had to re-open it with fresh shafts if I remember correctly.

2038. With regard to the increased proportion of accidents to the total number of accidents in metalliferous mines as compared with collieries, should not you say that is largely due to the fact that a fall even of a small piece of stone in a metalliferous mine is more dangerous than in a colliery; first, because the stuff is so much heavier; and, secondly, because it may frequently fall from a much greater height?—Frequently it falls from a much greater height, but otherwise I do not think there is much difference.

2039. Surely you would allow that a piece of limestone the size of your hand is heavier than a piece of coal the same size?—It is generally stone.

2040. Is it not heavier?—It is not only falls of coal that kill.

2041. If it is heavier, and falls on a man's head, is it not more likely to injure him?—If one is 20 lbs. and the other 100 lbs., I think either falling on a man's head will have that effect. I do not lay much weight upon that point.

2042. I have generally heard that accepted as a fact: that the danger is very much greater.

2043. (*Mr. Thomas.*) You think, on the whole, that the Special Rules have been fairly well worked in Cornwall. I mean the Special Rules with regard to the laying of dust and ankylostomiasis?—Yes, on the whole, but it is still capable of improvement.

2044. You say that omissions of application of the spray do occur when the carrying of water is very troublesome?—That is so.

2045. Generally omissions to use the spray or the omission to take those provisions occur more on the part of the men than on the part of the managers and owners. Is not there an apathy on the part of the men to take advantage of the provisions put in their way?—There is a desire to take advantage of them.

2046. There is a desire to provide them, but is there an equivalent desire to use them?—I rather understand that there is. Of course you will get omissions, and a great deal depends on how the Rules are enforced. If they are strictly enforced, the men will use them more strictly than if an official goes in and finds them not using them and takes no notice. If they know they will be strictly and severely dealt with upon a repetition of the omission, they will use them more.

2047. You think that they are using them more than they used to?—Considerably more.

(*Chairman.*) Thank you very much for the valuable evidence you have given us.

FIFTH DAY

Friday, 8th July 1910.

PRESENT:

SIR HENRY HARDINGE SAMUEL CUNYNGHAME, K.C.B. *(Chairman).*

RICHARD AUGUSTINE STUDDERT REDMAYNE, Esq.
JOHN SCOTT HALDANE, Esq., M.D., F.R.S.
JOHN STIRLING AINSWORTH, Esq., M.P.
RICHARD METHUEN GREAVES, Esq.
RICHARD ARTHUR THOMAS, Esq.
ROBERT THOMAS JONES, Esq.
WILLIAM LEWNEY, Esq.
URIAH LOVETT, Esq.
T. E. BETTANY, Esq. } *Joint Secretaries.*
G. W. CHRYSTAL, Esq. }

Mr. JOHN BOLAND ATKINSON called and examined.

2048. *(Chairman.)* You have had many years' experience as an inspector?—Yes.

2049. What date did you commence?—1873. I am the inspector of longest standing now.

2050. The retirement of Sir Henry Hall leaves you the longest?—My brother and I are equal as inspectors in charge of districts. I was appointed assistant inspector before Sir Henry Hall.

2051. You have had great experience of metalliferous mining in the Durham, Newcastle, and East Scotland districts?—Considerable experience.

2052. Comprising vein, irregular deposit and stratified bed mining?—Yes.

2053. The metals with which you have dealt are lead, zinc, copper, iron ore, barytes, and whinstone, in the Durham, Newcastle, and East Scotland districts?—Yes.

2054. In deposit mining, iron ore in the Newcastle district?—Yes.

2055. And in stratified bed mining, limestone, sandstone, gypsum, and slate in the Newcastle and East Scotland districts?—Yes.

2056. What is the principal difference as regards the natural conditions between mines under the Coal Mines Act and mines under the Metalliferous Mines Act?—In coal mines, inflammable gas, firedamp, and coal dust occurs. There is no coal dust in metalliferous mines and only in a very few are there inflammable gases. In some cases there is inflammable gas of the nature of firedamp in the Northumberland mines, where the mountain limestone in which the lead ore occurs is associated with coal seams.

2057. Have you had to use safety lamps in them?—Yes. I had an explosion in a mine called Sipton three or four years ago where four men were burned with gas.

2058. In such mines an extended explosion would be practically impossible?—Unlikely.

2059. There is no dust given off in metalliferous mines?—No inflammable dust.

2060. I mean dust which would be capable of being inflammable?—No.

2061. I am speaking to a well-known authority on the question of dust?—In some of the Furness and Cumberland hematite mines there are occasionally small explosions or ignitions of gas, which is probably derived from the decomposition of old timber left in the workings.

2062. What gases are those? Are they explosive gases?—It is inflammable gas. I do not know that it has been analysed. There was one the other day at Park Mine.

2063. All the shale mines would come under the Coal Mines Act?—Yes.

2064. They give out petroleum vapour?—They give off inflammable gas. I do not know whether it is petroleum vapour.

2065. You have something to add about steep coal mines?—In some of the coal mines, such as Niddrie Colliery near Edinburgh, the coal seam lies at an angle of 70 and 80 degrees, and in some cases almost vertical, and it was practically worked as a lead mine by overhand stoping.

2066. *(Mr. Greaves.)* That should be overhead stoping?—Overhead stoping.

2067. *(Chairman.)* As regards metalliferous mines, you would be in favour of some form of consolidation?—Yes.

2068. At present there is a great deal of confusion from the overlapping of the Factory Act and the Metalliferous Mines Acts?—Yes.

2069. In dividing the mines would you keep the division of mines and quarries, that is to say, overground and underground works, rather than attempt any division of the metals?—Yes, I should keep everything that is underground under a Mines Act.

2070. You are in accord, I think, with the opinion of other inspectors. Their view is that it is not absolutely philosophical but absolutely practical?—I think it is philosophical too. I may say that we have a good deal of confusion in some of our slate mines. They are locally called close head quarries.

2071. That plan of division would separate a slate mine from a slate quarry?—Quite.

2072. You are of opinion that it is advantageous to do so?—I think so.

2073. *(Mr. Greaves.)* Where a slate mine is worked partly in the open and partly underground there would be some difficulty in defining the boundary of the mine and the quarry?—I do not think there would be much practical difficulty.

2074. It was suggested wherever an artificial light was required it should be called a mine. Would that meet your views?—I should rather say wherever you went under the ground.

2075. In the case of a quarry overhanging that would become a mine?—Just a little overhanging like that you might exclude, but you might drive in under the ground a certain distance without using artificial light, and still you would be exposed to mining dangers; that is, falls of roof and side.

2076. You would not agree to the definition: any place where artificial light is required should be considered a mine and not otherwise?—You might put that in. It would not matter. It would only exclude drivings for a few yards. It is not a matter of much importance.

2077. *(Chairman.)* The best practical method would be to leave it to the Secretary of State to determine under which category it fell, as in the Coal Mines Act?—I think it would hardly be necessary to do that, because the question would seldom arise.

2078. As an inspector you might get into some difficulty if there were no method of solving it. If an owner says, "I call this a mine," you would say, "I call it a quarry." It does not matter who decides it if there is somebody to decide it?—Let a court of law decide it.

2079. You would have to prosecute an owner, which is not a pleasant way of deciding a point of *bonâ fide* dispute. After all, it does not matter to him

which side he does come under provided it is settled?—He would probably accept the inspector's view.

2080. In the long run it would be in favour of the inspector's view, because the Secretary of State's view would be on the recommendation of the inspectors?—You might put it in, but it would be overloading an Act to go into these details.

2081. It is done in the Coal Mines Regulation Act, and it has solved many little cruces?—If that is so I do not see any objection to it.

2082. Metalliferous mines are usually on a smaller scale than coal mines?—Yes.

2083. What is the biggest mine you have as far as you recollect?—Hodbarrow is the largest metalliferous mine in my district, and it employs over 1,000 persons underground.

2084. That is a very big mine?—They have an output of half a million tons of iron ore.

2085. (*Mr. Lewney.*) How many shafts?—A considerable number; I could not say how many off-hand.

2086. (*Chairman.*) I would like you to state the principal differences between the coal mines and the metalliferous mines, and in doing that at the same time will you give us the benefit of your experience and any observations you have to make upon the distinctions as you go on. First of all, metalliferous mines do not require a certificated manager. Would you be in favour of the larger mines having a certificated manager?—Yes.

2087. For the smaller mines it is suggested that a competent person should be nominated by the owner, to have somebody for the inspector to look to. Would that meet with your approval?—Yes. It might be on the same lines as the coal mines.

2088. They require a certificated manager in every case?—Not where there are less than 30 persons employed underground. They do not require one then unless the inspector gives notice to employ one.

2089. You think that the same rule could be applied to metalliferous mines?—Certainly.

2090. And all mines underground, slate mines as well?—Yes. I asked a good many managers of metalliferous mines their opinion, and I think they are favourable to it on the whole. It would advance their position, and secure that they have a certain amount of necessary scientific knowledge.

2091. You would be in favour of having consideration for existing men?—Yes.

2092. As regards shafts in the coal mines, every mine has to have two shafts when the coal is being worked?—Subject to certain exemptions.

2093. How far would it be practicable to apply some rule as to double shafts to metalliferous mines. What has been said is that it is not necessary in all cases, but that there ought to be some power of requiring it?—It would be quite practicable, but it is a question of expense, and also a question as to whether it is really necessary.

2094. The difference between coal mines and metalliferous mines comes in here. In a mine subject to great explosions like coal mines there would be greater necessity?—Yes, but we must remember that it was not an explosion which brought about the double shaft enactment with regard to collieries. It was a beam falling down the pit, a thing that might happen at a metalliferous mine.

2095. (*Mr. Lewney.*) Something gave way in the shaft?—A large cast-iron beam broke at the top and fell, and blocked the shaft up. It was complicated by the fact that there was furnace ventilation, and probably carbonic oxide was evolved, and the men were poisoned by it.

2096. (*Dr. Haldane.*) How long was the shaft blocked?—Not very long. Perhaps a week or less than a week. That was at Hartley Colliery, in Northumberland, and there were over 200 lives lost. It is the biggest accident that has ever happened in the North of England.

2097. (*Chairman.*) Have you had any loss of life due to the want of double shafts in metalliferous mines?—No.

2098. Your view generally agrees with what the other inspectors have said, that there ought to be some power of requiring it in special cases, but it is not reasonable to make it universal?—I think so. I do not think the responsibility should be placed on the Inspector of Mines.

2099. You would rather go to arbitration?—Something of that kind.

2100. Your general opinion is in accordance with the views of other inspectors who have given evidence?—In dealing with the question of double shafts, although there is no question that two shafts are better than one, yet there have been cases where there probably would not have been loss of life if there had been only one shaft.

2101. Will you explain why that is so?—There was an accident at Pagebank Colliery about 1860, before the double shaft enactment came into force, and they were working with one bratticed shaft with a furnace underground, and the timber in the shaft took fire in some way. There were about 80 men below ground, and 10 lost their lives; the fire burnt out the brattice in the shaft, and consequently stopped all circulation of the air. My father, who was inspector in the Durham district at the time, in his report said if there had been two shafts, probably all the men would have lost their lives.

2102. (*Dr. Haldane.*) If the fire had been in the downcast?—If the fire had been in the downcast, and the smoke had gone round the workings.

2103. If they let it go?—They could not stop it.

2104. They had no means of reversing then?—No.

2105. (*Chairman.*) That illustrates the need for mining knowledge before you come to a conclusion on a question of this sort. It is not so easy as it appears to anybody who is not experienced?—No; it requires caution.

2106. (*Mr. Greaves.*) Do you think that this rule, which is under the Special Rules for slate mines, ought to apply everywhere: "Secure means of access shall be "provided by which workmen can go to and from their "working places; and, except in going from the lowest "floor but one to the bottom of the mine, persons "shall not walk upon inclined planes worked by "gravity, or by steam, water or other mechanical "power." That means separate means of access?—That means there is to be one means of access.

2107. No, they cannot walk where there is winding, so that there must be another shaft?—You might look at it in that way, but it would be more satisfactory if it stated that there should be two separate roads, if you want them.

2108. There might be an entrance by an adit that would satisfy the egress of the workmen?—If you want to get two separate roads why not say so in the rules and regulations. Do not leave it to be inferred.

2109. The idea is to have a secure means of access?—That is one means, but the question is whether there should be two.

2110. There must be two if they may not use the winding shaft?—That is a roundabout way of getting at what you want. Why not say two? As regards the question of double shafts in metalliferous mines working iron ore in the Furness district of Lancashire and Cumberland, many shafts are sunk through limestone away from the deposit and they drive out to the deposit. These shafts are safe except as regards risk of fire. When sunk within the area of draw caused by the excavation of the iron ore, if they are damaged they become inaccessible.

2111. (*Chairman.*) It has been suggested that to make double shafts in metalliferous mines may be more onerous than in coal mines, because there is more risk as to what you find there. You might make a double shaft and come to nothing?—Yes.

2112. Whereas in coal mines you are more sure, once you have proved, that you will get remuneration to pay for it?—Yes. The iron ore is only found over a few acres in some cases. There is an extension going on in the iron ore mines in the Egremont district under the triassic rocks; where the triassic rocks lie direct on the mountain limestone there is a probability of getting iron ore. The most recent mine that has passed through the triassic rocks is Beckermet. They reach iron ore

at a depth of 200 fathoms, after sinking through 100 fathoms of red rocks and then some fathoms of conglomerate, and other ventures will be made in that direction. Sinking two shafts there is an expensive matter. When they get down to the deposit it is not like a coal seam; they have to drive in several directions to see whether they have anything worth working.

2113. Mr. Martin said with regard to metalliferous mines in his district that they had not been altogether successful except some of the companies, and that it was a risky thing and was difficult to get capital in. Are you in a better condition in your part?—Hematite mining is a commercial success.

2114. It has not given rise to so great losses as the tin mines?—No.

2115. (*Mr. Greaves.*) Most of the Cleveland mining is in the middle lias?—Yes, but under the Coal Mines Act.

2116. In the middle lias?—In the oolite or lias.

2117. (*Chairman.*) What remark may we make with regard to that question in dealing with copper, zinc, and barytes?—They are depressed in my district.

2118. And elsewhere?—Much the same elsewhere. Lead has been a good price of late years, and zinc is becoming of more value.

2119. I think that ends what you have to say upon double shafts?—Yes.

2120. Now with regard to safety lamps, the Coal Mines Regulation Act requires safety lamps, but the Metalliferous Mines Act does not. Is there anything you think should be done with regard to those?—No, I think it is too small a question, which only occurs at one or two mines occasionally.

2121. (*Mr. Lewney.*) They do use them in these cases, as a matter of fact?—Yes.

2122. (*Chairman.*) In the Metalliferous Mines Act there is no provision for boring against old workings?—I think that ought to be included in a Metalliferous Mines Act.

2123. Another difference is that there are no examinations and reports provided for. It has been suggested that it would be desirable that every day the places where men work should be visited by an official of the mine, and such examination as was reasonably practicable should be made. I am putting that as the outcome of Mr. Martin's view?—I think I would agree to that.

2124. That would be practicable and possible?—Yes.

2125. I presume, also, that men ought to be removed from places which are dangerous. There is no provision of the kind?—I do not know that it is necessary to put that in.

2126. That follows pretty well of itself?—Yes, they would be removed.

2127. Still they might not do it?—I do not think a rule would make them do it.

(*Mr. Lewney.*) They do that themselves.

2128. (*Chairman.*) The fact that it was reported dangerous would be enough, you think?—I think so.

2129. The regulations as to blasting are less stringent?—Yes.

2130. That is due to the character of the mines?—The absence of firedamp and coal dust.

2131. The regulations as to blasting are sufficient in the metalliferous mines?—On the whole I think they are.

2132. Are there any explosives that ought to be forbidden in metalliferous mines, or are they satisfactory on the whole?—I expect before any explosive is used it has to pass some Government test, apart from the Woolwich test.

2133. Keeping, for instance?—Yes.

2134. Chiefly?—Would not that be sufficient?

2135. It is not detonatable of its own accord?—Would not that be sufficient?

2136. I think so. I was rather alluding to dangerous fumes. Some have more dangerous fumes than others. Have you any observations to make on that?—There is no doubt that there is a good deal of harm done to men that go amongst the fumes, but I fancy that will be common to all explosives.

2137. High explosives?—Even gunpowder.

2138. (*Mr. Lewney.*) There was one many years ago, I think it was called lithofracteur, which gave off very noxious fumes?—Yes, and geloxite. They are bad fumes, but I do not know that they are very harmful.

2139. (*Mr. Thomas.*) It would be your view that any permitted explosive would be satisfactory?—A permitted explosive may have bad fumes.

2140. The Home Office would not permit an explosive that had?—They only permit it from the point of view of safety as regards ignition of gas, and dust.

2141. (*Dr. Haldane.*) It would be examined, but you think that they should study the other side?—I may say that this question of fumes has arisen once or twice lately in coal mines in the county of Durham, where they use naked lights, and men have died, and it has been alleged that they have been affected by the fumes of gelignite. I have had two cases within the last year.

2142. (*Chairman.*) Did a medical man make an examination afterwards?—Yes. There is a Dr. Pirrie, of Ryton-on-Tyne, who took a good deal of interest in the matter.

2143. Was he of opinion that the fumes had caused death?—He inclined to the view that the fumes had something to do with the death. He gave evidence a fortnight ago in the case of a man who was removed to the Sedgfield Asylum and died of acute mania, but it was alleged that he had suffered from fumes. Dr. Pirrie gave evidence in the case rather in support of that view, and the jury found that he had suffered from fumes.

2144. (*Mr. Lewney.*) Is this a local doctor?—Yes.

2145. (*Chairman.*) It comes to this. When reports are made on these explosives, you would like any examination as to fumes that is possible?—I think that is desirable.

2146. Otherwise the accidents from blasting in Mr. Martin's district do not seem to be worse or as bad as the proportion of accidents in coal mines?—No.

2147. Does that agree with your impression?—The fatal accidents in metalliferous mines in the Newcastle district were, four men killed in eight years.

2148. That, in proportion to the amount of explosive used, is smaller than in the corresponding figures for coal mines?—I could not say as to that, but it is small. Perhaps the time over which it is taken is not sufficient to form a definite opinion. I have not many in coal mines. Last year I had only one fatal accident from explosions at coal mines.

2149. Are the accidents from explosives diminishing?—I think they are.

2150. Are you taking in your district to electrical firing?—In the coal mines it is common.

2151. Do you approve of that?—Not altogether. There is a certain amount of danger.

2152. In some cases you permit the common fuse to be used?—I would not interfere with the use of it if it was safe as regards the ignition of gas, but in the case of electrical firing there is a new element of danger very common.

2153. What is that?—One man is at the battery, and another man goes to couple up the shots, and a third man comes on the scene, and the man at the battery thinks it is the man from the shot, and turns the current on; there have been two or three fatal accidents in that way.

2154. (*Mr. Thomas.*) From electrical firing?—Yes.

2155. It is difficult to make sure your shots are going, if coupled up in series and every test made?—This is where there was only one shot.

2156. If you have them in a series——?—There is further danger of mis-shots, and not knowing.

2157. You can test them with a galvanometer as much as you like and they will not go off. As a rule a well-made fuse is absolutely reliable?—Yes.

2158. (*Chairman.*) With the exception of that recommendation about reporting as to fumes, the law as regards blasting and the administration of it may be considered fairly satisfactory?—Yes.

2159. Another difference is that there are no regulations as to safety hooks. Would you make any

recommendation there?—I think I would have detaching hooks on all cages where men ascend.

2160. In metalliferous mines as well as in coal mines?—Yes.

2161. Have there been accidents in metalliferous mines from overwinding, and the want of hooks?—I remember one, I think it was many years ago when I was assistant inspector in the Newcastle district. It was in a mine at Furness, I forget where, but a son wound his father up.

2162. (*Mr. Greaves.*) Are you referring to vertical shafts?—Yes.

(*Mr. Lewney.*) There was one since that.

2163. (*Chairman.*) The speed of winding is less in metalliferous mines?—Some of the iron ore mines wind the same as coal, but they are vertical shafts.

2164. (*Dr. Haldane.*) The mines under the Coal Mines Act?—No, the iron ore mines under the Metalliferous Mines Act. In some cases they wind much the same as in coal mines.

2165. (*Chairman.*) Is it possible to say whether the weight of mineral got out by a man in the day is less or more than in coal mines? Will there be more to wind out than in coal mines?—Per man.

2166. Yes, for the size of the mine?—A coal hewer on an average will put out about 3 to 4 tons. A metal miner in some cases will put out more and some less.

2167. (*Mr. Lewney.*) It will vary from 1 ton to 5, according to the nature of the mineral?—Perhaps there is not so much difference in the weight.

2168. (*Chairman.*) In all cases it would be desirable to have safety hooks, you think?—I think so.

2169. (*Mr. Thomas.*) It is clear you mean safety hooks only where you have vertical shafts. It would be impossible to apply a safety hook on an inclined shaft?—There would be an element of danger.

2170. You would get the catches liberated?—You might limit my answer to vertical shafts.

2171. (*Chairman.*) How far do those remarks apply to apparatus for catching the cage in case the rope breaks?—I should not recommend them with the knowledge I have.

2172. What is the defect of that apparatus, speaking generally?—In some cases they have come into use when they were not required.

2173. What is your opinion, generally speaking?—In other cases they fail to act when they should have acted. Speaking generally, I should say that any experience as to the utility of them is not sufficiently great to justify the general recommendation.

2174. They would be good things if you could be certain that they would always act?—Yes.

2175. (*Mr. Lewney.*) They do act occasionally?—They sometimes act when not expected to act.

2176. Supposing the hook becomes detached, what will prevent the cage going to the bottom?—If the rope broke?

2177. If the engine-man over-wound the cage?—If you have a detaching hook the cage is caught at the moment the rope is detached.

2178. (*Chairman.*) Supposing in the middle of the shaft?—Then these appliances for arresting the fall of the cage would be good if you could depend upon them.

2179. Is it not better to have them at all events, with the chance of their acting, or would they be likely to cause danger? Is it possible that they might become a source of danger?—Yes.

2180. Will you tell us how?—There was one case (I think Mr. Leck will probably be able to speak to it) where a man got his shoulder under the bar that acted in connection with the arresting apparatus and caused the cage to be arrested, and I think it fell away. I think there was a life lost, but I could not give you the details.

2181. When a cage is descending fast when the rope breaks it is difficult for any arresting apparatus to act, the momentum will be so great it will carry away anything?—Yes.

2182. When rising or at the top it might act successfully?—Yes. In my district detaching hooks are almost universal at collieries, but rarely these other things. They do not generally use the arresting apparatus.

2183. (*Mr. Thomas.*) The application of safety catches attached to the cage would depend on the design of the road. You could not apply those to steel rail guides or wire ropes?—There is a patent for the application to wire ropes. I do not know why they should not be used with steel guides.

2184. Is it not the fact that the proportion of accidents has been more where safety catches have been employed than where reliance has been placed on the rope only?—I could not say. I should doubt whether there are any figures available.

2185. I have not any definite information except the impression I gathered from conversation with some inspectors. The winding accidents are few all through the country?—There are not many.

2186. They are not sufficient to give rise to a provision of that kind?—I scarcely think so.

2187. (*Chairman.*) While you are in favour of the compulsory use of safety hooks, you are not prepared to go so far with the arresting apparatus?—No.

2188. That is the sum of your experience?—Yes.

2189. (*Mr. Lewney.*) Will you explain what you mean by the arresting apparatus?—The arresting apparatus is mechanism attached to the cage that comes into operation when the cage becomes a falling body or when the chains are slackened. It is supposed to grip the guides.

2190. (*Chairman.*) It is a different thing from the detaching hook?—Yes.

2191. (*Mr. Lewney.*) You would not be in favour of making that compulsory?—No, not with the experience I have.

2192. (*Chairman.*) If invention improves it may be desirable?—Yes.

2193. (*Mr. Lewney.*) You have not had any knowledge of the cage becoming detached by the rope breaking and the cage being stuck in the slides and this apparatus holding the cage?—I cannot recall a case, but I think it is likely.

2194. I have seen two or three cases, and I am satisfied if it had not been for this the men would have been dashed to pieces at the bottom?—It is possible. They ought to act sometimes.

2195. You will be able to see them in operation?—They have them at Stirling's.

(*Chairman.*) I gather you think they are good things if you are sure they act.

(*Mr. Lewney.*) I hope when you come to our district you will see them.

2196. (*Chairman.*) The regulations as to plans are not the same in the Metalliferous Mines Act as in the Coal Mines Act?—No; small mines are exempt from the necessity of keeping a plan, and from depositing one at the Home Office.

2197. Are you in favour of altering that?—I would make them all alike.

2198. In regard to notices of opening there are differences?—That is an exemption in the case of certain small mines.

2199. Would you make it compulsory?—Yes, for all mines. There is nothing in it.

2200. Otherwise inspectors have to find out for themselves?—Yes.

2201. It is difficult?—As a rule we find out. As a rule they give notice.

2202. Again the rules are less stringent with regard to ventilation?—Yes.

2203. Would you make the law as to ventilation stricter in the Metalliferous Mines Act than it is at present?—I believe it is proposed to have a standard for coal mines. If a similar standard could be applied to metalliferous mines it would be an advantage.

2204. A standard of carbonic acid?—Yes, or a standard of oxygen present.

2205. The firedamp standard would not apply?—No.

2206. You think any standard of oxygen or CO_2 applicable to coal mines might apply to metalliferous mines?—Yes.

2207. Another difference is that there are no powers of formal investigation?—I do not see why there should not be power for formal investigation in the case of an accident at a metalliferous mine.

2208. As there is at present as regards coal mines?—The same as in coal mines. In some cases there might be men lost in metalliferous mines, and no body forthcoming, and no inquest would be held.

2209. (*Dr. Haldane.*) How do you mean there would be no inquest?—The coroner can only hold an inquest on a body; I had a case in Cumberland where three men were lost in a coal mine, and the bodies are there yet, and there has been no inquest held.

2210. (*Mr. Greaves.*) The inspector would have power?—There is power under the Coal Mines Act to have a formal investigation, and that was held.

2211. In metalliferous mines the inspector can examine the place as much as he likes?—Yes.

2212–13. He has the most technical knowledge, and is most likely to know?—Yes, but a formal investigation partakes somewhat of the nature of a coroner's inquiry. It is properly constituted, and I do not see why it should not apply in metalliferous mines as well as in coal mines.

2214. Do you find, generally speaking, that coroners' inquests are satisfactory in your district?—Yes.

2215. I am speaking of metalliferous mines?—Yes.

2216. The provision that each of the jury must see the body is rather obsolete?—Yes.

2217. Do you think it is unnecessary?—Yes. If that was done away with it might give more time before the inquest is held.

2218. That is what Mr. Martin said?—Both in metalliferous mines and coal mines and in quarries the inquests have to be held quickly, because of viewing the body. It must be held in two or three days, particularly in the warm weather.

2219. That takes you away from your work with no advantage?—Occasionally, but it sometimes does not give time to examine the place before the inquest.

2220. To a certain extent it defeats the object of the inquest?—Yes.

2221. Besides being an inconvenience?—That occurs very rarely. I think in 99 cases out of 100 we have time to examine the place before the inquest, but it is a rush.

2222. You have to have an adjournment after a mere formal assembly?—As a rule we try to meet the coroners and prevent adjournment, and if they give us 24 hours' notice, we are almost always able to make an investigation, and see the place before the inquest, which is very necessary.

2223. There is no provision as to check-weigh men?—No.

2224. I do not know how far our reference touches that point. I do not think it deals with more than safety?—I think under the Coal Mines Commission you were allowed to go into it.

2225. We did not go into that very much. This Commission deals more with safety. I think the question is a wider one. There is no power of workmen's inspection?—I do not see why they should not have the power.

2226. It acts well in Durham?—It is largely taken advantage of in the coal mines in Cumberland too.

2227. There is no provision as to ambulance in the Metalliferous Mines Act?—No.

2228. You are of opinion that the same corresponding provisions should exist in both Acts?—Yes.

2229. You say in your statement that the special rules are optional?—Yes.

2230. Is there not the same power of the Secretary of State to bring them into force under the Metalliferous Mines Act?—Yes, it is optional, but under the Coal Mines Act the owner is compelled to prepare a code of special rules, but not under the Metalliferous Mines Act.

2231. You are in favour of the same procedure for the two groups?—I should be inclined to think that the necessity for special rules might be avoided by having all the rules general rules in the Act.

2232. Would not there be a necessity, as in coal mines to patch up the general rules?—Probably there would.

2233. That would lead to your view being on the whole that the same procedure should apply in both cases?—Still, if you have a special rule common to all metalliferous mines, there is no reason why it should not be put into the general rules.

2234. You would keep the general rules in the Metalliferous Mines Act just as in the Coal Mines Act?—Yes.

2235. Then there is no regulation as to boys and women on the surface?—No. They come under the Factory Act.

2236. You would do away with that and make it all under one code?—Yes.

2237. There is no provision as to fencing abandoned underground places. Fencing will be useful for the men?—I do not think it is necessary. It is more necessary where you have inflammable gas.

2238. Why is that?—To prevent a man inadvertently going among inflammable gas.

2239. In an adit?—In coal mines they are required to fence and the fencing is necessary on account of the existence of inflammable gas.

2240. If there is an old shaft a man cannot get in?—From the surface?

2241. Yes?—This only refers to underground places. It does not refer to shafts. In the Coal Mines Act there is a general rule that every place that is abandoned or discontinued is to be fenced off to prevent anybody inadvertently entering.

2242. And to prevent gas coming out?—No. I hardly think that is necessary in metalliferous mines.

2243. What about timbering?—I do not know that there would be any harm in putting in a general rule.

2244. Uniform timbering would not be possible in metalliferous mines in the same way as in coal mines?—Even in coal mines it has not proved a success.

2245. Is there a rule that men are to be provided with sufficient timber as in coal mines?—No.

2246. Are there many accidents from want of proper timbering in metalliferous mines?—I do not think you can say that any accidents occur from want of timber being on the premises or even at the place. Some accidents occur where you see afterwards that it would have been desirable to have had more timber set, but that may be an error of judgment on the part of the men.

2247. Is it a source of danger sometimes as well as of safety? Does it sometimes keep up a place that ought to fall?—Do you mean in metalliferous mines?

2248. Yes?—Sometimes they want the place to fall.

2249. That is what I mean?—The method of working the iron ore in certain deposits in Lancashire and Cumberland is that after they take out a slice they want the roof to come down.

2250. It would be better to let it go down than to keep it up?—They take the timber out to let it collapse.

2251. That is against attempting to make a hard and fast rule as to timbering by statute?—(*Mr. Lewney.*) That is when the place has been worked through once.

2252. (*Chairman.*) I was trying to ascertain whether it was possible to make any provision?—There will be some regulations in the Special Rules. We are considering more the Act now.

2253. (*Mr. Lewney.*) It will be as well to take the Special Rules?—There is no doubt that the provision of the setting of timber is a very necessary thing as regards the safety of any class of mines. It may not do any harm to have a general rule in the Metalliferous Mines Act providing that a sufficient supply of timber has to be available and has to be set. I cannot say, however, that I have known any case where had such a rule been in force I should have found it necessary to prosecute.

2254. (*Chairman.*) Through want of care in timbering in coal mines a good many accidents occur?—The newspapers often say that, but I think there are not

so many which you can say are due to carelessness as people say.

2255. What are they due to? They are rather heavy?—There are natural fissures running in the stone horizontally and vertically and sometimes at angles. You cannot always see these. You may have a place very well timbered, and a set of these fissures cut out the stone between the timber, it falls and kills a man in coal mines. Sometimes it cants the timber out. If more timber had been set you can say this would not have happened. That may be true, but I should guarantee in most of the cases if you had taken a thoroughly practical man into the place before the accident he would have said that it was well timbered.

2256. Those kind of falls are not so much in metalliferous mines as in coal mines?—They also occur in metalliferous mines.

2257. They are rather unpreventable?—They are to some extent; they are to a very large extent. It is an uncommon thing after a man has been killed by a fall of roof at a coal or metal mine to find any allegation of negligence on the part of the men or the officials.

2258. Do you think Durham is better in that respect than other parts of the country?—I do not know that it is.

2259. Another point of difference between the Acts is that the attendance of engine men in certain cases is not compulsory?—When men are down the pit in a coal mine an engine man has to be in attendance, but men can be down the pit at a metalliferous mine without any attendance of the engine man.

2260. Ought that to be altered, or is it not so necessary?—I do not know that I have heard any demand for it.

2261. (*Mr. Thomas.*) Metalliferous mines are furnished with ladder roads. They can get out?—In many of the hematite mines in Cumberland and Lancashire the exit is altogether by cage, not by ladders.

2262. (*Chairman.*) The last point in your valuable comparison is that there is no barometer and thermometer necessary. You think these are necessary in metalliferous mines?—I think they ought to have a barometer and thermometer.

2263. What would be the use of the barometer?—If the barometer is falling they might expect to get blackdamp, and they do have blackdamp.

2264. It is an indication of that just as much as firedamp.

2265. (*Mr. Greaves.*) In the iron mines?—Iron ore, lead ore, any mine.

2266. Is that explosive?—No.

2267. Simply poisonous?—It puts out lights.

2268. Is it CO_2?—It is a mixture. Dr. Haldane has made some investigations into that matter, and the blackdamp is different from what it was supposed to be.

2269. (*Dr. Haldane.*) It is air deprived of the oxygen?—It used to be thought to be pure CO_2 or nearly pure, but it has been found in many cases that it is air deprived of oxygen. Still, it would kill a man.

2270. Is there much porous rock or cavities in these ironstone mines where blackdamp could accumulate?—There are considerable fissures in the limestone that encloses the ore, and they have loughs in the ore itself.

2271. Air spaces?—Yes.

2272. From which the blackdamp can issue when the barometer falls?—Yes.

2273. (*Chairman.*) The barometer is kept above ground?—Yes.

2274. Ought a thermometer to be above or below?—Above ground would be sufficient.

2275. (*Mr. Greaves.*) Why have a thermometer?—As a record of the temperature.

2276. (*Chairman.*) And a check on the barometer?—Yes; they are associated together.

2277. (*Dr. Haldane.*) In the ironstone mines the ventilation depends upon the temperature?—Very largely. There are two or three fans at work now, but it is largely natural ventilation, depending upon the temperature; in fact it is generally about this time of the year that the ventilation is worse, owing to the warm weather. There comes a time when there is stagnation.

2278. (*Chairman.*) Is there any good to be got from records, or record offices of barometers?—Yes, to some extent. If they could predict a fall of the barometer for the next day or two days, it would be useful to know that.

2279. We had a good deal of evidence in regard to coal mines, but the gist seemed to be that a barometer at the surface, at the office, was better than a record, because it gave a local rise?—Yes.

2280. Then the requirements peculiar to the Metalliferous Mines Act are regulations as to ladders. Have you anything to say about that?—They do not use ladders much in the iron-ore mines, but in the lead and zinc mines they use them to a very great extent. The provision is satisfactory.

2281. What have you to say about dressing-rooms?—As regards dressing-rooms, there might be something said as to the amount of space to be provided. We have a difficulty sometimes in determining whether there is sufficient. The owners say there is sufficient.

2282. That is a point you would like settled?—Yes, if they once say what amount.

2283. Dressing-rooms are necessary?—At the iron-ore mines they are.

2284. Why more than at other mines, at coal mines, for instance?—Coal mines have always seemed to have been against it.

2285. The men?—Yes. At iron-ore mines the clothes become very red and would be disagreeable in the house, but at many of them the men prefer going home.

2286. Opinion is changing with regard to that, I suppose, in the district with regard to coal mines, for instance?—I cannot say. I do not see any difference as regards coal mines.

2287. They prefer to wash at home?—They have not the option as a rule, but I think they prefer to wash at home.

2288. (*Dr. Haldane.*) Do they provide baths at any ironstone mines?—In Lancashire and Cumberland they have to provide them.

2289. Baths?—Tubs for washing in, not elaborate baths such as they have in Germany.

2290. No mine has done it?—No.

2291. (*Chairman.*) Is warm water provided?—Yes.

2292. (*Mr. Ainsworth.*) Have you found the changing rooms in the hematite districts are very largely used, more than they used to be? Are they more largely used now than when they were first instituted?—I cannot say as to that.

2293. (*Chairman.*) Have you had experience on the question of miners' phthisis, particularly in connection with rock drilling?—Not any very direct.

2294. Have you formed any views on the question?—I am inclined to think at the coal mines, more particularly where there is a good deal of work done by stone men in shooting down canches, as they call them, that is shooting down a portion of the overlying stone, and they drill the holes by hand-drilling machines, where the drilling is in sandstone, the men become affected.

2295. Do they use sprayers?—No.

2296. Would it not be a good thing, wherever any siliceous material is drilled into, that sprayers should be used?—It would require a little more investigation.

2297. There is not a single mine in which sprayers are used in your district?—Not that I know of.

2298. (*Mr. Lewney.*) Would that be practicable with that hand-drill?—Water.

2299. Yes, sprayers, as the Chairman suggests?—Yes, it might. In many cases the stone is naturally wet and does not fly about. I have come across cases where the men that had been drilling the canches were said to have been affected, but I have not sufficient information on the subject.

2300. (*Mr. Greaves.*) Are you talking of hand drilling?—Yes.

2301. (*Chairman.*) Have you any granite works?—Yes.

2302. Mines?—No.

2303. Only quarries?—There are one or two granite quarries.

2304. The phthisis question does not seem in your district so burning and important a question as in the South?—Attention has not been directed to it, and I think there may be cases where probably it ought to be inquired into.

2305. (*Dr. Haldane.*) In connection with the lead mines?—Both collieries and mines.

2306. (*Chairman.*) You have not seen those sprayers?—No.

2307. As to accidents in your district, what do you say?—There were not many in the metalliferous mines, in fact only one you might call a metalliferous mine, that was Leadhills. The others were limestone mines or sandstone mines. There are only about 500 people employed altogether, and I never had any accident of any serious character.

2308. In the Newcastle district what has been the number of persons employed since 1902?—It has averaged 7,958.

2309. Since 1902 what has been the number of fatal accidents?—60 fatal accidents, causing 65 deaths.

2310. Up to the end of 1909?—Yes, eight years.

2311. The death rate for nine years is 1·02?—Yes.

2312. It is not so high as in some parts of the country?—I think it is low. It is less than coal mines, considerably.

2313. And less than some of the metalliferous figures in the South?—Yes.

2314. The shaft accidents are unduly high?—The shaft accidents are larger in proportion, but as a member of the Commission suggested that there was more work in connection with the shafts about metalliferous mines than collieries, so that you naturally expect more accidents. There are more shafts sunk and more levels in use.

2315. On the whole, in your district is the engineering of the shafts satisfactory?—Yes.

2316. (*Mr. Ainsworth.*) With regard to the higher number of shaft accidents, you put that down to the larger number of shafts?—Yes.

2317. In a colliery district the same colliery is laid out to work a large area?—Yes.

2318. Whereas in a metalliferous district you have to put your shaft wherever you happen to find a deposit?—Yes.

2319. With regard to the increased proportion which was brought before us yesterday, if you take the fatal accidents in metalliferous mines and collieries, the proportion of fatal accidents is larger in metalliferous mines than in collieries?—As regards shafts only.

2320. No, the whole thing. Would your explanation of that not be what I suggest, that in cases of falls from roof or sides the workings are much larger as a rule in metalliferous mines than in collieries?—They may be much larger.

2321. A fall in a metal mine is of an infinitely heavier material than the material in the colliery, and we always think there is something in the idea current in the West of Cumberland district, that the cause of the increased proportion of fatal accidents is that when you have a fall the danger of a fatal result is greater than in the colliery. Would you say so?—First I would point out that the death-rate I quote here over eight years is less than in coal mines, not greater.

2322. I thought we were told yesterday that the proportion of fatal accidents to the proportion of all accidents, perhaps we ought to say, from falls, was larger in metalliferous mines than in collieries. I am glad to hear you say that it is not so?—I do not know as regards falls particularly. In coal mines the falls average about 50 per cent. of the total accidents. Here, in these eight years in my district, under the Metalliferous Mines Act, it only averages about 30 per cent., so that the deaths from falls are less in proportion to the total deaths than in coal mines. The total result is 1·02 per 1,000, as against 1·3 per 1,000 in coal mines, so that if the total metalliferous figures are worse than coal mines, it must be made up in other districts.

2323. With regard to the point, the metalliferous mines are different so far as the Acts go—take the difference between metalliferous mines and coal mines as to double shafts. Have you known any fatal accident in metalliferous mines which might have been avoided if you had had a double shaft?—No.

2324. As you know, the causes which require a shaft to be sunk in metalliferous mines largely depend on the way the deposit may develop or vary?—Yes.

2325. In metalliferous mines exploration is going on invariably. You can hardly say you have proved the ground and lay yourself out for that. You have always to be on the look-out for new ground?—I would agree, with this limitation, in some cases so many bore-holes have been put down as to justify you in saying you had a permanent mine. For instance, take Hodbarrow. They spent over half a million in building a sea-wall in order to enclose iron ore they knew they had.

2326. (*Mr. Thomas.*) It would not be safe to generalise from Hodbarrow?—No. I agree in the majority of cases in metalliferous mines of all descriptions of vein or deposit there is an element of uncertainty which requires to be considered in any legal enactment.

2327. (*Mr. Ainsworth.*) With regard to bore-holes in a coal-field, if half a dozen bore-holes all proved the coal, you would assume you had a coal-field over that 500 or 1,000 acres, or whatever it is?—Yes.

2328. In metalliferous mining, certainly in the hematite district, you can put down three bore-holes and sink a shaft and find that the ore found has been only quite small?—Yes, sometimes a bore-hole may go down on a thin vein of ore.

2329. A chink?—Yes, and be misleading altogether.

2330. I am pleased to hear you say that you have not known any case where a double shaft would have resulted in the saving of life?—No, but it does not take the exercise of much imagination to see such cases could arise.

2331. So long as the accesses to the shaft and the main roads were kept in as high a state of repair as possible, then you probably are minimising the danger?—You must separate the question of underground roads. As a matter of fact the Coal Mines Act does not require double underground roads, only double shafts.

2332. It is as bad for the mine to be blocked by a fall in a main road as a fall in a shaft?—Yes, but still the Coal Mines Act does not deal with that point of view.

2333. With regard to ventilation, because the metalliferous mine deposits are irregular, it is not so easy to lay out a regular system of ventilation as in a colliery?—No. On the other hand, the distances in metalliferous mines are usually smaller.

2334. It is to the interest of the working altogether that the ventilation should be good, because the men are able to work in good air when they cannot work in bad?—Yes.

2335. The attendance of enginemen at present is not compulsory. Is it not the case, where an engine man is not always in attendance, it is because you happen to have one or two shafts within easy reach, and the same engine man is able to serve both, so that if you have a signalling arrangement from the shaft to the surface, he can be easily called?—Yes. I do not say that there are any cases in the district where engine men are not in attendance. I have not had any complaint on that point.

2336. It would be safe, where you had two shafts in easy reach, to have one engine man?—Yes. That is done in coal mines. You do not have every engine man at night. They need have only one so long as the men can get to the shaft.

2337. (*Mr. Greaves.*) You say every working place should be examined every day. What do you mean by "examination"?—For an official to go in and look round and test the roof, and see that the air was good.

2338. To test the roof, in many cases, would be an impossibility?—He would require to make such a test as is commonly made.

2339. (*Mr. Thomas.*) He would test the accessible roof?—Yes. You have to read the rules with a certain amount of latitude.

2340. (*Mr. Greaves.*) Take a roof 200 feet above your head. It would be impossible to test it?—I have not many cases of that kind.

2341. You mean an ordinary examination?—An ordinary examination. If it was a general rule it would be prefixed by the words that they have to be observed so far as "reasonably practicable."

2342. (*Mr. Thomas.*) I was observing that you drew attention to the principal differences between the Metalliferous Mines Act and the Coal Mines Act, but I did not follow you when you were dealing with the two questions of fencing of abandoned underground places, and regulations with regard to timbering. I was looking at the special rules in regard to metalliferous mines in Cornwall?—I am dealing with the Act.

2343. I will read these, and perhaps something similar might be adopted, according to your judgment?—I may say there are regulations as regards both, I think, but certainly in some of the special rules we have in the district there are regulations as regards timbering.

2344. You suggested the special rules should be brought into the general rules, and therefore the existence of special rules would probably meet the point?—Probably.

2345. These rules seem to be drafted with a great deal of common sense in regard to the captain, who is the equivalent of the under-manager. It says: "He "shall see that (in addition to the required fencing "at the top of pumping or working shafts, and at all "entrances thereto from levels, cross-cuts, and such-"like openings between the top and bottom) the top "and side entrances to old shafts, winzes, stopes, and "such-like dangerous openings below ground, are "fenced." That is part of the provision, and it goes on further in Rule 53, "He shall see that a proper "supply of timber is provided, and that the travelling "roads are properly secured, and he shall give general "directions concerning the securing of working "places." Probably provisions of that kind would be all that is necessary?—Yes.

2346. You could not have any regulations with regard to timbering. Practical men must use their discretion?—Yes.

2347. (*Mr. Lewney.*) In reference to the certificates you suggest should be obtained by the managers, what qualification would you insist upon?—The certificates would be of two classes, a certificate of service, which would be granted, if it followed the Coal Mines Act, to every manager who was in office at the time of the passing of the Act, or who had been in office for, say, a year within five years of the passing of the Act. This would safeguard the interests of men already acting. Then there would be another class of certificates for competency, which would have to be given after passing an examination.

2348. In regard to the second class, would you insist upon the man having a practical knowledge as a miner?—Yes.

2349. You would not grant it simply for a theoretical knowledge?—No, it would follow the lines of the Coal Mines Act, which insists upon every man before he can sit for a certificate having had five years practical experience in a mine.

2350. In regard to ventilation in a single shaft, you spoke of attention being drawn to single shafts by an accident which occurred through furnace ventilation. Do you find that still in existence?—It is not true to say the accident happened through the furnace ventilation. It happened through a beam falling down the shaft, but the result was complicated by the fact that there was furnace ventilation, and it vitiated the air left in the mine.

2351. Do you think there is danger from furnace ventilation in the shaft?—Yes. There have been plenty of examples of that.

2352. Some better method of ventilation might be insisted on?—Practically furnaces are dying out. There are some.

2353. In regard to single shafts, where there is only one shaft in existence, do you not think it should be compulsory that shafts should be of such dimensions as to allow of a ladder road, and that that particular portion should be closely divided off from the drawing shafts?—I think that is already provided for in the Act. "Where one portion of a shaft is used for the "ascent and descent of persons by ladders or a man-"engine, and another portion of the same shaft is "used for raising the material gotten in the mine, "the first-mentioned portion shall be cased or other-"wise securely fenced off from the last-mentioned "portion." That is sub-section 9 of section 23 under the General Rules.

2354. That means so long as there is a fence the man would not tumble through, but that would not be securely fenced off?—It would be for a court of law to decide what the meaning was, but I take it to be a continuous division.

2355. Do you not think that it would be an advantage to have it fenced off, so that it would act for a ventilation purpose—have it closely divided?—They are bound to have that.

(*Mr. Thomas.*) That is in regard to vertical shafts.

(*Mr. Lewney.*) Most decidedly.

(*Mr. Thomas.*) If you had an inclined shaft and had the ladder road secured off from the winding compartment, the men could not examine the winding compartment used for the purpose of winding men. In the majority of these instances things might be left to the discretion of the inspector.

2356. (*Mr. Lewney.*) I am putting these things from a ventilation point of view?—Inspectors do not like to have things left to their discretion if it can be clearly defined in the Act.

2357. (*Mr. Thomas.*) Inspectors, as a rule, have the confidence of the owners and men?—Yes, but still cases of difference would arise.

2358. (*Mr. Lewney.*) We have discussed this question of the single shaft, and we are all agreed that it is desirable, but it is not always practicable. We are trying to get at the best possible substitute, and to get something which would act as a means of ventilation in the absence of a second shaft?—Nobody would think of working a mine of any size with a single shaft unless they had it divided, or fitted with air tubes, or some means of that kind. It would be practically impossible to do it. All these deep iron ore mines, where they have a single shaft, have a continuous wood brattice from top to bottom. They must have.

2359. Not always close together?—No. It might be advisable to put in some regulation that where single shafts were in operation certain regulations should apply.

2360. In regard to the examination of the working places, I presume you mean, as you explained in replying to Mr. Greaves, those places that are accessible. You desire an official of the mine to go through and do officially what the miners are expected to do for their own protection?—Yes.

2361. There is nothing unreasonable in that?—No.

2362. (*Mr. Thomas.*) You still require the miners to carry on the inspection in addition to the officials?—Yes.

2363. You would make the responsibility rest on the man in addition to any other inspection?—Yes. It would not apply to the roads they have to travel on.

(*Mr. Thomas.*) No, his own place.

2364. (*Mr. Lewney.*) Supposing there was an explosive in use that was deleterious to health, is there any authority at the present time that can insist on the withdrawal of such explosive?—You might do it under the first General Rule, which provides: "An "adequate amount of ventilation shall be constantly "produced in every mine to such an extent that the "shafts, winzes, sumps, levels, underground stables, "and working places of such mine, and the travelling "roads to and from such working places, shall be in a

" fit state for working and passing therein." That would cover the question of fumes.

2365. I had in mind this particular explosive to which I referred before, lithofracteur. That was withdrawn by somebody interfering. I do not know whether it was the Home Office or not?—Were the fumes bad?

2366. I have known men seriously affected by it, and it was not long in use. In regard to inspecting after an accident, would you recommend that the representative of the working men or the trade union officials should have the right to examine a working after an accident?—Certainly. That is done regularly at collieries in Durham and Northumberland.

2367. In re-opening old shafts, is it customary, or is there anything in the Act that requires these old shafts to be examined by an official before the workmen are allowed to descend?—Not in the Act.

2368. Do you not think it would be an advantage to have something to that effect?—Do you mean in opening out old shafts? Do you mean just at the beginning, or after each shift?

2369. At the beginning, as a precaution against bad air?—I should think it is always done.

(*Mr. Thomas.*) The men or the officials would take a rough and ready test by lowering a candle to see if it would burn.

2370. (*Mr. Lewney.*) I have done it?—I have known accidents happen in that way.

2371. (*Mr. Lovett.*) Have you known the woodwork in the shaft of a metalliferous mine take fire?—No, I do not recall a case at this moment.

2372. You have never had a case?—No.

2373. You spoke of rock drilling. Is it the single-handed rock drilling you refer to?—I spoke of hand-drilling by drilling machines.

2374. Compressed air?—No. This is worked with handles.

2375. (*Dr. Haldane.*) In soft stone?—Even in sandstone they work with hand-drilling machines. It is not very hard. All the holes in coal now are practically drilled by these machine drills.

2376. (*Mr. Lewney.*) They would be mostly back holes?—Mostly horizontal holes, but they can put them in other directions. I have not seen much rock drilling except in sinking shafts, and then it is generally wet.

2377. (*Mr. Lovett.*) It is all dry-hole boring in the cases you refer to?—In the case I referred to as having had suspicions about the sandstone dust affecting men deleteriously, it was hand-drilled in the sense of working a machine. It was not striking.

2378. There is a hand-drill by compressed air?—No. It is not that kind.

(*Mr. Thomas.*) You refer to the drill called the hammer-drill.

(*Mr. Lovett.*) No, it is a very small drill. They call it a hand-drill, but it is really a machine-drill. One man can pick it up.

2379. (*Mr. Thomas.*) That is the hammer-drill. Now they call it the "Thunder-bolt"?—The "Little Hardy" and the "Flottman."

2380. They are a development?—Where there is compressed air I do not know that the current of air necessarily goes into the hole.

2381. (*Mr. Greaves.*) Nearly all, I think. Of late years every one of these little hammer drills has a hollow drill with the air going in?—Then I understand it might be noxious for a man to be working near.

2382. Do you think it possible for a man to make enough dust by single hand-drilling to be injurious in any way?—I think it may be.

(*Mr. Lovett.*) That is the point I want to get at. I think the fact of the air going into the hole makes it more deleterious than it would be otherwise.

2383. (*Mr. Greaves.*) There is so much more rock moved and made into dust by a machine drill. With a drill worked by a man with a hammer, can sufficient dust be produced to be injurious?—I should say so in certain cases.

(*Dr. Haldane.*) That is how the old Cornish miners used to get phthisis. They had no machine drills.

(*Mr. Lewney.*) If the rock is of sufficient hardness, very little dust comes from it after each separate blow.

2384. (*Mr. Lovett.*) What is the average depth of these holes?—Where?

2385. The holes you refer to?—In hematite mines or collieries; I should say all classes of holes of that kind vary from 2 to 4 feet as a rule.

2386. It ought to be possible to use the spray or water in some way?—Yes, I do not see why not.

2387. Would you favour making the use of water spraying compulsory?—No, not unless there is clear evidence of injury to health.

2388. You are thoroughly convinced that there ought to be a special inquiry?—I think it is a matter worth inquiring into. It has been inquired into a good deal of late years; it may be going on now for all I know. There was an inquiry as regards ganister mines and a report issued and some special rules drawn up and established?

(*Mr. Greaves.*) There was an inquiry as to slate mines, which showed there was less phthisis than anywhere about.

2389. (*Mr. Ainsworth.*) How deep are the average holes of metalliferous mines?—I should think 2 feet to 4 feet, sometimes longer.

2390. (*Mr. Lovett.*) Do you think it would answer any good purpose to collect the different kinds of rock dust and classify them as to their relative danger?—Yes, I think it would.

2391. (*Mr. Greaves.*) Could you judge of their danger by looking at them?—I should think not. It depends partly upon the specific gravity, and a good deal upon the sharpness of the particles.

2392. You can judge of the sharpness by looking at them?—Not very well.

2393. I mean with a microscope?—Yes.

2394. (*Mr. Thomas.*) A special investigation would only determine whether it was injurious if it was carried on by experts?—Yes. I do not think in drilling hematite it affects the men much. Coal-dust does not, although coal-dust looked at through a microscope is very spiky.

2395. (*Dr. Haldane.*) If you look at coal-dust it looks as if it would lacerate everything, and it does not do any harm?—It must be spiky, but still soft or easily broken.

2396. It is rather mysterious. Do you think any codification is required with regard to the quarry regulations?—Yes. I agree with the previous witnesses. I think all the regulations as to quarries might be contained in a single Act, with no provision as to special rules. Such rules as were necessary could be comprised as general rules.

2397. What number of persons has been employed in your district?—Taking the eight years from 1902 to 1909, the average is: inside 3,166, outside 1,572; total, 4,738. I would like to say that I have some doubt as to the accuracy of these figures, because I fancy in the smaller quarries we get the same men returned more than once. The total fatal accidents occurring during the eight years may be classified as follows:—Falls of ground, 12 fatal accidents killing 12 persons; blasting, 5 fatal accidents killing 8 persons; miscellaneous, 15 fatal accidents killing 15 persons; outside, 6 fatal accidents killing 6 persons, giving a death-rate over the period as follows:—Inside, 1·38 per 1,000; outside, 0·48; inside and outside, 1·08. That is rather more than the metalliferous mines, but still less than the coal mines.

2398. It is distinctly less than the collieries?—Yes.

2399. (*Mr. Lovett.*) With regard to the use of explosives, are you in favour of limiting the number of men allowed to use the explosives in quarries?—No, I do not think so.

Mr. William Leck called and examined.

2400. (*Chairman.*) You have been employed in all sorts of underground work in iron ore mines, as underground labourer, miner, shiftman, and manager?—Yes.

2401. You were appointed Assistant Inspector of Metalliferous Mines in 1894?—Yes.

2402. Your jurisdiction extends over Cumberland, Furness, and since 1901 the Isle of Man?—Yes.

2403. The minerals worked there are barytes, copper ore, gypsum, iron ore, lead ore, slate, wolfram and zinc ore?—Yes.

2404. Will you tell us the location of the metalliferous mines in your district?—I have prepared a sketch map which will give the Commission an idea of the places where the hematite mines of the district are located. By this it will be seen that there are three groups comprising in the North what we call the Cleator district, the Hodbarrow district in the south of Cumberland, and across the estuary in the other county, Lancashire, the Furness group. These are the three groups of hematite mines in the Newcastle district.

2405. The mines are only hematite mines?—Yes. There are other metalliferous mines in the district. The map shows the hematite mines, and how they are located in the three groups.

2406. Are those the most important mines in your district?—By far the most important mines in my district.

2407. How many hematite mines, roughly, are there, do you think?—According to the official list there are 43 hematite mines in Cumberland, 18 in Lancashire, and one in the Isle of Man. The one in the Isle of Man is merely prospecting.

2408. How many people do they employ?—In Cumberland last year there were 3,715 persons employed underground, 1,136 above ground, a total of 4,851. In the Lancashire portion of the district there were 865 underground, 644 above ground, a total of 1,509. The total employed in the iron ore mines of the district was 6,361, consisting of 4,580 underground and 1,781 above ground.

2409. How many men are employed in the biggest hematite mine you have got?—About 1,400, roughly, 1,000 underground and the rest above.

2410. That is near enough. Are there many small hematite mines?—A few—not very small ones.

2411. What do you call the smallest?—I have divided them out, taking the number 30, which is mentioned in the Coal Mines Act. Out of 43 mines in Cumberland, 29 employ over 30 men, 14 under 30; and in Lancashire, out of 18, six employ over 30. It is probable Mr. Lewney will think I am under-estimating the number of mines, as he knows a portion of the district exceedingly well; it is possible that the way in which we describe the mines may not be the same as he would enumerate them. In the official list a mine means one which is separate from other mines, but some have several drawing shafts. Take Hodbarrow, for instance, we have been referring to that as one mine, although there are four separate drawing shafts, four pits drawing ore. They are all grouped in the list as one mine, "Hodbarrow," as they are all connected. It is possible that local persons would say they had four mines. Putting it in that way, mentioning the separate drawing shafts in Cumberland, we have 59, and 35 of those employ over 30 persons, in Lancashire 28 on the same lines, 12 employing over 30 persons—a total of 88. That would add 26 to the number of mines, but it does not add to the number of persons employed.

2412. Is it a flourishing industry—are they making money?—Yes, I should say they are making money. I should say it is a flourishing industry at present, but it fluctuates.

2413. (*Mr. Lewney.*) It is better now than it was two years ago?—Yes.

2414. (*Chairman.*) Have you anything to say with regard to the Government inspection as regards accidents?—Might I give the number of inspections that have been made?

2415. Yes?—My work is practically confined to metalliferous mines and quarries, and during last year I made 206 underground inspections, and 160 surface inspections apart from the underground inspections. The previous year I made 212 underground and 125 surface inspections, and going back to 1905, 222 underground.

2416. I think we have them all in the returns?—They are all within a score of each other. With regard to inspections *re* accidents, and apart from accidents, when Mr. Atkinson took charge of the district he suggested that all accidents should be investigated, that is, all accidents that were reported. He acted on the line that if an accident was serious enough to report by the owner it was serious enough to investigate, and his instructions were that in the case of all such accidents he would require a report from the inspector, and that has been done. Apart from that, casual inspections are made as time permits. A very small proportion of these underground inspections which I have made refer to accidents.

2417. I will go through the existing law and ask you your opinion upon various points. For instance, at present there is no compulsion as to the inspection by mine officials of working places?—No.

2418. What do you think of that? Do you think there ought to be one?—I think it ought to be a legislative enactment that all working places should be inspected every working shift.

2419. By "inspection" I presume you mean such inspection as a man can reasonably make, having regard to the circumstances?—Yes, inspection of the working places.

2420. It might be impossible to sound a roof that was very high every day?—Yes.

2421. (*Mr. Redmayne.*) You work by the shrinkage method mostly?—In the Furness district and Hodbarrow, and part of Cumberland.

2422. The slicing is equivalent to the board and pillar system in coal mines, so that you could inspect every place?—Yes. If the question referred to hematite mines exclusively, there should be a thorough inspection made.

2423. (*Chairman.*) Do you mean by "inspection," such inspection as is reasonably practicable, regard being had to the character of the mine?—I would understand that. We have one mine in my district which has an exceedingly high roof.

2424. There an occasional inspection ought to be made?—Yes.

2425. The daily examination of which you speak would not include sounding of that high roof every day?—No.

2426. (*Mr. Redmayne.*) Is that a hematite mine?—A slate mine, Saddlestone.

2427. Every hematite mine can be inspected similarly to a coal mine?—Yes.

2428. (*Chairman.*) And ought to be inspected?—Yes.

2429. You would also inspect the machinery and winding ropes?—Yes.

2430. Do you think it desirable that workmen should have the same power to inspect as they have under the Coal Mines Regulation Act?—Yes; I think they ought to have that power. I do not see why metalliferous workmen should not have the power if they care to exercise it, but whether they would exercise it or not I do not know.

2431. The reason it is not found in the Metalliferous Mines Act is that it was a subsequent idea?—Yes. It was not in the Coal Mines Act of 1872, and there has been no general Metalliferous Mines Act since 1872.

2432. With regard to accidents, have you any inflammable gas?—We have a little. I investigated an ignition of inflammable gas this week at one of the iron ore mines. No one was injured. It was very slight, but under the new Notice of Accidents Act that has to be reported.

2433. What was the character of the gas?—It was all dissipated before I got there. I have never been able to get a sample. There have been during the 16 years I have been inspector, perhaps seven or eight

cases of ignition, but when I got to the place the gas was always dissipated.

2434. (*Mr. Lewney.*) Does it always come from the old timber?—Yes.

2435. (*Chairman.*) The gas is from the timber?—Yes.

2436. (*Mr. Redmayne.*) It must be marsh gas?—Yes; its characteristics seemed to be the same. I describe it as inflammable because it has not been analysed.

2437. (*Dr. Haldane.*) What evidence is there that it is from the timber?—Very direct evidence. In one case the manager of the mine told me he had seen it burning from the end of an old head tree sticking out of the side, and it was burning like a gas jet for a considerable time.

(*Mr. Lewney.*) I have seen that myself.

2438. (*Dr. Haldane.*) It might be coming through the head tree from the ground?—No.

2439. (*Mr. Lewney.*) This old timber may have been buried 20 or 30 or 40 years. It is not timber newly put in.

2439A. (*Mr. Redmayne.*) Was it damp?—Yes.

2440. Timber all rotten?—Yes, and always damp. There are certain conditions in one particular mine where they expect this gas, in going through old workings where the timber has been in 30 or 40 years, closed down, and a certain amount of moisture. The manager of that mine, who has been there 30 years, says they never found gas in an absolutely dry place. In one place where they had an ignition of gas some years ago the place was perfectly dry when the men left it on the preceding shift. The following day there was a small amount of water percolating, and there was an ignition of gas but nobody was burnt.

2441. (*Chairman.*) With regard to explosives, the amount of explosives is large in quantity as compared with the number of men employed—larger than in coal mines?—Yes.

2442. Taking that into account, what is the comparison between accidents in coal mines and in metalliferous mines?—I should say ours would be more favourable.

2443. Your opinion would be the same as that we have heard from Mr. Martin and Mr. Atkinson?—Yes, in the iron-ore mines of Cumberland last year 331,000 lbs. of the higher explosives were used. Gunpowder is not used in the hematite mines of either Cumberland or Furness, nitro-glycerine explosives exclusively, and there were five accidents, all non-fatal.

2444. They compare favourably with coal mines?—Yes.

2445. Is there any danger from the gases from these explosives?—I have never had any complaint. I understand that there is an explosive on the market that does not produce fumes. I have heard of those explosives, but I have never come across them.

2446. It would require some proof before you could necessarily assume they were free from gas?—Yes. I am rather sceptical.

2447. That may be a development?—Yes.

2448. Do you think it desirable, if it could be arranged, that the Explosive Inspectors should report, when they pass the explosives, upon the character of the gases emitted?—I think that would be desirable.

2449. I presume, also, on the strength of the explosive?—Yes.

2450. So as to be a guide to the charge?—Yes; that would be a move in the right direction.

2451. How about stemming and mis-fires?—I may accept some responsibility for raising this question. During the last 13 or 14 years I have tried to impress on managers and miners at the hematite mines of Cumberland and Furness that in stemming the higher explosives there is no necessity to stem in the same way as the old miners used to stem gunpowder, that is, stemming the barrel of the hole tight up to the neck; but two or three inches of stemming is sufficient. The rending effect of the explosion is practically identical, but the object is that in the event of a mis-fire after the miner has waited outside the half-hour prescribed, he can prepare another cartridge outside and go in again to the working, drop it into the barrel of the hole, put on a small amount of clay, fire the fuse, and retire. The whole operation in the working could be done in 30 seconds.

2452. There is no necessity, as in coal mines, to give a complete stemming?—No; we are not afraid of blown-out shots. I remember an experience of my own when I was working as a miner, a case where a shot had mis-fired; we waited fully half-an-hour, in fact it was lunch time, and we were just chatting, and had almost forgotten about the hole, when it exploded. If we had gone back and been working at the hole or boring another hole with a view of exploding it, the persons in the working would no doubt have been killed. The object of only putting in a few inches of stemming is that the person coming back may not spend more than the smallest appreciable amount of time in the working before he retires. Then the explosion of the second cartridge would explode both.

2453. With regard to signals, are you of opinion that it would be a good thing to have a uniform code?—I think it would.

2454. A large number of signals might be made compulsorily uniform?—Yes.

2455. If you gave time to bring them into effect?—Yes, some of the owners want to be approached with a little tact. Every owner imagines his signals are the best possible, but I think with a little amount of cheerful tact they would see it would be desirable. I have had complaints occasionally from engine men that they found it a little confusing to have different signals when they went to another mine in the district.

2456. With regard to the inrush of water and boring against old workings, are you of opinion that some provision ought to be inserted?—Yes. Since I was appointed inspector we have had one fatal accident where three persons were killed by an inrush of water. Although I say that it is desirable that boring should be compulsory, yet at the present time where an inrush of water is feared boring is always done, although there is no legislative enactment.

2457. (*Mr. Redmayne.*) Were these, in the case you mentioned, boring against old workings?—Yes, there had been boring. It was a case of plans. They thought they had got past the place. There had been boring but they had given it up at the time.

2458. They were inaccurate plans?—Yes.

2459. (*Chairman.*) You agree with Mr. Martin that the plans ought to have more particulars upon them, and that the exception of not sending them in where less than 12 are employed ought to be done away with?—I think that is very desirable.

2460. As regards education, that is a subject we have not had before us yet. What is done in mining classes in Cumberland and Lancashire?—I know the County Council of Cumberland is rather keen on promoting mining education in the mining districts, and the local Education Committees are also rather keen; in fact they are particularly anxious in the mining districts of Egremont, Cleator Moor, Frizington and Whitehaven, to have mining classes, but the difficulty is that the miners will not attend.

2461. Does the miner who attends get the reward of his work?—I think that is very doubtful. That is one reason why they do not attend.

2462. There is no chance of getting on to be deputies or overmen, or whatever is the term used in that part of the country?—I have been told by a person—it did not come to me direct—that a local manager rather looked askance at a certain student because he had managed to get his three years' certificate in mining. He rather ridiculed him.

2463. It is the old prejudice?—Yes, but I should not say that feeling is general.

2464. Do they have popular lectures of a simple and interesting character?—No, they never have had any, but the Cleator Moor Council have had the subject before them: in fact I have been asked if I would give a popular lecture of that kind, a sort of missionary lecture, to begin the classes this year.

2465. Do you not think a missionary lecture given by a thoroughly competent man is frequently better than the most wonderful and scientific lecture?—It would reach the workmen better.

2466. Is it not possible to explain the most difficult things in very simple language if you set your mind to do it?—The simpler the better, and much more effective.

2467. Perhaps we might say that the fault has been that the lectures have not been in simple language and have been too complicated?—Some of the students have complained to me personally that the lectures were above them.

2468. Take gas and the composition of gas; if you set to thinking of it carefully beforehand, you can explain that comprehensively to any miner, so that he would understand it if you had the patience not to go too fast?—Yes.

2469. I hold the same opinion, and I agree that a simpler form of exposition is wanted for these lectures?—Yes.

2470. You were not at a college yourself?—No.

2471. Now, with regard to ambulance, what results have you with that subject?—We rather pride ourselves on our ambulance results in Cumberland.

2472. It is a volunteer system?—Purely voluntary.

2473. The men do not get paid?—No.

2474. They take to it?—They take to it remarkably well. The managers as well, in fact, all the officials have taken a very keen interest in the question of ambulance in Cumberland, and an association was formed 15 years ago in response to a circular by the Home Secretary, the present Prime Minister, asking the Inspectors to encourage ambulance work amongst the miners. In response to that a meeting was held at Whitehaven, and a centre was formed described as the Cumberland Mines and Quarries Centre of the St. John Ambulance Association. The management is vested in the managers, coupled with the representatives of the men, but the funds of the organisation are contributed exclusively by the mine owners. They contribute *pro rata* in accordance with the number of persons employed.

2475. Have you found that has been a good result in aiding injured men?—There have been excellent results. Doctors have testified that the change from fifteen years ago is remarkable.

2476. In saving a man's legs, or any part of his body?—Yes. A very serious accident occurred this week which I investigated on Tuesday, and the doctor, when he arrived, said he need not do any more with it, and the man could go direct to the infirmary. He was satisfied with the first aid that had been rendered by the miners on the spot.

2477. Which was much more effective than if they had brought him up anyhow and left the doctor to attend to him?—Yes.

2478. Was that a case of a fractured bone?—It was a case of a man whose hand was blown off. It was an explosives accident.

2479. That is a case in which the prompt action taken may have saved the man's life?—He might have bled to death.

2480. How about breathing-apparatus? What has been done with regard to that?—In connection with the iron ore mines, we have discussed it in an academic way. I was a member of a committee appointed two years ago by the Ambulance Association to visit the rescue stations in Yorkshire; we made a report, and it has been before the Ambulance Committee, but nothing has been done yet. I think the metalliferous mine owners of Cumberland will be prepared to move in that direction, but instead of having a rescue apparatus at each mine, they might be grouped, because our mines are thickly placed together.

2481. If that can once be made to serve, the grouping promises to be efficient, because you can get men very highly trained indeed?—Yes. It would be absolutely necessary to have men from every mine.

2482. To guide them?—Yes.

2483. However trained a man is, it is no good sending him down without somebody who can wear the apparatus to guide him?—Yes.

2484. A perfect thing would be a combination, a certain number from the mine with the apparatus on, and a certain number more of very highly skilled men?—That would be admirable so long as you had the local men to give them the local knowledge, which is quite indispensable. Of course we have not firedamp in metalliferous mines, but we occasionally have fires. There have been three or four serious fires in my experience. I do not know in any case that they would have saved life; they would certainly have saved property.

2485. How many shafts have most of the mines you are dealing with?—They mostly have two.

2486. Do you agree with the view that it would be impossible to make a hard-and-fast rule requiring two shafts for every metalliferous mine, but that there ought to be power to require two wherever possible and practicable?—In a general way that would meet my views. I am not sure who is to be the authority to decide when they are necessary.

2487. I suppose you would go to arbitration, like a Special Rule, in case of dispute?—Yes.

2488. It would not be often that there would be a serious dispute?—Very rarely.

2489. Except where it was expensive?—I have a list of mines in Cumberland and Furness. There are twelve in Cumberland and two in Furness. I do not think there is more than one case where the expense would be serious. In most of the other cases, from a commercial point of view alone, they will ultimately make another connection.

2490. You heard what Mr. Atkinson said this morning about the shafts?—No, I was not here the whole time. From the point of view of safety, two shafts would be better; but we have not the risk of explosion, and so far as the shaft is concerned, I do not think we have the risk of fire, because if you have a single shaft you must get the water up the same shaft and it would be wet, and therefore in no danger of taking fire. There might be danger of the workings in-bye being cut off by a fire on the main road. I have known a fire in a main road 50 yards from the shaft which would have cut off everybody if there had been men in the mine, and only one shaft. There have been three cases of mishaps to single shafts in the district, but no lives have been lost and no one has been injured. In one case where the top of the shaft collapsed no one was in the pit. In another there was a communication almost made to another pit, and they completed it and got the men out in seven or eight hours.

2491. Is the general health of the miners good?—Yes. Iron ore does not seem to have a deleterious effect.

2492. What is the fatal accident rate per 1,000?—Last year underground in the iron ore mines it was ·65, no fatals above ground.

2493. That is very favourable?—Exceedingly; above and below ground the rate was ·47 for the iron ore mines. In Furness there were no fatal accidents.

2494. Are they an exceptionally skilful set of men, the iron ore miners?—I think they are. I consider them an exceptionally skilful set of men.

2495. Perhaps that is the reason why you have fewer accidents, I mean the skill of the men?—Yes.

2496. (*Mr. Redmayne.*) Is it not rather due to the system of working being more on a par with coal than with metalliferous mines?—I am not sure that I would say that.

2497. Take the coal mining accidents at 1·47 per thousand; 56 per cent. of those are due to falls of stone?—Yes.

2498. That gives you about ·7, and yours come out to about ·6 per 1,000?—Yes; we have falls.

2499. The majority of your accidents are due to falls of ground?—Yes.

2500. As a matter of fact you are working these masses of hematite in slices?—Yes.

2501. Each slice is similar to the working of a seam?—Yes, especially in Furness and at Hodbarrow. It is slightly different in the remaining part of Cumberland.

2502. The conditions are safer than those when working a vein?—I should think so.

2503. And the falls are of softer material than what would fall in a coal or metal mine?—Yes.

2504. I think that is the reason?—Yes.

2505. (*Chairman.*) The dressing-rooms are a great deal used in your district?—Yes. With regard to the dressing-rooms, the General Rule is not carried out in the same way in Lancashire and Cumberland. In Lancashire, when the Act was passed in 1872, the Rule which says that sufficient accommodation shall be provided where more than 12 persons are employed underground, where the men can conveniently dry and change their clothes, was evidently interpreted to mean accommodation for all the persons in the mine, and they built accordingly. In Cumberland they have acted on the principle that so long as they provide accommodation for all who required it they were satisfying the Act. There has not been a decision on the matter. I am not prepared to say what the law is, but the practical way in which we have administered the Act is this: In examining the dressing room, we were prepared to admit there was sufficient accommodation if they had room for more. There are a number of men who will not use rooms, at least who say they will not. Personally, I should like to see it compulsory. I think it would be a great advantage to the district.

2506. What is the condition of the mines as regards ankylostomiasis?—We have not had any cases. At one time there was a little fear, but we have never had a case.

2507. Do you attribute importance to the certificates for winding engine-men?—Yes. I think they are a very important body of men. Our lives all depend upon them every time we go down, and I think they would like it themselves.

2508. Would they be better for being certificated?—I do not think they would be better engine-men. We have a good class of engine-men, but it might give them a status. They would feel that they were better, although I do not think they would wind any better for it.

2509. As regards Special Rules for groups of mines, you would like Special Rules made wide for the whole district, and that there should be unification?—I quite agree with that.

2510. You are also greatly in favour of uniformity of signals?—Yes.

2511. Would you have speaking-tubes from the pit top to the engine-house?—That would be a great improvement. It is a very simple matter, and at many places they have them.

2512. Would there be any use in telephones from the interior of the mine to the top?—That is another matter; that is an extension.

2513. Would it be practically useful?—Undoubtedly, but the speaking-tubes can be put up so cheaply, and are so effective, that any one who has them wonders why they have not had them before.

2514. (*Mr. Lewney.*) These speaking-tubes are sometimes carried down the shaft?—They could be.

2515. Have you never seen one?—I do not know one at present. I have seen one. There is no reason why they should not be carried down shallow shafts.

(*Chairman.*) The telephone question is a wider question.

2516. (*Mr. Greaves.*) Would you prefer speaking-tubes to the telephone?—On the surface it is only a matter of 40 or 50 feet. They are so simple.

2517. From the pit top to the engine-room?—Yes.

2518. (*Mr. Thomas.*) Do not the underground signallers signal to the pit top man as well as the engine man?—In some cases they do, in others they do not. That is a question with regard to uniformity of signals I should like to see carried out. In the Furness part of the district all the signals go to the banker, not to the engine-man. In Cumberland, except Hodbarrow, they go to both. I had a complaint from an engine-man in Furness on that point. There was a mine started by Cumberland men, so they introduced the Cumberland signalling methods, and the engine man complained that he was getting the signals direct from the bottom; he said: "I ought to get them "from the banker; I have to watch the banker's "signal and the bottomer's signal, and it is putting "too much responsibility on me." All round the district where he had been working they had not been accustomed to that method. I should like to see one system.

2519. (*Mr. Redmayne.*) You would like to see the signals sent from the bottom to both banksman and engine-man at the same time?—I think it would be desirable.

2520. Not to the engine-man through the banksman?—I think the engine-man should receive his signal direct from the bottom.

2521. (*Mr. Thomas.*) Is there any system of reply signalling?—Yes.

2522. The engine-man replies, or the banksman?—The banksman in Furness, but the engine-man in Cumberland.

2523. (*Mr. Lewney.*) In the Cumberland district the engine-man would reply?—Yes, but in the Furness district the banksman

2524. (*Mr. Thomas.*) Generally you would like to see some uniformity in regard to these signalling arrangements?—Yes.

2525. (*Chairman.*) Are the ladders in your district good?—Yes. I mentioned ladders because it is one of the few points inserted in the Metalliferous Mines Acts which is not in the Coal Mines Act.

2526. Man engines?—We have one in the Isle of Man which goes down 200 fathoms.

2527. Are they obsolete now?—Yes.

2528. (*Dr. Haldane.*) Is that the Laxey?—Yes, the Great Laxey.

2529. (*Chairman.*) Have you anything to say with regard to annual returns?—There is one point owners have mentioned to me from time to time, viz.:—whether they should enter in the return the amount they bring up the pit, or the amount they sell. The return form asks for mineral sold exclusive of that which has been stocked. The table of output in the inspectors' reports is headed "Quantity of mineral raised," but you cannot have it both ways. It is a matter which has bothered me to some extent every year, but it is a departmental question.

2530. How many quarries have you in your district?—About 170 in Cumberland and Furness, but not more than 50 large quarries. They are chiefly limestone, slate and granite, principally limestone. We have three or four big granite quarries in Cumberland, one of which is not working at present. There are six limestone quarries in the Cleator district, supplying limestone to blast furnaces.

2531. (*Mr. Lovett.*) What about the whinstone quarries?—We have not a large whinstone quarry in Cumberland.

2532. What about Embleton?—That is not in Cumberland.

2533. There are two, there is one in Northumberland and one in Cumberland?—The one in Cumberland is a granite quarry.

2534. The one in Northumberland is a whinstone quarry?—Yes, but I have never seen it.

2535. (*Chairman.*) You treat a slate mine as a mine and a slate quarry as a quarry?—Yes.

2536. Not dividing them by the character of the mineral, but rather by the nature of the working?—Yes. I do not know a single year in which we have not had to go back to some slate mines owner and get him to correct his annual return. They never seem to realise what is a slate mine and what is a quarry. They call them all quarries as a matter of fact. The terms are, "close head quarries" and "open top quarries."

2537. (*Mr. Greaves.*) Have you slate mines in your district?—About a dozen.

2538. Are they deep?—None with shafts. They are all adit levels. One is the mine I referred to as being the only mine we had which was difficult to examine, in fact at one point it is 250 feet high.

2539. Where is that?—Saddlestone, Coniston.

2540. (*Chairman.*) Would you be in favour of grouping each of those quarries under the government of some authorised man who would act as a foreman?—Yes.

2541. Whom you could look to if anything went wrong?—I have not had any difficulty. I always find that is done.

2542. The accident rate at Furness and Cumberland quarries, I believe, is a low one?—I am afraid I have not got that.

2543. It is rather low, I believe?—It is low. There were no fatal accidents last year.

2544. Are explosives well used in quarries?—Yes.

2545. They use a good many straws, apparently?—The quarries are apparently of two classes. All the slate quarries and mines use straws, and the limestone quarries of Cumberland, but the limestone quarries of Lancashire and big limestone quarries in South Cumberland close to Hodbarrow do not use straws.

2546. You are contented on the whole with the mode?—Yes.

2547. Accidents occur to eyes?—Yes. We have had a number of accidents of that kind in the limestone quarries, but curiously enough, the accidents have been principally from one particular quarry. I do not know whether the stone is different, but in the last five years there have been seven accidents from splinters of stone when breaking with a hammer, striking the eye. In two cases the men lost an eye. In five cases the injury was not so severe. The owner of that quarry introduced goggles, and I have a pair here (*producing*). The men wore them a little while, and then they objected. Two or three of the accidents came rather rapidly after each other, and we were anxious to prevent a repetition. I had an interview with some of the men, and a very intelligent workman said: "We find that we are likely "to do very much worse with these on than without "them, because first of all as soon as we perspire it "becomes very uncomfortable and we cannot see as "well with them on as off." In order to break the limestone he showed me that it must be struck at the proper place. He broke the stone and showed how with comparatively slight taps the stone could be broken by hitting it on the proper place. A man who does not understand the work might work much harder and the stone would not break. He said, "When we have the goggles on we cannot see the "cleavage, and the work is more difficult." The owner offered to give them these goggles, and after one of the accidents where the man lost his eye, they did wear them for a little while.

2548. (*Mr. Lovett.*) I have worn them for a few days, but they have a very injurious effect on the eyesight undoubtedly. You get that kind for 2*d.* a pair, and I would sooner have a rap occasionally and a serious rap at longer intervals than wear those continually?—I have never worn them, but I will take your experience.

2549. (*Mr. Lewney.*) In your statement you spoke of automatic signalling. Will you explain what you mean by that?—It is the case of a rather ingenious application by a local mine manager. By a simple wire and system of levers the engine-man on the surface sees whether the gate at the inset is closed. It is important that the gates at the insets of shafts should be closed when the cage is not there. With this arrangement, when the gate closes it moves a pointer in the engine-house and marks "shut"; when they open the gate it pulls the pointer again and marks "open." The engine-man has instructions not to lift the cage until the gate is closed. I complimented the man and told him he ought to patent it.

(*Mr. Redmayne.*) The same thing is in practice in the steep mines of Scotland.

2550. (*Mr. Lewney.*) What mine is that?—Kelton Mine. That is an example of a pure vein mine. The mines belong to William Baird & Co., a Scotch firm, so that they may have seen it in Scotland.

2551. In regard to ladder-ways, do you always find these sufficiently stayed to keep them from swaying about?—Yes. I do not recollect that I have had occasion to complain.

2552. The Act provides for a certain length between one ladder and another?—Yes.

2553. Or rather between landing and landing?—20 yards.

2554. To put up a ladder 20 yards from one landing to another without these stays would be a source of danger?—It would be very unwise, I think. If I were going up a ladder which was swaying I should point it out.

2555. I have seen them. That is what made me ask you about it. The rule might be amended by inserting words requiring these ladders to be sufficiently steady to prevent them swaying?—Yes, you could say it should be substantially fixed. There would be no harm in that.

2556. With regard to explosives, have you had any reason to complain about the class of men using explosives? Do you think any good effect would be had by limiting the number either in the mines or quarries?—Certainly not in the mines. No one uses the explosives in the mine except the fully qualified miner. In Cumberland we have a system of gradation. A man goes through an apprenticeship. He is first a general labourer, and is then put on for six months as a boring labourer. He learns the rudiments of practical mining, and whilst acting as a boring labourer he is not allowed to charge holes, but after six months' probation he is considered qualified as a miner and qualified to use explosives. I am satisfied with the present arrangement.

2557. In any accidents that have happened, it has not been demonstrated that it is through want of experience of the people using these explosives?—No. In the last accident that occurred this week it happened to be the most experienced man in the place. It was in a stone drift, and he was the contractor, and a most experienced man.

2558. (*Mr. Redmayne.*) Was it due to carelessness?—It is rather difficult to say. I should say carelessness.

2559. The most experienced man turned out to be careless?—Yes. It sometimes happens that experienced men have careless moments.

2560. The saying "*Experientia docet*" is not correct in this case?—No.

2561. (*Mr. Ainsworth.*) You said that the hematite district divided itself into three groups: the Cleator, the Hodbarrow, and the Furness?—Yes.

2562. The nature of the deposits varies to some extent, but the character of the mining is much the same?—Yes, fairly similar. A good miner for one district would have no difficulty in picking up mining in the other.

2563. With regard to the changing-houses, do you find that the men are more inclined to use them than they were?—I think so. I believe now if there was a movement to make these changing-houses thoroughly clean and comfortable they would be inclined to use them. I may say, in my own experience, on one occasion I went round a mine and asked the men if elaborate changing houses were put up, would they use them. Out of about 200 men only six said they would use them if they were put up. A considerable number said they would use them if compelled, but the majority said: "No, I will not use them. I can go home." They nearly all lived in the village quite close by. It was a dry mine, and there was accommodation for more than were requiring it, but the owner was anxious to put up a thoroughly reliable and comfortable dressing-room; after the experience mentioned it was not erected.

2564. (*Mr. Lewney.*) In the Furness part of your district you will find a different feeling from that?—Yes. I should like to see Cumberland the same as Furness. In Furness you scarcely ever see a red man going home. In Cumberland you see crowds. It must be an advantage to the miner's family if he comes home in clean clothes instead of as a dirty iron-ore miner. I am surprised that the wives do not protest against it. I know my wife did, and insisted on my changing at the dressing-room.

2565. (*Mr. Ainsworth.*) I rather think in the Furness district the Barrow Steel Company began a system of changing-houses before the Metalliferous Mines Act was passed. I think they have been accustomed to them in the Furness district for a longer time than elsewhere?—I made inquiries at Hodbarrow, and was told when they built their changing-houses that they insisted on the men using them.

2566. Can you make it compulsory?—It is not a legal enactment. It is simply a case of "If you do

not use these you can find work somewhere else." On one occasion I saw a man going home on a bicycle in red clothes, and I thought that looked like *primâ facie* evidence that there was not sufficient changing accommodation at that particular mine. I asked him if there was dressing-room accommodation, and he said, "Yes, plenty, but I will not change there." I mentioned it to the manager, who subsequently said to the man, "You will have to change here." The man came to interview me and said, "Am I compelled to change at the pit if I do not wish?" I said, "No, you are not compelled." I told the manager there was no compulsion in the matter.

2567. (*Mr. Greaves.*) When talking of the 3 inches of tamping, you are referring to the high explosives only?—Yes. Gunpowder is absolutely unknown in the iron-ore mines of Cumberland and Furness.

2568. (*Mr. Redmayne.*) With regard to hematite mines, there are two classes, those working masses of hematite and those (restricted to one mine, I think) working it in vein form?—Yes.

2569. The masses of hematite are surrounded with limestone?—Yes.

2570. In the case of the vein it is in the silurian system?—Yes.

2571. The shafts are sunk in the majority of cases in the limestone?—Yes.

2572. And cross-cut are driven to the masses of hematite?—Yes, that is the regular method.

2573. Do you know any cases where shafts are sunk in the ore?—Yes, in the early period a very large number were sunk in the deposit, but it was soon found that they collapsed, and other shafts had to be sunk in the limestone.

2574. That is the object of my question. The shafts sunk in the ore were more liable to collapse than those sunk in the surrounding rock?—Yes. It is the object in mining to sink in the limestone, so that the shaft may remain intact and not be disturbed.

2575. Are there many mines in which all the shafts are in the ore?—I do not think so. Speaking off-hand, I should think not. I cannot call to mind any.

2576. The working shaft is entirely in the limestone at present. In working these masses of hematite the usual method is the method you described some time ago, namely, taking it off in slices and letting the top fall in—the shrinkage method?—Yes; that is the method with the softer deposits.

2577. Sometimes the "square set" timber method is in operation?—It has only been tried in one part of the district. It was tried at Hodbarrow. It was found it did not stand side pressure, and they abandoned it. It is not used at present.

2578. It has not been tried extensively enough to obtain reliable data as to the comparative rate of accidents in respect of the tin methods, viz.:—"slicing" and "working up"?—No; not extensively enough.

2579. (*Mr. Thomas.*) In the "square set" timber did they fill or did they rely on the timber?—They packed it solid.

2580. It would not stand side pressure?—They had not packed it properly, I should say. A portion had given way and allowed the rest to collapse, I should think. It was entirely new. They had not been trying it long. It was a new arrangement entirely.

2581. Do you know the size of the sets. Were they 8 feet square?—About that, all pitch pine, morticed into each other, a neat, elaborate arrangement.

2582. (*Mr. Redmayne.*) With regard to underground fires, you mentioned that the breathing-apparatus might have saved property but not life. Where did those fires take place, and was there any loss of life?—There was loss of life in two cases of fire, but I do not think the apparatus would have saved life. It might have done so.

2583. Where was the fire?—The fire occurred at the bottom of a dip not far from the shaft, perhaps 150 yards. It is quite possible in that case if rescue apparatus had been on the spot they might have got down the mine right away, and put out the fire. It would have been a good illustration, and would have saved a lot of property, because the mine had to be flooded. There were four lives lost. The doctor at the inquest said, in his opinion, the men would be dead 10 minutes after the last man got out. The survivors came through the smoke, and when they got to the top of the dip where there was clear air they found four men missing. The smoke was almost impenetrable, although there was very little fire.

2584. This apparatus to be of use must be on the spot?—That is so. Possibly in that case it might have been useful and saved life. They might have got down and put out the fire right away. It was a very small fire, but it filled the pit with smoke.

SIXTH DAY.

Friday, 22nd July 1910.

Present:

Sir HENRY HARDINGE SAMUEL CUNYNGHAME, K.C.B., *Chairman.*

Richard Augustine Studdert Redmayne, Esq.
John Scott Haldane, Esq., M.D., F.R.S.
John Stirling Ainsworth, Esq., M.P.
Richard Methuen Greaves, Esq.
Robert Thomas Jones, Esq.
William Lewney, Esq.
Uriah Lovett, Esq.

T. E. Bettany, Esq. } *Joint Secretaries.*
G. W. Chrystal, Esq. }

Mr. Owen Rowland Jones called and examined.

2585. (*Chairman.*) You are Junior Inspector of Mines and Quarries in the Liverpool and North Wales district and have filled that appointment for the last 16 years?—Yes.

2586. During the course of your 16 years' experience you have had a good deal of opportunity of observing the working of the present law?—Yes.

2587. You have some proposals to make by which it might be amended?—Yes.

2588. Upon the whole does the law work well or ill at present?—It is extremely complicated.

2589. You mean the first thing you would suggest is that all the existing Acts and Rules should be codified as far as they could be?—Yes.

2590. You are in accord upon that with the evidence given by the other inspectors?—Yes.

2591. You wish to have one simple code?—Yes.

2592. You would favour a division into mines and quarries irrespective of the nature of the material excavated. You might, on the other hand, divide the minerals into coal and slate, and put slate under one category whether in a mine or quarry?—Yes.

2593. Most of the other inspectors were of opinion that the best division was into mines and quarries, no matter what the nature of the material got out was. Have you formed an opinion upon that?—I rather like the French system of doing it: they divide the question on the nature of the mineral and not the nature of the excavations.

2594. The difficulty is that there are a number of materials, and that it is difficult to say whether any particular one is a metalliferous mineral or not. You get into philosophical distinctions?—You could put them in the schedule at the end of the Act.

2595. But what if you get a new one which is omitted from the schedule? You see the difficulty?—I understand the difficulty.

2596. The reasons given by those who prefer to have the division into mines and quarries was as follows: they said all underground work is very much alike, so upon the whole a slate mine was nearer a metalliferous mine and a slate quarry nearer a quarry, so far as the grouping of rules is concerned?—No doubt they have much in common.

2597. On reflection, leaving the theoretical side out—I do not wish to persuade you, I am only putting before you the considerations that have been put before us—they said upon the whole it was best to neglect the theoretical side and take the practical, and for practical administration they would rather group under mines and quarries, and it would be easier to be understood?—I do not see any difficulty as far as slate mines are concerned in adapting the Quarries Act to suit them. There would be the question of plans.

2598. You think it might be done in the way which was convenient?—Yes. There is the question of statistics; any one who wanted to know the extent of the slate trade would have to consult——

2599. Two different lists?—Yes.

2600. Do you feel very strongly about it? We must decide it one way or the other?—I do not feel very strongly, but I am of opinion it is the better way of doing it.

2601. The first thing you want to do is to repeal the Factory Acts, 1901, and practically re-enact them?—Yes, and make them really applicable to the industries.

2602. Can you give an illustration of the confusion arising out of the existing arrangement?—A mine has two large steam boilers, side by side, and looked after by the same man; one is used solely for supplying mining machinery, and the other for the dressing plant. The inspector is obliged to ask the manager to have the mine boiler examined and cleaned out every three months by a competent person and once every 12 months by a competent engineer.

2603. Those are under different provisions?—Yes.

2604. Consequently you have a double set of regulations instead of one?—That is so. Then there is another mine in our district where the owners have not adopted Special Rules under the Mines Act. The result is that one set of boilers (those used for the dressing floors) must be examined and cleaned out by a competent person and a report made thereon—this would come under the Factory Act—while the other boilers used in the same mine and adjoining the others just mentioned need not be examined at all.

2605. I will not insist further on that, because your evidence is so confirmatory of everything we have heard hitherto. I should like to ask you about the meaning of the words "competent person." You find some difficulty?—Yes.

2606. Do you not think if we attempted to define it we might plunge into even greater metaphysical difficulties?—I do not know.

2607. How do you propose the definition should be made more exact?—First of all, with regard to the examination of boilers I should like the man to produce some proof that he understands how to test a boiler, how to ascertain the safe pressure, and all that sort of thing.

2608. A case arose in which there was a boiler explosion, and the man who had examined it was pronounced by the authorities who held an investigation under the Board of Trade to be quite incompetent?—Yes, and that man had been doing this work for at least 40 years in the district.

2609. After that, instructions were given by the Home Office not to accept these certificates any further?—Yes.

2610. There the evil cured itself after all?—My difficulty is about his successor; I do not think the man is as good as the old man.

2611. Would you examine the man on paper, or how would you do it?—I think they ought to be able to produce some proof of their competency to do the work.

2612. What proof would you have? It is not enough to find an evil, you want a remedy?—I believe the Board of Trade issue certificates.

2613. Of competency in boiler examination?—I think so; I may be wrong about that.

2614. That means examinations?—Yes.

2615. We shall end by having everybody examined. Do you not produce in the complication of the system even as great evils as you cure? Have you found a large number of the people, or any considerable number, who examine boilers are incompetent?—I am afraid it is so. I had a case of that difficulty only last week. There is a man, a farmer, who lets his boiler on hire—it is a sort of traction engine—to small quarries working occasionally. I came across this boiler the other day working in a quarry. I asked the man, "Who examined this boiler"? "I did," he said. I asked him about his qualifications: I said, "Could you test the boiler with hydraulic pressure." He did not know what hydraulic pressure was; he is only a farmer. He said, "I go inside it and clean it, and that is all." He was satisfied that the boiler was right. There is also another case where we took legal proceedings against the owner about a fortnight ago. He had not examined his boiler, and I pressed him on the subject, and he called in an insurance man who refused to insure it unless he were prepared to spend 30*l.* on it, it was in too bad a condition.

2616. Would a simpler method than having certificates be to have a list kept by the inspector of the district so that everybody who wished to be pronounced a competent person would have to get his name put on that list. That is a kind of certificate of competency?—Yes.

2617. It would not be necessary to hold examinations, but persons who were incompetent would not find their way on to that list easily. Perhaps that would satisfy it?—Perhaps it would.

2618. That would be your solution of the question of "competence"?—Yes. The two terms are used in the same Rule, a competent person and a competent engineer—every three months by a competent person and every 12 months by a competent engineer, in the Special Rules.

2619. That points to something more elaborate than the competency of the person?—Yes.

2620. You propose that there should be two lists, competent persons and competent engineers?—No, I should not say that. I want to know that the man is really competent to do the work.

2621. I agree with you, but we have to find out how to do it?—These insurance companies have very good men going about, and I believe they must have satisfied themselves as to the competency of their men.

2622. Is the plan I have suggested one that commends itself to you, that he should be accepted as competent by the inspector of the district?—But somebody must know that the man is competent.

2623. The inspector could find that out?—I do not know how I can find out.

2624. Would it be enough for you to have this rule, that anybody could be refused power to examine a boiler or to be considered a competent person if his name was deleted from a list kept by the inspector of the district. I want you to suggest some remedy for the evil we see?—Somebody must examine them all, I think.

2625. Then you have more examinations.

(*Mr. Greaves.*) Are we now talking of attendants or inspectors?

2626. (*Chairman.*) We are talking of the competent persons?—The making of the annual report on the boilers. Every steam boiler must be examined once every 14 months by a competent person.

(*Chairman.*) The witness says some of the persons who examine are most incompetent. I am pressing him to say how we are to determine what a competent person is, whether we are to have another system of examinations and add them to those we have already, or whether it would be possible to have a list.

2627. (*Mr. Greaves.*) I was under the impression we were referring to attendants?—No.

2628. (*Mr. Ainsworth.*) Who are the inspectors paid by?—There are the insurance companies; they engage men; but there are other persons doing it on their own account, a sort of private practice.

2629. (*Chairman.*) Who would be paid by the owner?—By the owner of the boilers.

(*Chairman.*) The State does not pay them.

(*Mr. Ainsworth.*) My point was where boilers are insured with an insurance company, as is the case in all large employs, the boiler insurance company send an inspector.

(*Chairman.*) That is included in the insurance. That is a satisfactory system because they would not send a bad man.

(*Mr. Ainsworth.*) No; if they do so they do it at their own risk.

(*Chairman.*) I suggest all the examiners belonging to insurance companies would go on the list as a matter of course, but the inspector should have the power to prevent a farmer becoming his examiner.

(*Mr. Greaves.*) The inspector would be an autocrat, and have the right to put anybody on the list.

(*Chairman.*) He would have power to object, and it would go to the Secretary of State. After all an inspector's action goes to the Secretary of State when it is complained of. When you say "inspector" you mean under the supervision of the Secretary of State.

(*Mr. Greaves.*) But the inspector would have considerable patronage under that system.

(*Chairman.*) No. A person would apply to be registered and the inspector would not refuse unless the applicant was incompetent, and if he did the man could write to the Home Office. That would be the idea of it.

2630. (*Mr. Redmayne.*) Supposing something is wrong with the boiler, by what legal machinery can you get it put right? Supposing a boiler is not sufficiently strong to stand the pressure, what would you do?—Reduce the pressure, or discard the boiler altogether.

2631. By what machinery?—Really I do not know; test it with hydraulic pressure.

2632. I do not mean the mechanical, but by what legal machinery would you put it right?—There is a section in the Act which says they must be kept in an efficient state of repair.

2633. What section of the Act says that?—All machinery and appliances—that is the Factory Act—and boilers too.

2634. Some of the boilers come under the Factory Act and some under the Mines Act?—Yes.

2635. You could get at those under the Factory Act, but how do you get at those under the Mines Act?—I have referred to that already.

2636. You have no machinery?—No.

2637. (*Chairman.*) It is all a confusion, that is what it comes to?—The Factory Act could deal with them if a boiler is found in a bad state; there would be no difficulty in dealing with them.

(*Mr. Redmayne.*) All the Mines Act says is: every steam boiler shall be provided with a proper steam gauge and water gauge, and a proper safety valve; that is all.

2638. (*Chairman.*) Since every quarry is a factory the question is still more complicated. There is great confusion?—I think you will find there is a Special Rule.

2639. You need not press that further?—There is a Special Rule in our district which says all machinery must be kept in an efficient state of repair.

(*Mr. Ainsworth.*) We could get over it by making it compulsory that all boilers should be insured.

(*Chairman.*) I do not know that you could go so far as that.

(*Mr. Ainsworth.*) It is always the case with any works of any extent, they always insure their boilers and get the inspection of the boiler insurance company. If the boiler gets into bad order and explodes, so much the worse for the company.

2640. (*Mr. Redmayne.*) That applies to nearly every colliery in the kingdom. There is one colliery I was director of some years ago, I found there were six of the insured boilers which for years must have been in an absolutely dangerous condition, this was before I was a director. We had them taken out and replaced by new boilers. The inspection was practically null and void?—This is the Special Rule in the Mines Act: The engine and boiler shall always be kept in good working condition, and the whole of the machinery.

2641. That is a Special Rule applicable to your district?—That is all.

2642. (*Chairman.*) I think you have made that point clear to us. We shall have to consider the question of competency afterwards?—I wanted to point out it was a very difficult thing.

2643. (*Mr. Redmayne.*) You are of opinion that the Act in respect of boilers should be strengthened?—Yes.

2644. Apart from the inspectors altogether?—Yes.

2645. (*Chairman.*) I think you have a point also on the signing of the examination, about the signing of the report after examination?—Yes.

2646. There was a case of the chief engineer of a large insurance company sending two reports on the same boiler, one marked confidential, and the other for the inspector to see, the statutory report?—Yes.

2647. Will you tell us about that?—One Saturday morning I called at a small quarry in my district—they had a large boiler (second-hand); I examined the report which had just been received from the chief inspector of the insurance company. It certified the boiler to be in good condition. The following week I was visiting a mine, the owner of which had advertised a boiler for sale. Incidentally the owner mentioned to me that the manager of the small quarry referred to had been there to see the boiler. Knowing that the quarry only had use for one boiler, and that the one they had had only just been examined, my suspicions were aroused. I paid another visit to it. I asked the manager to produce the report on the boiler. He replied, "You saw it last Saturday." I said, "Yes; but have you not two reports on this boiler?" He replied, "Well, I am not going to deceive you—here is the "confidential report—from this you will find that the "boiler is in a very bad state. We had two estimate "for repairing it, one 120*l.* and the other 130*l.*, so "we have decided to buy a new one." This boiler was broken up in a month.

2648. That discloses an absurd state of things, to have one "show" report and another real one?—I found out this particular insurance company had been doing this for some time.

2649. That is a state of things we must consider how to remedy?—That is my object in mentioning it.

2650. You think section 12 of the Metalliferous Mines Act ought to be amended so as to apply the section to all mines irrespective of the number of men employed?—Yes.

2651. Will you give your reasons for that?—Here is an instance of the difficulty. A mine in my district employed 200 men for many years. Some years ago they reduced the number of men to five. They continued working the five for three years and then abandoned the mine. Result: the section was not applicable. We cannot force them to send a plan of it, and the same thing applies with regard to giving notice of the opening of a mine. I mentioned another instance; of course it is upon the same section.

2652. I think we have had evidence of that already, and your views are the same as those expressed by other witnesses?—I should like to mention one thing here, and that is, that a new section should be put into the Act to extend the time for taking proceedings in case we do not get the plan. I have a case now in hand. I saw in the

papers the other day that a company had been wound up. I went to the manager to ask for the plan. He said, "I will send you the plan." I waited for some time and did not get it. I called again, and he said, "We have "not quite finished there; we have some men in the mine "getting up some rails"; but they were not in the employ of the company, they were working for the people that bought the plant and machinery. I do not know whether the mine is an abandoned mine or not.

2653. That puts the difficulty very well. You want this matter cleared up?—Yes. There is another case where a mine became bankrupt and a man bought the plant; I was after them from one place to another, and finally I found the plans at the office of a solicitor in Manchester; but really we had not the right to them and could not enforce it because the time had expired.

2654. And that was wasting your time as an inspector?—Yes.

2655. Quite uselessly. Now, take section 23, subsection 1, of the Act as to adequate ventilation?—I recommend that the standard recommended by the Royal Commission on Coal Mines should be adopted.

2656. You do not think that would cause any difficulty or abandonment of mines if you had this standard of ventilation?—No, not in my district.

2657. Do you think it could be worked without hardship?—Yes; we have a standard now, only it is not defined.

2658. You would like facilities to be given by the Home Department for the chemical examination of air—of specimens sent by inspectors?—Yes, I wish to suggest that too.

2659. Now with regard to explosives. You are of opinion that the explosives provided by the workmen are often unsuitable. Will you tell us about that? You remember instances of that?—Yes. I mention one here: quite recently I prosecuted a corporation and their surveyor for using nitro-glycerine explosives that were frozen. At the trial the surveyor stated that he was not aware that his foreman had any high explosives until after he was served with the summons. I might also mention that when I pointed out to the foreman the explosives were frozen and quite unfit to be used, he told me he had never handled high explosives before he was appointed to that duty five weeks previous to the date of my visit.

2660. He was using an explosive with the character of which he was not familiar?—He did not know anything at all about it. I forget the quantity, but I think it was about 1 lb. kept in an old tin, without a lid on it, in the rock. I said, "Where do you keep this at night?" he said, "I have nowhere but the "smithy, and it is too dangerous to take it there, so I "leave it here."

2661. You are of opinion it is safer to have the explosives supplied by the employer?—Yes. They are to a certain extent under the control of the owners; otherwise they do not know what they are using.

2662. Unless the owner supplies the explosive it is practically impossible to hold him responsible for the explosive used?—That is my opinion.

2663. You are in favour of the standardisation of cartridges?—Yes.

2664. I do not think the chief inspector and I have heard that suggested before. There seems to be something to be said for that?—Really it is not my suggestion, it is Captain Desborough's suggestion, and I quite agree with it. There is a tremendous number of accidents through the men trying to push cartridges into holes of insufficient size.

2665. There are no less than seven sizes very close to one another?—Yes.

2666. It would be a great point to have a simple standard determined?—Yes.

2667. That is a point the Home Office could deal with under their present powers under the Explosives Act?—I do not know.

2668. (*Mr. Lewney.*) Supposing you are boring different gauges; what would you do then?—That is my suggestion, that they should adopt the same gauges all over the country. In slate mines it cannot be done.

2669. That would be a difficult matter. Supposing you wanted to put down a deep hole?—The hole would be larger at the top than at the bottom.

2670. You could not carry that on starting with 1¼-inch gauge?—No. The difficulty is this: You have a 2-inch hole and they put ¼ cartridges, two together, and push them.

2671. That is where the trouble comes in?—I do not say the cartridge ought to exactly fit the hole, but really very much nearer than that case I have just mentioned.

2672. Would it not answer the purpose if the employer was compelled to provide a certain gauge of cartridge for the gauge of drills used on the place?—Yes, that is exactly what I suggest.

2673. (*Chairman.*) You go further, you suggest that the drills should be standardised, not necessarily that everybody should use the same diameter but definite sizes should be used if possible, 1, 2, and 3, or something of that kind?—That is my suggestion, and I think it can be carried out.

2674. Like the standardisation of screws, for instance?—Yes.

2675. Everybody knows what a Whitworth screw is; if you give a ¼-inch screw they know the thread at once?—Yes. It is a little different with the deep holes: they will be 2 inches in diameter upon the top and considerably smaller at the bottom; the same cartridges would do, because I do not want the cartridge to fit like a cork.

2676. By having cartridges of different sizes a man will sometimes be deceived, having made his hole too small for the cartridge and ram the cartridge in too tight?—Yes.

2677. (*Mr. Greaves.*) Would you advocate the same size hole in all materials for all purposes?—No.

2678. So that in a quarry or mine where various minerals were being drilled, it would require a considerable number of standard sizes?—Take slate mines; they always use the same gauge for the hand drill.

(*Mr. Redmayne.*) Take the cartridges in use throughout the kingdom, the variation in diameter is very small, but enough to necessitate undue pressure being used in inserting some cartridges into some holes. The point Mr Greaves raises is met by the fact that the variation that exists is extremely small.

2679. (*Mr. Greaves.*) I think the witness will agree with me the variation of holes is very large?—Yes, so far as slate is concerned; but this particular thing I recommend would not apply to slate, because they use loose powder, and must use loose powder with slate.

2680. Would you apply that to slate quarries or mines?—I would apply it whenever they use nitro-glycerine. It is with the nitro-glycerine that we get the accidents through pushing in.

2681. Would you advocate the use of one size hole for high explosives?—You cannot do that. If you have an absolutely pure slate bed the quarry man would make his hole as small as possible.

2682. (*Mr. Redmayne.*) If you had a standardised nitro-glycerine cartridge, it would follow that the drills would never be made too small for that standard. They might be bigger, but never smaller?—That is so.

2683. That is the point.

2684. (*Mr. Greaves.*) I understand. I think the witness will agree that in some cases it may be desirable to use a small hole?—Absolutely necessary, particularly in slate.

(*Chairman.*) Your view of the whole thing is that before they took to 11 and 16, which are the standard bores, they had every sort, and people were trying to get an 11 cartridge into a number 10. They would just go, but they jammed, and you got all sorts of difficulties until the makers agreed to have some standard bores. That is the point.

2685. (*Mr. Greaves.*) The point I wish to get at is, do you recommend one standard size or a number of standard sizes?—They can have standards. It is absolutely necessary in the case mentioned with the large bits. There are hand drills. Those beds are necessarily small.

2686. You would recommend a number of standard sizes?—Yes.

2687. (*Mr. Lewney.*) Your idea is to prevent men tying two cartridges together to put into a hole?—Yes.

2688. Which is too large for one cartridge?—Yes.

(*Mr. Lovett.*) I like the idea of the standardisation of cartridges, but if you are not careful you will try to simplify a complex state of affairs and get into greater complexity.

(*Chairman.*) Sometimes that is so.

(*Mr. Lovett.*) You will find on investigation that the drills in the largest stone quarries do not vary very much; the blacksmiths easily get ¼ of an inch out in sharpening the drills. They sharpen them to a gauge, but they are not very careful. As the cartridges do not vary very much, you would have to be extremely careful as to what pressure you put upon quarry owners.

(*Chairman.*) Still you could have the number marked on the cartridge, so that you would know what you were doing.

(*Mr. Lovett.*) Some of the holes supposed to be the same size vary.

(*Chairman.*) You must take a cartridge well within the size.

(*Mr. Lovett.*) As long as you allow plenty of latitude the idea could be carried out.

(*Chairman.*) You would have to have numbers, and as many numbers as necessary would be found by the Home Office.

(*Mr. Greaves.*) Are not cartridges already sold in that way, by the diameter?

(*Chairman.*) No; anybody takes any size they like. You may get them from one company ¼ of an inch bigger than the last, the same kind of cartridge, but one company will supply a little bigger than the other. When they come to be used, they probably will not fit the drill holes.

2689. (*Mr. Greaves.*) In your district they order a certain diameter, 1 inch?—I am afraid they do not.

2690. (*Chairman.*) They are ordered as "cartridges"?—Speaking generally, of course.

(*Mr. Lovett.*) It is about ¾ of an inch?

(*Mr. Greaves.*) Yes. That is what are generally used.

2691. (*Chairman.*) The witness wants standards, like gun cartridges?—The workmen try to put two into a hole drilled by a machine.

2692. (*Dr. Haldane.*) Side by side?—Yes.

2693. It must be a big drill?—I have known accidents occur through pushing small cartridges that have not filled the hole, and they are pressed to fill the hole, and explosions have followed.

2694. (*Chairman.*) What is the cause of the explosion?—Using undue violence to the nitro-glycerine. I have seen cases where the cartridge would be outside plastic, but if you look with a glass in the middle you will find some ice there.

2695. (*Mr. Redmayne.*) Not plastic throughout?—No.

2696. (*Mr. Lewney.*) Do you mean to say that only arises when the cartridge is frozen?—No.

2697. (*Chairman.*) Standardisation will not prevent the abuse of cartridges?—No, I was not suggesting it would.

2698. Still, it might minimise it at all events?—Yes

2699. (*Mr. Lewney.*) Do you not think if you had a standard of 2 inches, the probability is that somebody might try to get a 2-inch cartridge into a 1¾-inch hole?—That is what we say all along.

2700. Supposing you have a standard, you say the probability is that someone would try to get a 2-inch cartridge into a 1¾-inch hole. There is nothing to prevent people making blunders if you standardise?—No.

(*Chairman.*) It renders inspection and supervision easier where you have the cartridges numbered.

(*Mr. Lewney.*) I am not so sure of that.

(*Chairman.*) I should have thought it would.

(*Dr. Haldane.*) Does it prevent accidents, is the main thing we have to consider.

(*Mr. Redmayne.*) Supposing they had been using a ¾-inch cartridge and a 1-inch drill, and the manager changes the order and gets a German cartridge 1 inch in diameter, and the men ram the 1-inch cartridges into holes of barely sufficient size, that is the trouble. Standardisation would meet that point, but not putting two cartridges together and ramming them in.

(*Chairman.*) You would know what you got. Whether you misused it afterwards is another matter.

2701. (*Mr. Lewney.*) There was an explosive some years ago which was extremely hard. It frequently occurred that when you put that into a hole it was too large for the hole?—I have seen it. But you could not put it in if it were very hard.

(*Mr. Lewney.*) You had to break it to pieces.

2702. (*Chairman.*) Accidents occur owing to the non-using of warming-pans?—Yes.

2703. What is the present rule?—It says when explosives require to be thawed, safe and proper warming-pans shall be provided by the owner for the purpose.

2704. (*Mr. Redmayne.*) Provided, but not necessarily used?—In a good many cases they are not even provided. In the small quarries I often see high explosives and I ask, "Where is the warming-pan?" They say, "Well, we have not got one," and they say they do not use the high explosives. The offence is to use them. We can hardly ever catch them using them.

2705. (*Chairman.*) It is all connected with the men supplying their own explosive?—Yes.

2706. If they do bring in an explosive that requires a warming pan, there is not one for them?—Yes. I find it common in sandstone quarries in Cheshire. The owners do not like high explosives, but the men get them somehow or other.

2707. If the explosive was provided by the employer all that would cease?—Yes.

2708. It would not be necessary to have warming pans where the explosive did not require it?—No.

2709. Then with regard to ramming shots, you would make it an offence for any person to have in his possession an iron or steel stemmer?—Yes. I often see iron stemmers in the small quarries.

2710. (*Mr. Lewney.*) Do they use them in putting in the high explosive?—I do not know, they never use them when the inspector is about.

2711. They would be using powder there?—Yes.

2712. It is necessary to have them?—An iron stemmer?

2713. Yes?—Do you think an iron rammer necessary? I do not think so with powder nor with high explosive.

2714. (*Mr. Redmayne.*) You would use some alloy of copper as a rammer?—Yes.

2715. As in a coal mine?—Yes.

2716. (*Mr. Lewney.*) As a rule, do not they use copper for the first 2 or 3 inches of stemming and iron afterwards?—You will not see an iron rammer in any of the big quarries, but in the small ones you often see it.

2717. (*Chairman.*) Why is it necessary to use an iron rammer?—They think it necessary to ram gunpowder very hard, and copper will bend; it is not hard enough. I have seen men using the thin end of crowbars to do it.

(*Mr. Redmayne.*) Seeing no iron rammer is allowed in coal mines, I should not have thought it necessary to use an iron rammer in slate mines.

(*Mr. Greaves.*) Do they use gunpowder in collieries?

(*Mr. Redmayne.*) Yes.

(*Witness.*) They do not use iron rammers in coal mines.

(*Mr. Redmayne.*) No, it is prohibited by law.

2718. (*Chairman.*) Have you known accidents through the use of iron rammers in your district?—Any number.

2719. The truth is, it is better not to have an iron rammer about, and then people are not likely to use it?—Yes. I had difficulty with a quarry manager in Montgomeryshire on this point. When these Special Rules were established I pointed out there were several iron rammers about, and he said, "But we do not use them": he simply provided one or two between 30 men. I knew perfectly well that one or two rammers would

not be sufficient. At last—this is what I am coming to—they had an accident there through using an iron rammer, and we were able to bring him to book, but it had been going on a long time. I frequently saw these things but I could not do anything, because the "using" of it is the offence.

2720. It ought not to be there?—No.

2721. (*Mr. Lovett.*) What about wooden rammers? Some inspectors will allow them and some will not?—I have never heard of anybody objecting to wooden rammers.

2722. I have heard of some cases. In some quarries they scarcely use anything else?—That is so with high explosives. In some stone quarries they never use anything but wooden rammers. But they are not prohibited by law. It says a wooden rammer shall be used for pushing the explosive in: that is what the rule says.

2723. (*Chairman.*) The word "only" means no other than a wooden rammer shall be used?—To put them in the hole. It is necessary to get it down to the bottom, and they are not prevented from using them.

(*Mr. Lovett.*) They ram with them in many cases when the inspector is not about.

2724. (*Chairman.*) As to shot firers, a suggestion has been made that shot firers should be appointed in every mine in the same way as they are in collieries. That appears not to be practicable in metal mines and quarries?—I do not think it is.

2725. What rule would you suggest as meeting the case in quarries and metal mines?—I would suggest this. The owner or agent shall appoint a sufficient number of competent persons to fire shots, and no person unless authorised in writing by the owner or agent shall be allowed to fire any shots. Such authority shall not be given unless the owner or agent has satisfied himself after due inquiry that such person is competent.

2726. In the big quarries that is generally done?—Yes.

2727. Care is exercised. In the small quarries is there carelessness in that respect?—There is a considerable difficulty in small quarries about incompetent persons firing shots.

2728. (*Mr. Jones.*) What do you mean by "incompetent"?—"Inexperienced." There is the case I mentioned in my own proof of a man using gelignite. He had never used it in his life before. He should know something about the danger of using it when it is frozen, and how to thaw it, and that sort of thing.

2729. (*Mr. Greaves.*) Every man must at some time or other use a high explosive when he has never used it before. He must have a beginning?—Of course, but he must know something about it, that is my point.

(*Chairman.*) The witness means the man should have been duly instructed. That was a man who did not know it was necessary to thaw it.

2730. (*Mr. Jones.*) I am thinking of our slate quarries. The man that fires the shot has gained some experience from association with other men. Your suggestion does not apply to a slate quarry?—I meant it to apply to all; it may be badly worded. In Festiniog I do not think there is the remotest chance of an incompetent person getting charge of explosives.

2731. In Carnarvonshire it is the same?—I am not acquainted with that.

2732. That would apply to all large quarries undoubtedly?—I think it does.

(*Mr. Lovett.*) I agree it should apply to the smaller ones too. This is very practicable and would be advantageous.

(*Chairman.*) Is the rule suggested here?

2733. (*Mr. Lovett.*) Yes?—If you will allow me, I should like to suggest in the case of a misfire that the man should be made to report it immediately to the owner or agent, and that a record of it should be kept in a book. I think it would be a very good opportunity for inquiry. There are several cases of misfire through using a weak detonator, for instance, and explosives not properly thawed, and with gunpowder a bad fuse. It would give the agent an opportunity of going into the thing.

(*Mr. Redmayne.*) If he had to report it immediately, and the agent was 3 miles off, how would he do it?

2734. (*Chairman.*) Report it to somebody who enters it in a book?—I could mention a case. My colleague happened to be on his holidays, and he asked me to see about two shot accidents in his district. I had one myself at Halkyn, it was a premature explosion. I tested the fuse and found that it was thoroughly bad. Then I went on to the Oakeley Quarries at Festiniog.

2735. Were these Bickford fuses?—No; I am afraid I had better not mention the name of the firm. There was the same kind of accident at Festiniog. The man had 2 feet of fuse outside the hole, and before he was a yard away it went off. I asked the manager where he got the fuse. He told me, and we went and tested them. It was exactly the same fuse and from the same firm as the Halkyn accident. The next day I was in Carnarvonshire, and in that case it came from the same firm.

2736. Your rule would be a deterrent to the makers of bad fuses?—Yes. In this particular case one coil would take much longer than the other. It was a bad fuse altogether. It was a new firm, as a matter of fact, at the time.

2737. Had that fuse been tested by our department?—I should not think so.

2738. (*Mr. Lovett.*) Undoubtedly it would lead to stricter supervision on the part of the manager if they had to make a record of misfires?—Yes, that is what I mean. The cause of the misfire might be carelessness on the part of the man, or it might have been a bad fuse or a weak detonator, or anything.

(*Chairman.*) By making it the duty of the people engaged to report it, it gives the management a fair chance of knowing how the fuses are acting.

2739. (*Mr. Jones.*) He would not report his own carelessness?—It would give the management an opportunity to go into the thing.

2740. (*Chairman.*) Would it be possible to use electric fuses entirely?—I do not think so; I do not know.

2741. You are aware that has been recommended for coal mines, electric firing and nothing else?—I should not like to answer that off-hand without thinking.

2742. (*Mr. Greaves.*) Have you any reason to think electric firing is safer in the sense of being less liable to missfire than a fuse?—I should certainly say it would be safer, especially when you get to firing the same hole three or four times, what they call the springing, putting a small quantity on the bottom.

2743. (*Mr. Lewney.*) In quarries?—Slate mines in particular.

2744. (*Mr. Greaves.*) Misfires you will agree have occurred with electric fuses?—There have been misfires with electric fuses undoubtedly.

2745. Do you recommend that electric fuses should be used?—No, I do not.

2746. (*Mr. Redmayne.*) Where electric fuses are not used but ordinary fuzes, in the case of a missfire what lapse of time should take place before they enter the place and approach the shot?—Our rule says not less than half an hour.

2747. I know the rule says that, but is that your opinion?—Do you mean is sufficient.

2748. Yes?—There have been cases of accidents after they have waited longer than that, especially when you have a big hole 20 feet deep. We only put a very small quantity at the bottom at first; the fuse would naturally be long, and a crack is made and the whole thing remains for some time hanging fire.

2749. Half an hour would not be sufficient in such a case?—Generally speaking it would, although I must say there have been accidents after waiting more than half an hour.

2750. That is in quarries?—Yes.

2751. (*Mr. Lewney.*) Would it not be as well to insist on water being poured into the hole?—Yes, but

if they are using powder they object to that, because the powder would get wet.

2752. Without the hole being wiped out after?—It is not an uncommon practice to throw a handful of powder down.

2753. You are bound to use water, and they wipe it out before putting the powder in?

2754. (*Mr. Lovett.*) That would be impracticable. You spring a hole 20 feet deep; you might have to spring it 10 or a dozen times?—Yes.

2755. I have known more than that. The idea of springing is to crack the rock all about. It depends on what you want that hole to do. You cannot pour water down and mop up the cracks, because they extend the length of this room, perhaps?—No.

2756. The idea of water would be impracticable in those cases, and that is where the danger comes in the springing of the hole. I have not known an accident to happen since the half-hour rule applied, but before that I have seen men blown to pieces. I have had experience in the larger quarries, and I have not known an accident. I do not say there has not been one?—There have been a few, but I admit they are few and far between.

2757. (*Mr. Redmayne.*) One may almost take it half an hour is sufficient?—Yes. I should not make it more than half an hour. The workman would have to exercise his own discretion.

(*Mr. Lovett.*) The question is whether some precautionary measures might be taken. The time, I think, is sufficient, but you might get to one hour and that might not be sufficient in some cases.

2758. Are there precautionary measures by which you could increase the measures of safety? We cannot use water?—I do not think it would be practicable to use water.

2759. That is out of the question altogether?—That is a thing that is often done, but I have known a fatal accident through a man doing it, and that is throwing a handful of powder down.

(*Chairman.*) With carbonic acid you can put out ordinary fire, but not gunpowder.

(*Mr. Lovett.*) The danger is with the fuse.

(*Chairman.*) There is no way of putting out a fuse, as far as is known. You cannot use carbonic acid.

(*Mr. Lovett.*) You are dealing indirectly with this matter, when discussing the question of who shall have power to use explosives. It depends almost altogether on the commonsense of the individual. One would put half a can of powder down at once, and another would gradually feel his way to safety point.

2760. (*Chairman.*) As to detaching hooks in winding shafts, you are in favour of them?—Yes.

2761. Have you known where they have acted well?—Yes. There was one quite recently in Flintshire.

2762. (*Mr. Greaves.*) You are referring to vertical shafts alone.

2763. (*Chairman.*) Do you know about cage-arresting devices?—I have read a great deal about them, but I have not seen any.

2764. You would like the cages in the shaft to be made more secure?—Yes.

2765. What do you propose?—This is the thing. (*Producing picture.*) It is in Dr. Foster's annual report. That is the sort of cage they have there. Without that coupling chain, it was simply hooked on to the winding rope before. That is a drawing of it after the accident.

2766. Here it is attached by the bar. What was the source of danger there?—The bar broke. (*Witness explained to the Chairman.*)

2767. At all events, you mean there should be both a bar and also coupling chains?—Yes.

2768. (*Mr. Redmayne.*) That drawing does not seem to represent a cage?—It is a peculiar cage, four bars and a sheet at the bottom of it. There are plenty of them in use.

2769. (*Chairman.*) To make that safe there ought to be something surrounding the men?—The cage, so far as that thing at the bottom is concerned, is perfectly safe, but it was only hooked on by that iron bar, and in the winter months it is dangerous to use a thing like that.

2770. A cage like that might be safe enough if properly constructed?—Yes.

2771. Its small size would not be against it?—No. I think four can ride in that.

(*Mr. Redmayne.*) There is nothing to prevent them tumbling out.

2772. (*Chairman.*) Do you not agree it would be better to secure that cage by having something round it to prevent the men being jerked out?—Of course it would be safer, I have no doubt, but I have not known of an accident there.

2773. Have you known any accidents from cages like that?—No.

2774. Men being jerked out from want of some protection?—No, and it is a mine over 400 yards deep.

2775. At present we have heard the owners of metalliferous mines and quarries are under no legal obligation to appoint a manager. You are of opinion that where more than 30 persons are employed it ought to be compulsory for a certificated manager to be employed?—Yes.

2776. In all mines would it be as well to have a head man to whom the inspector could look as the head of the mine, however small?—Yes.

2777. Even though he might not be certified, there should be some responsible person?—I would make the certificated manager the responsible person for the safe working of the mine.

2778. I am speaking of small mines that employ less than 30 persons. Would you still have somebody to be responsible for the carrying out of the Act?—Yes.

2779. At present there is nobody responsible?—No, except the owner.

2780. (*Mr. Lovett.*) How would you deal with a quarry where the owner allows a man to work on commission, and pays the owner of the quarry so much a ton? I am not thinking of royalty rights?—I should say the owner would be legally the occupier of the quarry.

2781. (*Mr. Redmayne.*) Supposing a county council is working a quarry through a contractor, who is responsible?—I do not see any difference between the contract made by a county council and a contract made by owners. For instance, it is all done by contract in the slate mines, practically speaking. All the chambers are let on contract.

2782. (*Mr. Jones.*) Take the case of a small slate quarry, and a number of men offer to take the quarry, the owner to get 10 per cent. commission on the sale of the slates from them and pay them. Who is responsible?—The Act says the person who merely receives rents and royalties shall not be deemed to be the owner. That is the definition of the term "owner" in the Act.

2783. The 10 per cent. is a commission to the man for selling the slates, although he is the owner of the quarry?—The owner of the quarry getting slates there, and selling them?

2784. The men working a quarry, and working it according to their own system; the owner does not interfere, but sells the slates and gets 10 per cent. commission for selling the slates?—And nothing from the quarry.

2785. No?—Of course it is a legal question, but I should be inclined to think the men working it.

2786. (*Chairman.*) Then as to cranes, you think they ought to be marked as to their lifting capacity?—Yes.

2787. That is done in docks at present. There was a recommendation to that effect by one committee; at all events, it is a good thing to have?—Yes.

2788. The chains on cranes ought to be periodically annealed?—Yes.

2789. That is the same as in docks?—Yes. I have often come across a crane in small quarries and asked the manager, "What is the lifting capacity of this crane?" He says, "Well, I do not know." That is always the answer.

2790. As to intoxicating liquors being taken into mines, that you disapprove of?—Yes.

2791. How is that dealt with in coal mines at present? The men take down what they like?—I do not know much about coal mines.

2792. You would have it for all mines the same as coal mines?—I think so.

2793. (*Mr. Greaves.*) Underground?—Yes, and in the quarries, too.

2794. On to the premises?—I think so.

2795. (*Chairman.*) Are you a temperance man yourself?—Yes, I am; but it is not for that reason I was recommending it. I remember on one occasion going to the engine house of a small quarry on a very wet day. There were the foreman and the engine driver both absolutely drunk, and steam on the boiler; and not so long ago I saw a man with a big can of beer in his explosives box, and he was working on the face of the rock, one day after pay day.

2796. (*Mr. Lewney.*) Do you not think the employers should have taken some action in a case of that description?—I do not see how they could.

2797. They could send the man about his business?—It is a loss to the employer, very often. It would help the employers and everybody concerned to have power to stop it.

2798. (*Mr. Lovett.*) They can take bottles in. To make it illegal is the point?—Yes.

2799. (*Mr. Lewney.*) They sometimes keep a drop of brandy in the office in case of accident. You would allow them to keep a certain quantity?—Certainly. That is a different thing altogether. I am speaking of the workmen.

2800. I agree that men ought to be prohibited from taking it underground, but still I think that is a matter that rests with the management?—I would give the manager the power to deal with the men.

2801. (*Mr. Redmayne.*) Supposing you adopted the phraseology of the Coal Mines Act, that no intoxicant be allowed below ground except with the permission of the manager, that would meet the point?—Yes.

2802. (*Chairman.*) A small quantity of brandy is necessary with the ambulance?—Yes.

(*Mr. Jones.*) If a man prefers beer to tea with his food, why should he not have it? I should rather leave it to the manager that too much should not be taken.

(*Mr. Lewney.*) It is dangerous underground.

2803. (*Mr. Lovett.*) If a man is allowed to take intoxicants on the work during working hours—I mean by "taking it" to drink it—it would endanger the lives of other men?—Yes.

(*Mr. Lovett.*) I have had some experience, and I have seen a good bit. I think we have an important suggestion here, at any rate.

2804. (*Chairman.*) If coal mines can be worked without liquor being taken below, one does not see why metal mines and quarries cannot be. Then, as to offences against the Act and regulations, what is your point?—It is the same section in the Factory Act and the Coal Mines Act with regard to the disqualification of disinterested persons.

2805. As regards Special Rules and Regulations, you would like a simplification of the whole code?—Yes.

2806. That was gone into at considerable length in the Coal Mines Inquiry, and amendments were suggested for simplifying the procedure for general rule-making, and that is what you desire?—Yes.

2807. (*Mr. Greaves.*) You are of opinion that slate mines and quarries would be more conveniently grouped together under one Act?—I think so.

2808. (*Mr. Jones.*) I understand you are a practical slate quarry man?—Yes.

2809. I should like to ask a few questions about slate quarries especially. You accompanied Sir Henry Hall in the inquiry made into the number of accidents at Dinorwic; you took part in that inquiry a few weeks ago?—That is not altogether correct. I know a statement appeared in the paper that Sir Henry Hall and myself were there making inquiries. As a matter of fact, I was acting as interpreter, when necessary, to Sir Henry Hall. He was ordered to make a special report himself, an independent report, but I took no part in it; I have not seen a word of the report. I know nothing about the report, but still I was there, as you say.

2810. You were there, and you are a practical quarry man. Have you any suggestions to offer for the better method of working some of these slate quarries?—I have really nothing to do with the Carnarvonshire quarries. I have been there on special occasions, but I have not been inspecting the Carnarvonshire quarries at all. I do not mean to suggest I do not know anything about them: as a matter of fact, I have been there a good many times.

(*Chairman.*) Is there any particular point you would like to suggest?

(*Mr. Jones.*) I want to ask if he has any explanation to give for the various accidents.

2811. (*Chairman.*) The question is this: There has been a large number of accidents in slate quarries, and some of the witnesses have suggested that the accidents were very small in character, and that that accounted for the number. Have you any suggestion to make as to the reason of there being a large number?—I must say here I did not go into those particular accidents, but I should certainly say this: I was very much surprised to find they had more accidents at Dinorwic and Penrhyn. I should have expected those two quarries to be the safest in Carnarvonshire.

2812. Looking at the way they are worked?—Yes.

2813. (*Mr. Jones.*) Can you give any explanation for that, or suggest any improvement in carrying out the quarry, or find any fault with anyone?—Any suggestions to make these particular quarries safer?

2814. Yes?—It is a question one ought to go into thoroughly: as I said before, I am not an inspector of the district. If I had been I have no doubt I would have been thinking about it, but to express an opinion off-hand like this I hardly like to do, unless you ask me about any particular thing. I have already told you, in my opinion, looking at the quarries, I would have expected them to be the safest quarries in Carnarvonshire, certainly more safe than the Nantlle quarries.

2815. Even after you had been there to have a look at them?—Yes.

2816. (*Mr. Lovett.*) The accidents to the eye are very numerous?—Yes.

2817. What is your opinion about wearing goggles?—I have no experience of these goggles. There are only one or two small stone quarries in my district—I mean granite quarries.

2818. I raise this point because I am convinced that if some kind of goggles suitable could be devised you would prevent probably 95 per cent. of the accidents to the eye. That would lower the percentage of non-fatal accidents very considerably. Accidents to the eye at any rate are not fully reported. According to the statistics they are very high?—They are reported at the end of the year if they have been on the compensation list.

2819. They do not go on, all of them. Some reflection was cast the other week on the men staying on the club since the Compensation Act was passed. On the other hand, many of the men stay at work?—Yes.

2820. After having had accidents to the eye, when they ought really to be at home?—Yes.

2821. Those are never reported?—I agree with you there. You often find men, who ought to be at home, trying to work.

2822. These accidents are preventible if we could get goggles that would not injure the sight of the men?—Yes.

2823. If something could be devised you would lessen the accidents to the eye by 95 per cent., and almost do away with the loss of the eye both in the granite and slate quarries. Have you ever formed any idea as to what sort of goggles could be used?—No. As I told you before, I have only one or two small granite quarries in my district, and as far as my recollection goes I do not remember a single accident.

2824. You do not?—They are very small trivial affairs in my district. I do not go to Penmaenmawr.

2825. I am surprised at that, because my experience of the granite quarries is quite the opposite to yours

in that respect?—I have not got any granite quarries in my district, except two or three very small ones.

2826. I used to get men all day long from different parts of the quarry with bits of steel or stone in their eye, and sometimes they have had to go to the infirmary to have the eye taken out. In many minor accidents I have often with the point of a needle got a piece of stone or steel out. Those are never reported, and the men will go on with the eye inflamed and continue work. Although the percentage is very high, you do not get even a quarter of the accidents to the eye reported.

(*Chairman.*) The witness does not seem to know much about this question.

2827. (*Mr. Lovett.*) With regard to cranes, did you refer to standing cranes?—Yes.

2828. I was thinking it would be impossible to test the chains of locomotives, and that is where the greater danger arises as regards accidents to the men. You have mentioned the sandstone quarries in your district: do they work them in ledges?—Some of them.

2829. What is the specified minimum width of a ledge?—There is no specified width.

2830. Do you think there ought to be?—I think so; there should be a limit to it, at any rate.

2831. Could you suggest a minimum?—You mean the width to the gallery.

2832. Width from the gallery?—What is commonly accepted is that they should not be less than half the height.

2833. That applies to a certain district in Scotland. You would make it general?—Certainly, not less than that.

2834. You would apply that to the slate quarries, sandstone quarries, and gritstone quarries?—In the German quarries you would find they are limited to 45 feet in height.

2835. That is so.

2836. (*Mr. Redmayne.*) Would you advocate a limitation of height?—Yes.

2837. As well as a standard of width?—Yes, but I would not put it at 45 feet.

(*Mr. Lovett.*) You could not do that in quarries.

2838. (*Mr. Greaves.*) Would you apply some rule as to the width of gallery in a slate quarry where the sides are vertical and at an angle? Take roughly the difference between the Festiniog and Nantlle beds?—I think there is always a good width at Festiniog, and if the lower gallery comes too near the top one they always have to stop it.

2839. Would you have a rule to that effect?—It could not do any harm.

2840. I was not suggesting that. I was asking if you think such a rule is necessary?—In these open quarries it is necessary, I am bound to say.

2841. Even with the inclined strata?—I have not any of those now.

2842. (*Mr. Lovett.*) Quarries under 20 feet deep do not come under the Quarries Act. Do you agree that all quarries, irrespective of depth, should come under the Act?—It is an extremely difficult question. On the whole I would leave the Act as it is. I understand, after reading the evidence, that there are rather larger quarries in Northumberland or Durham, but I have had no experience of them. We have not them in our district. If a quarry is of any size it is more than 20 feet in depth.

2843. That particular quarry comes under the Quarries Act, because there is a hole at one end of the quarry?—They will be using explosives, I take it.

2844. Yes, tons in a year?—On the whole I would not bring every small quarry under the Act.

2845. (*Mr. Lewney.*) You suggest that slate mines should be put under the Quarries Act?—Yes.

2846. Do you not think that would be somewhat complicated, with slate mines?—I do not, because as a matter of fact there is not very much in the Metalliferous Mines Act applicable to slate mines. They are really governed by the Special Rules.

2847. The question of ventilation would make them distinct from the quarries?—That is so, but you must have those incorporated in the new rules, and the surveying business, keeping plans.

2848. You would have to incorporate in the Quarries Act a good part of the Metalliferous Mines Act?—A very few sections indeed. There is the question of plans and ventilation. I maintain that the regulations are the Special Rules already in force under the Metalliferous Mines Act.

2849. I take it you will find just as great a variety amongst other classes of minerals as you will find comparing the slate to the lead mine. You have a variety of minerals under the Metalliferous Mines Act?—Yes.

2850. And slate would only add one more to the number?—As I said before, it complicates matters very much for statistical purposes, and I do not think it would do any harm to the men.

2851. (*Mr. Redmayne.*) How would it adversely affect the statistics?—If you want to know the production of slate you have to look under the Mines Act and the Quarries Act.

2852. There would be no difficulty in that?—Not to me, but I do not know about the general public. It would simplify matters if you get all the minerals under the same heading.

2853. (*Mr. Lewney.*) There must be a great dissimilarity between mining in mines and mining in open quarries?—Slate mines and quarries are more similar than a limestone mine.

2854. (*Mr. Redmayne.*) Would you say there was just as great a difference between a hematite mine working a mass and hematite mining in the vein, as there was between quarrying slate in an open quarry and quarrying in a mine?—I do not know anything about those mines. It is a very small industry, the slate industry, and occasionally they go from the mines to the quarries, and I think it would be an advantage for them all to be under the same regulations.

2855. (*Mr. Greaves.*) In many quarries, or mines if you like to call them so, they are worked partly as mines and partly as quarries?—Yes.

2856. In that case it might happen a man might be one minute under the Mines Regulations, and the next minute under the Quarries Regulation, if separate?—Yes.

2857. That is your view?—Yes.

2858. (*Mr. Lewney.*) In reference to boiler inspection, were these inspectors about whom you complained practical boiler-makers?—The man that was stopped?

2859. Any of these people who were unsatisfactory. Were any of them practical boiler-makers?—Yes; the man who was stopped and declared to be incompetent by the Board of Trade had never been doing anything else. He had been a boiler-maker, and a foreman in a yard for many years. I have the report of the Board of Trade, if you would like to see it.

2860. One would have thought, if you were going to get a practical man, that was the place you would get him.

2861. (*Dr. Haldane.*) Why did he not know anything of hydraulic testing?—That was the farmer, and I never expressed an opinion about the old man being incompetent. The Board of Trade did that.

2862. (*Mr. Lewney.*) One could hardly expect a farmer to be competent?—I think he was devoting the whole of his time to his engines. He was going about threshing corn, and all that sort of thing, but another time he would go to a stone quarry.

2863. In reference to the stemming of holes where high explosives are used, do you think it would be a good thing to insist upon a minimum amount of stemming being used?—I do not know. I know it is done in the collieries, but for another purpose altogether, to prevent giving off flame. I do not think it would affect us at all.

2864. I will put it in another way. Supposing a hole misfired and you put the stemming on it, do you think the cartridge that you put on to explode has as good a chance to strike through that foot of stemming as if there were only 3 inches on?—I see the point. No.

2865. Have you known accidents arise from that cause?—I cannot call to mind an accident of that kind.

2866. With regard to defective fuses, do we understand that any person can manufacture a fuse and sell it to mine owners and quarry owners indiscriminately without having it certified as being fit?—I do not know anything at all about the Explosives Act. I only mention that case.

2867. I do not know?—Whether they have the power to stop them or not I do not know.

2868. Is there no authority?

2869. (*Chairman.*) He must get a licence as a manufacturer of explosives?—A licence to manufacture—I understand that.

2870. His factory must be certified, but I do not know that there is a test for mere fuses alone. We had a committee on the question of whether there should be a test for fuses; we are of opinion that there ought to be?

2871. (*Mr. Greaves.*) You talk about the standard of ventilation applicable to coal mines being adapted to all mines?—Yes.

2872. Do you think we want as much ventilation where there are no explosive gases?—No.

2873. (*Mr. Redmayne.*) The words are, "There shall be an adequate amount of ventilation"?—It is not defined.

2874. (*Mr. Greaves.*) I thought there was a definition?—No, not in the Mines Act.

2875. That the air should contain not less than 19 per cent. of oxygen or more than 1¼ per cent. of carbon dioxide?—I suggest a definition.

2876. (*Mr. Lewney.*) In regard to detaching hooks, have you never seen catches on the cage, providing against a rope breaking?—I have not seen those. We have only one detaching hook in the lead mines—in those I know, at any rate.

2877. (*Mr. Redmayne.*) Mr. Lewney means safety catches?—I have not seen any.

2878. (*Mr. Lewney.*) To grip the guide in case the rope breaks?—I know what you mean, but I have not seen them.

2879. In regard to single shafts where for a time it may be impossible to have more than one shaft, do you not think it would be an advantage to make it compulsory that such a shaft should be of sufficient size to have a ladder road, a second means of exit?—I should not like to make it compulsory in our metal mines at present to have two shafts.

2880. That is not the question I am suggesting. Where for the time it may be impossible to have two shafts, would you have the single shaft of such a size as to admit of a ladder road independent of the drawing shaft?—Certainly; I do not know of any shaft in our district without it.

2881. I was astonished to find, since we met last, that there are such shafts?—There are not in my district.

2882. You think it ought to be compulsory?—Yes.

(*Dr. Haldane.*) You are clear there are such cases? I am astonished to hear it.

2883. (*Mr. Lewney.*) I am afraid Mr. Atkinson must have misunderstood my question last week. He referred to that section of the Act. The section does not bear the construction I was led to believe it did, and I am afraid there is some misunderstanding about it. The section reads, where one portion of a shaft is used for the descent of persons by ladders or a man-engine, and another portion of the same shaft is used for raising the material got in the mine, the first-named portion shall be cased or otherwise securely fenced off from the last-mentioned portion. It does not say that there shall be a ladder-way independent of the drawing shaft?—Of the winding compartment, you mean?

2884. Do you not think it ought to be compulsory?—Yes, certainly, and I am surprised to hear there are some without them.

2885. (*Mr. Redmayne.*) Do I understand you to mean you would advocate two means of exit in one shaft?—Yes.

2886. Where there is a single shaft?—Yes.

(*Mr. Greaves.*) That is supposing there is no other means.

2887. (*Mr. Redmayne.*) Where there is a single means of exit it should be doubled, so to speak?—Yes.

2888. (*Mr. Lewney.*) I put that to Mr. Atkinson?—There is one shaft I know very well in my district, where they are doing the winding by cage; there is a ladder there, but they never use it.

2889. Supposing there was a breakdown?—It is there in case of accident.

(*Mr. Redmayne.*) The point is, that in case of a breakdown of the winding arrangement, the men can get out.

(*Mr. Lewney.*) That is the point.

2890. (*Mr. Ainsworth.*) With regard to the boilers in your district, are the majority of them insured?—Yes.

2891. When they are so insured are you satisfied with the inspection?—Generally speaking, always.

2892. It is only in cases of small places that they are not?—Yes.

2893. As a rule, at mines the explosives are supplied by the management?—Yes.

2894. You consider that is a good thing?—Yes.

2895. The class of explosive is safer and of a higher character?—Yes.

2896. Have you had cases come before you of cartridges varying in size, and how much have you known them vary?—I cannot answer that question off-hand.

2897. Should you say, as a rule, that the cartridges supplied by any of the principal makers are all about the same size?—I know that they vary very much.

2898. How much?—I should not like to answer that off-hand.

2899. Does the variation arise between cartridges manufactured in this country and cartridges imported from abroad, or is there a variation among the makers in this country?—I cannot answer that question.

(*Mr. Ainsworth.*) Have you known much variation, Mr. Lewney?

(*Mr. Lewney.*) No; 20 years ago there was more variety.

(*Mr. Ainsworth.*) As a rule now they are all the same size?

(*Mr. Lewney.*) They all use the ⅛ of an inch for 1¼ inches gauge.

2900. In regard to the provision of changing-houses for the men, have you any definite view on that?—We have them in the metal mines of North Wales. I am speaking of the lead mines.

2901. The Act provides that where 12 or more men are employed, there shall be means provided for their changing?—Yes, and we have made a Special Rule, too, that they must be kept clean and whitewashed, and that sort of thing.

2902 The Act does not say anything about providing water for the men to wash?—No.

2903. You would agree to include that? It is not very much use a man changing his clothes without also giving him opportunity to wash himself?—Would the men appreciate it if they had it? I fancy they could get plenty of water in most places.

2904. You would agree it would be useless for a man to change into clean clothes without being allowed to wash before so doing?—Quite so.

(*Dr. Haldane.*) Is there such a place provided where there was no water to wash?

2905. (*Mr. Lewney.*) I have been told so?—Water is not provided in the changing-houses in North Wales, I know it is in Cornwall.

2906. Have you known cases where there are three or four pits on the one estate, and the men may have to walk half a mile sometimes to a changing-house?—Take Halkyn, for instance. There is a changing-house at the pit-head. There are some workings over here, and there is a walking shaft. The men, instead of walking down to the cage, prefer to walk up, and then to walk to the changing-houses. That is the only case I know. There is not the slightest necessity to come up this ladder-way.

2907. Do you agree where there are several pits that none of the men should be compelled to walk half a mile?—I think it would be a good thing.

2908. You agree it is a dangerous thing to do?—Does not the Act say they must be provided at convenient places?

2909. Where 12 or more men are employed?—It is section 23, sub-section 16 of the Metalliferous Mines Regulation Act: "If more than twelve persons "are ordinarily employed in the mine below ground, "sufficient accommodation shall be provided above "ground near the principal entrance of the mine."

2910. It is evident that there is some neglect, or the law wants strengthening, but there are cases where the men have to walk half a mile. I suggest it is a dangerous thing to do, coming out of a heated atmosphere, particularly in the winter time?—And especially if they have to climb ladders.

2911. It is dangerous in any case. Can you explain why there should be more accidents in the open quarries in Wales than there are in the slate mines? I see this is a matter which has been brought out very prominently?—Are you talking of slate quarries and slate mines?

2912. Yes?—You are on the same question again. I do not inspect the slate quarries of Carnarvonshire, and I do not inspect the slate mines. I have only two, and those are very small, in my district.

2913. I made a note of that through something I saw in the paper.

(*Chairman.*) It has puzzled everybody; it is a great difficulty.

Mr. David John Williams and Mr. Thomas John Evans called and examined through an Interpreter.

(Mr. O. R. Jones acted as Interpreter.)

2913A. (*Chairman.*) I propose to ask Mr. Williams for his evidence, and Mr. Evans will listen to it, and afterwards he will say whether he agrees with it all, or if he does not agree, then he can point out anything with which he disagrees, or give any extra evidence he has to give.

2914. You are a worker in slate mines?—Yes.

2915. What slate mine have you worked in?—Llechwedd, Festiniog.

2916. You have some remarks to make upon the method of working the chambers in slate mines?—First of all, the method of working a quarry.

2917. You mean a slate mine?—Underground. They are worked in galleries or benches, and then they are prepared and opened out into chambers, one following the other. The chambers are not all of the same width.

2918. Have you any suggestions to make about improvements in the method of working the chambers?—No.

2919. Have you any suggestions to make about the use of explosives?—I believe that the greatest care is being exercised by the managers and the men at the present time, and I have no suggestion to make.

2920. Are the explosive cartridges you have of different sizes?—I do not use any cartridges. I am a rock man. I am not allowed to use high explosives, only black powder.

2921. Is the black powder provided by the employers, or do you buy it?—I buy it from the employers. It is provided by the employers.

2922. Do you think there would be any objection to making a law that all the explosives should always be got from or through the employers, at a fair price, of course?—I am in favour of the explosives being bought through the employers.

2923. At a fair price, of course?—Yes.

2924. You are aware that by the law when the employer provides the explosive and it is paid for by the workmen, the employer cannot make any profit of any kind?—Yes.

2925. Under those conditions you think it would be desirable to have the employer provide the explosive?—Yes.

2926. Can you tell us what is the fuse you use with your gunpowder?—Tape fuse.

2927. Is it a Bickford fuse? That is one of the best?—I do not know.

(*Mr. Greaves.*) It is Bickford's, as a matter of fact.

(*Mr. Lewney.*) In nine cases out of 10 the workmen do not know where they get the fuse.

(*Mr. Greaves.*) If it has a blue line in it, it is all right. I think the witness will agree to that. They know it by the blue line.

2928. (*Chairman.*) What is the state of the paths that lead from the works, I suppose, to the workmen's homes?—I am only answering for the particular mine in which I work. As to the particular mine in which I work, I am bound to say that there are very good paths going through every part of it, but I cannot speak of other slate mines.

2929. Do you mean you would rather not speak of them, or do you not know?—I have never worked in any other mine except the Llechwedd Mine, and I do not know.

2930. You are contented with the state of the paths in your mine?—Yes.

2931. What conveniences have you for eating at your mine?—We have got everything provided by the employer, the eating-houses, fire, and the employer also pays for the cleaning, and we have also plenty of clean water.

2932. Do the men heat the food in the middle of the day?—Only boiling water.

2933. Do they boil up their food?—No.

2934. That is for tea, I suppose?—Yes.

2935. Have you anything to say about Government inspection?—Yes. I do not know how often the inspector visits the mine; so far as I know, only when an accident happens.

2936. Have there been many accidents at your mines?—Not very many.

2937. Are those accidents due to carelessness, or to what cause?—Not to carelessness so much as to being in too much haste or hurry.

2938. Can you give an example of the kind of accident that most often occurs through being too hasty?—I cannot give you any specific instance, but still I know that is how a good many happen.

2939. What accidents are the most common?—Cut hands and feet are the most common accidents.

2940. With the sharp edges of the slate?—Yes.

2941. Those, I suppose, only keep a man a short time away from work?—They are not very long away.

2942. What is the method of letting out the chambers in your mine?—The chambers are let in contracts, two as a rule inside getting rock, and one or two dressing what they get underground—in partnership in the mill outside.

2943. I suppose the manager of the mine has not a certificate?—Yes, he has the highest possible certificate, and that is experience and good judgment.

2944. You would be in favour of always having certificated managers for the big mines?—No, I do not think so, if we can get men of experience and judgment.

2945. You think that would be enough?—Yes.

2946. How would you have them proved or examined?—They have been proved in their work before they were raised to their positions.

2947. (*To Mr. Evans.*) You have heard the answers of Mr. Williams?—Yes.

2948. What is the mine you work in?—The Oakeley Quarries.

2949. You are a quarry worker?—Part of it is under the Mines Act and part under the Factory Act.

2950. You do not know much of the working of slate mines?—I am working at the sheds.

(*Mr. Greaves.*) The Oakeley Quarry is largely a mine.

2951. (*Chairman.*) You have heard Mr. Williams' evidence. Do you agree with what Mr. Williams has said?—Yes, except one point about the eating-places.

He said the Llechwedd Quarries were providing the men with water for cleaning and preparing the food for them. The employers do not pay and prepare that at the Oakeley Quarries. The men have to prepare that themselves, the employers supply them with coal and houses.

2952. After the work, do the men get very hot?—Yes.

2953. They have changing-houses there?—No.

2954. Do a number of men employed get phthisis?—According to the doctor's report, the men underground are more subject to pneumonia, and the mill workers are more subject to phthisis.

2955. What is your opinion of that. How far do you think that is true?—I think that is true.

2956. Have you ever yourself suffered from the dust. Do you feel it?—We feel the dust, but I do not think I have suffered from it.

2957. What is the feeling like, when you, as you say, feel the dust? How would you describe it?—A man gets thirsty.

2958. He gets thirsty sometimes without the dust?—Yes.

2959. Is there a peculiar feeling about the thirst?—No.

2960. They do not spit blood ever?—I do not think so, not so far as I know.

2961. You have not seen any blasting operations—rock drilling?—Yes.

2962. Do they have the water spray there. Do you know what that is? It is to spray the drills?—Yes.

2963. Is that a very fine jet of water?—We only use a tin and pour it in. We pour the water in with the machine and the hand-drills in the same way.

2964. Have you any complaint to make about the eating-houses?—None in my quarries, but I know other quarries are without them in Festiniog.

2965. Eating-houses are provided by some employers but not by others?—Yes.

2966. What about the sanitary state of the mine? Is it foul below ground or not?—I know very little about the underground workings.

2967. Do accidents happen in the part where you are employed?—Yes.

2968. A good many of them?—Not very many.

2969. What are they chiefly?—Cuts on the hands.

2970. Could you wear gloves?—No.

2971. Why not?—We could not handle the tools with gloves.

2972. Hedgers and ditchers who cut the hedges use them. They cut the hedges in Wales, do they not?—Yes.

2973. If a hedger can wear a pair of gloves and handle the shears, why cannot a slate quarrier handle the slate?—I do not think a man can take hold of a hammer and chisel with gloves and handle the tools as well as he can handle shears.

2974. Do you wear any respirator over your mouth?—No.

2975. Is there a great deal of slate dust about when you are dressing the slate?—Yes.

2976. Why do not you wear something over the mouth?—I cannot give you a straight answer to that question. I should like to see the dust put down by water, say, once a day. That would keep much dust down.

2977. It would not be enough merely to lay the dust with water once a day, because you are constantly kicking it up in the slate dressing?—Yes, but that would get a good lot of it down.

2978. The most dangerous is where you are chipping the slate right under your nose. Have you anything to say about the machinery?—Nothing.

2979. (*Mr. Jones to Mr. Williams.*) Have you any suggestions as regards the method of working the chambers? Have you any improvement to suggest?—No. I cannot say I have any improvement to suggest.

2980. You are quite satisfied that the method carried out at Festiniog is the proper method of working a slate mine?—Yes.

2981. We have had a suggestion that certain men should be appointed to do the shot firing in a quarry. Do you think that would be practicable in a slate mine?—No, I should leave it as it is now.

2982. You would leave the rule as it is now?—Yes.

2983. Does the number of accidents justify a change in the existing regulations?—No.

2984. You are satisfied that the regulations now in force are being carried out satisfactorily?—Yes.

2985. As regards the paths to the quarries, you are satisfied with these at the particular quarry, but have you heard complaints at the other quarries as to no proper paths being employed, without naming any quarry at all?—I have not heard a complaint from any special quarry. I know there are splendid paths in the quarry I am working in. I have never been in another one.

2986. You would like to have a rule?—To make them compulsory for every colliery.

2987. In reference to Government inspection, as far as you know, you see the inspectors after an accident only. Have you any suggestion to make as regards that?—I should like them to visit the quarries more often. I think it would be advantageous if the Government inspector were to visit the quarry oftener. At the same time, I wish to say that the greatest care is being taken by the managers and the men at the present time. If there is to be inspection by Government inspectors, I believe they ought to come and do their work and not leave it to the manager of the mine to do it. Suppose, for instance, we were bringing down dangerous stuff with ladders from the roof of a chamber, I believe that the Government inspectors should be practical men and inspect the roofs as well as the manager and the workmen, and if they were to visit more frequently they would have the opportunity of going up these ladders and seeing for themselves the state of the roofs. I see no meaning in Government inspection as it is carried on at the present time, because their visits are always after an accident.

2988. With regard to your suggestions as to inspection, you do not think it fair that the manager or workmen should be blamed for a thing the inspector has not properly inspected himself. That is what you mean by your suggestions that the inspector should inspect the place himself?—I think he ought to inspect the place himself.

2989. Have you ever seen an inspection of the roof of the chamber by an inspector?—No.

2990. (*Mr. Lewney.*) What height, as a rule, are the workings?—40 and 50 yards; 60 yards sometimes.

2991. Straight up?—Yes.

2992. (*Mr. Jones.*) Every working chamber gets examined once or twice a year?—Yes.

2993. By the owner or manager?—Yes.

2994. You made one remark about accidents being due to haste. Why do they hurry over the work? Would you like to give an explanation of that?—There is only one reason for that, they want wages, and you must be pretty quick to make them. By making too great haste, there is no doubt many men meet with these accidents.

2995. The number of accidents at Festiniog is not so very high?—No.

2996. (*To Mr. Evans.*) As regards dressing machines, do you get many accidents to the workmen through the hands going to the machines? I do not want the number, I want your opinion?—Not many.

2997. If you could get a guard that would allow sufficient space for a slate to be put in, would you be in favour of that?—That would be sufficient for your hand as well?

2998. No?—You could not work properly so close as that. The cover would not amount to anything. You are not working above the machines.

2999. If you could get a machine with a proper guard which you could work easily you would be in favour of it?—Yes.

3000. (*Mr. Greaves to Mr. Williams.*) Would you be in favour of the slate open quarries and the slate mines being under one Act, or do you think, as has been suggested, that they should be under separate Acts?—I think they should be under separate Acts.

3001. The mines and the quarries. Very often, I suppose, it must happen that a man may be at one moment underground and the next in the open at his work?—Yes, they used to be like that.

3002. At one minute in that case he would be under one Act of Parliament and the next minute under another?—Yes.

3003. You think that would be a good thing?—No, he cannot change from one Act to another. Most of us do not know what the Acts are.

3004. (*To Mr. Evans.*) Changing-rooms have been mentioned. Do you think changing-rooms are required, or if they were provided, would they be used? Do you think the men would change their clothes before going home if there was a place to do it in?—They do not want to change their clothes to go home, but they have a jacket to pull off and they have no place to keep that. It might get damp by the morning and they have to put it on again.

3005. That would be more in the nature of a cloak-room to keep the jacket?—Yes.

3006. Do you think changing-rooms with baths and basins where a man could keep a complete change of clothes would be any use in the slate mines?—No.

3007. I think you said the men underground were more subject to pneumonia, and the men in the mills more subject to phthisis?—I said that was the doctor's report.

3008. I think in the doctor's report it was also shown that the men working in the slate mines and quarries—quarries we call them—were less subject to phthisis and pneumonia than a similar class of men working outside, that is, masons and carpenters and so on?—I cannot answer that.

(*Mr. Jones.*) I think he is referring to a late report.

3009. (*Mr. Greaves.*) Anyhow, those figures were given at the last inquiry?—It is the Festiniog Urban District Council's report for 1909. That is a local thing altogether.

3010. As a matter of fact, at the last inquiry it was shown the men in quarries suffered less from lung diseases than the men outside, but you do not know that?—I do not know that.

3011. (*To Mr. Williams.*) I gather that the inspection on the part of the Government inspectors should be more frequent than it is?—Yes.

3012. And they should examine places very frequently and say whether they are safe or not?—No, I do not think they can say that.

3013. What is the use of the examination?—If they were practical men they can say it is safe or not.

3014. I mean that?—That is all right; then I do.

3015. That would transfer the responsibility to a great extent from the manager and the workmen to the Government inspector?—No; I should not like it to go that way.

3016. I think that would be the natural result?—The Government inspector could have a consultation with the management and the workmen.

3017. (*Mr. Jones.*) Will you explain what you mean as regards the new vein, because there is a thickness at which a theoretical man would think the place was dangerous and a practical man would work it?—I am against giving the right to the inspector to stop any place. If you had an experienced man to examine the roof who knew the conditions exactly, and the quality of the roof, I would have no objection to that man expressing his opinion, but if a man who is not an experienced man goes up and notices a crack, the chances are he would order the place to be stopped, and that would be entirely due to his inexperience.

3018. (*Mr. Greaves.*) The conditions vary very much in every quarry, do they not?—No, not very much. The nature of the ground is pretty much the same.

3019. (*Mr. Jones.*) Do you think it would be possible to get a man who was thoroughly competent to examine all the quarries of the district and all the working places—any one man?—Do you mean the Government?

3020. Yes?—I believe it is possible.

3021. It would be probably difficult to be sure of getting a man with sufficient practical knowledge for the purpose?—The Government succeeds in getting competent inspectors to other places. Why cannot they find competent men to inspect quarries as well? They should have proper men to examine mines and I am sure they could find a man to inspect a quarry who was bred and born there.

3022. (*Dr. Haldane.*) With regard to the dust from slate, are you clear that there is no excess of illness from consumption among workers in slate quarries, whether in the mines or in the dressing sheds?—Underground there is not so much dust as there is at the mills.

3023. Are all the holes bored in a downward direction?—Yes.

3024. So that they are all kept wet?—Most of them, not all.

3025. Are there any dry holes?—Yes.

3026. Bored in an upward direction?—Yes; they have upward holes in the loose sides.

3027. Are they not dusty?

3028. (*Mr. Lewney.*) That is where it is necessary to square the working as we call it?—In cutting the loose sides as well they would have them.

3029. That will be only a very small number out of the total number of holes?—From the nature of the rock there is so much dampness there, that it allays the dust.

3030. (*Dr. Haldane.*) As a matter of fact, there is very little dust?—Yes.

3031. (*To Mr. Evans.*) There is a good deal of dust in the sheds?—Yes.

3032. You are not aware of any harm coming from that dust?—I am not aware of it.

3033. You are not aware of any serious ill-health caused by the dust?—No; I cannot say it is caused by the dust.

3034. Do you think that the men who work in the sheds are more liable than other men to consumption?—Taking the doctor's suggestion I should say they are. He is more experienced than I in saying that.

3035. Have you known men who seemed to have suffered from the work and become incapacitated through their lungs being affected?—Yes, the slate dressers. That is sure to be so.

3036. You think that the dust does do harm? Some kinds of dust do not seem to do men harm, and some kinds certainly do harm. We want to know where to put the slate dust, whether it is harmful or not, and that is why I am asking you?—I should say that slate dust would be harmful to the lungs.

3037. You suggest as one means of preventing the dust that the floors should be kept damp?—Yes.

3038. You think a good deal of dust is stirred off the floor in walking about and moving about the shed?—Yes, and the wind disturbing it as well, when the place is not closed up.

3039. Do you think that would stop most of the dust in these sheds?—Yes.

3040. (*Mr. Greaves to Mr. Williams.*) You said one cause of the number of accidents was men had to hurry over their work to make wages?—To earn money.

3041. Can you suggest any other means of letting or contracting or paying which would get over the necessity of the men hurrying?—No, I cannot.

Mr. Robert John Roberts and Mr. Morris David Jones called and examined through the Interpreter.

3042. (*Chairman to Mr. Roberts.*) You are an inside worker at the Dinorwic Quarry?—Yes.

3043. How many years have you been working?—I have been working outside seven or eight years, and inside now for 20 years.

3044. You know that there are a great many accidents at the Dinorwic Quarry?—Yes.

3045. A great number of those accidents are small accidents?—Yes.

3046. Cut hands?—Yes.

3047. Do you think that those accidents are inevitable, or that they could be prevented a great deal?—I do not think that they can all be prevented.

3048. Do you think some of them can be prevented?—Yes, you could stop some of them by taking more care, and less haste.

3049. Do you think that it is rather negligent and hasty working that causes them?—There are so many obstructions in the way and we have only got a month to make our wages, and because of these obstructions we lose so much time, and then we are obliged to hurry up in order to make up our wages.

3050. What are these obstructions. Are they ordinary ones in the course of working or some peculiar ones?—Unavoidable obstructions on account of the outward parts being blocked up by rubbish or falls coming down.

3051. (*Mr. Greaves.*) He means obstructions of the tramroads?—The openings from the pits are very narrow, and there are people who throw things down, and the road from the outside is consequently obstructed.

3052. That is what I suggested; you mean obstruction of the roads or tramways?—Of course I admit that those things are unavoidable.

3053. (*Chairman.*) Would it be a good thing to make the width of the floor of the gallery greater?—In some parts we have got plenty of width in the galleries. The reason why those are so narrow is because the old management have neglected them and the present management have got to work them on.

3054. Is it not possible to make the existing ones wider?—No, you must bring those places down or else you will block up the quarry.

3055. You have no other recommendation with regard to Dinorwic except that some of the old floors that are obstructed should be worked clear as much as possible?—No, the present floors are wide enough, but in some parts they are very narrow.

3056. They could be made wider in some parts?—Yes, in time.

3057. It will take time to do that?—Yes.

3058. Have you anything to say about the tramroads?—The tramroads are in pretty good condition, but some of them might be improved on.

3059. Your view is that you want to get rid of the obstructions and get the stuff away?—Yes.

3060. As to explosives, you think they are all very good at present?—Yes.

3061. Does everybody fire shots, or only the specified persons?—Yes, with very few exceptions, every man fires his own shots.

3062. Do they employ young lads?—No, they are all men of experience.

3063. The inspection by the quarry officials is good apparently?—Yes.

3064. Do they inspect every working place every day once in the day?—They come through every day, and sometimes they call our attention to dangerous things, and we call their attention to dangerous things.

3065. You think the owner ought to provide the workmen with a rope at their cost?—I believe it would be advantageous.

3066. How much does a man's rope cost him in the year?—They vary very much. If they get damaged, they will last but a very short time.

3067. About how much do you mean?—10*s.* or 15*s.*

3068. 10*s.* or 15*s.* a rope?—Yes.

3069. How many of those would a man wear out in the year?—A new rope, if taken care of, will last 12 or 18 months.

3070. Do they use chains instead of ropes?—No.

3071. Why do not they use steel chains?—They are dangerous, and hurt them.

3072. You would be in favour of a certificated manager and foreman for a big quarry like that?—Yes.

3073. You think the working manager ought not to be interfered with in his method of working the quarry?—The manager ought to have his own way.

3074. Do you live at Llanberis?—In the parish of Llanrug, three miles from Llanberis.

3075. There are paths up on the surface of the cliffs?—Paths inside the quarry.

3076. Do you mean the paths leading from the quarries to where the men live?—I mean paths in the quarries.

3077. Those paths are not upon the floors; they are up on the sides?—The paths leading up to our work in the quarry.

3078. Leading up from the floors?—Yes.

3079. Who keeps those in repair now?—The management.

3080. That is day work. They have special day workmen for that?—Yes, oftener than otherwise.

3081. Do accidents occur from those paths not being in a good state of repair?—I cannot remember more than one or two in the last 10 years.

3082. I suppose that the reason for keeping the paths in good repair will be to enable the work to be done more quickly?—No, the paths to go to and from our working places. They might have been better for this reason. Suppose a man meets with an accident, it is then difficult to take him down, an injured man. That is one reason I mentioned that the paths should be better—the narrow path coming down.

3083. Otherwise they are good?—Yes.

3084. Have you got eating-houses provided at your quarry?—Yes.

3085. You like those, I suppose?—They are very satisfactory; there is plenty of water close by.

3086. You would like to see those in every quarry?—Yes.

3087. The only point that occurs to me is if the quarry is paying badly and not much money is earned, would it not be a difficulty if eating-houses were insisted on? Might it not lead to the closing of the quarry?—No, because they are very cheap things; they are not expensive.

3088. You think that would not be an unjust burden?—No.

3089. (*Mr. Greaves.*) He is thinking of large quarries such as he is used to, where the building of eating-houses would be a mere bagatelle. In a small place employing 20 men, would it not be a serious thing?—No, I do not think it would be a hardship where there were only 10 men employed. We are paying for the coal ourselves, and the carrying of the water.

3090. (*Chairman.*) Those quarries at Dinorwic are open to the sky. In case of rain you cannot get shelter except in the eating-houses?—Yes, the shelters we use when they are blasting. They can be used to shelter against the rain as well, and those are plastered inside.

3091. How many eating-houses are there in the Dinorwic Quarry?—One in every gallery.

3092. Do the men all go to the eating-houses to eat, or eat in the little sheds where they are working?—There are a good many in Dinorwic living in barracks. They do not go home at night, and they go to the barracks to have their meals.

3093. Do most of them go to the eating-houses to have their meals, or to the barracks, or do some eat their meals in the little sheds where they work?—The majority go to the eating-houses.

3094. There they are able to get warm in case the rain has been falling?—Yes; we are buying the coal and paying for it ourselves.

3095. How long do you have in the middle of the day to go to the eating-houses?—One hour.

3096. What is the method of getting rid of the rubbish now?—We get rid of it ourselves.

3097. You would prefer to have that cleared out by labourers?—Yes.

3098. Are you of opinion that what it comes to is, if you pay for labourers to remove rubbish, that in the long run the wages are adjusted accordingly?—I do not know about that, but the quarry is being worked out, and there is more rubbish than slate there, and possibly a good many of us might be out of work—the quarrymen.

3099. (*Mr. Greaves.*) The quarry is worked out?—Yes, it is not nearly so good as it used to be—there is more rubbish, I mean.

3100. (*Chairman.*) Are you of opinion it is a better method of working to remove the rubbish by separate labourers rather than to leave the men to do it, supposing the wages were adjusted accordingly?—I think it would be an advantage, although I would not get more wages. It would be an advantage to have a labourer to clear the rubbish.

3101. That method might result in a benefit all round?

3102. (*Mr. Redmayne.*) Would it decrease the accidents?—It would have the effect of reducing accidents, because when we have to get the rock and clear the rubbish away, we are in too much of a hurry very often.

3103. (*Chairman.*) What it means is, it would be a better plan of working for everybody to work like the hewers and drawers in the coal mines, where you have a different set of men, some getting and some drawing?—My opinion is that it would be better to have men to get the rock—one class to get the rock and another class to clear the rubbish.

3104. Is the general health of the workmen good at Dinorwic?—No.

3105. Apart from accidents, what do you say?—No, it is not good.

3106. What is the cause?—I think the cause of it is that we get wet very often, and are not allowed to go home after getting wet.

3107. I do not understand that. You do not suggest whenever it rains you should go home at once?—No; after getting wet.

3108. That would end the work of the day?—We cannot get a permit to go home after getting wet, because the man who has the right to give the permit is very often far away from us—an hour's walk.

3109. What is the rule about going home after you get wet?—That we are not to go home without a permit from the overlooker.

3110. Every man does not go home when he gets wet unless he feels ill?—No; without a permit they cannot go home.

3111. That part of the country has a very heavy rainfall. You say workmen suffer in their health often because, after getting wet, they cannot go home. There is a heavy rainfall in North Wales. It probably rains every day. They do not go home always when they get wet?—My opinion is that if a man gets wet to the skin, he ought to be allowed to go home.

3112. Do they, as a rule, all wish to go home when they get wet?—Yes; and if we do go home without a permit, we are stopped.

3113. I quite understand that; but do they not have oilskin coats, or something of that kind?—It is quite impracticable to work in a quarry in an oilskin.

3114. You can put the oilskin on while the rain goes on, and take it off when it becomes fine?—We cannot work in it. Very often we are compelled to work when it is raining—when a shower is on—instead of being allowed to go to the shelter for a time.

3115. Have they to get leave to go to the shelter?—No.

3116. How can they be compelled to go to work?—If we do not go on, we stop other people from working. We would rather get wet.

(*Mr. Greaves.*) He means they are morally compelled.

3117. (*Chairman.*) Would the thing be met if you had something in the sheds to dry your clothes?—We have that. We are compelled to take off the wet clothes and put others on.

3117*a*. What do you mean by compelled?—Only our coats.

3118. You say you are compelled to take them off. Is that by law?—We are obliged to take them off. We have two or three coats in the quarry.

3119. Are these men working at piece work or day work?—Piece work.

3120. If they go home they lose the money?—Yes.

3121. Therefore, in asking permission to go home, they would not get the extra money as if they had stayed?—No.

3122. (*Mr. Redmayne.*) There would not be the necessity to go home if they had efficient means of drying their clothes?—No; there are places for the majority of us, but not for all of us.

3123. (*Mr. Lewney.*) What is the nature of the complaint these quarrymen suffer from as a rule?—Colds.

3124. Do many suffer from rheumatism?—Yes. My opinion is that when a man gets wet to the skin, he ought to be allowed to go home.

3125. (*Chairman.*) There is a point about security for wages and monthly payments. I do not think that is a matter of health. Have you anything to say about it? I will just put the question, but I do not think I can allow any questions to be asked about it?—It would be a great advantage to us to be paid every week.

3126. (*Mr. Ainsworth.*) How often are you paid?—Every month.

3127. (*Mr. Greaves.*) Do you get subs?—No.

3128. (*Chairman.*) You think the top of the galleries ought to be kept clean, with plenty of space between the tramway and the edge of the gallery underneath?—It is a very important matter.

3129. Is it getting better at the Dinorwic Quarries?—Yes.

3130. You told us it was very bad once?—Yes.

3131. Is there a sufficient supply of bandages and ambulance?—It is rather short in that respect.

3132. Have you ever observed any case in which suffering was caused from want of ambulance appliances?—I cannot point to any particular case, but I do know for a fact that they are obliged to take dirty handkerchiefs to bind up their wounds, and I do not think that is a very good thing.

3133. Do the men who have cut their hands with the slates have a bottle of any solution to put on?—Nothing at all. They simply wet a bit of rag in cold water and send them down to the hospital.

3134. (*Mr. Greaves.*) Do you think if there was more ambulance work it would be a good thing—I mean more teaching in ambulance work?—We have some.

3135. Is it much taken up by the men?—Yes, and they get very fair play in the work afterwards, those who are attending the class.

3136. What do you mean by fair play?—These men who have obtained the ambulance certificates are always called to attend to an injured man in the quarry.

3137. How many of those certificated men are there at Dinorwic?—They say scores.

3138. (*Chairman.*) Can you tell me why there are a good many accidents at the slate quarries, and can you suggest any explanation of it?—I think to a great extent the method of letting the working accounts for it, because we have to get the rock and also to clear the rubbish, and as I said before, the obstruction.

3139. Your proposed system of working would diminish accidents?—Yes.

3140. Cannot you work with gloves?—That is quite impracticable.

3141. How is it a coachman can drive with gloves on?—A driver has only the reins in his hand and the whip, but we have to use so many different small tools.

3142. You have only to use a pick and shovel?—We use a pick occasionally just to loosen the dirt.

3143. Why are goggles no good?—I should think they would be quite as impracticable as gloves.

3144. Do their eyes get hurt by the chips of the slate?—Yes, occasionally, but it is not nearly so dangerous to the man actually working as to the man who is somewhere in front of him.

3145. The danger is not so great as to be worth wearing goggles for?—I cannot say whether it is more safe, but I would rather work as I do now.

3146. You are aware that the men who break stones on the road, particularly flint stones, all wear goggles?—Yes.

3147. You think it is not necessary for the slate quarriers?—I do not think that slate is nearly so dangerous as flint or macadam.

3148. (*To Mr. Jones.*) You have heard the evidence given by Mr. Roberts. Do you agree with it?—Yes.

3149. Would you like to add anything else?—I should like to say a word or two about our deepest galleries. The gallery in which I work is 36 yards in height, and the rope which I use cost 18*s.* and in some other galleries from that to 21*s.* I am now going to say a word about blasting. The horn gives the warning for the man to run away. Every man who has got a shot to fire must remain there to fire until the second horn goes off three minutes after the first, and when the second horn goes off all the men fire at the same time. In a deep gallery I am compelled to climb perhaps 20 yards high with a rope after firing a shot, whereas the man who fires shots in the gallery above me fired at the same time, and we all have to retire to the same place.

3150. (*Mr. Lewney.*) What is the distance between the gallery above and your gallery?—36 yards. He might have a hole somewhere between the bottom and the top.

3151. It is a dangerous method of working?

3152. (*Mr. Redmayne.*) So that you may receive part of the charge of the other man's shot?—Yes. That man's shot might go off before I am out of the way.

3153. (*Mr. Greaves.*) Have you a suggestion for that?—Yes, making the galleries smaller.

3154. (*Mr. Ainsworth.*) Smaller?—Lower.

3155. (*Mr. Jones.*) Is there anything else you would like to say?—I should like to say a word about the method of working our quarry, because we work differently from any other quarry with the exception perhaps of Penrhyn quarry.

3156. What is the difference between your method and that of other quarries in North Wales?—I may make the same complaint about the quarrymen or the getter having to get the rock and clear the rubbish.

(*Chairman.*) You agree with what Mr. Roberts has said.

3157. (*Mr. Greaves to Mr. Roberts.*) Do you think that the slate quarries and mines should be under one Act?—I know nothing about the underground slate quarries, except so far as dressing the slates is concerned. I believe they ought to, because both are slate quarries.

3158. (*Mr. Lewney.*) Have you known any accidents occur through a shot in one gallery prematurely exploding, before the men in another gallery had time to get clear away?—I cannot mention a recent one, but I have seen many in days gone by.

3159. Did you ever know the hole in the top gallery go off before the men in the bottom one got to a place of safety?—Many a time.

SEVENTH DAY.

Saturday, 23rd July 1910.

PRESENT:

SIR HENRY HARDINGE SAMUEL CUNYNGHAME, K.C.B. (*Chairman*).

RICHARD AUGUSTINE STUDDERT REDMAYNE, Esq.
JOHN SCOTT HALDANE, Esq., M.D., F.R.S.
JOHN STIRLING AINSWORTH, Esq., M.P.
RICHARD METHUEN GREAVES, Esq.
RICHARD ARTHUR THOMAS, Esq.
ROBERT THOMAS JONES, Esq.
WILLIAM LEWNEY, Esq.
URIAH LOVETT, Esq.

T. E. BETTANY, Esq. } *Joint Secretaries.*
G. W. CHRYSTAL, Esq. }

Mr. MORRIS DAVID JONES recalled and further examined (through an Interpreter).

3160. (*Chairman.*) You wish to make a statement in addition to what you said yesterday?—Yes, a few hints with regard to the depths and the widths of the galleries; the height to be 20 yards, not exceeding 20 yards, and the width to be not less than two-thirds or three-fourths of the height. Of course, it is impossible to carry out all at once this re-arrangement of the galleries. My opinion about the accidents in quarries is that every care is being taken with regard to blasting and ropes. Things are quite satisfactory in the quarries from that point of view. I think the roads and the paths to the works ought to be improved.

3161. (*Mr. Greaves.*) On the premises, not outside?—Yes. Another thing is to have all the quarries under the same Act.

3162. Do you mean mines and quarries?—I mean the underground quarries as well as the open quarries—slate quarries. My reason for that is this: Only one man out of nine in Merionethshire gets injured where they work with artificial light or candle light, whereas one out of three at Dinorwic gets injured in the open, according to the latest statistics. I believe that it would reduce the accidents by having the quarries under the same Act. The last reason is this: the insecurity to the men to earn their wages. Only one accident happened at Dinorwic during the last two years with blasting, as far as I know.

3163. What do you mean by the insecurity of wages? Will you explain that?—For instance, two partners and the day workmen are working. They work for a week without earning a penny, and perhaps they have used 1*l.* worth of explosives. When we do get slates we are overdoing ourselves in trying to make up for the lost time in clearing and protecting rock. We had no accidents at Dinorwic with ropes, except one or two. That is all I have to say.

3164. Mr. Roberts said yesterday he thought the wages ought to be paid weekly. Do you agree with him?—Yes. I feel certain that it would have the effect of reducing the accidents.

3165. In the cases you mentioned you might work for a week without earning anything. In that case weekly pay would not have done you any good?—Yes, because everybody would get paid for every day he works.

3166. Whether he earns anything or not?—Yes; of course, if he had done an honest day's work.

3167. You mean you would practically have day work instead of contract work?—Yes; of course, they could put something on compounding commission.

3168. Practically it would mean being paid by time?—To a certain extent.

3169. If you earn nothing in a week and are paid for the time, it would be entirely for the time?—I am advocating a minimum wage.

3170. Do you mean to say there ought to be a guaranteed minimum wage?—Exactly.

3171. Do you suggest a maximum in case of a place turning out very well?—I would be quite agreeable to that.

3172. So that practically a man would be paid irrespective of his earnings, because he could not go below or above a certain amount?—Quite so.

3173. (*Mr. Jones.*) You mean that the man actually does give work to the employer although he does not produce anything at the time?—Yes.

3174. (*Mr. Ainsworth.*) Would you be satisfied if you got a payment on account in the course of the month?—As a matter of fact they do give an advance. If we go to the employer and ask for an advance we will get 1*l.* each if we have earned it.

3175. (*Mr. Greaves.*) How does the management know whether they have earned it or not?—He visits every day.

3176. Do they count the slates?—Simply make a guess.

3177. They do look at the slates?—Yes. Supposing if I had only earned 1*l.* during that month and had 1*l.* as a sub., they would deduct that although I may have to go home without a penny at the end of that month.

3178. (*Mr. Thomas.*) Those cases very rarely occur, I take it?—Very common, on the increase every month.

3179. (*Mr. Greaves.*) Are the average earnings decreasing?—No, it is just the same. If I am working on day work on the floor he will give me 3*s.* 6*d.*, but if I work on the rock he will give me 4*s.* a day.

3180. By day work?—Yes. If I am worth 4*s.* on the rock I am sure I am worth 4*s.* on the floor.

3181. You think the accidents would be less if you were paid 4*s.* on the floor?—By the day.

3182. Yes, if paid 4*s.* on the floor the accidents would be less?—No, I do not think so.

3183. (*Mr. Jones.*) The men would have no need to hurry, you mean?—I mean if they were paid in the manner I suggested, the men would not be under the necessity to be in such a hurry.

3184. (*Mr. Greaves.*) You work so hard?—Yes. They let contracts, and the terms are so hard that we must produce slates from the beginning of the month till the end before we can earn wages, but when we lose a week to get down bad rock, that only leaves us three weeks to make our month's wages.

Mr. William Richard Williams and Mr. William Morris Jones called and examined (through an Interpreter).

3185. (*Chairman.*) You, Williams, are a worker at the Dorothea Slate Quarry?—Yes.

3186. Where are you working now?—Vronheulog.

3187. You, Jones, work at the Alexandra Slate Quarry?—Yes.

3188. (*To Mr. Williams.*) What are the disadvantages of working the pits in the present way?—The first thing is that we have no tipping ground, the ground is so very expensive.

3189. (*Mr. Greaves.*) Where is this?—I am speaking generally of Nantlle Vale.

3190. (*Chairman.*) Some of the regulations have been useful for safety, I believe?—Exceptionally so.

3191. Can you mention any regulation you think has done a lot of good?—Blasting regulations.

3192. The inspection by the quarry officials is good, is it?—Yes; they have got special men to go round regularly, and they have special ropes belonging to the owners to do the work.

3193. Do those men examine every place where a man works once in the day?—No, they could never do that.

3194. Not even where the men are working? That is the point. By "examining" I do not mean a minute examination of everything, but a general look round?—Yes, every working place they come and have a look at that.

3195. Every day?—Yes.

3196. How often do they regularly examine them?—Once a month, as a rule.

3197. Is that sufficient, in your opinion, for the needs of safety?—We cannot complain about that.

3198. You think there ought to be shelters at all the quarries?—Of the best possible kind.

3199. What is the use of the shelters?—We use them for shelters during blasting, and in a good many of them we have our meals.

3200. They are a shelter from the rain, I suppose?—Yes, and the heat.

3201. Is there a great deal of rain in that part?—I do not think it is quite as wet as Festiniog.

3202. As a rule the ladders are good in your quarry?—Exactly like what the law demands in every part.

3203. Open quarries, you think, ought to be compelled to work in galleries?—As far as that is practicable.

3204. What is the other way of working them?—We are compelled to work them in pits without galleries.

3205. Sometimes?—In the Nantlle Vale that is the rule.

3206. That means they go right down instead of forming stages?—Yes.

3207. (*Mr. Greaves.*) When you say "compelled," you mean compelled by the nature of things?—Yes, according to the nature of things, yet there are some galleries——

3208. The nature of the surroundings, are the words to use?—The nature of the place, and the rubbish—the difficulty of getting tipping ground.

3209. Practically the open quarries are worked in galleries when possible. Is that what you mean?—Yes, so far as they can.

3210. (*Mr. Redmayne.*) What reasons prevent their being worked in galleries? Are they geological conditions, and, if so, what are they?—It is the nature of the ground, not the geological nature of it. It is not a mountain, but a vale. They have to go down after them.

3211. I do not follow at all. You may open out a big opening in the bottom of the valley and still have open work?—You cannot do it now.

(*The Interpreter.*) He means that they have already been opened on this principle and cannot be altered, but I did not think I was entitled to correct his answer.

3212. (*Mr. Greaves.*) In some cases it will be legal difficulties connected with the boundary of properties, and so on?—There is no doubt about it. I can give you one instance, if you like.

3213. (*Chairman.*) You are of opinion that the galleries should be of sufficient width, and there should be room for the tramroads?—Yes.

3214. That, you think, is the most important point?—It is a matter of great importance. I do not say it is of the greatest importance.

3215. Overburden ought to be cleared away, too, carrying out the same idea?—I think it would be of the very greatest advantage, because the overburden weighs on the edges of the gallery, and no doubt causes some very serious accidents occasionally.

3216. (*Mr. Greaves.*) What do you mean by the "overburden"?—They are compelled to tip the rubbish on the edges of the top on account of land being so very scarce, tipping ground.

3217. (*Mr. Jones.*) That is one of the reasons they cannot work in galleries?—Yes.

3218. (*Mr. Greaves.*) I gather there are two kinds of overburden, one rubbish deposited there, and the other bad rock?—I am speaking of the rubbish that has actually been deposited.

3219. How far back do you think that ought to be?—I think that ought to be carried to the seaside.

3220. That is about 10 miles or more?—Yes.

3221. That would be safe?—It would have been safe, and the idea was in the district some years ago of carrying it to that place. We have a committee which has been formed in the Vale with the intention of carrying out that idea.

3222. A committee of whom?—There are owners on it, and people interested in the neighbourhood as well.

3223. You do not suggest that they should be compelled to carry their rubbish to the seaside?—Of course, I do not suggest that they ought to be compelled to carry it 10 miles if they could possibly get ground anywhere else, but I have explained that they cannot get tipping ground. The rubbish question has become a public question, so really it affects the whole of the Vale, and not any particular quarry.

3224. (*Mr. Ainsworth.*) Your idea is that the quarry would be worked more economically and satisfactorily if the rubbish could be removed altogether?—Yes.

3225. (*Mr. Greaves.*) Can you give any idea of the proportion of rubbish to the manufactured slate?—No, it is a very difficult question for me to answer.

3226. Do you agree to it being about 1 in 20?—I am not an authority on that question.

3227. Assuming that was correct, if the rubbish cost 2*s.* a ton to remove, that would mean 2*l.* a ton on the slates?—I cannot answer that. It is outside my scope altogether.

(*Mr. Lovett.*) Are you assuming they will have to take the rubbish 10 miles.

(*Mr. Greaves.*) That is what he said.

(*Mr. Lovett.*) Would it not be possible to get land close by?

(*Mr. Greaves.*) The sea, he said.

(*The Interpreter.*) At the beginning he said the difficulty is that they cannot get tipping ground, and are obliged to deposit on the edges.

(*Mr. Greaves.*) He said it ought to be taken to the sea.

(*The Interpreter.*) That is the only place.

3228. (*Chairman.*) With regard to eating-houses, they are good?—Yes, as a rule, but there are a few that could be made better.

3229. They want clean water there. That is a great want?—We have no clean water. That is a great complaint in the district.

3230. How could the clean water be got?—By acquiring a right to use the water of the urban district council.

3231. They would give them the most enormous rate for that. That is where the difficulty comes in, is it not?—We have tried to get it. The urban district council spent more than 50*l.* to get the water to the quarries, and the difficulty arose from the site of the landowners, the riparian owners of all the land surrounding the watershed.

3232. (*Mr. Jones.*) What would be the rate the council would charge for the water?—I cannot say

3233. Can you give an approximate sum?—Perhaps about 5*l.* a year.

3234. (*Mr. Greaves.*) For each quarry?—Yes.

(*Mr. Jones.*) That is not much.

3235. (*Mr. Greaves.*) I should doubt that?—It would be nothing.

3236. (*Chairman.*) Is better sanitary accommodation also necessary?—I believe that we ought to get them in every place, but we have a few in some quarries inside the pit, but not on the banks.

3237. In sheds and dressing mills you think the floor should be watered once a day to prevent dust?—I think it would be of great advantage to water the place at least once a day.

3238. In summer, if you watered it once it seems to me that would probably only make more dust than before, when it got dry again?—I believe if the sheds were watered after we finished our day's work in the evening, that would go a long way to keep the dust down.

3239. Do you mean watered with a hose, or how?—Yes.

(*Mr. Greaves.*) Do you mean the mills or the dressing sheds?

(*Interpreter.*) By the mills he means the dressing sheds.

3240. (*Mr. Greaves.*) The little sheds where they dress by hand?—We have only a few in Nantlle, and those small places. They are in sheds in big mills like ours.

3241. There are a good many of those small sheds?—No, very few.

3242. (*Mr. Jones.*) You do water their places?—Yes.

3243. (*Mr. Greaves.*) Those small ones would require watering as much or more, being a smaller cubic capacity per man?—No, I do not think so, because they have not the saws in these small places.

3244. Is there any dust from the saws?—In my opinion there is more dust from the saws than from anything else.

3245. The saws turn in water?—Yes, they do revolve in water, but, in spite of that, from the top comes a lot of dust.

3246. (*Mr. Jones.*) Is there a cask dropping water on top?—It revolves in a trough with water in.

3247. (*Mr. Redmayne.*) The water does not drip down on to the block?—No.

3248. (*Mr. Ainsworth.*) Are there opportunities of getting a local supply of water for the works for sanitary purposes, for the changing-houses, and so on?—The water is quite close to us, only the law will not permit them to use it.

3249. (*Mr. Jones.*) The landowners?—It is the landowners that will not allow them to use it.

3250. (*Chairman.*) As to ventilation, some of the sheds are insufficiently ventilated?—Yes. They are pretty fairly ventilated, and yet it would be an improvement if more ventilation could be got.

3251. Is the use of gloves possible?—No.

3252. And are goggles also impracticable?—I think they might be used with advantage when we start drilling holes with a rock drill, that is the power drill.

3253. What do they do when a man gets his hand cut? What is the usual way of dealing with him?—Trying to find sticking plaster as quickly as possible unless it is a very serious wound.

3254. Is that what they all do?—Some men are stout enough not to put anything on them.

3255. The rest put sticking plaster?—As a rule everybody gets sticking plaster.

3256. A diachylon plaster—yellow stuff on linen?—Yes.

3257. Do they not put any special wool on it, or anything?—No.

3258. There are some complaints against Government inspection?—The only complaint I have against Government inspection is that the inspector is always accompanied in his rounds by the quarry officials.

3259. What is the harm of that?—Because the Government inspector is an official for everybody and not for the employers.

3260. If the employer is the person who is liable to make things right, is it not proper for an inspector to take him round and point out what is wrong, and say, "Why is this, and why do you not do it rightly"?—I do not think there is anything wrong really in going round with the quarry official, but there would have been a better chance for the workmen to make their complaints to the inspector when the quarry official is not present.

3261. They know they have a right to send complaints to the inspector?—Yes.

3262. Workmen's representatives have no right, in the quarries, to go round, I believe, as they have in the coal mines?—No.

3263. Supposing we recommended that the same rights of inspection which exist in the coal mines should be given to workmen's representatives in the metalliferous mines and quarries, and, of course, with a power to complain both to the management and

inspectors if anything was found wrong, that would put the complaint you make right?—Yes.

3264. (*To Mr. Jones.*) Do you agree with the evidence Mr. Williams has given?—Yes, to a very great extent.

3265. Would you like to add anything?—Yes. With regard to the sticking plaster referred to, the district where I work at they supply boracic lint.

3266. That is an excellent thing. Do they wash the wound also in antiseptic water?—Some of the quarries do that.

3267. (*Mr. Greaves.*) Have they any ambulance classes?—Yes, we have them all over the Vale.

3268. What proportion of men have gone through the ambulance course?—It varies from six to a dozen in the quarry I work at.

3269. (*Mr. Ainsworth.*) How many men are there?—200.

(*Mr. Greaves.*) It is about 3 per cent. to 6 per cent.

3270. (*Chairman.*) Have you anything else to add?—With regard to the land where I work, it belongs to the Crown.

3271. We cannot go into the condition of their leases. We are only concerned with s question of safety?—It is not that I was going to refer to; it is with regard to the galleries. The position of the mountain is favourable to work the quarry in galleries, but there are several quarries situated on the mountain, and the boundaries approach one another. That is a great difficulty, to work the quarry in galleries at our place.

3272. (*Mr. Greaves.*) That is what Williams said He said there were in many cases legal difficulties connected with ownership?—I think the mountain is about three miles in extent, and it is owned by the Crown, and I think that the Crown ought to work it as a model quarry, a Crown quarry, without letting it on lease to a private individual or companies.

3273. (*Chairman.*) Is there anything else you wish to add?—No; that is all.

3274. (*Mr. Ainsworth.*) Who supplies the ropes at the quarry you work at? Are they supplied by the men or the management?—The workmen buy the rope which they use themselves, and the company buy the ropes which they use specially.

3275–6. The men supply their own ropes in reality for their own work. Would you approve of the ropes being supplied by the management just as they supply the explosives?—Yes, I think so, but we are free to buy them where we like. As a rule we buy them from the owners.

Mr. David John Jones called and examined.

3277. (*Mr. Redmayne.*) You are here to speak on behalf of the workers in granite quarries?—Yes, the mills.

3278. Will you briefly tell us what your experience has been?—I have worked in the crushing mills for the last eight years.

3279. Have you worked in quarries at all?—Not in the rocks, but I work on the bank where the mills are.

3280. Your evidence will be directed to what transpires at the crushers.

3281–2. (*Mr. Lovett.*) You particularly wish to refer to the crushers and the dust question?—Yes. I wish to speak about the mills, and not the getting of rock.

(*Mr. Redmayne.*) We will take you entirely on the mills. What have you to say with regard to the mills?

3283. (*Mr. Lovett.*) You get a lot of dust?—Yes, especially when the wind is blowing from the north-east.

3284. (*Mr. Redmayne.*) I suppose that is when the wind is blowing from the crusher towards you? It might be north-west, but it is not necessarily because the wind is in the north-east; it is because it is blowing from the crusher on to you?—Yes. The crusher is not the only thing that makes the dust. The rolls make quite as much.

3285. It is when the wind is blowing from the machinery in the direction of the individual that he gets the dust?—Yes, and warm weather we get a lot of dust.

3286. Because it dries up quicker?—Yes, settles.

3287. What is done at the crushers you are working at towards preventing dust?—We have got two fans to take the dust out.

(*Mr. Greaves.*) What part of the country is this?

(*Mr. Lovett.*) Penmaenmawr. I believe you have a drawing of the fan. Perhaps you can explain better with that.

(*The witness produced a plan, which was handed to Mr. Redmayne.*)

(*Mr. Redmayne.*) The point is this: that there is a fan, to begin with. Your crusher is enclosed.

3288. (*Mr. Lovett.*) You have a roof on?—Yes.

3289. (*Mr. Redmayne.*) And there is a fan some distance away, sucking the dust from the crusher and throwing it out through a chimney into the air?—Yes.

3290. When the wind is blowing from the top of that chimney towards you, you get that dust over you?—No, it does not blow the dust from the chimney to the mill.

(*Mr. Lovett.*) The wind gets into the mill, and it depends on the wind whether it is bad or not.

3291. (*Mr. Redmayne.*) The dust does not come from the chimney? Where does it come from if it does not come from the chimney?—The mill is a very draughty place, and the wind gets through the holes, and if there is any dust in the wheels or pulleys it is spread about.

3292. Those parts of the machinery which are not absolutely covered, such as pulleys and spindles, the dust blows through the apertures?—Yes.

3293. I take it really the reason the north-east wind affects the place where you work particularly is owing to the position of the machinery, and that in another place another wind if from another direction would affect it. That is so, is it?—Yes.

3294. How long have the mills where you are working been fitted with a fan?—17 years, since the mills have started; close on 18 now.

3295. Ever since they were established?—Yes.

3296. Have you ever worked at mills that have not had fans?—I do not know about any mills in Penmaenmawr without the fan, but I believe there are some crushers at other places.

3297. Seeing that the dust does, according to your statement, get out through the apertures in the casing, have you any suggestions to make as to the prevention of the dust?—I should think if they could get another new fan it would be better in that mill. The fan *there* has been put there about two or three months ago from another place. There is a company down from London now, and they have not finished that yet.

3298. You mean by interchanging the fans?—That is an old fan shifted from another place.

3299. You would suggest instead of taking an old fan and putting it in this mill, they put an entirely new fan in?—That is as good as a new one, but get another one to make it three fans.

3300. There is not a sufficiency of fans?—In my opinion.

3301. I am only asking for your opinion. We may take it that the draught is not sufficient.

3302. (*Mr. Greaves.*) There are not sufficient fans when you get branches from those tubs everywhere.

(*Mr. Redmayne.*) It comes to this, the total draught is not sufficient.

(*Mr. Greaves.*) Not sufficient sucking capacity.

(*Mr. Redmayne.*) Not sufficient to meet the requirements.

3303. (*Mr. Lovett.*) They have two fans alongside each other?—Yes.

3304. Do you think it would be an improvement if they had another fan—that is, two alongside each other

at the bottom, and this one where it is?—Yes, get a new one alongside of the old one, and leave that fan where it is now, on the top floor of the riddles.

(*Mr. Greaves.*) I do not think we can go into these mechanical details here.

3305. (*Mr. Redmayne.*) The fans are not, in your opinion, placed so as to give the best possible results?—Yes.

3306. The same fans in different positions would be better, you think?—Yes.

3307. (*Mr. Lovett.*) You think it is advisable to to have these two fans where they are placed, but you suggest an additional fan alongside the one at the bottom would bring about the improvement?—Yes, get a new one alongside for the oldest in the bottom, or shift that one.

3308. (*Mr. Redmayne.*) It is an arrangement of fans. In your opinion there should be a better arrangement?—Yes, and it is the opinion of the majority of the men.

3309. You are of opinion that dust is injurious to health?—Yes.

3310. Will you state how it affects it?—The men are in the mill for 9½ hours every day, from 7 till half past 5, and of course they are naturally breathing that dust those hours. The majority of them complain of constipation and kidney trouble.

3311. How many men are employed?—Inside now there are 10 and 2 young boys, and about the mill about 30.

3312. (*Mr. Thomas.*) In these mills are stone-breakers where they make macadam out of this so-called granite?—Yes.

3313. It is chiefly road metalling?—Yes.

3314. The dust is resultant from breaking this material in the stone-breakers. Ordinary jaw-breakers are used, I take it. Are there rolls in addition?—We have got crushers, jaw-breakers, rolls and screens, and we have a rolling mill, too, to make the small stuff.

3315. (*Mr. Redmayne.*) First of all, I take it, the granite goes to the crusher?—Yes.

3316. Then from the crusher——?—To the rolls.

3317. You pass to the roll before passing through the trummels. Perhaps you call them screens, revolving screens. It passes from the crusher to the roll?—Yes.

3318. From the roll to the revolving screen?—From one pair of rolls to another pair of rolls.

3319. And then it is sorted out into the various degrees of fineness through the trummel, the cylindrical screen?—Yes.

3320. The crusher is enclosed in the manner you mention?—Yes.

3321. Are the rolls covered?—Yes.

3322. And the screens?—Yes.

3323. Is there any spraying of water?—Yes, after they tip they put some water on it, but we are not allowed to put much because it spoils the stuff.

3324. You put a little water when it passes from the shoots into the crusher, but not much?—No, because it spoils the stuff. It spoils the dust and the half-inch stuff.

3325. It makes it stick together, I suppose?

3325*a*. (*Dr. Haldane.*) Is the dust of any use, or do they just want to get rid of it? You say it prevents the dust from being separated. Is the dust of any value, or do they want to get rid of it?—They send the stuff away, the stuff that goes to the riddlers.

3326. (*Mr. Greaves.*) That is no use?—They are making concrete with it.

3327. (*Mr. Thomas.*) I thought you said the dust, when extracted by the fans, goes into a tower and is blown away?—100 tons of dust every day goes through the arches. We could not see each other if we kept all the dust in the mill.

3328. (*Mr. Redmayne.*) Do you resort to spraying at any other stage in the process, or do you only spray when you pass the stones into the shoot?—We only spray the stones when they pass to the shoot. We spray the floor sometimes, if they are brushing it.

3329. Not the machinery at all?—No.

3330. Not while you are riddling the crushed stones?—No.

3331. Would it be possible to use spraying at any other stage of the process?—I do not think it would be possible. It would be very dangerous if you tried to spray while the stuff is in the screen.

3332. Even with an automatic sprayer? It would be economically difficult, because of making the dust?—I do not understand you. In my opinion there is no dust after it goes through the screen. As soon as the dust goes through the screen it is going down.

3333. In the process of screening you could not spray, because it would make the dust muddy?—Yes.

3334. The only way to prevent the ill-effects of dust is by means of a better fan arrangement?—Yes, just the same fans as those. They are very good fans, I believe; get one more, or shift *that* one to where it was before. They have shifted that to where it is now. They thought it was an improvement.

3335. Can you suggest any other possible way of preventing the ill-effects of this dust?—I do not think there is a better way than that.

3336. Have there been any cases of phthisis?—I only know one that had consumption, but I believe he had consumption before he came to the mill. There are several of them who have suffered from that disease I have told you, kidney troubles and constipation.

3337. (*Mr. Lovett.*) Have you known the doctors to order men to leave?—Yes. I have known three men the doctor has told them to discontinue in the dust.

3338. They were allowed to work in the quarry, and the doctor suggested they should discontinue working in the crushers?—Yes.

3339. What do you think would be the condition of things in the crushers without fans? There would be a density of dust, and the men would scarcely see each other plainly?—You could not work at all without the fans. You could not see each other.

(*Mr. Redmayne.*) I thought you said you had never worked on the crushers without fans?

3340. (*Mr. Lovett.*) That is how he imagines things would be. Do they sweep the floors at your place?—Every day, some part of it.

3341. Would the dust soon settle again?—As thick in about an hour.

3342. The same depth after an hour?—Yes. The same depth in about four or five hours after it had been swept.

3343. (*Mr. Redmayne.*) Is it sprinkled before they sweep it up?—Yes.

3344. Or do they sweep dry?—Sweep dry, and sprinkle the water after.

3345. Does not sweeping cause a great dust?—Yes. I can suggest one thing, and I have no doubt it would be a great improvement—spray the stones either 10 or 15 yards to the crusher; it would keep the dust from rising out on tipping to the shoot, and if it was sprayed in that way it would not harm the stuff.

3346. (*Mr. Lovett.*) It would be better to sprinkle it before sweeping, undoubtedly. That is what I wanted to bring out. Do you think the dust is of an irritant nature, I mean the granite dust? Can you tell us anything about it as affecting the men? I have heard men complain it is of such a strong irritant nature that it will skin their faces?—Yes. Everybody's skin is tender.

3347. Do you think that the condition of your face is the result of the dust?—It would be a great help to it.

3348. Men are generally affected in that way who work in the crushers?—Yes.

(*Dr. Haldane.*) In what way?

(*Mr. Lovett.*) It irritates the skin. I think, rightly or wrongly, if it will irritate the skin in that way it will have an injurious effect on the lungs.

3349. (*Dr. Haldane.*) You have already said that you do not know of any lung trouble arising from this work in the dust?—I know one young man had inflammation of the lungs and was ordered to leave the mill, and he did so.

3350. Still, anyone might have that working at anything. You do not know that it is more common among the workers there?—No.

3351. To have any lung trouble?—I do not know of any man that is working there now complaining of lung trouble.

3352. Or that has worked there?—I could not say for sure.

3353. At any rate it is not a known thing that lung trouble arises from that work?—No.

3354. Have the men to work in the dust very much? Is it just an occasional puff of dust, or are they constantly working in it?—Constantly working in it.

3355. More or less in the dust?—Sometimes the dust is not much: at other times it is awful.

3356. How long has that crushing machine been at work? Are these machines new, or have they been there many years?—These fans.

3357. No, the crushers?—They have been there 17 years, but they have got two new ones now.

3358. The men have been working at that crushing occupation for 17 years?—There are two of them who have been there 17 years, close on 18.

3359. They are quite well still?—No, they are not quite well.

3360. What it the matter with them?—They complain of kidney troubles and constipation.

3361. What sort of kidney troubles do these men have?—I could not answer that question:

3362. Just pains in the back?—Pains *here* and some in the back.

3363. It is chiefly pains? Have you any reason to suppose that is due to kidney troubles? Most pains in the back are nothing to do with kidney trouble, although people think they have. Does the doctor say it is definitely something wrong with the kidneys?—The doctor said that it is kidney trouble.

3364. (*Mr. Lovett.*) It is not your own opinion or the men's opinion: it is the opinion of the doctor. You say that on the authority of the doctor?—I could not say that to rely on it.

(*Mr. Lovett.*) Perhaps we shall be able to see some of the men you are speaking of when we go next week.

(*Mr. Lewney.*) I think the witness does not understand the question.

3365. (*Mr. Lovett.*) Have the men been told by the doctor that they suffer from kidney trouble?—Yes.

3366. (*Mr. Greaves.*) You said you worked how many hours in the mill?—9½.

3367. All the time?—Yes.

3368. Do they have meals there?—Yes, from 12 to 1.

3369. They stay in the mill for their meals?—No, they go to a hut.

3370. They are not 9½ hours in the mill?—They get one hour for dinner.

3371. (*Mr. Lovett.*) They are in the mill 9½ hours. They are on the works longer. You get half an hour for breakfast?—With the dinner hour it is 11 hours.

3372. They are on the works 11 hours. They are in the crushers 9½ hours.

At Egremont, Cumberland.

EIGHTH DAY.

Thursday, 20th October 1910.

PRESENT:

SIR HENRY HARDINGE SAMUEL CUNYNGHAME, K.C.B. (*Chairman*).

RICHARD AUGUSTINE STUDDERT REDMAYNE, Esq.
JOHN SCOTT HALDANE, Esq., M.D., F.R.S.
JOHN STIRLING AINSWORTH, Esq., M.P.
RICHARD METHUEN GREAVES, Esq.
RICHARD ARTHUR THOMAS, Esq.
ROBERT THOMAS JONES, Esq.
WILLIAM LEWNEY, Esq.
URIAH LOVETT, Esq.

T. E. BETTANY, Esq., *Secretary.*

Mr. THOMAS GAVAN-DUFFY called and examined.

3373. (*Chairman.*) Are you the General Secretary of the Cumberland Iron Ore Miners' and Kindred Trades Association?—Yes.

3374. Is your present membership 2,500?—Rather over.

3375. What proportion does that bear to the total number of working miners in this district?—About two-thirds.

3376. You have been secretary for three years?—Yes.

3377. I understand you do not come before us as a professional miner?—No.

3378. What is your trade or profession?—At the present time I am secretary to the Association. Prior to that I had been a journalist and author. In connection with that I have spent some 20 years studying the industrial and economic interests of the miners and others.

3379. As a journalist?—Yes.

3380. That was your only profession?—Well, intermittently.

3381. What was your profession?—Journalism was my profession.

3382. Did you carry on any trade; were you an engineer, for instance?—No.

3383. What were you?—For a short time I was a clothing designer.

3384. I suppose you have been underground occasionally?—Only once; there is no access given to me to go underground.

3385. I think we quite apprehend the position in which you come here. You have addressed, I think, a series of questions to your officials at various pits?—Yes.

3386. What is the total number of pits in this district of all kinds?—About 30.

3387. How many pits are worked by men in your Association?—Twenty-five.

3388. I suppose you do not have all the men in all the pits?—In a great number we have all the men and a majority in the rest, with the exception of three small pits, and those we do not pretend to cater for.

3389. You addressed a series of questions to your officials at the pits, and you have tabulated replies?—I have all the replies; but I have tabulated them myself.*

3390. You will hand your questions and the replies to our Secretary?—Yes.

3391. We need not go into the details of them now. You have sent us a document, which of necessity is rather a long one, and in some respects complicated, containing a number of suggestions that you desire to make. I suppose you would not put it that the whole document in all its details has been submitted formally to the whole of your Association?—To the Council, which is the governing body of the Association, the whole document has been submitted.

3392. I may take it that the Council put forward this document which I have before me?—Yes.

* *See* Appendix "D" for Summary of Replies.

3393. I suppose it has not been put forward to the individual miners at a men's meeting?—No, not to the individual miners.

3394. Nor published in any form?—No.

3395. As it was rather complicated I have taken out the principal heads of it. I have done that because remarks about such matters as changing-houses, and so on, are a good deal scattered through it; and if I take it paragraph by paragraph we shall get the record backwards and forwards. We rather prefer to deal with the different points by subjects, not to cut short anything, because we will hear you to the full on every point, but for simplicity and because we have had these matters before us already?—It would be hardly possible for me to follow you clearly in that way.

3396. I think you will soon see that it is the best method. We will deal, first of all, with the question of double shafts. We want to take the important local questions; that is the principal reason of coming here to-day. The double shaft question, for instance, is an important one, and we should first of all like to hear what you have to say upon that question. May I put it in this way? I gather you think there certainly ought to be in every mine a method of emergency exit so that the men could get out in case anything happened to the winding arrangement and the cage?—Yes, we think that vital.

3397. That does not necessarily involve a double shaft, does it?—For the double purpose of ventilation and safety double shafts are the most effective.

3398. I do not know whether I am to gather that you would advocate the compulsory provision of a double shaft in every case before mineral could be got?—No; but after the first shaft has been sunk and the mine has been proved, and a large number of men are employed in the mine, then we think that the Secretary of State ought to have power to compel the sinking of a second shaft.

3399. In cases where it was considered necessary?—In all cases.

3400. Independent of whether much mineral was got or expected to be got?—I have said a second shaft should only be put down after the mine had been proved.

3401. In those cases a double shaft should be universal?—Yes.

3402. Taking a mine of a reasonable depth, say, 100 fathoms, what would be the cost of a double shaft?—The cost would vary according to the ground they had to go through.

3403. About what do you think would be the cost?—I could not estimate; but we suggest to you the question of cost ought not to be put in juxtaposition to the life and safety of the men.

3404. Would you say that a double shaft is not as necessary in a metalliferous mine as in a coal mine, or would you put them exactly on the same footing?—In that respect, yes.

3405. You do not consider there is any more risk not to have a double shaft in a coal mine than in a metalliferous mine?—With this exception, that there are mines adjacent to each other, and it is possible in that case to get an exit without really sinking two shafts to that particular mine.

3406. Have as many accidents occurred, necessitating double shafts, in metalliferous mines as in coal mines?—I would hardly think so.

3407. Is there any liability of an explosion occurring in a metalliferous mine?—I do not think so.

3408. That might make some difference, perhaps?—There is probably less liability of falls, but more probability of floods in an iron ore mine than in a coal mine.

3409. Could the men not get out if there were emergency ladders provided?—The ladder system is antiquated, and to get 100 men out by ladders is a very cumbersome way of dealing with the matter.

3410. I will leave that question for the present. I may say I am not a professional mining engineer any more than you are. Is there anything more you would like to say on that double shaft question?—Nothing, except to strongly emphasise the fact that it is the wish of the whole of the miners in the district that there should be preference given to a double shaft, and consequently a second means of exit.

3411. They do not think that that would in any way check the industry if it were made compulsory?—If an industry can only be carried on at the expense of or danger to human life, it ought to cease whether it affects wages or not. Human life is the first asset.

3412. I will come now to the question of changing-houses. I should remind you that these matters have been before us already. You are, I think, in favour of a statutory provision compelling men to change?—If the accommodation is good.

3413. Providing there was proper accommodation you would compel them to change?—Yes.

3414. Do you mean that if proper accommodation were provided you would have them brought up before a magistrate if they did not change?—I would. That is put forward in the terms of my notes which, of course, I cannot follow now exactly from the way in which you are taking it. But there are places made at a disadvantage to the men.

3415. I do not think it matters very much what you have written on those notes; the important thing is what are your views. I am asking you whether you would make it compulsory. Would you make it an offence?—Yes, I would.

3416. I am obliged to ask you these questions. Is that your individual view or the view of the whole of the miners of the district?—I could not say that it represents the views of the whole of the miners of the district, but I venture to say it represents the views of 90 per cent.—that is, of course, if the accommodation is perfect.

3417. Give us your idea of what the accommodation ought to be?—I think there ought to be a changing-house sufficiently large to provide accommodation for all the men in the employ. It should be in two compartments under one roof, and one compartment should be for changing separately and the other compartment for washing. In the washing compartment there should be a constant supply of hot and cold water, and there should be a separate tub for each man.

3418. Such as there is already in many of the best mines?—In some of them the accommodation is good but insufficient; and in others it is bestial.

3419. How many cubic feet do you think there ought to be in the shed?—That would depend upon the number of men employed at the mine and the size of the mine. Of course, they would work three shifts, consequently it would be a reasonable thing to ask the owners to provide accommodation for one in three, that is one tub for three men.

3420. With room for the clothes of the men on two shifts to be there—the men going down and the men coming up?—Yes.

3421. I may say that point has been under our consideration already?—And, further, I think the owners ought to provide that changing-house accommodation without taxing the men. In some places there is a charge made of 6*d.* per fortnight, and that is a very profitable part of the mine to them. I may say that is not so in all places.

3422. I think we have your views upon that now. We have been taking the areas of some of the changing-houses already, and the figures are before us. Coming then to the question of the ventilation of mines, would you say that the ventilation of the mines in this district is good or not?—The ventilation is not good.

3423. What do you mean by bad ventilation? What gases are there that make it bad?—In the case where men have fired their shots, I think it is common knowledge that the oxygen in those particular places is destroyed for the time being, and that there is a gas produced.

3424. I think the latter part is probably correct. It would be difficult to see what destroyed the oxygen unless there was an explosion. I will leave that to experts. At all events deleterious gases are produced by the use of explosives?—Yes.

3425. And I suppose there is the breathing of the air by the men?—Yes.

3426. Have you formed any opinion as to what standards should be adopted with regard to that?—No.

3427. How would you deal with it? How would you know when there was ventilation enough and when there was not?—If the men were able to work without feeling the effects of bad air, we might take it that the conditions were favourable.

3428. That would hardly be enough for me, I am afraid. The question is, have you any percentages of oxygen to offer us as a guide?—I do not suggest any.

3429. The feeling of the men would be your test?—Yes.

3430. Can you give us any cases that have come within your knowledge, as secretary of the Miners Association, of the inadequacy of the ventilation?—Yes. There was a man named Butler of the Winder Gill Mine, Frizington, who dropped down in the mine.

3431. How long ago was that?—Not many months ago.

3432. In your statement to us you say that during the past 12 months two men have died in the pits?—Those are other cases. One man died at Lonsdale Mine and the other man died at the Winder Mine; and it was quite obvious from the evidence that in both cases the men were affected by bad air.

3433. Was there a coroner's inquest in each of those cases?—Yes.*

3434. Have you the evidence that was taken at the inquest?—No, but I was present and heard it.

3435. You could perhaps let us have the newspaper reports?—Yes; but the particular case I had in my mind was the case of Butler, who collapsed in the mine at Winder Gill through bad air; he fell down and was only discovered by accident.

3436. (*Mr. Redmayne.*) Was that not due to the fumes from an oil engine situated near the shaft?—And bad air; there were fumes from the oil engine, but if the air had been right it would have carried the fumes away.

3437. You mean if the oil engine had not been there the man would not have succumbed?—That is a question. The man himself complained of bad air. If the air had been good it would have carried the oil fumes away.

3438. (*Chairman.*) Did a doctor see that man?—Yes. This man Butler was under a doctor for many weeks. I do not know whether he has restarted work yet.

3439. In what part of the mine was he found; was it at the working place?—Not quite; it was on the main road between the working place and the shaft.

3440. Up-cast shaft or down-cast shaft?—Up-cast.

3441. Do you know of any further cases of bad air that have taken place at that mine?—Yes, several cases.

3442. At that same mine?—Yes, I have sent complaint, certainly once, to the inspector, and the inspector went down and suggested some alterations which I think to some extent were carried out.

3443. That was put right then?—Yes, subsequently.

3444. Is it right now?—I could not say.

3445. Now take the other two cases of the Lonsdale Mine and the Winder Mine. Are those still bad at this moment?—In regard to the Lonsdale Mine I could not say; but I know in the case of the Winder Mine that they do what they can to get the ventilation as good as they can.

3446. Is it so bad, for instance, that a candle would go out?—Well, sometimes but not often, not now. There have been some considerable alterations made in the Winder Mine during the past 18 months.

3447. Am I to take it that if we went there to-morrow we should find it satisfactory or not?—I am sure that if you went there to-morrow you would find it satisfactory.

3448. I mean if we went down there without notice? You think it would be put right before we got there if we gave notice?—Oh, you cannot move in this neighbourhood suddenly.

3449. You think they would know we were coming?—I do.

3450. What other cases have you besides those three mines?—There are a large number. We find it reflected in the general illness of the miners. We had in connection with our Association a sick club, and although the men paid 6*d.* a week into the sick club in a year we lost 400*l.** We found on an average that practically one-third of our members lost from 10 to 14 days every year.

3451. Are they all examined by a doctor before they get sick pay from the club?—Yes; they would not get any money until they produced a doctor's certificate.

3452. Have you a list of the complaints for which the doctor's certificate was given, and the illnesses?—Unfortunately the doctors do not state the complaint on the certificate. They simply send a certificate "I certify this man is unable to follow his employment." It does not specify anything, and probably they do not know.

3453. If they do not know they do not know whether it is bad or not?—No, but the men know.

3454. Dr. Haldane is more qualified than myself to speak on the question of illnesses, and he will probably ask you some questions presently. You may be quite sure there is no want of sympathy on the part of the Commission at all on that subject, but of course we must honestly get the absolute facts. You do not wish to strike at merely imaginary grievances?—Not at all.

3455. Have you any other suggestion to make as to how the ventilation can be improved, because we have here experts on that subject, and we should be only too pleased to hear anything you have to suggest?—Sometimes the men think it could be done by means of fans; but the men who have got experience in the mines strongly object to the use of compressed air.

3456. Why?—They think that the effects of compressed air are almost as bad as the fumes themselves.

3457. The exhaust from a pump, for instance?—Yes.

3458. They complain that it hurts them?—Yes, that it is deleterious.

3459. Dr. Haldane will ask you about that presently. You think there might be fans, but you do not think much of the compressed air?—No, but going back again, we think the double shaft would solve that.

3460. As a matter of fact it seems to be possible to ventilate a mine with a single shaft, at all events in some cases, perfectly satisfactorily?—In a very few, if any. In order to follow the air it is necessary to go down to the bottom of dips and up-rises, and all kinds of queer places, and it is impossible to ventilate those places in a satisfactory manner with one shaft.

3461. You mean it comes to this, that every single mine in this district which has only one shaft is badly ventilated?—Yes.

3462. And must be?—Yes, from the nature of the thing, although the owners may be desirous of doing what they can.

3463. Now we will turn to the rock drill question which is an important one. You say that the rock drill is dangerous on account of the dust?—Yes.

3464. What does the dust produce?—It produces phthisis for one thing.

3465. In your opinion does the hematite dust produce phthisis?—Hematite dust would not have the same effect as stone dust. I do not think the rock drills are used on the hematite; they are used mostly in driving stone drifts.

3466. Are they being driven into limestone or silica?—Limestone, I think, mostly.

3467. Have you any cases of phthisis produced by limestone dust or by hematite dust?—No. There are

* The Commission have obtained newspaper reports of the proceedings at the inquest in these two cases. *See* Appendix E. It will be observed that in each case the jury returned a verdict of "Death from natural causes," the medical evidence pointing to heart disease in each case as the cause of death.

* This is a mistake. The figures should be 722*l.* 16*s.* 10*d.* *See* question 3845.

only four mines in the district where rock drills are used, and up to the present time we have not any known cases of death at all events.

3468. Then the cases of phthisis you have only come from the four mines apparently?—We could not quote a definite case and say that phthisis has been due to the use of rock drills in any of those four mines These drills have not been here very long.

3469. What is the proportion of men who die from phthisis in those four mines to the actual number of miners?—I do not think we could estimate it yet.

3470. Is it a larger number than the average proportion who die in the district?—I could not say.

3471. You cannot very well conclude that phthisis from dust arises unless you have some figures; it is only an impression?—We may reasonably expect that the result of your labours will be a new Act of Parliament, and that Act of Parliament may govern this district for many years to come. It is almost inevitable that some day or other machinery will be found that will be used not only in stone but in metal.

3472. You have heard, I suppose, that the plan of using drills wet has had the effect of reducing the number of cases of phthisis?—Where the spray has been used it has reduced the death rate certainly; but there is the difficulty of getting men who are earning wages to use the spray which interferes with their labour and earning capacity.

3473. Would you suggest that they should be compelled to have a respirator?—Yes.

3474. Have you consulted the men about wearing respirators?—I think it is necessary.

3475. Can you produce to us a man who would undertake to work on hard work for six hours with a respirator on?—They do it in the Potteries regularly.

3476. I put to you "hard work"?—I daresay in the Potteries works they work as hard as they do here.

3477. Physically as hard?—Yes, physically as hard.

3478. I have seen them at both, and I should say it is not physically as hard. This seems to me uncommon hard muscle work?—I have seen them at work in the Potteries with the respirators on. You impose conditions upon the owners for the safeguarding of the lives of the men, therefore we must impose conditions upon the men for their own safety.

3479. Suppose a man could not work with a respirator. Have you gone into the question of whether the men can wear them and work hard? Have you yourself had one on?—Yes, several times.

3480. Have you worked hard with it on?—No, I have just put it on to see.

3481. Of course you could walk down the street with a respirator on, but the question is whether you could work hard with one on?—I was not in the street at the time. I was in a glost oven where there was plenty of dust, and I wanted to see whether it was possible, wearing one of the respirators, to inhale the dust.

3482. That we can quite understand, that it is possible to inhale the dust with a respirator on is pretty certain, but the difficulty is whether you can work in it?—Yes, I think you can work in it.

3483. (*Mr. Lescney.*) Do you mean that a miner could wear a respirator when following his ordinary duties, or do you mean simply when attending to a machine?—When he is using a drilling machine.

3484. (*Chairman.*) We shall have evidence about that, no doubt. By a great many people it is doubted whether any dust that is not of a siliceous character can produce phthisis. Have you gone into that subject?—Yes. Most of the experts I have read seem to think that dust of any kind will have a tendency towards it.

3485. Will you give us the name of anyone who says that?—Dr. Oliver.

3486. I am speaking of stone dust?—If a man is predisposed towards phthisis, working in stone dust will accentuate it.

3487. I see you have Dr. Oliver's book, "Dangerous Trades," before you; it is simply what you have read?—Dr. Arlidge, in his book on "Industrial Diseases," says something of the same kind.

3488. I suppose you would be prepared to admit, so far as your reading has gone, that it is considered much more dangerous to work in siliceous rock?—Yes. We have, in connection with our Association, a death levy fund—when a man dies we pay his next-of-kin 10*l*. Being a trades union, we cannot pay that money unless we get a death certificate. Since I have been secretary of this Association, I have handled 37 of those death certificates, and out of the 37 there have been 29 in respect of phthisis or other pulmonary diseases.

3489. (*Mr. Thomas.*) Have you a record of where those men worked?—They have worked in this district.

3490. In this district alone?—I do not think any of them have been in Africa; I think they have all worked in this district.

3491. And nowhere else; they have confined their work to this district?—I think so.

3492. (*Mr. Redmayne.*) Were any of those employed at the four mines where they use the rock drills?—I could not just speak from memory.

3493. (*Chairman.*) And the doctors' names are on all those certificates, I suppose?—Yes.

3494. The question has been raised as to whether managers ought to be certificated as they are in coal mines. You have not offered any remarks upon that question; but I do not know whether you have any opinion upon it one way or the other?—We certainly think they ought to be.

3495. The whole of them?—Yes, the whole of them.

3496. You mean pass an examination before they are appointed?—Yes; it is only a reasonable thing.

3497. The suggestion, on the other hand, is that it would cut out of employment a lot of men who are now earning their living in this way and doing good work?—But if they passed an examination they would not be cut out.

3498. Supposing they did not?—Our civil servants have to pass examinations, and managers and undermanagers of coal mines have to do it. In most occupations you have to prove your qualifications.

3499. Do you suggest the present men could pass an examination?—Not all of them. Some of the present men are very good men; others I do not think could pass an examination.

3500. You mean it comes to this, that the mines at the present time are badly managed or mismanaged for want of the education of the managers?—Some of them are very badly managed.

3501. I put it for want of education of the managers. I should badly manage a mine, I suspect, if I attempted to do so, but what we want to know is whether it is really for want of education?—Education in mining or school education.

3502. That is what you wish for?—Education in mining.

3503. Passing a written examination?—Or oral.

3504. On the principles or science of mining?—Yes. Very often a man could pass an oral examination, but could not pass a written one.

3505. Do you think that a regulation of that kind, if passed, would meet with the approval of the miners of the district generally?—I do. It would be an additional safeguard in some cases.

3506. I think you have something to say upon the question of the investigation of accidents and coroners' inquests. What is your view on that matter?—We support the suggestion that there should be a formal investigation into accidents in the iron ore mines.

3507. You do not like the coroner apparently; you want to do away with him?—Well, the coroner has his use.

3508. What is your view?—The difficulty is, and I have experienced it in this district, to get men before a coroner's jury who will really state the facts. At an investigation it would be, in my opinion, far easier

to get them to state the truth than it is before a coroner's jury.

3509. Is that the fault of the coroner or the jury?—I do not think it is the fault of either; I think it is the fault of the men who are either justifiably or unjustifiably afraid of speaking the truth.

3510. Would they not be a great deal more afraid at a regular inquiry?—You might get it out of them better. The coroner sits in a coroner's court, and there is a certain amount of awe, I expect, about it. Another thing, it widens the scope of the matter. The coroner's inquiry is confined entirely to the cause of the man's death, and how it was brought about. There are certain things which the coroner cannot inquire into which might be inquired into at a formal investigation.

3511–12. Would you have a formal investigation in the case of every single death?—Yes, I do not object to the coroner, but I say in any case which presents unusual features there ought to be power to order an inquiry.

3513. I quite agree with you—and there is already power?—But we never hear of one.

3514. There is one probably going to take place at Whitehaven?—Yes, but that is under the Coal Mines Act.

3515. I do not remember a catastrophe of sufficient importance in metalliferous mines, happily, to warrant one, but I suppose you are aware that if there was occasion, one would be ordered to-morrow?—Well, there have been cases where we may have asked for a formal investigation.

3516. Did you ask for one?—No, because we think the machinery is crude.

3517. Still it is pretty effective at the present time?—I have never heard tell of one in this district.

3518. As a matter of fact you have never asked for it and had it refused?—No.

3519. Then I think you would like a power of inspection of mines by the workmen analogous to that in coal mines?—No, that is unsatisfactory. The coal miners themselves have decided that.

3520. I was a member of the Coal Mines Commission and they said it worked extremely well?—That may be so, but from my knowledge of the coal miners, and having talked the matter over with them, I can say they are dissatisfied with it, especially in this district. A workman is appointed inspector for three days of the week and for the other three days of the week he has to work at the face. We have no power here for the workmen to inspect the mines.

3521. The question in the first place is whether similar powers which exist in coal mines should be given here, that is, a power to the working men employed in the mine to appoint two of their number to go down and themselves inspect the mine and see whether they consider it safe?—We go further than that.

3522. What would you like further than that?—We suggest that power should be given to the Miners' Association to appoint an inspector and pay that inspector to inquire into any complaint which may be made by the miners at the several employs, and access should be given to that inspector. I think it is conceivably possible that the Secretary of State might draw up rules which might prevent that man interfering with the management of the mine or anything else. Let him simply inquire into any complaint which may be made by a miner, and in that case the responsibility would be fixed. A man cannot serve two masters; he cannot be a workman three days in the week and an independent inquirer or critic upon the employers for the other three days of the week.

3523. I do not think he is an inspector for three days in the week under any system?—I am speaking particularly now of Whitehaven—there are workmen inspectors there.

3524. You mean the men who have a right to go and inspect the mine?—Yes.

3525. They are not inspectors in the sense in which that term is usually employed?—They are workmen inspectors—at any rate, they call them workmen inspectors. Their duty is to go round and inspect the workings on behalf of the men. They cannot be workmen inspectors three days of the week and workmen the other three.

3526. Why not?—They cannot do it and do it justly.

3527. If anything goes wrong in the mine the men have the power to communicate with the inspector of mines anonymously?—They have that power.

3528. Do they not exercise it?—I could not say. But the men fear doing that. I have suggested that myself many times, but the men would not hear of it.

3529. They can come and tell you; you do not fear doing it?—I do not fear it.

3530. Would it not be possible for you to go to the inspector and make a complaint on behalf of the men?—Yes, and I think that is done in this district.

3531. You have done it?—Yes.

3532. You have it remedied?—Where it is possible.

3533. So that it is tolerably satisfactory. Here is a system followed, complaints are made to you very properly; you go to the inspector as representing them, and you get them remedied?—Yes, but there is not 10 per cent. of the complaints that ought to be made which are made to me.

3534. Why not?—Simply because the men know that if they come to me they go to the inspector.

3535. You do not reveal their names to the inspector?—No; but the inspector will go to the mine, and he will naturally go to the place which has been complained of.

3536. Your workman inspector would have to do that?—Naturally; then some man in that particular place is picked out as having communicated with me and is victimised; but if our suggestion is carried out and an inspector is appointed by the Association and paid by the Association, and he gets access to the mine to investigate complaints, that would meet our views.

3537. Would not the men who informed him still be victimised? If the men who informed the present inspector are victimised, and those who inform you are victimised, the men who informed the Association's inspector would be liable to be victimised?—Yes; but a practical miner would be able to go in and pick out things for himself.

3538. Perhaps the present inspector is a practical man?—Which inspector?

3539. The Government inspector?—Yes, but we say that the inspectorate at the present time is inadequate.

3540. You have not made any complaint that he has not investigated?—I do not suggest that.

3541. Then how is it inadequate?—Anyone must know that it is absolutely impossible for Mr. Leck to get round and make a proper examination of the mines. He cannot do it.

3542. You want a very much more elaborate system of mines inspecting than we have at present?—Yes.

3543. A dozen Mr. Lecks?—Not a dozen Mr. Lecks.

3544. Half-a-dozen?—No, we will just have one.

3545. If that would be enough for you then your workman inspector would not be much use?—We suggest there should be two more inspectors for the Newcastle district in addition to Mr. Leck.

3546. You say, really, that the Association should appoint them instead of the Home Office?—We do not suggest that at all; we suggest that there should be two more inspectors along with Mr. Leck on behalf of the Government, and not our Association, but any trades union in the Newcastle district should have power to appoint an inspector and pay him.

3547. (*Mr. Lewney.*) You mean independent of the Government inspector?—Yes.

3548. (*Chairman.*) In other words, your Association should appoint a set of inspectors?—No.

3549. It comes to that?—Not our Association—any association should appoint one inspector—only one, not more.

3550. To keep Mr. Leck in check, I suppose?—No.

3551. At all events, I suppose you wish that the same system of inspection by workmen that obtains in

coal mines should be applied to these mines too?—No, we do not agree to that.

3552. You see great differences?—Yes.

3553. Is there need of more or less inspection here than in coal mines?—If the workmen inspectors were appointed now in this district it would be quite useless.

3554. (*Mr. Lewney.*) You mean a workman following his ordinary occupation?—Yes.

3555. (*Chairman.*) You suggest that the men cannot make an efficient inspection of the mine?—They can do it, but they are put in an unfair position.

3556. (*Mr. Lewney.*) They would not be free agents?—That is so.

3557. (*Chairman.*) And yet they are free agents in coal mines?—No, they are not.

3558. You condemn the system in coal mines too?—Yes, but we are not concerned with that; the coal miners are able to look after themselves, and we do not want that introduced here.

3559. If they are content with it you do not agree with them?—So far as my inquiries are concerned, they are not content with it; and I know the coal miners fairly well.

3560 At all events you are not?—No, we do not want it here.

3561. Does that cover the remarks you have to make upon the question of inspection and kindred points?—No, we want something more. We think that the metalliferous mines throughout the country are sufficiently important from the industrial and speculative standpoint, and that the requirements in regard to supervision and inspection are sufficiently onerous to necessitate the organisation of inspectors under a chief inspector.

3562. A separate staff of inspectors altogether for the metalliferous mines?—Yes.

3563. I do not know whether you have any reasons particularly for that, theoretically or generally; how would it be better?—A man may be a first-class inspector of coal mines with a thorough practical and technical knowledge of all the intricacies of coal mines, but if he was sent suddenly down into an iron ore mine he would know nothing about it.

3564. Is there any other point you wish to make?—I think not in regard to inspectors, except to say, and it is only right to say it, that whenever a complaint is sent to Mr. Leck, it is always attended to, and we have no complaint to make of any sort, except that there ought to be two more.

3565. Then, I think you wish for an opportunity of inspection of places where accidents have happened—after they have happened—before any change or alteration is made?—Yes, that is vital; in fact, we suggest it ought to be made a criminal offence to interfere with a place after an accident has happened before it has been inspected. I do not want to cite cases, but there have been instances where that has been done.

3566. You would not go so far as to say that where it was necessary for safety to make an alteration it should not be done?—No; but still, if it is in the working, that working should be boarded up and left for the time being.

3567. I may say all these points have come before us already, and we have discussed that matter. Of course, there must be safety?—Yes, we do not object to that of course. There was a case cited by Mr. Leck, where he went to take a sample of gas, and it had evaporated before he got there. There are lots of things evaporate before Mr. Leck gets there.

3568. How could you prevent it evaporating?—Possibly not then, but there are sets of timber and lots of things which evaporate. The suggestion we make would obviate that.

3569. Can you bring a case before us where that has happened?—I do not want to cite cases; but the thing is often done up here. I have one clear case in my mind where a man was killed and the place was turned inside out entirely before Mr. Leck got there at all.

3570. Of course that may have been so, but there need not necessarily have been a wrong intent?—I do not know. In the very same place a man met with an accident, and when the man was taken away to the hospital instructions were given to another man to go in and blow the place up before Mr. Leck came, so that there was plenty of evaporation there.

3571. It would be a very grave question whether that would not be obstructing the inspector. If managers know an inspector is coming and they do that, I should be inclined to consider whether that was not an offence. It is quite enough to mention that for us to see the point you make. You do not wish to say anything more on that now?—No.

3572. The next point is the overhauling of section 18. It comes to this, there is power, where an inspector thinks any practice is dangerous, to require it to be altered. If there is an arbitration your point is that in the meantime the men may be killed, and you think that there ought to be power to apply to the High Court for an injunction in a proper case to prevent things going on pending the arbitration?—Yes.

3573. We will consider that carefully. It has been before us also in coal mining?—You have uncertificated managers. A man may know nothing about a mine, but there is the Government Inspector, who is a trained man, and if he finds the gear defective or dangerous he can give 20 days' notice and arbitrate.

3574. Evidence was given at some length on that point before the Coal Commission?—You can arbitrate the same as the Conference that is going on.

3575. The next point is men riding against men in the shafts. I am especially taking the local points which are likely to be of interest. I believe that is not done in the Furness district?—I do not know anything about the Furness district. It is not done in many cases here. You will find it in the tabulated return. There are only three or four places in the district. There is Park House, for example, where there are 10 men riding against 10 men.

3576. Why is that unsafe?—If an accident happens it means that there are 20 men involved instead of 10.

3577. Is there any other reason?—There may be other reasons, but that is the main one.

3578. Is there not another reason more important still?—There is the possibility and there is the fear of an accident.

3579. At all events your people are against that?—Yes, they are strongly against it.

3580. That is all I need ask you upon that. I will leave the experts to ask you questions with regard to the detail of that. I will come now to the sections in your notes which deal with the employment of boys and women. You are in favour of the total prohibition of the employment of women in mines?—Yes.

3581. That represents the feeling of the district?—As a matter of fact there are no women or girls employed in the district.

3582. Then it is not a local question?—No, but it ought to be put in the Act.

3583. For fear they should appear and begin to work. Do you think it is likely that that will take place in this district?—It might.

3584. You do not know what the ladies will be doing?—When their husbands are getting small wages you do not know what they might be driven to. We want that put in the Act.

3585. We have no cases of the evil of women's work here, and consequently we have no experience one way or the other?—No woman ought to be employed about a mine. There is no work about a mine a woman ought to be called upon to do.

3586. How many boys have you working here in the district, boys under 16, I mean?—Probably 400 in the entire district.*

3587. How many boys less than that, say under 14?—I do not think they are allowed under 14.

3588. How many under 15 have you got?—Say 50.

3589. And about 400 under 16?—Yes.*

* This is a mistake. The figures should be 50 boys under 16 years of age, and 400 between 16 and 18 years of age. *See* question 7143.

3590. What do you want to do with those?—Before this new Act is passed they will have solved that question themselves. They will have grown over 16.

3591. (*Mr. Lewney.*) Another generation will be coming up?—It is for that generation we want a stipulation put in now.

3592. (*Chairman.*) That no boy under 16 shall be allowed to work?—16 is young enough for any boy to go down a mine.

3593. (*Mr Lewney.*) You mean underground?—Yes.

3594. (*Chairman.*) I suppose that the question of the earnings of those boys to the parents is not so important as the question of age. They might earn something under the age of 16?—They are spoiling the most impressionable years of their life. Those years ought to be spent in education and preparing themselves for the battle of life. Parents ought not to be allowed to exploit the youth of their children. The parents ought to get enough wages to keep them.

3595. I was driving at this, apart from that question of general education. There does not seem to be any particular danger to which the boys under 16 are exposed?—A boy under 16 is certainly, if a boy at all, with some vivacity, and probably likes to have larks, and there is an element of danger in that.

3596. The returns do not show that more boys are injured than men. You base it upon the educational side rather than upon the accident side?—On both, but mainly on the educational side.

3597. The next point is timber in the working places and roads?—In regard to that we hold it to be reasonable. We think that as no one is more likely to know the particular character and condition of the working places better than the man or men who work in them, they should undertake some responsibility for keeping such place safely timbered as far as they can, and such responsibility should extend two fathoms from the face of their working place, but no further.

3598. (*Mr. Lewney.*) Do you mean to say the timber must be kept 12 feet back from the working place?—Yes; there is a little difference of opinion amongst our men as to that. They think 12 feet too far.

3599. (*Chairman.*) Do you mean that you must keep the timber 12 feet back?—The workman in the place must be responsible for the timbering of his working place and for 12 feet out.

3600. What is the present rule with regard to that?—The present rule is, in most mines, that the men can be brought out and told to put up a set of timber, and they get no pay for it. According to the reports I received there is not a single mine in the district where men are paid for timbering.

3601. We are on the question of safety. Why is the present system unsafe? That is what I want to understand?—Because the workman is, to a large extent, responsible for the timbering, and it arises in this way. If men are working on ton price they get so much a ton. The bargains are fortnightly, and, if on the last day of the fortnight, the men have a certain quantity of metal to get in order to obtain a reasonable day's pay, if the men do not get that metal out they do not get a reasonable fortnight's wage.

3602. At present they are responsible for a longer distance back than 12 feet?—Yes.

3603. You want to make them only responsible 12 feet back from the place in which they are working?—Yes.

3604. The point is, they want to get all the wages they can earn, and think they ought not to be responsible for more than 12 feet back?—Yes. If they are called out on the last two days of the fortnight to put up timber, or even if the timber is required, and it is a question of safety or wages, it is the tendency of the men to neglect safety and go for the bread and butter.

3605. Mr. Lewney will ask some questions upon that presently; it is a point he will understand very well indeed. Then you advocate winding enginemen having certificates?—Yes. We have, in the district, a more than steady and superior set of workmen as enginemen, and I feel sure that 90 per cent. of the men at present working would be able to pass any kind of examination.

3606. What is the use of putting it on them if they are sure to go through it?—They do not ask for any exemption, and there are cases where any man or half a man is considered good enough to put upon an engine.

3607. But if there are no such cases here?—I said 90 per cent. could pass.

3608. Have you a certain number of enginemen here not fit for their duty?—We think so.

3609. Perhaps you could give us those names privately?—Yes, privately; but in the main I want to emphasise it that 90 per cent. of the enginemen throughout the district would be able to pass an examination.

3610. Is it not likely that a man who was not a good engineman would be able to pass the examination, and that a man who was would fail?—We suggest in another place that in addition to passing the examination he must have two years' experience as an engine driver in an iron ore mine—a kind of apprenticeship; and that he ought not to be allowed to wind men up or down a mine until he has had two or three years' experience of working an engine, not as chief hand, but as second hand.

3611. How many enginemen have you in the district altogether with 25 or 32 mines?—Nearly 200.

3612. They belong to this association?—90 per cent. belong to our association.

3613. You are no doubt aware that is a very wide question which has been before the public for some years, the question of certificates for winding enginemen?—Yes, but 90 per cent. of the enginemen in this district who are members of the association would like it.

3614. You are aware that this question of winding enginemen's certificates has been before the public and Parliament for many years?—Yes; in fact there has been a Bill introduced into Parliament—the Persons in Charge of Machinery Bill.

3615. You are in favour of winding hooks?—Yes.

3616. You have a special opinion of one known as the King's?—Yes. There will be called before you Mr. George McWilliams, who has been for 50 years employed as an engineman at Stirling's, and he speaks very highly of it. They have them there, and you will get it better from him.

3617. You would not be specially favourable to putting King's into an Act of Parliament?—I have no commission from King's.

3618. (*Mr. Lewney.*) Are we to understand that these are detaching hooks?—Yes.

3619. (*Chairman.*) I thought he meant that?—I would not say more in favour of King's than any other, but I do not think that the last word has been said in regard to cages at all.

3620. Then you think that some of the machinery should be duplicated?—No, but at Beckermet they have the duplicated machinery, and they have spared no money to safeguard things. They have put themselves in this position, if one set of machinery breaks down, probably in 10 minutes they have another set going. Even that generous precaution from the monetary point of view would not prevent an accident if the two sets went wrong or some other accident happened.

3621. Do you mean that you would have three sets?—No. In a mine like that we say that there ought to be another way out.

3622. It comes back to the question of double shafts?—Yes.

3623. It is a question of exit?—Yes. We do not want the duplication of all machinery.

3624. The next points I have all bear on the question of deductions from wages for materials supplied?—That is a very sore point.

3625. You have said in the course of your statement that the Truck Act does not apply to this part of England?—No.*

* The witness evidently had in mind the order of exemption of the 30th July 1897. This exemption, however, only applies to persons engaged in iron ore mines and limestone quarries in the Furness or detached part of Lancashire and in the Millom Urban District in the county of Cumberland.

3626. Why does it not apply to this part of England?—There is a very large number of things charged to a workman in this district, which is absolutely in flagrant defiance of the Truck Act.

3627. I drew that Act myself, and I am well acquainted with it, and you surprise me when you tell me that it does not apply by statute to this part of England. I think you are wrong?—I wish you had the administration of it down here.

3628. We have. Have you made any complaint to the inspectors of a breach of the Truck Act which has not been immediately attended to?—We have not made any complaints on that heading.

3629. We are speaking of the amendment of the law. If the law applies, and it is illegal to charge men more than the cost to the employer of the article, but it is not observed, no amount of fresh legislation will do any good?—If we make a complaint to the inspector and the inspector takes action, the probability is that the men who make the complaint would have to suffer in some places.

3630. So they would under any possible new Act we pass, if it comes to that?—No. If it was laid down, or a section was put into any prospective legislation which should be passed, that the things should be supplied at cost price and it was put in the Act.

3631. But it is in the Truck Act?—They do not know what the Truck Act is.

3632. You knew all about the Truck Act?—Yes.

3633. Seeing all these evils, and knowing about the Truck Act, did you not think it your duty to complain to the inspector that breaches of the Act were going on wholesale in the district, and should be stopped; did you not think it your duty?—No; it is the recrudescence of an old system which is going on.

3634. If you knew the law and the evil, why did you not complain?—When you talk to miners about the Truck Act, they do not know what you are talking about.

3635. But they have you to help them to know the law; why did you not complain?—Because it would have necessitated a prosecution.

3636. Any law will do that?—I think, if it was laid down clearly in a new Act that the things should be supplied at cost price, without any prosecution at all, the great majority of owners would acquiesce.

3637. If you did not complain under the old Act, why would you under the new Act?—It would be in the Metalliferous Mines Act.

3638. It does not matter. A law is a law, and if a great evil is going on, and you are there as the secretary of the miners' association to see that the law is carried out for the benefit of the men, and you do not make any complaint, I own it surprises me?—The men would not allow a complaint to be made.

3639. Has any man come to you and suggested, "I am being charged too much; mind you do not complain"?—Yes, several times.

3640. They have prevented you complaining?—Prevented me complaining. They are afraid in most cases.

3641. According to that if it was put in a new Act they would prevent you complaining?—It would be an incentive to most of the employers (I say "most") if it was put in the Act that these charges should be net cost price, or we would even agree to some slight increase upon that.

3642. I would not agree to any?—We think if it was put in the Act the employers, without prosecution or trouble, would acquiesce.

3643. Have you never been to any of the employers? You are not afraid to go to them. Have you not said, "you are breaking the Truck Act, and "the men are afraid to make their complaints publicly "will you not do something, you know the Act." Have you done that?—Unfortunately there are no facilities for that.

3644. Have you never written to them?—Yes, but they never answer.

3645. What complaints have you made about the Truck Act; to what single employer?—Not one, but it would be treated the same as most of the other complaints.

3646. I assure you it would not if written to the Home Office. Throughout the country there have been a good many complaints about the Truck Act, and I can confidently answer for it—it is my department—that not one single case has remained without redress at once, and if you will send in your list of cases of breaches of the Truck Act to-morrow, I will undertake to say that in a week or a fortnight you will get an answer, and the whole grievance will be, if it is possible, remedied. Will that not content you, under the present Act?—I would sooner have it in the Act.

3647. You might make a beginning next week?—I will not miss that point. We have Lord Leconfield's employ where the Truck Act is practically observed.

3648. He seems to know of it?—In one employ they charge 3*s.* a pound for dynamite, 4*d.* for candles, 1*s.* for fuse, and 3*s.* 6*d.* for caps. At another employ, at the Kelton Mine, the charge is 6*s.* for dynamite, 6*d.* for candles, 1*s.* 6*d.* for fuse, and 4*s.* 6*d.* for caps.

3649. I see a field for your activities. You had better commence I think?—I have been railing at these things for years.

3650. You have not taken the obvious course?—Simply because the men dare not.

3651. The men have held you back?—Yes. Here is a case last Saturday where a company of men earned 25*l.* 15*s.* 3*d.* and the deductions amounted to 13*l.* 8*s.* 10*d.*

3652. You had better not go on; the men will be very angry. I understand they are holding you back?—Yes, but they are not here.

3653. We had perhaps better not publish this part of your evidence?—We want it published.

3654. I think if you will try and put in operation the law as it is, and learn what it is, you will find you will get considerable redress on these points?—I have a bill here I would like to hand in.

3655–6. I have heard you upon this point, but it is not really a matter with which the Commission is concerned; similarly the point you raise about workmen's compensation and some other points are not for us?—I think there has been a suggestion permeating all the evidence given, that we should have a composite Act.

3657. I do not think Parliament would be likely—it is not for me to say—to put every single thing affecting the workmen into the Mines Act, *e.g.*, truck, compensation, and old age pensions?—This is a very vital point. I would like it put down that 12 per cent. of the earnings of the miner is taken from him in charges.

3658. Now we come to the point you raise in reference to the Workmen's Compensation Act. I do not think we can go into that under our Terms of Reference. Then with regard to the returns relating to accidents: you say that these are incomplete—cases being known where non-fatal accidents were not reported through the union because the men were threatened with refusal of future employment if they claimed compensation. Is this under the Workmen's Compensation Act?—Yes.

3659. We will note the point, but it is under another Act: we are dealing with the Metalliferous Mines Act?—It arises out of the fact that the owners have to report to the inspector, and the inspector's report of accidents is published as a Parliamentary Paper, and that Parliamentary Paper is incomplete. It is not a general thing, but there are cases where men have been warned, "You can get "compensation, but if you get compensation you will "get no more work."

3660. I think a case of that sort is outside our scope. It is not in our Reference. I have noted the point?—There ought to be a remedy for that kind of thing somewhere.

3661. With regard to housing, that question is also outside our Terms of Reference?—It shows the general need for good changing-houses. The houses in this district are very wretched.

3662. We may take it in that form, it buttresses up the case for good changing-houses. You are not in

favour of any exemptions being made for small mines?—The small mine owners are the greatest sinners in regard to wages, ventilation, sanitation, and working conditions in general.

3663. You would close them in fact?—No.

3664. If they are only on the margin of existence what would you do?—They take up old workings which the big companies drop because they cannot be run on commercial lines, and they will form a company, and it is only by the sweating and exploitation of the workmen, and using cheap materials, and spending no money on timbering that those things can be run. They are a nuisance and a danger to the district.

3665. Is it better for them to be closed?—Yes, if they cannot be made safe.

3666. What would become of the workmen?—They would get work in the other mines. If they were closed the output of ore would not be reduced, because the mines where they treat the men in a respectable way would still have the ore to supply.

3667. If it was not brought in by foreign competition from the outside. You want Tariff Reform?—Tariff Reformers import the foreign ore.

3668. You think that the competition of foreign ore should be stopped. You want to create a scarcity?—No, we want the Nationalisation of the mines. That is really what we want.

3669. That I think is outside our Reference too?—I am sorry that it is.

3670. You do not seem to be afraid of the possibilities of closing a number of mines?—These little mines are a danger to the district and they compete unfairly with those big mines who pay their men a decent day's wages. It is only by the exploitation of the workmen that these mines can be run.

3671. The wages earned are less?—Ridiculously less. Here is one where the miners earn 9*d.* a shift and the labourers 1*s.* 9*d.*

3672. How much does a man earn a week in one of those small mines; I want to know how many shifts he does in the week?—Six. That is 4*s.* 6*d.* a week for a miner.

3673. (*Mr. Thomas.*) Is that wages account or contract account?—There is a man's wage bill.

3674. (*Chairman.*) We cannot go into this question of wages, but we will take your statement as being put forward in support of your proposal that the small mine should not be exempted from the Act. I presume the mine of which you speak is a small mine?—It is a small mine.

3675. I have gone through all the big questions, but there are a number of smaller points which you raise. There is, for instance, a point on explosives. When shots misfire precautions should be taken in ramming?—Yes.

3676. You may take it that that point is a good deal before us, and your suggestion here will be considered. I will read it out, "A charge of dynamite or "other explosive which has misfired shall not be "unrammed, and any owner, agent, or deputy ordering "men to return to a working where a charged hole "has missed fire within 40 minutes from the time of "the misfire being known shall be guilty of offence "against the Act." Where are these proposals taken from?—I have constructed those myself.

3677. They represent the present practice in coal-mines. I seem to be familiar with them?—I have not seen the Coal Mines Act, but it struck me that provisions of that kind ought to be made.

3678. I am sure I have seen them before; at all events, we take it, some care should be exercised on that point?—We may take it these two matters will receive the very careful attention of the Commission.

3679. You can be sure of that. Then there is a question I do not quite understand. You say the present Act gives power to individuals to contract themselves out of the provisions of the Act; what Act is that?—By special rules. It means, if they draw up special rules, they are submitted to the Secretary of State, signed by the inspector, and have the same force as if they were enacted in the Act.

3680. Surely you are not against the making of special rules; a code of special rules is considered a great palladium?—We think the special rules ought to be part and parcel of the Act.

3681. Supposing the Act is passed and a danger arises, would you deprive the Secretary of State of power to deal with it by special rules?—No, I would confine the making of special rules to matters of emergency of that character.

3682. It is not a matter of emergency. Supposing a new invention is brought in—a dangerous one—and it becomes necessary to lay down rules for its use, you would not wait for an Act of Parliament?—That would be a case of an emergency; that would be something that was not anticipated at the time of the passing of the Act; but, in regard to laying down a comprehensive scheme for working by special rules, we think it a loose way of doing things.

3683. You could not put it higher than this, that everything that can be done and foreseen in an Act of Parliament should be done?—Yes.

3684. You would not oppose the Secretary of State having further powers?—No.

3685. To establish supplemental special rules where necessary?—No, he must have some discretionary power we know.

3686. In making the special rules you suggest they should be seen by the workmen beforehand. You get that from the discussions on the same question in regard to coal mines?—Yes.

3687. It has been gone into at length. They should not only have the opportunity of reading them, but of taking them away?—Yes.

3688. They should have copies of them?—Yes.

3689. You have something to say in regard to the evidence given by Mr. J. B. Atkinson, H.M. Inspector of Mines for the Newcastle district (questions 2259 and 2260). You say: "We have had to make several "complaints and we go so far as to advise our men "not to go down the pit if they know they are "going to be left by the engineman. In case of a "flood or fall or sickness there should always be an "engineman within call"?—We have had two.

3690. Do you agree with Mr. Atkinson's view?—Yes. Mr. Atkinson suggested there always ought to be an engineman on duty.

3691. Then upon that point you agree with him?—Mr. Atkinson says "Another point of difference "between the Acts is that the attendance of engine-"men in certain cases is not compulsory? When "men are down the pit in a coal mine an engineman "has to be in attendance, but men can be down the "pit at a metalliferous mine without any attendance "of the enginemen."

3692. Yes, but if you go further you find the next question is "and ought that to be altered, or is it "not so necessary? (A.) I do not know that I have "heard any demand for it." That is his answer?—We have complained, not to the inspector, but to two managers. The matter was rectified, but we think it ought to be in the Act.

3693. The next point is with regard to the amendment of section 10 of the Act. It is a small point of improvement in drafting?—Yes, it would enlarge the powers of the Secretary of State and the Home Office. If they want information with regard to a particular subject they would have power to demand it. I would like what I say in my notes on this and some other points to be embodied in the evidence.

3694. Very well, will you read them?—In section 10 we suggest that following the word "form" on line 12, there should be inserted the words "And "give such information as may be" &c. This would enlarge the power of the Home Office, and might occasionally prove of great value.

With regard to section 21 we suggest that subsection 3 requires strengthening so that the last line of the subsection shall read " . . . . . interested . . . . . in any metalliferous mine."

In regard to subsection 15 of section 21, we suggest that there be added after the word "consult"—"and "have power to call for the production of all plans,

"papers, and instruments which may be deemed "essential to the elucidation of any point in dispute."

3695. The next point is as to the exemption in section 23. Subsection 2 *(d)* of this section is very important. "In charging holes for blasting, except in "mines exempted from the operation of this section "by the Secretary of State, an iron or steel pricker "shall not be used." You think that exception ought to be abolished?—I do not think they ought to be allowed to use them.

3696. The power of exemption ought to be abolished?—Yes. An iron or steel pricker would do as much harm in a small mine as in a large one.

3697. The section says "In mines." The suggestion is there may be special mines where it should be allowed?—We do not think it should be allowed in any mine.

3698. Are hematite mines exempted at present?—I do not think so.

3699. Then there is no need to take away this power of exemption which might be useful in mines in some other part of the country?—They might be exempted.

3700. *(Mr. Lewney.)* Are there any mines where they use an iron or steel pricker at present; do you know a single case?—I think I know one case; it is not used with the knowledge or consent of the manager, but the workmen might use it. Consequently you want a prohibition against the use of it.

3701. *(Chairman.)* Doing away with the exempting power of the Secretary of State will not make the slightest difference in the case you have mentioned because it is illegal already?—That is so, but I think the exemption applies to small mines.

3702. It does not say so?—It may be made so.

3703–4. It has not been read so by us, and would not be?—Unfortunately we shall not have you with us for ever.

3705. I think you may take it it is not the least likely that the Secretary of State will make an exception of the hematite mine, large or small. However, it is a small point, and it is not worth while labouring it. Now, I think I have gone through the whole of your points, paying special attention to those which have appeared to me to be important, and I have pointed out the ones that appear to be outside the powers of the Commission?—There is one very vital point.

3706. Please understand that I have taken your notes in the way I did only for the sake of clearness; one does not want to shorten you or not to give you the fullest opportunity of placing your views before the Commission?—There is the question of sanitation in the mines, a very vital question.

3707. Will you tell us about that?—You referred to the memorandum I have put in giving a summary of the replies I received to the circular I sent round to my officials in the various mines. I have made an enquiry in that circular as to what takes the place of a closet in mines.

3708. Yes, I see you refer to that in your notes. Will you please deal with it now?—If you refer to the replies to question 18 asking what takes the place of a closet at your mine, you will find in the whole of the mines there is not one single water closet. The replies are, from 4 employers, they use the gutter; from 4 employers, they go anywhere; from 2 employers, they go to the sump; from 2 employers they have the stream; from 1 employer, Sir John Walsh's Bigrigg, they use a dynamite packing case, and at Wood End they use an old bogey which is emptied occasionally. That is the whole of the sanitary accommodation in the mines, and I feel quite sure, looked at from any standpoint, this is a beastly arrangement, if it can be called an arrangement at all. In regard to sanitation where the sump or stream leading to the sump is used, there can be no objection, but some men are sensitive, and rather than use an open space with men passing to and fro they practice restriction; but the use of old workings, allowing men to go anywhere, is neither respectful to human nature nor conducive to health. May I point out what the Belgian Mines Commission and the Belgian Government have done in this respect? No doubt Dr. Haldane will be conversant with what the Belgian Government has done?

3709. Really, I think if a case is made out we should not wait for the Belgian or any other Government. If the thing is bad I am sure the employers, several of whom I see present here, will deal with this subject. We will ask what they think about it?—I am sure the large employers will do it gladly, but in regard to the small ones you have to use some compulsion.

3710. At all events your point is that the sanitary arrangements leave very much to be desired. What do you think they ought to be? You have put before us the evil. What do you think would be a fair arrangement?—Our suggestion is that where there is a stream running into the sump that there shall be provided, near the sump, one water-closet for every 25 men employed.

3711. With the sewage running into the sump?—Yes.

3712. Would that not be dangerous and bad?—It is not an ideal suggestion or arrangement at all. Something better ought to be done.

3713. However, you suggest it at all events?—We say there ought to be a water-closet and a good flush of water, kept clean, and they should be provided at any place where the owners may suggest down the mines, one for every 25 men who may be employed upon any one shift.

3714. And that there shall be something on the surface for the enginemen?—Yes, there should be an arrangement for the enginemen because it may be necessary for the engineman who is on the night shift—there may be men working down the mine—to leave his engine-house and go out one hardly knows where.

3715. I should have thought as there is a quantity of stuff brought out from the mine, a sort of earth-closet arrangement would be best. You could take care there was a quantity of debris like there is with a mould earth-closet?—The earth-closet is neither healthy nor practicable. It would have to come up the mine.

3716. To be disinfected?—Just the same as this old bogey used at one mine.

3717. I should have thought it was more healthy than putting it into the sump?—That would be emptied occasionally.

3718. Dr. Haldane knows more about health than I do. Personally I agree that something ought to be done, if matters are in this bad condition, to make more healthy arrangements?—The tub system would be bad.

3719. We shall have to consider the whole question carefully. Another point you raise is the question of checkweighing and payment by weight. That again is a wage point and does not come within our terms of reference?—I take it from reading some of the evidence given by Mr. Atkinson and your comments thereon, that the question of checkweighing might come within your province.

3720. I do not think we took evidence from Mr. Atkinson at length?—I did not gather from your comments that it was excluded from the reference.

3721. I do not think we can deal with it. It is a very big question?—It is a big question with us in this county and this particular district.

3722. You want to pay all men by weight entirely?—Yes. We want the men to work on the net ton. There are some mines where there are 60 cwts. for a ton. They do not sell coals that way in London.

3723. We must consider this, but I do not think it is a question for us to deal with?—From the miners' standpoint it is very important.

3724. I agree there may be many important points which are outside our inquiry. I will not rule it out, however, if it is referred to in the terms of reference.

3725. *(Mr. Lovett.)* It affects the conditions as to safety?—Yes.

3726. It makes them rush?—Yes.

3727. *(Chairman.)* I do not think it is within the terms of reference. The reference says: "To inquire "into and report on certain questions relating to the "health and safety of miners and the administration "of the Mines Acts and the Prevention of Accidents "in Quarries." Further, it says, "And whereas we "have deemed it expedient that a further Commis- "sion should issue to inquire into and report on the "health and safety of persons employed in metalli- "ferous mines and quarries, and also to deal with "any matter in relation to metalliferous mines and "quarries, which was referred to the Commissioners "appointed by the aforesaid Royal Warrant." I think the checkweighing question is outside our refer- ence and must be dealt with separately?—With respect do you not think the question of safety arises? Here are some mines where the men get 20 cwt. for a ton. In other mines the men have to get 60 cwt. Is it not conceivable that the men who have to get 60 cwt. will have to rush their work?

3728. It is very ingenious, but I think if you argue in that way I can bring in the sun, the moon, and astronomy?—You can never get the sun and moon into a bogey.

3729. I mean into our inquiry if I argued in that way. I think it would be reading it too far?—I think the question of safety is involved.

3730. I hardly think so. It is involved indirectly, but you have to keep to the main issues. If I were as ingenious as you in introducing things I could bring in anything. So far as I know that covers all the points brought forward by you. Do you think there is anything more?—Yes. We suggest that section 35 should be amended to permit of a prosecution against an owner or agent of a mine for any wilful infringe- ment of the provisions of any future Act by the person directly aggrieved or injured by such infringement or by a solicitor acting on behalf of such person.

3731. You mean he should do it without the consent of the Secretary of State?—Yes.

3732. That might give rise to what some people may call blackmailing prosecutions?—I can quite see the possibility of frivolous actions.

3733. And blackmailing ones by unscrupulous people?—That might be; but, on the other hand, at present the inspector is sole arbiter, with the result that no prosecutions are instituted. It is quite useless to ask the consent of the Secretary of State, who merely refers the matter to the inspector and is guided absolutely by his decision.

3734. I do not think you will find that if you write straight to Mr. Winston Churchill and put your case straight to him, he would be guided by the inspector, if the inspector was not acting justly?—The Secretary of State was guided by the inspector even as regards the constitution of this Commission in this district.

3735. I do not know about that, but I think it is going far to suggest the Secretary of State would not do justice, and allow a person who ought to prosecute to prosecute?—The Secretary of State knows prac- tically nothing about the local circumstances of the case, and consequently we think that a man, if he does bring a frivolous action, has to bear some responsibility for it.

3736. No, it is not a question of bringing a frivolous action; he can always bring his action?—With the consent of the Secretary of State.

3737. No. Do you not see the difference? Every man has a right to bring an action without the consent of the Secretary of State, for damages?—I mean a prosecution.

3738. But when it comes to asking for a man to be punished, then the Secretary of State comes in; in other words, the State is asked to act. You see the difference?—Yes. Take it that an accident had taken place in a mine, and the place was blown up, and the man was aggrieved through that, and he knew all the circumstances at first hand: he ought, if he cared to, to have the power to prosecute.

3739. He might bring an action at present?—He could not prosecute.

3740. Why should he prosecute if the Secretary of State thinks he ought not to?—The Secretary of State knows nothing about it, he is in London.

3741. I think I see the point. We shall consider that very carefully. What other point is there?—I should very much like to place on record my views as to the changing-houses. I attach the very greatest importance to the sufficiency and efficiency of these changing-houses, and I do not at all hesitate to say that the high rate of mortality among iron ore miners in its pulmonary class is due in some measure to the absence of proper changing-house accommodation. Take, for illustration, the case of a man who in the depth of winter is working in a very hot part of the mine, and who, when his shift is ended, comes up the mine wet through either from water or perspiration —imagine that man having to walk home, two or three miles, on a keen frosty night. This is so common an occurrence that no one notices it. The amazing thing is that the rate of mortality is not very much higher. I am quite sure from the number of complaints I have had to deal with that 95 per cent. of the men would change if they had reasonable facilities for so doing. May I mention here that the miners in Germany, not- withstanding the fact that they work long hours, receive less wages, and have a standard of life less, perhaps, than the British miner, live an average working life of five years beyond the British miner? I attribute this almost entirely to the better sanitation and hygienic conditions under which the German miner works, and the excellent arrangements made for cleaning himself and changing his clothes.

3742. One of the first points Mr. Lewney brought before us was the changing-houses, and we have gone into it and measured a number of houses carefully. We have gone into the whole matter?—I think they are better off in the Furness district than we are.

3743. However, the point has been brought forward and considered carefully?—There is the point with reference to men working in a shaft.

3744. That you dealt with, did you not, rendering them responsible for timbering?—This refers specially to men working in the shaft, not men in the working.

3745. You want an overhead platform over the heads of those who are sinking. It must be closed over their heads?—No.

3746. It will not prevent things falling down then? —We suggest that whilst the men are at work sinking a shaft it should be timbered to within 4 feet of their working place, and that a sufficient overhead covering be provided to protect men working in the shaft from anything which may fall down the shaft.

3747. I will leave the Chief Inspector to ask you about that?—We have some suggestions to make with regard to signals.

3748. We have taken that already. I think you may assume we are in sympathy with that proposal. We have considered that already?—We submit that the present arrangements are antiquated, confused, and dangerous, as witness the accident last week at Hodbarrow, which was obviously due to a mistake in signalling. Our suggestion is that the signalling be done by electric bells, and that in every mine there shall be a telephone between the winding engineman and the bottom of the shaft.

3749. Do you not think that in a shallow mine a mechanical signal might be safer than an electric bell? I should have thought a bell that worked with a rod was more sure to act?—The tendency is for shallow mines to become deeper.

3750. But so long as they are shallow do you not think where a mechanical bell can be worked it is safer. If the electricity gets out of order you are in difficulties?—It means a communication by telephone from the bottom.

3751. Take one thing at a time. We are now dealing with the question of signals. If the electricity went wrong or one contact went out of order, you might have an awful accident?—The mechanical arrangement might go out of order.

3752. Which is the more likely, that is the point? —Electricity is the power of the future.

3753. But it is rather a capricious power?—It is being mended day by day.

3754. It is unnecessary to assert that it is the power of the future. Electricity is the cheaper of the two?—I do not think so.

3755. It is easier to run two wires and a bell than a mechanical arrangement?—That may be, but I think with an electrical bell you can get a guarantee to keep it in perpetually good order, or reasonably so. An electrical bell would be more convenient to use, and more conducive to safety than the present method.

3756. I should not have been altogether sure of it, although I am a strong advocate for electricity?—Take one mine 200 fathoms deep; there is no communication between the bottom of the pit and the engineman.

3757. There must be a signal?—There is no communication of any sort. There is the ordinary signal, but there is no direct communication. They could not communicate anything. They could not speak.

3758. You are running off on to the telephone, which is a different point. You do not propose that the signals to raise and lower should be given by telephone?—No.

3759. We are dealing still with the question of the signals?—We think that the electrical bells would be better.

3760. We will enquire into that very carefully indeed. I will not give an opinion on it. It is an expert question. The telephone is a different point. You would like the telephone from top to bottom?—From the bottom to the engineman, and then if anything goes wrong they can speak. Then there is the question of the coroner. I have suggested amendments to the Act which I think ought to be inserted.

3761. What sections are those?—It is section 22 dealing with coroners' inquests.

3762. Give us shortly the general provisions you want to put in; never mind the words of the Act of Parliament?—We think that all notices which the inspector gets should also be sent to a representative of the family, that is a notice of an inquest going to be held, and that the representative of a family at an inquest should also have power to ask questions appertaining to the accident.

3763. Even though the coroner objects?—No, always subject to the coroner. We are allowed that in the district now on sufferance. In a coal-mining district and under the Coal Mines Regulation Act, the representative of the family is freely allowed. We are treated with every courtesy by the coroner of the district.

3764. You said "subject to the coroner"?—Yes.

3765. He should have a power of saying no if he likes?—Yes, but he ought to state his reasons.

3766. It will not give much consolation to the family if he says "I shall not let you do it, and I will tell you my reasons"?—But we may be able to take some action.

3767. You would find it rather difficult to bring an action against a coroner. When you came to consult your solicitor he would tell you you could do nothing?—I would not believe him.

3768. That would not matter if the court agreed with your solicitor. The truth is, there is no grievance in practice. I did not know one had arisen. So far as I know, the coroners do, when the relatives wish a question asked, allow it. It was gone into at considerable length by the Coal Mines Commission, and everybody was satisfied that the relatives were allowed to ask questions, as far as I remember. The point was you could not give people a right to go on, because, if they once began they might go on for a week without power from the coroner to stop them?—Yes.

3769. You see the difficulty?—Yes.

(*Mr. Redmayne.*) He is asking for the same right in the metal mines as exists in the coal mines.

3770. (*Chairman.*) Yes. I imagine we should be inclined to treat them on a par?—That is all that is suggested.

3771. That is the substance of what you ask?—Not exactly. There is another point, and that is, the coroner shall be deemed disqualified from holding an inquest upon the body of any person whose death has been caused by any explosion or accident in any mine in the affairs of which he is by himself, partner or partners, directly or indirectly interested.

3772. Has any evil arisen from this?—There is one case which has arisen where a coroner was indirectly interested; there is a prohibition in the Coroners Act, but as we have a particular section in this Act dealing with it——

3773. Is there a prohibition in the Coroners Act?—Yes.

3774. It would apply to this clearly. Whatever provision there is generally for preventing coroners acting when they ought not to act, would apply to any inquest. We will take the point, but I should think there is no cause for alarm?—The next point is, that the coroners shall, either at the request of the inspector or the representative of the family of any person whose death may have been caused by an explosion or accident in any mine to which this Act applies, take and keep a record of the material facts given in evidence before him at an inquest upon the body of any such person, and a certified copy of any such depositions shall be obtainable from the coroner by any interested party upon payment of a fee not exceeding 1*s.* per folio of 150 words.

3775. If the Departmental Committee on Coroners is still taking evidence on this subject, we will transmit that to them?—Except in a case of murder or manslaughter, the coroner is not bound to take any depositions, and we found one case where it was very desirable.

3776. We will consider whether we can deal with it, but there is a Committee which has reported this year upon the whole question of coroner's law?—Then there is a point with regard to section 7 of the Metalliferous Mines Act. "We suggest that where there is a shaft, "incline, plane, or level in any mine to which this "Act applies, whether for the purpose of an entrance "to such mine, or of a communication from one part to "another part of such mine, and persons are taken "up, down, or along such shaft, plane, or level, by "means of any engine, windlass, or other appliance "driven or worked by steam, electricity, or any "mechanical power, a person shall not be allowed to "have charge of the engine working such appliance, "unless he is a male over 22 years of age."

3777. That is changing 18 into 22?—No, this is the engineman: "and with not less than two years' "practical experience in the working of such engines "in connection with metalliferous mines."

3778. The difference between section 7 and your proposal is that instead of 18, as at present, you would have it 22 years of age?—Yes, and he should have two years' practical experience in the working of mines. I take it our suggestion that no deductions from wages——

3779. That is the Truck Act question. I think that is provided for?—Then we would suggest that "a male young person between the age of 16 and 18 "shall not be employed in or allowed for the purpose "of employment in any mine," &c.

3780. That is the question of the employment of young persons?—And "(1), There shall be an interval "of not less than 16 hours between each period of "employment, and no male young person under the "age of 18 shall be employed on the night shift. "(2) The period of each employment shall be deemed "to begin at the time of leaving the surface and end "at the time of returning to the surface. (3) A "week shall be deemed to begin at 6 a.m. on Monday "morning and end at 12 o'clock noon on Saturday. "The arrangements now in operation in regard to the "division of shifts and working hours to be the basis "of any future legislation regulating the working "hours of all employés in, on or about metalliferous "mines." There is no dispute between the owners and ourselves in regard to working hours in the district, consequently we accept the present basis and suggest that it be inserted in the Act.

3781. Of course the question of restricting the employment of boys under 16 with a view to their

better education is a wide question affecting the country. It is more than local. What ought to be the rule here, ought to be the rule universally?—I do not think any boy ought to start under 16 years of age.

3782. You are putting the proposal forward in a general way?—We are dealing especially with the boys here. We do not expect every boy in the district to be brought up to be a miner.

3783. The rule you are suggesting would be a rule of universal application?—I should like it to be so, but we are dealing especially with this district.

3784. (*Dr. Haldane.*) I think you suggest that the occupation of a hematite miner is rather unhealthy, especially as regards the respiratory diseases?—Yes, I do.

3785. Have you any statistics to support your opinion?—I think Dr. Tatham's tables rather go to show that. I would like it to be pointed out that the iron ore mining industry has been for many years a neglected and almost forgotten industry, and there do not seem to be any statistics. People seem to have forgotten it has existed.

3786. There are statistics for ironstone miners in his tables?—Which do not apply here.

3787. How do you mean—do they not include the men here?—They may include them, but his tables are fallacious because there is a difference between the getting of ironstone and the getting of iron ore.

3788. I understood they included all ironstone miners, which includes all miners employed in getting iron ore?—That is where grave injustice is done to the iron ore workers of Cumberland: they are put under the head of ironstone mining, which is different.

3789. They go with the Cleveland men?—They shove them in anywhere: they are not particular.

3790. They put ironstone miners all together?—Yes. There ought to be a different table drawn. I would suggest that a similar enquiry be held in regard to the iron ore miners of Cumberland as was held in regard to the miners of Cornwall, or that the data now held by the registrar of deaths in the district should be gone into, and proper tables from which a basis could be raised should be established. Here is what is called a standard work, written by a standard man, "The Diseases of Occupation," by Dr. Oliver, and there is not a reference to iron ore miners in it.

3791. Is there not in that book an article by Dr. Tatham, of the Registrar-General's Office, which gives statistics about ironstone mines?—That is in Dr. Arlidge's work.

3792. I think it is in that book?—There is not a word about iron ore mining in it.

3793. What is that book?—"The Diseases of Occupation."

3794. Is there not an article by Dr. Tatham, of the Registrar-General's Office?—On the general question of drills, stone drilling and that kind of thing. He quotes tables of Dr. Tatham, but there is no reference to the mortality of iron ore miners.

(*Dr. Haldane.*) This is not the book.

(*Chairman.*) There are two books by Dr. Oliver.

3795. (*Dr. Haldane.*) I am thinking of the last one, on dangerous trades. I do not know what is in this one exactly. At any rate you have looked at the Registrar-General's existing tables on the subject of ironstone miners?—Yes.

3796. Are you aware that the mortality among ironstone miners, taking the Cleveland men with the men here, from respiratory diseases is extraordinarily low? You have noted that point?—Yes, but I say again that they have no specific application to the iron ore miners. The iron ore miners are included in the general statistics, and I think from my three years' experience of iron ore miners I am entitled to say that quite 60 per cent. of the iron ore miners who die in West Cumberland die from respiratory disease of some kind or another.

3797. Have you considered the proportion of men of the same age who die from respiratory diseases in any other average occupation—that must be your standard of comparison?—I do not know whether you have heard of Mr. Blossom: he is a very eminent Friendly Society actuary, and he gives a table showing the amount of illness among miners in comparison with other occupations, and he groups them together, quarry, iron and steel workers; whether it is at the bottom of the quarry or the steel, the iron ore miner is here somewhere.

3798. I should not have thought it?—Then there is the miners' group. In that case the sickness from 16 to 44 among railway men, 116 weeks; quarry, iron and steel workers, 152 weeks; miners, 183; and he gives the mortality tables. In the agricultural group the average age is 62, from 16 to 44, the percentage of deaths, and the agricultural group is 64; the railway men's group is 63, and the miners' group 70.

3799. These tables are not very clear as regards ironstone miners?—No, we have no reliable statistics with regard to them.

3800. I will point out to you that there are the statistics of the Registrar General for ironstone miners, including Cleveland with Cumberland, as I understand it, and these statistics show that ironstone mining is one of the healthiest of occupations, especially as regards the respiratory diseases. It surprises me to hear you express the opinion that it is an unhealthy occupation?—It is almost an entirely different industry. In some of the Cleveland mines they can walk: there is no shaft.

3801. They are all included in the statistics?—Yes; we want them divided.

3802. It is possible to get that?—I think, too, that there is something in the different housing accommodation among the ironstone workers of Cleveland and the iron ore miners here, which is reflected in the mortality tables.

3803. Taking them all together as they stand in the evidence, the presumption is that the men here are extremely healthy as well as those in Cleveland?—Those tables are not reliable in regard to the health and mortality of the iron ore miners.

3804. You cannot say how much of the good health is due to Cleveland, and how much to Cumberland, but on the whole the health is extraordinarily good, taking the two together?—Yes, but it is a question of percentages.

3805. I want to know whether there is any evidence that there is anything injurious in the dust, for instance, in these mines here. I have always assumed that there was none?—I think there is very little arising from the dust from hematite, but there is from the stone. Then there are the fumes, and the gas which is created to some extent at all events in the mines. I may point out that the two prevailing diseases among miners in this district are pneumonia and bronchitis. Some miners live to a very healthy ripe old age. I know one man well, working to-day over 70 years of age. He has worked for 55 years in the mine. There is a question whether his grandson will ever live to be that age.

3806. Then there is the question of rock drills. I daresay you are aware that the Coal Mines Commission has recommended that in cases where work is done with rock drills in drifts in siliceous stone of any sort they should provide sprays and jets by law?—Yes.

3807. Do you think that provision would cover the conditions here?—There would be some difficulty in getting the men to use them. If you make a stipulation of that kind and say that the employer must provide a man who shall do the spraying and pay that man, then I think it would be possible.

3808. Do you mean in addition when working the drill, and a sprayer which probably works automatically?—Sometimes those automatic things require a great deal of work. They are called automatic. Those penny-in-the-slot machines are supposed to be automatic, but I have lost about 1*s.* 6*d.* in them.

3809. Anyhow, there is very little work with rock drills in hard stone?—In my judgment—I have only seen them worked once, but a man who is working drill machines has enough to do without being bothered with any supposed piece of automatic mechanism.

3810. There are usually two men there anyhow with the drills?—If there are two men and two men's wages——

3811. Have you seen these things in operation, because they work effectively in Cornwall? This is going to reverse all that has been done in Cornwall. Have you seen one being worked?—Yes, I have seen one working.

3812. Down below?—No; but in an ironstone mine——

3813. (*Mr. Thomas*) You have seen a drill?—No, one of these drill machines. The man had it on his chest.

3814. (*Chairman.*) A sprayer we are asking about?—No.

3815. (*Mr. Thomas.*) A man had a drill on his chest?—Yes.

3816. (*Mr. Greaves.*) One he works like this (*indicating*)?—Yes.

3817. Not a machine drill?—No.

3818. (*Chairman.*) Your experience has been you have put a penny in the slot and it has not come out. That is practical knowledge; but I do not think you have seen a spray machine?—No.

3819. Really I do think it is not worth while pursuing it. You had better produce somebody who says he cannot attend to both the drill and the spray machine?—We can do that.

3820. It is rather imaginary?—Hardly.

3821. I would rather take your evidence on the penny-in-the-slot machine than on this question?—The man who has a drilling machine to work has enough to do.

(*Chairman.*) It is suppository. It is not your trade and it is not mine. I should not give an opinion with confidence.

(*Mr. Redmayne.*) He does not work from his chest either.

3822. (*Chairman.*) Perhaps we can get somebody who has tried it and says he cannot manage it. If I heard that, I should think there is something in it?—There is not a spray in use in the district.

3823. I think we must have the evidence of men who have tried to work them and failed before we attribute importance to it?—We have the drills, but no spraying machines.

3824. Then I do not think it goes for much, does it?—I take it Dr. Haldane suggests if the spray machine is in use it minimises the effect of the dust.

3825. It does; there is no question about that. You say a man cannot do the work and use an automatic spraying machine. I do not object to your stating it, but I ask if you have seen it fail, or can you produce anyone who has?—No.

3826. Then I do not think the evidence is worth much?—I do not think there is one in the district.

3827. I think it is better to drop that part of your evidence, because you do not know anything about it?—I admit that, because there are no facilities.

(*Chairman.*) If anybody will come who has failed with it we shall be delighted to hear him.

3828. (*Dr. Haldane.*) You mention one or two cases where men had apparently got gassed underground?—They were found dead underground, and from the evidence given at the inquest it was clear the men were affected by bad air. In one case the pipe conveying the air was 60 feet away from the working where this man died.

3829. Was the medical evidence to the effect that it was from bad air the men died?—I do not think there was any medical evidence given.*

3830. A man might easily drop down dead from heart disease in a mine. It is a thing that happens now and then?—It is conceivable, but in both cases the evidence given by the wives was to the effect that the men came home complaining about bad air, were unable to take food, and they went to work without taking their food, and the wives certainly thought it was on account of the bad air the men were unable to take food, and consequently they died.

3831. That is very unsatisfactory sort of evidence on this question. It is rather important to know whether cases of gassing from fumes from explosives do ever occur. They might occur quite well. They occur in some mines, although they are rare in this country. We should like to know of any undoubted cases of men being affected?—I will look up the newspaper reports of those inquests.

3832. I think it might help the Commission. There was one man who was believed to have got fumes from an oil engine?—Yes, and bad air as well.

3833. That is bad air. If it is the exhaust from an oil engine it might poison him easily?—This young man was practically asphyxiated. He fell down the mine and lay there for a considerable period.

3834. I want to be sure about the objection to compressed air. You have said men objected to it. Do you mean air delivered from the compressor?—Yes.

3835. Which is used for working machinery down a mine?—Yes. They do not think it effective, and to some extent they think it is deleterious.

3836. Are you aware that is used in mines constantly?—Yes. Temporarily it would be useful, but I mean as a permanent means of ventilation.

3837. It might be quite sufficient?—Yes. They do not object to it being put in temporarily.

3838. (*Chairman.*) Why is it deleterious?—By becoming constantly used it becomes deleterious. It may be beneficial at the beginning and deleterious in a period.

3839. (*Dr. Haldane.*) That is because there is not enough of it?—That may be.

3840. If you depend on that alone and there is not enough, it would become deleterious after a time, but that would not be the fault of the compressed air itself?—In one case I have in mind the men complained when they came home that they could do nothing. Their heads were dizzy.

3841. Might not that have been by reason of the gases from explosives in the place not having properly cleared away?—No. After the compressed air was done away with they were all right.

3842. Was there not some other means of ventilation provided?—There were fans put up.

3843. Then there was good ventilation provided?—Yes.

3844. That was not the effect of the compressed air, but the effect of having too little of it?—They did not like the effect of it.

3845. It was probably because there was not sufficient air delivered by the pipes?—I made a mistake in one statement I gave this morning. I said the loss on the sick club in one year had been 400*l.* I have taken the wrong table. The actual loss was 722*l.* 16*s.* 10*d.* in a single year. I suggest that owing to the ill ventilation of the mines that sickness is caused, and it is very prevalent, and is due largely to bad ventilation.

3846. (*Chairman.*) Have you a doctor's opinion upon that?—I have asked for no doctor's opinion, because, unfortunately, a large number of the doctors in the district are doctors for the insurance companies, and consequently we do not expect from them an unbiassed opinion.

3847. If you are going to say no man who has an interest in a matter has an unbiassed opinion people will ask whether you have. We must take the evidence the best way we can get it?—We try to get that.

3848. Have you not a doctor you could suggest to come forward and support this view?—I do not think so; there is not one I would call.

3849. It is difficult for us to assume a state of things is so unless we know something about it. We do not know how much sickness there is and how far it is caused by dust or by the men who have been to the Transvaal coming back here?—When they go to the Transvaal it is not often they come back here to work.

3850. But they die?—They die here, but sometimes they do not start work when they come from the Transvaal, they simply come home to die.

3851. It would be very much more satisfactory if we had some doctor?—May I suggest that the returns of deaths in the district be taken; they would not show the sickness, but deaths, and the cause, among the iron ore miners.

* But *see* note to question 3433.

3852. (*Mr. Lewney.*) Could you nominate a doctor in whom you have absolute confidence?—No, not one.

3853. (*Mr. Thomas.*) What about the medical officer of health for the district?—I cannot recommend any doctor at all.

3854. You surely have a professional gentleman here of repute?—Take one medical officer of health, he appointed himself.

3855. He cannot do that?—He did it. It was his casting vote on the Cleator Moor Council that appointed him.

3856. (*Chairman.*) We cannot assume a state of facts without some evidence to go upon?—I think if an inquiry was conducted in the same way as the Cornwall inquiry was conducted it would lead to revelations.

3857. You mean that somebody should test the air in the mines?—I would go further: not only the air in the mines, but as far as possible examine the men themselves, an independent medical inquiry.

3858. Of course it will be independent. I do not know what you mean by "independent"?—I have a right to my opinion. As the result of my three years' experience in this district I would not rely on the medical testimony of any medical man in the district.

3859. You suggest a medical man from another district to come?—Yes.

3860. (*Mr. Lewney.*) My idea was that a medical man resident in the district who had attended these people would be most likely to know the complaints from which they suffered?—I entirely agree with that. In some cases the medical man will know; but will he give it?

3861. (*Chairman.*) Do you mean if we took any mine at random and examined the men we should find half in an infirm state—if an independent man came from London, if you like, and examined the men in any mine, he would find half of them ailing?—I would not say one half, but I should certainly say 40 per cent. of them would be affected by respiratory disease of some kind or another.

3862. Dr. Haldane says that is about the number affected in an ordinary way among the population, so that if you went into shops above ground you would find people with some commencement of respiratory disease. It is a difficult matter. We could perhaps find some help in the Registrar-General's statistics, and we will go into them. They require to be taken out for us?—May I suggest the Home Office and every public office that compiles statistics in regard to industrial matters should take the iron ore miners as a class and not mix them up with other classes.

3863. You mean the hematite iron ore miners?—The iron ore miners in Cumberland.

(*Dr. Haldane.*) They are taken as a class already.

(*Mr. Lewney.*) Only this, that the Cleveland ironstone miners who are under the Coal Mines Regulation Act are classed with the hematite miners.

3864. (*Chairman.*) The point is if the Cumberland iron ore mines are abnormally bad, it is certain the Cleveland miners must be healthy beyond the dreams of man, because the two together are the most healthy trade we have got. If we prove you are abnormally unhealthy, then I do not know what the condition of the Cleveland ironworkers must be?—I am not concerned with the Cleveland ironstone miners.

3865. Yes, you are?—If I was I should say that their annual return of the amount they spend on sick pay and upon convalescent homes and upon men who are ailing is in absolute defiance of every statistic published in regard to them publicly.

3866. According to that, all the statistics of Dr. Tatham are wrong?—I think I pointed that out this morning.

3867. You said so this morning?—I would not like to say that Dr. Tatham, who tries to do what is fair, is wrong.

3868. Not intentionally, of course?—But the grouping is wrong, and it is owing to that that unfair inferences can be taken.

3869. If it is owing to the grouping, the grouping together shows a healthy trade, and if you are unhealthy the Cleveland people must be more than normally healthy, which is beyond what we can believe?—I do not believe we have a proper definition of grouping

3870. We will deal with this as best we can. If you can help us with any doctor's evidence we shall be glad to hear it. We shall hear any doctor we can, whether on one side or the other?—You can hear on one side.

3871. You mean there are plenty who will tell us the place is very healthy?—I will not say that.

3872. You said "on one side"?—I could not say a doctor would come here and give you the notes that are in his book.

3873. (*Mr. Redmayne.*) With regard to what you said about the desirability of a second outlet, do I understand you to mean by double shafts two distinct shafts separated one from the other with strata between?—We should like that.

3874. Not two outlets by means of the same shaft?—That is the alternative. We do not want two outlets of the same shaft; we want an outlet apart from the shaft.

3875. Two distinct shafts with strata between?—Or as suggested this morning, where there are mines adjacent to each other.

3876. That is the same thing—two distinct shafts?—The shafts need not be sunk by the one company.

3877. Have you gone into the question of the cost of these shafts?—No; and to be very candid, we do not care about the cost.

3878. You take this position: you advocate an additional shaft even if it meant the closing of several mines?—If there could not be a second outlet made we should insist on a second shaft at every mine, even though it meant closing up.

3879. And throwing out of work a good many men?—They are better out of work than dead.

3880. Have you known a case where any lives have been lost in the iron ore district through the want of a second shaft?—No, but there has been time lost.

3881. You have known of lives being lost?—No, not that I can remember in the three years, but there has been a large number of hairbreadth escapes which are never reported.

3882. You have not known of a single life being lost?—No, not during the last three years.

3883. (*Dr. Haldane.*) Could you specify any of the narrow escapes you speak of?—Last year, probably 18 months ago, there was a number of men entombed in this district.

3884. (*Mr. Redmayne.*) We would like to know the cases, because it is a serious thing you are advocating?—I think it took place in a mine belonging to the Wyndham Mining Company.

3885. What was the date? Was it within a month or two?—About 18 months ago.

3886. That was not due to the fact of the shaft being closed?—The men could not get out.

3887. Two shafts would not have got them out?——It might have.

3888. How?—They might have gone the other way.

3889. You are not only advocating two shafts, but a very close definition of where they should be?—No; that was only one case. I was asked if I could give an instance of a hairbreadth escape.

3890. No; you were asked could you give any case where the absence of a second shaft led to a hairbreadth escape. I take it this case was not due to the absence of the second shaft?—The second shaft would have been helpful; the men could have got out sooner than they did.

3891. Am I right in supposing that it was due to the obstruction of a road leading to that shaft?—No, it was an inrush of sand.

3892. That is an obstruction barring the men off?—Yes.

3893. I cannot see, speaking as a practical man, how a second shaft would have got the men out differently?—It would not have obviated the accident, but it might have tended towards the quicker rescue of the men. The men got out safely, admittedly because

the Wyndham Mining Company is one of the most careful in the district.

3894. The men were drawn up the shaft?—Ultimately.

3895. The exit was not obstructed so far as the shaft was concerned?—No.

3896. With regard to the area of these mines, can you give the number of men employed in the cases where the second shaft is at present used?—I could get that out for you. I have not it ready.

3897. I could get it out myself, but I thought you might give it off-hand?—No.

3898. Now, passing to the question of changing-houses, you advocated, I understand, several points in connection with them, but one in partscular was that they should be absolutely free to the workmen, and that no charge should be imposed for using them?—Yes.

3899. Are there any such cases where they institute a charge?—Yes, in the great majority.

3900. That is a charge imposed upon the men, not a gratuity?—No, the imposed charge. At Postlethwaite's mine, when the men objected to pay the 6*d*. a fortnight they declared that they would cut the water off at the changing-house and they would get none.

3901. With regard to ventilation you advocate as an indication of the badness of it the feeling of the men?—Yes.

3902. That is rather a variable standard, because a man might say he felt bad simply because he had indigestion. That would not necessarily show that the ventilation was bad?—I do not know a miner who suffers from indigestion.

3903. I take it that you would want a better indicator as to the state of the ventilation than the feeling of an individual?—I can quite see that what would affect a weakly man would not affect a stronger man.

3904. A man might think it was bad ventilation when in fact it was due to another physiological cause or effect?—Yes.

3905. It would be better to have a definite standard?—If you get a majority of men saying they are affected by bad air it is time to make enquiry.

3906. Would you not think it advisable the inspector should be acquainted with the fact and pay a surprise visit and take samples and ascertain the condition of the air?—Yes.

3907. And make the condition of the air adhere to some standard which might be established?—Quite.

3908. As to the amount of carbonic acid?—Yes. The only difficulty is this. I really think it would be impossible for Mr. Leck to make a surprise visit to any mine.

3909. Why? I have managed to make a surprise visit on several occasions?—You are the chief inspector, and they do not know you as well as Mr. Leck.

3910. Not if he left his house at midnight?—No. If he left his house in a fog they would know about it.

3911. He is a marked man apparently?—A marked man.

3912. (*Chairman.*) How, if he was to go down suddenly into a place in which the air was bad, would they suddenly put it right?—They could not.

3913. If they knew he was coming and they put it right, he would find it right?—I am not suggesting that. I am suggesting the impossibility of making a surprise visit.

3914. It would be a good enough surprise if he found the evil, and as long as he got a sample, and the sample showed the bad air?—I have followed the chief inspector's reports very minutely during the past three or four or five years, and I have not seen a single case where samples have been taken and analysed.

3915. There has not been much complaint made by the men or by you on their behalf?—I admit that. I would advocate taking samples of air, and those samples being analysed. It is only by that means you can establish a standard which you think could be observed.

3916. (*Mr. Redmayne.*) The fact that no samples have been taken and no complaints made might be regarded as an indication that the ventilation has not been so bad?—No; the ventilation has been bad, but there has been a hesitancy, in fact I would use a stronger word and say a cowardice, on the part of the men employed in the mine in making a complaint. I can name six men who have been dismissed from their work for complaining of bad air.

3917. Nobody can possibly know but themselves and the inspector?—I am afraid you hardly appreciate the district of which you are speaking.

3918. The Post Office is absolutely secret, and the inspector also?—Yes.

3919. And the men should be?—That is so, but you cannot make the men believe that.

3920. I suppose I cannot pursue it further if the men will not believe it. You state that the time lost by the miners in this district through illness was greater than that in respect of other mines. Am I right with regard to that?—I could not make a comparison.

3921. You alluded to the injurious effect, in answer to the questions put by Dr. Haldane, of the compressed air, and mentioned that Dr. Oliver had said it was injurious, but upon looking up his remarks on compressed air I find that he alludes to a totally different thing, because he speaks of compressed air in caissons, and illness arising from working in compressed air, which is a totally different thing?—Yes, quite.

3922. I think you see that there is no ill effect from air as having been compressed air?—Yes, there is a direct effect.

3923. How?—The men in this district resent any attempt being made to permanently ventilate the mines by compressed air.

3924. I will come to that presently, but what are the ill effects from air that has been compressed air as such? How can it be injurious?—It is not for me to explain it scientifically, but the effects on the men are dizziness in the head, bleeding of the nose and shaking of the limbs.

3925. Is not that through absence of air?—No; the more there is the more these men complain.

3926. After all it is only air?—It may be so.

3927. Air that has been in a state of compression?—That is so.

3928. (*Chairman.*) Would it be possible to bring a man who has felt this complaint?—I will try. I will make enquiries about it.

3929. Will you see if you can get a man to come and say that he has felt this, because it would be quite a new fact in physiological science if it is so. As it is quite unknown hitherto, we naturally receive it with caution. It is quite a new thing, contradicting all that we know of the subject. If you can produce a man who has had experience of it we could ask him what it was like?—I think I have one man who can speak to that.

3930. (*Mr. Redmayne.*) Are your cross measure drifts driven from the shaft into the ore body driven through limestone?—I could not say. They never allow me to go down a mine.

3931. You spoke about mines being badly managed?—Yes.

3932. You have not been down them?—No.

3933. Your evidence then would be hearsay evidence?—And observation.

3934. But you told me you had never been down one?—I did not observe what was down below, but I observed what was on the top.

3935. You think that is an indication of what is below?—Sometimes the breeze ruffles the stream.

3936. With regard to inspection I was particularly interested in what you had to say. You advocate, I understand, the employment and payment by the men's union of an inspector. You are aware that mines are inspected on behalf of the owners by the owners' officials, I mean in the daily routine of the work?—In some cases.

3937. You would not regard that as an impartial inspection?—It may be impartial. I cannot say it is absolutely impartial. That may be done quite honestly by these men. It is mostly done by the deputies as far as they can, but there must be things that they are

bound to overlook. They have not the time, to start with, and, on the other hand, the deputies are employed by the owners.

3938. Inasmuch as they are employed by the owners you think they naturally lean towards the owners' point of view?—Lean, but not be unnecessarily partial. They are trying to be as fair as they can, but there is a limit to that.

3939. On the other hand, would not an inspector employed by the men naturally lean towards the men's point of view?—That might be. I admit the possibility of that.

3940. The only form of impartial inspection would be Government inspection?—That would be so.

3941. You say the men's inspection is less impartial than the others. Human nature being human nature, one would lean towards one, and one towards the other, and Government inspection would be the only absolutely impartial inspection?—If the Government inspector inspects a place and makes a report we never see it. We have no right to see it under the present conditions

3942. Nor have the owners?—Well, no, but if the men's unions appointed an inspector and paid an inspector to inspect those particular places about which complaint had been made, then they would get a report and know exactly what the place was like, and if there was a remedy that remedy could be submitted to the inspector, and then he would know the place himself and it would be an aid to him, because sometimes the inspector is placed in a very precarious and very unlikeable position.

3943. If you work out the arrangement to its logical conclusion it would annul the Government inspection?—No, it would be subsidiary to it. We should suggest there should be three inspectors in the Newcastle district in connection with metalliferous mines.

3944. You are introducing a third kind of inspection?—It is an extension of the principle laid down under the Coal Mines Regulation Act. There is an admission of the principle that workmen should have a right to inspect, and it is only to get out of an awkward position which is neither logical nor practicable that we suggest the man ought to be independent. If an inspector, let him be an inspector, but if a workman, let him be a workman, but a workman and an inspector at the same time he cannot be.

3945. You advocate a sort of extension of General Rule 38 of the Coal Mines Act?—Yes.

3946. You asked that places after an accident should be left alone until they are inspected?—I mean to say that the evidence of the accident ought not to be destroyed.

3947. Would something like section 35, subsection 2 meet your case? I will just read it to you: "Where "loss of life or serious personal injury has immediately "resulted from an explosion or accident, the place "where the explosion or accident occurred shall be left "as it was immediately after the explosion or accident, "until the expiration of at least three days after the "sending of such notice as aforesaid of such explosion "or accident, or until the visit of the place by an "inspector, whichever first happens, unless compliance "with this enactment would tend to increase or "continue a danger or would impede the working of "the mine"?—I think that would be satisfactory. I would sooner eliminate the three days and have the visits of the inspector first. Sometimes the inspector cannot reach a place always in three days.

3948. You would not like to interfere with the working of the mine?—No.

3949. If a man had been badly injured, three days is a good lapse of time?—The place could be boarded off.

3950. (*Chairman.*) It says until three days or until the inspector comes, which ever happens first?—That would be quite satisfactory.

3951. (*Mr. Redmayne.*) I was very interested, because it is rather new to me, your advocating men not riding against men. Your point of view, I understood, was that if an accident happened only half the number of men would be in the shaft at the time?—Yes.

3952. But at the same time I think you are aware, are you not, that the number of accidents that happen while men are riding in shafts is infinitesimally small?—That is so.

3953. Would not the carrying out of such an injunction as that rather tend to increase accidents from the point of view of the unbalancing of the loads?—It might be so.

3954. I have in my head a case where an accident happened from the discontinuance of men riding against men?—We have a concrete example in this district, at Bigrigg, where 10 men rode against 10 men and there was an accident to one part of the cage. If there had been men in the other part they would have been smashed to bits.

3955. (*Chairman.*) How? I do not understand?—The cage went over the top.

3956. The other part?—Yes. There are only two or three mines where it is done in the district.

3957. (*Mr. Redmayne.*) It is the general practice in mining throughout the whole of the world, with the possible exception of this district, to ride men against men. Would it not be curious to have a rule with regard to one corner of the universe in opposition to the general practice throughout the other mining districts?—No. I think we have been an exception to the general rule so long that we ought to continue in that respect.

3958. Would you rather not come into the fold?—No. The men themselves complain very much, at those particular mines where they ride men against men; it may be sentiment. The number of accidents, however, is very small, as you have already pointed out.

3959. Were it attempted to have such a rule applied to the Cumberland iron ore district, and were one to attempt against one's belief to put such a rule in practice elsewhere, it would meet with every opposition?—In regard to metalliferous mines?

3960. Every sort of mine. Here is a practice common to all mines of riding men against men?—It is certainly not the practice in this district.

3961. It is peculiar that you should advocate something foreign to the rest of the world?—It may be peculiar, but I think it is to the credit of the district. It is one of the few things that we can claim.

3962. I will not pursue it further. There was one point under the Truck Act I was in doubt about. You advocate the inclusion of certain provisions in the Metalliferous Mines Act, because you think if they were embodied in such an Act they would be more likely to be observed?—I think they would.

3963. Do you think owners would be more likely to observe provisions in one Act than in another?—Yes. If they get a Metalliferous Mines Act they think it governs our industry and they take notice of it.

3964. So does the other?—They make themselves acquainted with this Act, but if they have to study a law library they look at the books and say, "We shall be dead and buried before we can read that," and consequently they leave them alone. There is the Truck Act, the Notice of Accidents Act, the Factory Act, and half a dozen other Acts, and all the decisions bearing thereon.

3965. You spoke about shot-firing and advocated the introduction into the Metalliferous Mines Act of certain things which are in some of the special rules with regard to loading, stemming a shot and unstemming a shot. How would General Rule 12, the parts marked (*d*) and (*e*), meet the case? I will read them to you: "In the process of charging or stemming "for blasting, a person shall not use or have in his "possession any iron or steel pricker, scraper, charger, "tamping rod, or stemmer, nor shall coal or coal-dust "be used for tamping." You would have nothing but non-inflammable appliances. "No explosive shall be "forcibly pressed into a hole of insufficient size, and "when a hole has been charged, the explosive shall not "be unrammed, and no hole shall be bored for a charge "at a distance of less than six inches from any hole "where the charge has missed fire."—I agree entirely with that section. The only thing I contend is that there should be no exemption or power to exempt.

3966. That is from the Coal Mines Act. Would you include that in the Metalliferous Mines Act?—Yes. I think that section should be made applicable to every mine without any exception.

3967. If it became a general rule in the Act there would be no exception?—Then we want a time limit.

3968. After a charge has misfired?—Yes.

3969. You advocate 40 minutes?—Yes.

3970. Half an hour is generally stated in the quarry rules?—We had a case where a company of men were driven in after 15 minutes. There is an unwritten rule in the district of 30 minutes, but we had another case of a man killed at Moss Bay going in after 25 minutes.

3971. You say the men were driven in in the other case. What do you mean by that?—Ordered in to their working.

3972. How many minutes after the shot misfired?—15 minutes.

3973. I was advocating twice as long?—That is an unwritten rule in the district now. They do that in most places. I think if a man at Ullcoats went in under 30 minutes the managers would send him home.

3974. With regard to the special rules you think the putting up of a notice does not necessarily inform the men as well as if they had a copy to read at their leisure?—No; it is no good putting special rules on the pit-head.

3975. In section 28, subsection 2 of the Metalliferous Mines Act it is stated: "The owner or agent shall "supply a printed copy of the abstract and the special "rules (if any) gratis to each person employed in or "about the mine who applies for such copy at the "office at which the persons immediately employed by "such owner or agent are paid"?—If I was a workman I would not apply.

3976. Is there any harm in applying? Why would you not apply? You would not think it *infra dig.* to call at the office?—But if a man goes to the office and applies for a thing it is only natural—I should do it myself if I were the manager—I should say, "What does that man want with it?"

3977. If all the men came?—You could not get all, because one-third would be down the mine and the other third would be in bed.

3978. Some could come in the morning, and some could come in the evening. At any rate, they have a right to have a copy if they want it?—Yes, if they apply personally, but I think the suggestion I made that the things should be hung up so that they could read them or carry them away without the formal mode of application, would be better; or, in the alternative, any special rules proposed might lie on the table of the House of Commons for 40 days; then we will get a copy without application to the mines.

3979. You mean by purchase?—Yes. Sometimes we get them without.

3980. At present you can get them gratis?—Anything you can get gratis is not of very much value.

3981. With regard to the sanitary arrangements in the mines, you object to an earth closet?—Yes.

3982. An earth closet is thought rather highly of on the surface?—I do not think so.

3983. It has strong advocates?—I do not care who the advocates are. I have no respect for them.

3984. Anyway, I would take it, whether you have respect for them or not, whatever sanitary arrangements they advocated as the most sanitary you would accept?—Yes.

3985. I am afraid I need not ask you more questions?—All those towns in the United Kingdom where the tub system is retained have the highest death-rate in the country.

3986. Would you or would you not accept the recommendations of the best sanitary authorities in this respect?—One would have to see them first.

3987. (*Chairman.*) You are still in favour of a sort of drainage into the sump of the whole of the excrement of the men down in the mine. It rather startles me?—It is not an ideal arrangement.

3988. It would become a most awful place. Is it not an arrangement which ought to be forbidden? I think it is worse than an earth closet?—I would like it put side by side with the accumulation of excreta allowed in non-workings for years and years.

3989. If that is the system you have come to advocate I can only say that I am astonished at it?—It is better than what we are getting. It is only conditional upon there being a stream in the mine.

3990. A stream running into the sump will deposit the whole of the excrement in the sump and make a cesspool of it?—It is pumped out of the sump.

3991. A nice job for the pumping men. However, I do not want to pursue it. We can deal with it, but I only say that it surprises me?—To some extent it is the principle carried on now.

3992. (*Mr. Redmayne.*) That is why I say would not the earth closet be a greater improvement on what is in operation now than what you have advocated?—The earth closet, if brought into existence, unless hedged round by similar conditions and regulations as laid down by the Belgian Government, would become worse than the present thing.

3993. I want to get at the best type of closet, and you can be sure that it will be hedged round with recommendations of the best kind, whether Belgian or British. Would you, or would you not, accept the dictum of the best sanitary authorities as to what sort of sanitary arrangements would be used?—Having regard to the promise of consideration which you have been good enough to give us, I would say yes, so you have made a convert.

3994. Passing to the covering of shafts in sinking pits, you advocated some arrangement by which men were protected from falling objects?—Yes.

3995. It would have to be a covering which did not interfere with the ventilation?—Yes.

3996. If you put a bell arrangement over the heads of the men it might protect them from falling stones, but it might lead to serious results, especially in a deep shaft, especially in respect of the ventilation?—It might do that.

3997. (*Mr. Lewney.*) You mean what is known by miners as a penthouse?—No, something more than that. We think there ought to be a covering to prevent anything heavy falling down.

3998. A penthouse answers that description?—Does it?

3999. (*Mr. Redmayne.*) It might bring in its train a worse form of accident than that which you seek to prevent?—The miners do not seem to think so. Possibly it would not obviate anything falling down the shaft, but in regard to falls of stone if there was a limit put to the wooding of the shaft.

4000. Would you not rather advocate that the sides should be protected?—I think from what I know that would be the more important of the two.

4001. To prevent anything falling away from the sides?—In the case of iron ore a piece half the size of that ink-pot falling 10 or 20 feet would kill a man.

4002. Could you not go to the root of the evil and prevent the stuff falling?—That is what we suggest by the wooding of the shaft.

4003. You advocate electrical signalling?—Yes.

4004. In preference to mechanical signalling?—Yes.

4005. You know electrical signals are more apt to get out of order and are not so certain as the old-fashioned rapper?—That might be, but if the cost of electric signalling is so small they might duplicate it.

4006. Would you not rather let the old rapper stand if you had electric signalling?—No; the old rapper form is not only antiquated but there is no uniformity about it.

4007. What does it matter so long as the signals are uniform?—The signals are not uniform.

4008. I am not talking about the code but about the method. Rap one is rap one with a bell or with a hammer?—Quite. I think in new mines that electricity will be used in place of the old method.

4009. There is more certainty about a mechanical rapper?—They go wrong.

4010. They are very much less liable to get wrong than an electrical battery?—I do not know. I think electricity has come to a good state of perfection.

4011. I have worked with both, but I always had the mechanical rapper as a stand-by?—It is more reliable than it used to be.

4012. You have referred to the opinion of practical miners upon that?—Yes.

4013. (*Mr. Thomas.*) Dr. Haldane has already asked you some questions in regard to rock drilling, and I see no good purpose in asking you more, as you cannot bring practical knowledge to bear on the matter. In regard to inspection, in your opinion one inspector is not sufficient for the Newcastle district?—Yes, for metalliferous mines.

4014. It is too large for him to inspect the place properly?—Far too large.

4015. You therefore suggest the addition of two others?—Yes, in addition to Mr. Leck.

4016. Those three will be able to properly inspect it on behalf of the Government?—Yes. Those two inspectors should be practical iron ore miners.

4017. That is another point. You suggested having two others, making three in all?—Yes.

4018. It would take three to do the work?—Yes.

4019. I was curious to know why you say it only requires one working man inspector to do the work of the other three?—The duties of that man appointed by a trade union would be limited to the enquiry into any complaint which had been made by a member of the union.

4020. He would not make a regular inspection?—No.

4021. You would anticipate a great number of accidents keeping this man busy?—No, but if we had a man of that type I am confident by specialising complaints made by members he would earn his money.

4022. It surprised me—Mr. Redmayne has already dealt with it—as a mining engineer of some experience in various parts of the world, to hear you suggest the prohibition of the winding of one set of men against the other. If you do so, I can only agree with Mr. Redmayne that this is the only place in the world where I am acquainted with any such custom?—It is the custom of the district. There are only three or four mines in the district where men are wound against men.

4023. But surely you would not insist on any provision of that kind?—I have had three or four complaints from men where it has been tried on, and I have written to the managers and the custom has been discontinued. The great majority of the mine managers find it sufficient responsibility to have one cage of men going down at a time without any coming up against them.

4024. Surely in a mine employing a large number of men, with the comparatively limited winding capacity which one observes in the district, it would be a disadvantage not to have it?—The best mine in the district is Ullcoats, and they employ more men than any mine in the district, and there I do not think there is any difficulty.

4025. You made some reference to timbering in working places, and I understood you to say that the workman must be responsible for the timbering of his working place only 12 feet back from his place?—Yes.

4026. At the present time a workman taking his bargain would undertake to maintain it within a certain distance. What is that distance?—It varies considerably. There is no system.

4027. He may be called upon from the place he is working to go and timber somebody else's place?—On the main roads he may be called out. Supposing there is a company of miners working to get wages on the last day of the fortnight, they may be called out on that day to put up a set of timber, and they get nothing for putting up that set of timber; consequently the time they have lost in putting up the set of timber deprives them of getting their wages in the working place.

4028. If a man or a set of men take a contract, and not only the contract but the Metalliferous Mines Act provides specifically that they shall keep the place in a safe condition for working, you do not mean to say the custom is, if these men are suddenly transported to another part of the mine to put in several sets of timber, they will not be paid?—I think that is a false hypothesis.

4029. What do you mean?—What you suggest. What I said and say again is, that if the men in a particular working should be called out of the working to put up a set of timber on the main road or in some other place they get nothing for it.

4030. As pointed out by the Chairman, we have nothing to do with wages in these matters, but you say you would make these men responsible for timbering the working place 12 feet back from the working place and nowhere else?—Yes.

4031. If they are going to drive a place 30 feet before they turn to meet the other party, you would still make it 12 feet?—Yes.

4032. Will you anticipate such a thing as frequently occurs: if a man is working 14 feet back, and a piece of timber suddenly shows signs of collapse, unless that man is ready to put in a piece of timber it might result in a serious accident. You should give some consideration to the limitation of these 12 feet. The Act already provides for the men seeing that the working place is in proper order?—There ought to be nothing in the Act to put that on the workmen. We say no man or men can understand the working better than the men in the working; consequently they are bound, while in the working, to take responsibility, and 12 feet out is quite sufficient. One can easily imagine a case where 12 feet 3 inches out there might be a necessity for doing something. You have to use reason in those things. It is not to be supposed, because men are only responsible for 12 feet, that they would stand and see the place coming in for the sake of a piece of timber. I do not suggest a hard and fast line, but I say fix responsibility on somebody somewhere.

4033. You prevent the men from being employed somewhere else?—I object to them working for nothing.

4034. You made some statement with regard to sanitation in mines. You probably are aware that there have been special rules to meet a great evil in regard to the sanitation of mines, and after a lot of careful study on behalf of those appointed a special rule has been established and which has since been adopted in its entirety in Johannesburg. Are you aware of any rule for what is undoubtedly an evil amongst miners?—In Johannesburg?

4035. Established in this country?—Not here that I know of.

4036. Let me read you one and see if you agree with this: "The owner, agent, or manager shall cause "a sufficient number of suitable sanitary conveniences "to be provided above and below ground, in suitable "and convenient places, for the use of persons em- "ployed, and to be constantly kept in a cleanly and "sanitary condition, and no person shall relieve his "bowels below ground elsewhere than in those con- "veniences." That is already established?—In this country?

4037. "No person shall soil or render unfit for use "in any way any convenience or sanitary utensil or "appliance provided for the use of the persons em- "ployed. Pump cisterns, sumps, and water accumu- "lations in the mine shall not be directly or indirectly "used for the purpose of Rule 5 as a sanitary conveni- "ence." I rather gather that you said in reply to Mr. Redmayne, and you suggested it to start with, that you would use the watercourses underground, and even the pump cisterns, for the purposes of sanitary conveniences?—Where there was a stream.

4038. If there was no stream what would you do?—We would leave it to the owner according to the rules drawn up by the Secretary of State to make the accommodation.

4039. Supposing there was not a stream you would use a cistern for that purpose?—Yes, not the sump.

4040. It is the same thing practically. You would really suggest that being done?—No, I like that better, the rule which you say has been adopted in some part of this country.

4041. In this country and approved of in Johannesburg. You agree with what Mr. Redmayne said that the earth-closet may be the proper thing to use underground?—I think there would be a danger in it. It would be all right if kept clean. There is provision for it being kept clean.

4042. We might assume that. It came as a shock to me to hear the suggestion that you could have a great number of men in a mine using as a sanitary convenience a cistern or sump?—You have a case where men used an old bogey. There is a rule that it shall be emptied in that mine every week. As a matter of fact it is a month or five weeks at times without being emptied.

4043. You say you wish a water closet to be provided for every 25 men employed in one shift?—Yes.

4044. Where are you going to put them?—How many men work on a shift?

4045. Take a large mine, such as there are in this district, there would be a large number of water-closets?—There is not a mine in the district where six closets would not be ample provision.

4046. I can only suggest I cannot be aware of the number of men employed or else you cannot?—Six would provide accommodation for 150 men.

4047. Still, in a general way, you think there is no doubt about it, that some sanitary arrangement should be made underground?—Absolutely.

4048. You modify your views in regard to using the pump cistern in preference to the other?—Yes.

4049. It was not clear what you said with regard to overhead protection and timbering within 4 feet of the bottom of the shaft. How far would you put this protection, whatever it is, above the bottom?—4 feet.

4050. They could not work under 4 feet protection. An average man is more than 4 feet high?—4 feet above his head.

4051. Would this be a movable thing?—Certainly, it would have to be movable.

4052. Suspended, perhaps?—Yes.

4053. Do you not think the danger might be greater than the supposed cure?—To a large extent I agree with Mr. Redmayne, that if there are boards provided, and the shaft is boarded to within 4 feet of the height of the men working, you largely minimise the danger.

4054. Are you familiar with the usual practice among shaft-sinkers in the various places?—I cannot say that I am, but I am conversant with the details of inquests held on men killed in shafts, and you get some knowledge there.

(*Mr. Thomas.*) This comes to me as a surprise because I have never heard or seen the practice.

4055–6. (*Chairman.*) Has it been done? Is there such a case of a cover of this kind in existence anywhere?—I do not think so; but there is no reason why there should not be. I think there used to be many years ago a special kind of hat worn by miners.

4057. I daresay one of the practical miners who is coming can tell us about that?—There is a pit-sinker coming.

4058. (*Mr. Thomas.*) You think a hat would be sufficient protection?—Hardly. It would be possible to devise a headgear.

4059. I am afraid you have not used these things for working. If you had you might modify your views?—I have seen them working.

4060. You would make a provision that every shaft should be timbered within 4 feet of the bottom?—No, above the man.

4061. You say that the sides of the shaft should be timbered within 4 feet of the bottom?—No, 4 feet from where the men are working.

4062. This protection of yours and that?—Yes, both together. If you put the covering on the top, that is only to prevent things falling down, but it might not prevent a piece of wood falling from the side.

4063. You must have an outlet to get the stuff out?—The whole thing is movable.

4064. How would you get ventilation there?—You would.

4065. How would you get it through a closed cover?—It would not be hermetically sealed. There could be a margin on each side.

4066. You think electricity, although rather fitful in its action, is preferable to the old-fashioned knocker I can understand in a very deep shaft, extending four or five times the depth you have here, it might be advisable to have electricity, but you despise the old-fashioned knocker in favour of electricity?—I think it would be better.

4067. Although old-fashioned and antiquated, I suggest this Commission would not consider an alteration of the method of signalling provided the code and everything else is desirable?—A thing is not necessarily good because it is old.

(*Mr. Thomas.*) But it has many virtues.

4068. (*Mr. Lewney.*) There are one or two points I should like to have cleared up. Upon many of the questions which Mr. Gavan-Duffy has put before the Commission I agree with him, but as a practical miner there are some things I do not agree with. With regard to having separate compartments in the changing-house, do you voice the opinion of the men generally?—Yes, unanimously. Here you have one compartment and the men have to wash and change in that compartment. There is one man washed and changed, he has his Saturday night clothes on, and another man comes in in red in the same compartment and wants to collar the tub the man has done with, and the man with the clean clothes on goes out half red; whereas if the man washed and went into another place to change they would be separate. They do not all arrive in the cage at once.

4069. Do you not think it is a matter rather for consideration to be directed to the space to be allotted to each man rather than separation of the changing from the washing place?—No, there is something to be said for the space to be allotted to each man, but there is the partition of that space when you have it, and I think it would tend to reduce the aggregate amount of space to be taken up if you had the partition. At Ullcoats mine they have two compartments under one roof and there is no confusion at all.

4070. (*Chairman.*) We did not see the two?—There is no confusion. The men's clothes are kept clean and dry.

4071. (*Mr. Lewney.*) I have no desire to pursue this matter any further, except to say in the district from which I come I think nine out of ten of the men entirely disagree with your views upon that point. As one who has had occasion to use changing-houses for nigh on 30 years I should feel disposed to oppose it. I may say that in our district 99 per cent. of the miners use the changing-houses, and in most cases the changing-houses are very good. Some of them I hope, as the result of the inquiry by this Commission, to see considerably improved. I suggest to you that it would be unwise to put into an Act of Parliament a requisition of this sort requiring separate compartments?—On the other hand I think it is the quintessence of wisdom and reason.

4072. We will agree to differ on that point. There is another point I should like to have cleared up, and that is with regard to certificates for managers. Will you explain what you mean by that?—I mean to say that a man who undertakes the management of a mine ought to have at least some knowledge of mining engineering and some practical knowledge of working a mine. I do not think it a fair or a reasonable thing to take a clerk out of a mill and put him into the position of a manager. I would not take a man out of a barber's shop and make him a manager.

4073. I take it that what you really desire is that every mine should be supervised by a thoroughly practical engineer. Is that what you mean?—I think there ought to be some differentiation between an engineer and a manager. I think I should be right in saying the manager in most cases is supervised by a practical engineer. I rather agree with you that the

engineer ought to be the supreme authority in the direction of the mine.

4074. You suggest in addition to a certificated engineer that there should be a certificated manager?—Yes.

4075. You also say education in mining matters would be an additional safeguard?—Yes.

4076. Do you mean a course of technical instruction?—No. When I speak of the necessity for a manager having a certificate, I do not mean that a manager ought to be planked down to a schoolboy examination for which he can be crammed; anybody can pass those examinations, but a man who has the responsibility of the lives of men and the working of the mine ought, either by an oral or a written examination, to show that he has some ability at all events for doing the work which is required of him. In that way practical experience in the mine I think might be a solid foundation.

4077. So that after all it is not merely a question of education?—No, not necessarily. Now the mine managers, like the rest of the population, have good educational facilities, and some of them use them to the very greatest extent. They will become more educated in the future than in the past, so that the real nature of education will not be of such pressing importance in the future as it is now.

4078. I wish you to clearly understand that I have no wish in any way to disparage education or belittle the advantages to be obtained from it, but I do suggest to you that some very excellent miners, in fact some of the best miners that we have, would be quite incapable of passing an examination to obtain a certificate such as you describe?—I do not agree with you.

4079. Have you had practical experience of this?—No; I told you that to start with. I told you, I think, I would not like any manager to have to submit to a schoolboy examination at the present day. If you take your old competent miner whom you have in your mind, and submit that man to an oral examination, and then plank that man down and ask him to write an essay on various things, it would be an impossibility.

4080. I suggest that eventually a test of this description might become purely an educational one, and would shut out many desirable men from any prospect of promotion?—There are millions of very desirable men who never have a possible chance of promotion.

4081. We know it is only one out of a considerable number that have?—How are you going to find a general remedy?

4082–4. By leaving it open to everyone?—I do not think it ought to be.

4085. In regard to inspection of working places after an accident has occurred, I suggest to you a way out of the difficulty might be obtained by the Commission recommending that after a fatal accident, a representative who is a practical miner, or someone having a practical knowledge of the surroundings, should be allowed to inspect the place. Would that meet with your views?—Yes.

4086. With reference to the men riding against men, in no single instance does that occur in the district I come from, to my knowledge. You stated that it was rather the fear of accident that induced the men to protest against that sort of thing?—Yes. That is the only complaint I have heard.

4087. You cannot give any other reason?—I have heard of none from the men, but there may be others.

4088. In this district the men are drawn sometimes from more than one eye or level?—That is so.

4089. Would it not rather result in this way: that when men were drawn from more than one eye or level that the attention of the top hand would be divided between the up cage and the down cage when it ought to be concentrated on the up cage?—Yes.

4090. You agree that would be a substantial reason why it should not be permitted?—It is a good reason.

4091. You would not agree that it is really the substantial reason?—No; I mean to say it is a good reason.

4092. Now I must say I am not altogether in agreement with you with reference to timbering. You suggest that a man should only be responsible for the timbering within a distance of 12 feet from the forebreast?—I do.

4093. I take it that it is largely a question of payment?—That is so.

4094. Will you allow me to suggest to you a better method than the one you advocate?—I should be glad if you would do so.

4095. In the district I come from the men, as they do here, take the timbering along with the other conditions of the contract—they are paid for it in their tonnage price—but if men are compelled through any circumstances to replace a broken course of timber, or to do any other repairs, they are paid extra for it. Would that not meet your views?—Yes.

4096. So that it is really the want of a proper system of payment for doing extra work?—Yes. Still, on the other hand, we do think it would be better to fix the responsibility for timbering upon special timbering men.

4097. I suggest that your ideas are not altogether practicable. For instance it is utterly impossible to have a lot of shift men in one particular pit at any given time. You may have two or three and it is a fairly large proportion; but these men may be engaged in a distant part of the mine, and, as very frequently happens in our district, the timbers break and they find it necessary to put in a lining set, but when the week-end comes he will say to the overman, "I put in a lining course there," and the overman will book it and he is allowed 1*s.* 6*d.* for every course he puts in in that way. I suggest that is a better way than the way you suggest?—I do not agree; still if we could get your idea adopted we should be satisfied.

4098. You see the difficulty, I think, of obtaining the considerable number of men to do what you want. I propose another method which would provide for the safety of the workmen, and by which they would suffer no loss?—I think if the men were responsible for their own workings, 12 feet out from the forebreast, and the rest were in the hands of practical timbermen, it would be a more satisfactory solution.

4099. Those men are practical timbermen who timber drifts, and would in any ordinary circumstances be able to secure their ground against collapsing?—Quite so.

4100. So that it is really after all a matter of arrangement?—I do not think so. If you will kindly put your recommendation in the report we shall be very glad.

4101. I am speaking as one member of the Commission. I am quite prepared to recommend to my fellow members a good many things, but I am not sure whether they would agree to adopt them all?—Well, you must convert them.

4102. There is another matter, with regard to the incorporation of the special rules in an Act of Parliament. Could you give us, either now or later, any particular rule you would like to have incorporated into an Act on the recommendation of this Commission? If you could, I tell you candidly I should be very pleased to do what I can to put the matter forward?—I thank you.

4103. As to the telephone from the bottom of the shaft to the engine-room, is it your idea that in addition to the bell from the bottom of the shaft into the engine-house there should also be telephonic communication with the engineman?—Yes.

4104. May I suggest it would be rather better to have it to the top hand than to the engine-room?—We think it better it should go to the engine-house. We think the man at the engine-house should have direct means of communication with the man at the bottom.

4105. I take it that such a telephone arrangement would be for other purposes than merely signalling?—It might be.

4106. If you wished to communicate with the top hand to send down a set of timber you would not desire that to go to the engineman?—No—have a second telephone.

4107. As to the question of raising the ages of winding enginemen, I thoroughly agree with you. As to the question of the notice of accidents to be sent to the representatives of the family, I take it in that case you wish a statutory right for the representatives of the family to appear before the coroner?—Yes.

4108. Then there is another question I should like to ask you about, in regard to the men at Wyndham Mine, and this is a matter that I think you ought to weigh carefully, that, however many shafts you have, there are not two outlets from every drift to any particular shaft, so that a case of this sort might happen even if you had two shafts. I suggest that to you?—I agree.

4109. For instance, there might be a shaft *here*, and one *here*, and the drift *here* (*illustrating*), and the drift might collapse midway between the two shafts, and the escape of the men *here* cut off?—That might be so.

4110. So that the double shaft would not in any circumstances prevent such an accident as occurred at the Wyndham Mine?—It would not prevent it, but the double shaft is absolutely necessary in my opinion, as I have explained.

4111. (*Chairman.*) Chiefly for ventilation?—Quite so.

4112. (*Mr. Lovett.*) You have an opinion that miners suffer from dust, and that they get respiratory diseases?—Those who use the rock drills suffer from dust, but they are not very much used in this district. I think there are only four mines in this district where they are used. I think the fact of their working in heated atmosphere, very often in water, and then coming out into the cold air causes pulmonary diseases.

4113. We have had expert medical advice on this particular question. Do you think it would help us if we got the different kinds of stone-dust analysed?—Yes, and ore.

4114. We have no statistics, but this question of analysis has been mentioned. With regard to the condition of affairs in relation to changing-houses, I am not quite clear just where you are in that particular respect. What percentage of the men in your district really change at the present time?—I should say 50 per cent.

4115. And there is a levy for the upkeep of the changing-house?—Yes, 6*d.* a fortnight.

4116. Do the whole of the men have to pay that?—Yes, whether they go there or not.

(*Chairman.*) I have been very much struck with this question of contribution. I do not like to give any opinion at present, but it is possible it comes within the sections of the Truck Act, and therefore is an illegal charge.

(*Witness.*) I have always held that opinion.

(*Chairman.*) Quite apart from the question of whether the owners would be prepared to do it gratuitously, it is illegal for them to charge at the present more than cost value. I merely throw that out because if the attention of the Home Office is called to it we should take immediate action upon that without waiting for any Act of Parliament. That is all I can say about it. The actual expense would be the only charge the owner could make.

(*Mr. Lovett.*) That answers my question entirely. It has been mentioned by Mr. Gavan-Duffy and by myself that if it was made compulsory upon the owners to provide changing-houses there ought to be some compulsory power to make the men use them.

(*Witness.*) Make it compulsory.

(*Mr. Lovett.*) I think it would help us somewhat if we knew the percentage of men who did change at the present time, and if the present charge debarred the men from using it. But I gather the whole of the men have to pay the 6*d.* a fortnight whether they use the changing-house or not. So that the cost of the upkeep and the levy cannot act as a deterrent in any way against using it.

4117. (*Chairman.*) At how many mines is it done?—At quite 75 per cent. of the mines throughout the district.

4118. (*Mr. Lewsey.*) Is it a universal charge of 6*d.*?—At some mines they do not charge anything at all, but at 75 per cent. of the mines they charge 6*d.* a fortnight, and it is stopped at the office out of their wages.

4119. (*Mr. Lovett.*) One question as regards the telephone as a means of communication between the top of the shaft and the bottom of the shaft. I take it you have in mind any emergency, such as sickness or anything of that kind; they would know exactly at the top what is happening at the bottom. It would facilitate things very greatly?—Yes.

4120. With regard to ambulance, have you sufficient provision for ambulance baskets?—We have no ambulance baskets. In some places we have stretchers. This district is made up into five, viz., Kirkland, Frizington, Cleator Moor, Moor Row, and Egremont. There are 3,500 miners employed in that district, and there is not a single horse ambulance in the whole district. If a miner had his spine smashed or injured here to-day he would have to wait here until an ambulance came from Whitehaven to take him to the hospital. Although there have been some very excellent ambulance classes formed, nothing has been done to facilitate them. There are some good ambulance men in the district—as good as there are in the kingdom—but they have no appliances but an old stretcher or something of that sort. As I say, there is not a single horse ambulance in the whole district.

4121. (*Mr. Jones.*) I am quite confused as to what you mean by workmen's inspection; I should like to be clear about that?—We think that the arrangements made under the Coal Mines Regulation Act have been unsatisfactory. The workmen themselves out of their trades union funds pay two or three men 7*s.* a shift to go through and inspect the mine.

4122. I know that?—Well, that occupies in some cases three days; but the other three days of the week they have to go back and work.

4123. I understand that, but I want to get at this, if you please: what do you mean by the suggestion you make with regard to metalliferous mines? Leave coal mines out. You suggested that inspectors should be appointed by the union, and should be allowed by law in the metalliferous mines?—One.

4124. One in each mine?—No. Each trades union in the district, or in the county, should be allowed to appoint a man who would to all intents and purposes be an inspector. The union should pay that man, and that man's duty should be limited to the inspection of places complained of, or to inquiry into complaints received from members.

4125. If the trade union had the authority to forward complaints made to the inspector (as a matter of fact they have it now), would that not be sufficient?—I do not think so.

4126. You want the inspector only to forward the complaints received?—Yes.

4127. If permission were given for the men to visit the place of an accident with the inspector, would that not meet it?—No.

4128. Why not?—Because we should not get a fair report, not even from our own men.

4129. Even if paid by the union?—If paid by the union. He dare not tell the truth.

4130. He would be an independent man?—He would not be an independent man if he was a workman after that.

4131. If a workman from the union was allowed to visit with the inspector, would that not satisfy you?—It would go a very long way towards it.

4132. (*Chairman.*) With reference to the point raised as to charging for the dressing-rooms, the present law is: "If more than twelve persons are "ordinarily employed in the mine below ground, "sufficient accommodation shall be provided above "ground near the principal entrance of the mine, and "not in the engine-house or boiler-house, for enabling "the persons employed in the mine to conveniently "dry and change their dresses." Personally I did not know that a payment was made, and I am sorry it has not been brought to our attention before. I doubt very much whether under this subsection there is power to make any charge at all, because the Act

says it shall be provided. I doubt whether that means shall be provided and charged upon the men, because that is rather like making the men provide it where it says it shall be provided by the employer. We will look into that point. You have said that the great majority of the owners wish to obey the law?—Yes.

4133. It is certain they cannot charge more than the cost price, but as at present advised I think it is very possible they cannot make any charge at all?—Well, they pay it.

4134. With regard to the changing-places, you know there are very good changing-places in the Furness district?—Yes.

4135. I have been to the Hodbarrow mines, and their changing-house conditions are most admirable?—That is so.

4136. There is no charge?—No, and they even provide baths free of charge.

4137. It is only in your district there is a charge?—Yes.

Mr. JOHN DIXON (Shiftman), Montreal Mine, Cleator Moor; Mr. JOHN MCCUSKER (Miner), Lord Leconfield's Mine, Bigrigg; Mr. GEORGE BEWSHAR (Miner), The Executors of Miles Postlethwaite's Mines, Moor Row; Mr. WILLIAM TINNION (Miner), Parkside Mining Co., Frizington; Mr. NOBLE DAWSON (Miner), Lord Leconfield's Mine, Bigrigg; called and examined.

4137*a*. (*Chairman.*) What I propose to do is to ask Mr. Dixon a certain number of questions and then I shall ask you other gentlemen whether you agree with what he says in reply.

4138. (*To Mr. Dixon.*) I believe you are here with several of your friends?—Yes.

4139. You are not a hewer?—I am not a miner.

4140. You are a shiftman?—Yes.

4141. You are in favour of a second shaft apparently in every mine?—Mostly, where there can be a second road out. I might say the men in our district are very particular on that point, and they impressed it upon me that where they cannot get a second road out, there should be a second shaft down.

4142. You mean you want either a second shaft or else a safe road up the existing shaft?—We want a safe road out; that is all we ask for.

4143. In addition to the cage?—Yes.

4144. In addition to the cage that is down the shaft. Would it satisfy you if up the same shaft there was a sufficient emergency ladder with stages?—No. The idea in this district is this: there are a good many of these pits holed into one another. The roads should be kept open providing it was agreeable amongst the owners themselves. There could be roads into one another and several roads kept and a door kept between them.

4145. Where there is no road and only one shaft?—They asked me to press upon you the putting down a second shaft when a reasonable time has elapsed, after the ground has been proved.

4146. Have they considered the question of cost of such a shaft? What do you think a shaft would cost?—I have not the least idea.

4147. Say 1,000*l*.?—I would think considerably more, some of them.

4148. Would you say 40,000*l*.?—Yes, and I might say more in some cases.

4149. Is it not a rather serious matter that as soon as you have proved and got the metal you should begin on the business of doubling the expenditure?—Yes; but when a reasonable time has elapsed it would then perhaps pay the employer to put it down.

4150. Suppose you had an emergency exit up a single shaft mine, in addition to the cage—which would you rather have, the extra shaft or the 40,000*l*. divided up amongst the men?—The extra shaft, because in the case of a shaft, as sunk in the olden times, where there is a set of pumps working, there is not much room for anything else.

4151. Do you regard it as so tremendously dangerous to work in a mine with only one shaft that you would rather have it than any amount of money?—Yes. Some gentlemen say there will come a time when the shafts will come to move, and there will be difficulties arise when that time comes.

4152. It is not with respect to the present time but some time to come?—Yes, for a time coming These shafts won't always stand good.

4153. Mr. Gavan-Duffy at the end of his evidence told us that really the demand for a second shaft was chiefly a matter of ventilation?—Yes, and it is for ventilation as well.

4154. It is not for escape, but for ventilation?—It is for both.

4155. Do you think it is impossible to ventilate a mine where you are getting metal without having a second shaft?—I do not say it is impossible; but I would point out that there are some of the workings so wide that you would simply lose control of your airway altogether.

4156. You mean that with a single shaft it is impossible to ventilate a mine?—I do not say it is impossible, far from it.

4157. Supposing such measures are taken as to make the ventilation really good, there would not be apparently the necessity for a second shaft?—Take for instance a newly opened-out mine where there are some 300 men in the twenty-four hours using dynamite; the fumes from the dynamite will many a time put the candles out. I heard of a case recently where a man's coat took fire, and the ventilation was so bad that the men had practically to leave the workings—they could not suffer it. Then what action would you take?

4158. I am beginning to understand what it is you really do require. Is it good, thorough healthy ventilation?—That is the point.

4159. I suppose it is possible in a mine with one shaft, if you are clever enough, to get good ventilation?—Yes; and where one pit is holed into another it could be done at very little cost.

4160. You agree really with Mr. Gavan-Duffy that it is really a ventilation question in the main?—Yes.

4161. But so far as getting out is concerned there certainly ought to be a second emergency outlet of some kind?—Yes.

4162. And in addition to that there should be good ventilation?—Yes, good ventilation in addition.

4163. And a second shaft is possibly the best way to get it?—Yes.

4164. That represents your mind?—Yes. The men in the district tell us stories when they come home as to the conditions under which they are working that you really feel sorry for them.

4165. I suppose what they are suffering from are the fumes of the explosives in most cases?—In most cases it is the fumes of the explosives. If there was a means of driving them out, I do not think there could be a great improvement on the old system of working.

4166. Now take the sanitation question in mines; do your people generally find there is not proper provision made?—As Mr. Gavan-Duffy told you before, they just went wherever they thought fit to do the job, in any odd spot. There is certainly a good scavenger below in the rats who clear most of it up, but whenever they go to the gutter it comes to the sump, and I have seen a man's legs badly poisoned by cleaning the sump out. It is part of my duty to clean the sump out.

4167. You object to the sewage going into the sump?—Yes.

4168. Is there any good mine of which you have personal knowledge where the sanitation is properly carried out?—I do not know of any other rule to what we have ourselves—simply go where anyone is working and do the job, or if there is a gutter, do it in the gutter, and it naturally flows to the sump, or at any rate, part of it, and lodges there. When you clean it

out, if there is a little bit of skin broke on your leg you may look for something happening if you are not in a healthy state at the time.

4169. You think something ought to be done, but you cannot suggest what should be done?—Yes. They ought to pay attention to it; but I think there are others who are more qualified to take the matter up than myself.

4170. You may depend upon it, the point will not be lost sight of. Now what do you say about changing-houses? Do you think the men would like to have it made compulsory to change in changing-houses, providing no charge were made for their use?—That is a question I could not answer; but for my own part, I always change, and have done ever since I was at the pit, and why men won't change is past my comprehension.

4171. Would you make it compulsory?—Yes.

4172. "Up before the magistrate, remember, if you do not"?—Yes.

4173. Is there not this point about changing, that it necessitates the use of an extra suit of clothes?—Yes.

4174. Walk home in one suit and change again when you get home?—Yes.

4175. Is that considered in any way an objection by some of the men?—Yes, it is. As you will be aware, there are some men who are very badly handled at home, and they have not got sufficient changes, and that is the reason why they won't change.

4176. You mean that what I have just mentioned is a good deal at the root of their not changing?—Yes.

4177. If it were made compulsory for them to change that reluctance would be put an end to, and the practice would raise the respectability of the men?—Yes, although there are some undesirables, if you understand me.

4178. We know what you mean perfectly well. If they were made to change and wash, and so on, it would be better for all parties and they would be more companionable people to have down there?—Yes; and there are others who have diseases on them which I think would be better left out.

4179. (*Dr. Haldane.*) That is arranged for at present: anyone who has any nasty condition about him is left out of the changing-house?—Yes, he does not come forward.

4180. (*Mr. Redmayne.*) They might contaminate the clothes of others?—Yes, if you made it compulsory for them to change there.

4181. (*Chairman.*) Where you work there is a good changing-house?—Yes.

4182. As a rule how many men would be changing when you change? What shift do you belong to?—I am in all shifts. If the work should fall so that it could not be done on the first shift, I should have to turn out on the second or night shift, whichever was most suitable for the work.

4183. You go down at any time you are wanted?—I am there one shift in 24 hours.

4184. I suppose you have seen the changing-house full of men?—Yes.

4185. How many do you think you have seen changing there at one time?—I should say I have seen 40; but we have two changing-houses in our employ.

4186. How big is the changing-house for those forty people?—I could not say exactly the measurement.

4187. It is enough such as it is?—Yes, such as it is.

4188. Has that got separate rooms for the clothes and for washing, or is it all one room?—We wash all in one room. There is a tub and the steam pipes go above; you sling the clothes on them. There is about a 6-foot space, and there is a bench, and you can step up on the bench and dry yourself.

4189. Do you like that system?—Yes.

4190. I do not know whether you have anything to say specially about explosives. Do you use them much?—Yes.

4191. Are there any dangerous practices in vogue in respect of not unramming the shots properly, that have misfired?—Not that I am aware of.

4192. How do you ignite your fuses, ordinary fire or electricity?—Just a piece of candle—put a piece of candle, let it burn away.

4193. Have you ever used electric firing?—No, and never saw it.

4194. Would you like to use it?—I cannot say, I have never seen it.

4195. Mr. Gavan-Duffy advocates electricity?—Yes, and men may agree to differ.

4196. We have made rules that electric firing shall take place in some cases, doing away with the old match?—Yes, but you would hardly expect a man to speak about a thing he knows nothing about.

4197. (*Mr. Lewney.*) Would firing by electricity be a difficult arrangement in these mines?—Yes; I would simply say it would be impossible to carry it out.

4198. (*Dr. Haldane.*) Are you charged 6*d.* in respect of the changing-house?—No, not anything.

4199. Which mine do you work at?—Mr. William Stirling's.

4200. There is no charge there?—No.

4201. With reference to the necessity of a second shaft, would it meet your views if it was left in the hands of the inspector to report such cases; that where he thought it desirable, in the interest of safety, there should be a second shaft, he should communicate that to the Home Office instead of having an enactment making it compulsory in all cases. Would that meet your view?—As I have said before, when once the mineral is proved it would not be a dead loss, it would be of commercial value to the master then.

4202. I am not going into the commercial part of it. Would it meet your views if it was left to the decision, say, of the inspector of mines in conjunction with the Home Office, as naturally it would be, to say whether or not a second shaft was necessary in such and such a case, or would you make it compulsory in all cases?—I am just repeating the views of the men where I am employed.

4203. What is your view?—That view is my view.

4204. Which?—That there ought to be two roads out; and if there are not two mines connected with one another, where a safe road could be got, they should have two shafts.

4205. You would make it compulsory in all cases?—Yes.

4206. In all cases absolutely?—Yes.

4207. (*Chairman.*) I thought you said if the ventilation was perfect and there was a second mode of exit, you would be content?—I thought I was plain enough about it.

4208. Let me put it in this way: suppose you had a mine in which there was but one shaft, and suppose that shaft had a means of egress by ladder besides the cage, and then suppose that the ventilation was made quite satisfactory, and suppose also that the providing of an extra shaft would involve a very large expenditure of money, would you still want an extra shaft? Do you see the point I have put?—Yes.

4209. Would you still want an extra shaft, or would you leave it to be determined by the inspector or higher authority?—When you say you have one good shaft with a ladder road in that good shaft, there is a probability that when the time comes she will start to drag and it will not be at all times a good shaft.

4210. Before it did drag you would have a second one?—Yes; as soon as ever there is a big number of men employed there should be a second road out. It does not matter in what way you make it so long as there is a second road out—that is all we ask.

4211. (*Mr. Thomas.*) Do you mean a second road out independent of the ladder which might be fixed over the shaft? You said provided there was a second road out. The second road out would be a provision of either another shaft or a means of going through one of the stone drifts to another colliery, and not the ladder road?—So long as you can get through into another pit that is quite satisfactory; if the owners of other pits would be agreeable to let you use the pits in time of necessity.

4212. (*Mr. Greaves.*) You mean you must have two shafts to get out of the mine?—Two roads out; it

does not matter about two shafts. If you have a shaft sunk already under some other employer, or if one employer has two pits holed into one another, that is quite satisfactory so long as there is a good road connecting the two.

4213. (*Mr. Redmayne.*) You know what is meant by a "pit"?—Yes.

4214. What you want is two pits?—No, I want two roads out of one pit.

4215. You know what is meant by a shaft?—Yes.

4216. However big that shaft is, however many compartments it is divided into, that does not meet your point?—No.

4217. You want another shaft?—Yes.

4218. And you say the reason for that is that when the drag commences it would injure the shaft?—Yes.

4219. Therefore you want another one to fall back upon?—Yes.

4220. Then would not that drag affect the other shaft in time?—Yes, but it could be put in repair.

4221. You cannot stop a drag once it is set going, can you?—No, but still you can meet it.

4222. Drags are very hard things to meet?—It has to be done sometimes.

4223. I very much doubt whether if a shaft has begun to sink by subsidence, anything will meet it?—The one shaft, if the drag became too great, do you understand, would help the other. If the shaft was dragging and you could not get the cages through, the whole thing would have to stand; then the cost would fall upon the employer and there would not be any output for him at all. On the other hand he could have the place in good working order.

4224. Let us come back to the original point: would you be prepared to leave it to the inspectorate, in conjunction with the Home Office of course, to say at what point a second shaft is necessary?—I would leave it to the men employed in the mine to say when they thought there should be a second shaft put down.

4225. Even supposing the mine employed, say, 15 people, you would have a second shaft?—If there was a chance of that pit developing.

4226. If it developed, of course it would employ more?—Yes.

4227. Would you determine whether or not there was to be a second shaft by the number of persons employed?—If there were 15 men employed in the mine, the 15 men's lives are just as sweet to them as 1,000 men in another mine.

4228. I quite agree with you there?—It is the point of the safety of the men we are on now; it is not a matter of money at all.

4229. However few there were, under the circumstances you would have a second shaft or road out?—Yes, however few, they want a second road out. I might say twelve months to-day the question was when we were going to get to work again through an inrush of water.

4230. It comes back to this: you would demand two shafts whatever the conditions and whatever the number of persons?—Yes, that is where they could not be holed one into another. If one shaft is holed into another, that would meet it

4231. It would require two shafts to every mine?—Yes, but it is not necessarily belonging to one owner; so long as there are two exits, that is all they ask.

4232. (*Mr. Lewney.*) At what period would you compel the employers to put down a second shaft? I am simply asking for information: I want to be clear about it, because certain suggestions have been made to the Commission which I will ask you about afterwards?—After they had proved the run of the ground.

4233. Before they have proved the run of the ground there is an element of danger, running the cages?—Yes.

4234. You would agree that that shaft should be of sufficient dimensions to provide a ladder way, or that there should be other means of exit in addition to the cages. You think that desirable?—I am not in favour of ladders, but it would be the best means.

4235. There is a certain element of danger whilst they are proving the ground and some time must elapse before it can be decided whether there is sufficient ore to pay for another shaft. Upon that point you agree?—Yes.

4236. And yet if we do not provide for a ladder road, or some other means of escape, we are still dependent upon the one means of exit. If you put down a shaft of 200 fathoms you are dependent upon the cages unless you provide a ladder road, or something of that sort?—Yes.

4237. It has been suggested that where conditions of that description prevail, a time may come after the mine has been developed when someone should recommend whether it is desirable and whether the company is in a position to put down a second shaft?—I would agree if worth putting it down, well and good; but you would not ask any employer to spend 60,000*l.* for a thing that was not worth 10,000*l.*

4238. That is what we want to get at.

(*Chairman.*) I think I understand his point. We want to get what his views are. That seems to me to be reasonable.

4239. (*Mr. Lewney.*) The point seems to be here, who is the person who ought to decide when the company is in a position to put down the second shaft, and also the time at which this second shaft becomes desirable?—The majority of the men employed, as I said before.

4240. I have a lot of sympathy with your view, but supposing I, as a representative of the workmen, was commissioned to suggest to His Majesty's Inspector that at a certain mine in the district it was desirable to put down another shaft, would you agree with that?—Certainly, I would have his advice.

4241. And that His Majesty's Inspector should be empowered to suggest to the officials at the Home Office that the conditions prevailing at a particular mine were not altogether desirable, and that a second shaft had become necessary, and that, further, the Home Secretary should have the power to order those people to put down a second shaft. You would agree with that?—It is like this: I am asking for compulsion for two roads out. The way you put it you leave that out. I want you to give the men the power to say that there is to be a second road out. You are going to take that power away when you leave it to anybody else to decide. You suggest it, but you take the power away when you leave it to other hands to say there should not be.

4242. I think you and I are agreed about the men's opinion being of value upon this matter, but you must agree that a time comes when someone must decide between the employer and the workmen. Who is that person to be. Even if you make it that they shall at some time put down a second shaft, you must have someone to intervene and say when that time arrives. Do you agree with that?—I agree if they send down experts that their advice should be taken.

4243. The employers, so far as I have seen, are perfectly agreeable to that course being adopted. I think I am safe in saying that, Mr. Ainsworth?

4244. (*Mr Ainsworth.*) You mean that the matter should be left in this way: if a second shaft is thought absolutely necessary by the Government inspector, he reports to the Home Office and then the whole thing can be considered, and then will come the question whether the proprietors feel that they are in a position to sink the shaft. If they feel that they are not, then the place will have to be stopped?—Yes.

4245. (*Mr. Lewney.*) That is it exactly?—If an inspector at any time before the shaft was started thought that the place was not safe, I would grant that inspector power to withdraw the men out of the mine.

4246. (*Mr. Ainsworth.*) Why should not the men withdraw themselves if they think it unsafe?—They should withdraw, but you will be aware that some men have not that confidence in themselves. They want a leader, and by giving the Government inspector the lead they would follow.

(*Mr. Lewney.*) You will agree with me, I think, that it is desirable to have someone to act as a judge—if I may be allowed to put it in that way—of the circumstances and to impartially decide between the workmen and the employer.

(*Mr. Ainsworth.*) He says that they would be satisfied with the Government inspector.

4247. (*Mr. Lewney.*) So that it really comes back to what I originally suggested, and what has been practically agreed upon so far as the evidence before us has justified us in coming to any agreement, that second shafts are always desirable, but that fair time must be given in order to allow sufficient development?—Certainly you would not ask anybody to blindly put down a second shaft without any prospect.

4248–50. In the meantime it is desirable to have a ladder road or other means of exit in addition to the cages?—Yes. Take, for instance, a cage when the ground begins to drag. You will see a fastening break here and there. If there is a man coming down and he catches that fastening because he drives a slide out, it does more mischief. When there is a second road out he knocks a partition out, and that partition is gone and where are you?

4251. (*Mr. Ainsworth.*) Supposing the ladders were fixed in the pump shaft, they would be safe from any accident to the two drawing shafts?—No. Take a case which comes to my mind, where the pump rod is broken and it is necessary to draw the pump rods, and the rod broke and went down the pit and wiped all before it.

4252. The pump rod would be in the pump shaft?—Yes.

4253. The drawing shaft would be all right?—No.

4254. Why not?—Because they strike first one side and then the other.

4255. The further shaft would be all right?—The rod in the rise end.

4256. (*Chairman.*) How did the men get out in that case?—There were not any men in. It was a matter of going down the street to get out, to another pit.

4257. From the number of accidents that have occurred it does not appear to me that it is a desperately dangerous thing to go down a mine with only one shaft. The danger is in proportion and dependent upon the number of accidents that have occurred?—Yes.

4258. It does not appear from the number of accidents that it is dangerous to go down a mine with one shaft, if it is a good shaft and there is a ladderway?—If it is a good shaft it is not, but the time will come when there will be a great danger from the floods.

4259. That is what makes you say it is a matter of discretion, because the time may come when there is no more ore in the mine?—Yes.

4260. (*Mr. Lewney.*) In regard to the changing-rooms I understand that you differ from Mr. Gavan-Duffy as to the necessity for providing them. It has been suggested, and I daresay that ultimately the Commission may recommend the Government to make it compulsory in all cases, that proper changing accommodation should be provided. Mr. Gavan-Duffy stated that he was of opinion, and that he voiced the opinion of practically the whole of the men in this district, that it should be made compulsory to have two compartments, one for dressing and hanging up the clean clothes, and the other for washing in and putting the red clothes in. You do not altogether agree with that?—No.

4261. It would be unjust to ask the employers to provide two places if one would be sufficient. Do you find in all cases in your district, so far as you are acquainted with it, that there is room between the place where you hang the red clothes and the place where you hang the clean clothes, and that there is also plenty of space for washing? Do you find that prevailing?—I cannot answer that question. I simply speak for our own employment. I am satisfied with the arrangements they have there.

4262. (*Mr. Ainsworth.*) How long have you worked at Montreal?—23 years.

4263. It has been the case that whenever suggestions have been made either for the safety or the comfort of the men, they have been attended to?—It has never been a matter of cost. Anything that can be proved to be beneficial to the men is carried out.

4264. We all know that the ground at Montreal has been on the move for some time?—Yes.

4265. Therefore the original shaft has had either to be abandoned or it certainly is not in the same condition as it was, and new shafts have had to be sunk from time to time?—Yes.

4266. Take the case of a new shaft being sunk at the present time to find ore: as we all know, you have to go to a much lower level than you had in former years?—Yes.

4267. What you have been always alarmed at in Montreal has been the drag on the shafts?—Yes.

4268. A great many of these new mines are sunk to 140, 150, or 200 fathoms. The danger of a drag is, therefore, much less. The surface ore in most places has been worked out, and when you want to open a new mine you have to do it at a much greater depth than was sufficient to reach the old deposits. Assuming your shaft is perfectly solid and that there is no fear of a drag, do you see the same need for providing a second shaft as in the case of a surface deposit where the ground soon gets on the move and begins to drag? Supposing you had a deep solid shaft, do you see the same need for a second shaft as you would in the case of the movable ground?—I will tell you my reason why. Here is a shaft solid and good, for a start. You lead off with that shaft, and I am sorry to say in olden times they were not going far from the shaft till they have started to win the ore. There might be a big area of metal at the shaft, and I am sorry to say they have availed themselves of the chance of that.

4269. Supposing your shaft had been sunk in solid ground?—If your shaft is sunk in solid ground it has a better tendency to stand.

4270. Supposing the shaft had gone to the depth of 140, 150, or 200 fathoms, do you not think that it would be a very serious matter for anybody to make up their minds to sink a second shaft?—It can be sunk from a commercial point of view as well as from a ventilation point of view.

4271. That might be so, but do you not see that it is a very much larger question?—Yes, but the instructions I have from the men are that they want a second road. They do not care when or where, so long as there is a safe road out.

4272. Supposing the shaft is sunk in solid ground, and sufficiently large to allow for a ladder road up the pump shaft, would you not say that the whole thing was fairly safe, and that the men had every chance of being able to get out if something went wrong with the drawing shaft, because they can get up by the ladders and the pump shaft?—For the time being only.

4273. Why?—It does not matter what is the depth. There will be big deposits of ore convenient to the shaft, which will cause the shaft to drag.

4274. You have worked so long in a mine where the ground is on the move, you cannot assume anything else?—It is what we see daily.

4275. With regard to the Montreal, no doubt you are right, but with regard to the other ground I think you will find that the shaft is fairly solid?—My experience does not go to that depth; 106 is the deepest that we have.

4276. (*Mr. Thomas.*) In this district where there are deep shafts and the deposits are more or less irregular and deep, the system is to put the shaft back from the iron ore as much as they can?—Yes.

4277. Those shafts cost a great deal of money?—Supposing, when they are proving the ground, they come across some fissure in the rock and there was an inrush of water and sand, and the pumps were blocked, what chance is there for them to get out? They tell me that there are pits where there is no connection except just at the bottom. There are no "eyes," as we call them here. They go back and there is a vertical rise. When they have got above the lip of the eye they are cut off altogether. If there is an eye where the men can get into, it is always a great consideration.

4278. (*Mr. Ainsworth.*) An opening from one level into another?—Yes.

4279. That could be easily done without a second shaft?—I said that there were some working on that principle now.

4280. That shows that the second shaft is not absolutely necessary?—Yes. The question is if the pumps were to break down and the water was to rise above the level of the eye, the air would be cut off.

4281. Everyone working upon two levels is almost certain to arrange for an escape from one level into the other?—But they tell me that there are pits which have only one.

4282. That is a matter for the inspector. I should recommend you to fall back upon him.

Mr. NOBLE DAWSON called and examined.

4283. (*Chairman.*) Upon whose behalf do you speak?—I speak on behalf of George Bewshar and myself.

4284. You have heard the evidence which has been given. Is there anything, which you would like to add? Is there anything in your mind which you would like particularly to bring before us?—Yes, there are one or two questions which you might ask me.

4285. Changing-houses, for instance?—With regard to changing-houses, from conversation I have had with the men in the district, and from what I have seen myself, I think that they are inadequate. There is not sufficient room in them.

4286. Would you be in favour of compulsory changing?—I do not say that I would go in altogether for making it compulsory. There might be some cases where you could not make it compulsory altogether.

4287. Have you a good changing place where you are?—No.

4288. Do you like two rooms, or one? In some cases the men wash and put on their clean clothes in the one room, but in other cases the men like going from one room to another. Have you a strong opinion upon the matter one way or the other?—I have not a strong opinion one way or the other, providing there is sufficient space. That is where the chief fault lies.

4289. Have you anything to say about the two shafts question?—I would like to say something else about the changing-house question. In some parts of the district I believe that the sanitary arrangements are very bad. They have simply a wooden floor, and the water is emptied down and it has nowhere to go except the earth.

4290. You would like something to be done with regard to improving the sanitary arrangements?—Yes.

4291. (*Mr. Greaves.*) The draining of the washing-houses is bad. There is no drainage to take away the soapy water?—No. That is very bad in the hot weather. The changing-houses are heated with steam and are generally very close. With regard to the double shaft question I should like to say that I think it is necessary to have two shafts or two means of getting in or out of the mine.

4292. (*Chairman.*) Would you make it so absolutely essential that nothing could excuse it—it must be general in every case—or would you leave it to be determined somehow in the case of each mine, to see what could be done?—After a certain time I think it ought to be done.

4293. Even though it broke the mine. You must go as far as that?—As far as breaking the mine goes, I do not think that it would do that.

4294. If it came to that point I should recommend, rather than make a double shaft, that the mine should be abandoned?—I think the iron ore mines in this district are all good paying concerns.

4295. Will you answer the question fairly? Would you go to the extent of saying this, It is so important that I would rather see the mine shut up than not have it? If you recommend a thing wholesale you must take the consequences of it fairly?—We have to consider the men's health.

4296. What is your answer to my question, yes or no?—And we have also to consider their lives, and from the opinion of the men I think that there ought to be two shafts.

4297. Then you would rather have the mines closed than not have the two shafts?—Yes.

4298. Is there anything else you would particularly like to mention?—Yes, there is the question of inspection.

4299. What do you think about that?—With regard to the inspection in the morning of the working places before the men go in.

4300. (*Mr. Thomas.*) Do you mean inspection by the officials?—The officials, or men appointed by the officials for inspection of the working places in the morning, the main roads and such-like places, before the men go to work.

4301. (*Mr. Redmayne.*) With regard to the inspection of the working places, it is carried out, is it not?—Yes, I think it is in all the mines.

4302. In every working place before the men go in?—Yes, I think so.

4303. You wish that there should be an inspection during the working shift as well?—Yes, but I do not think that the inspection in the morning is satisfactory.

4304. In what way is it not satisfactory?—First of all, I do not think it is safe for one man to inspect those places.

4305. You think they should not go in singly?—That man is a workman at the same time. There are places in an iron ore mine that height (*indicating*), and probably the men have been firing shots before they left in the shift before, and that man is expected to go into those places in the morning before any other man has gone down, and there is all this bad ground behind ready to fall down from those shots, and he does not know it.

4306. How long before the inspection is made have the shots been fired?—Probably 16 hours—probably 8.

4307. Before the shot-firer leaves the place does he not take down the loose stuff?—Not if there is only one shift working. They shoot it down before they come out, and leave it to settle till the morning.

4308. You think it is not safe for a man to go in singly and inspect the places for that reason?—No. There is a rule that one man is not allowed to work a place by himself, and therefore I think that this man should not work by himself.

4309. Am I not right in supposing that the inspection that is made before the commencement of work is made by an official of the mine, and that sometimes in some cases it is not, it is made by a workman?—Yes.

4310. Would you advocate that in all cases it should be made by an official of the mine?—Always by an official, and I think that he ought to have a man to accompany him.

4311. Would you also advocate that this inspection should be reported?—Certainly.

4312. By the official?—Certainly.

4313. Would you also advocate that this inspection should be made at a not longer period than a specified period before the commencement of work; before the men go in?—It should be immediately before the men go in.

4314. He could not do it immediately in every case, but you would not need to have a big lapse of time before?—Now they commence to go round the mine about 5 o'clock, and the men come in about 6.

4315. With regard to the inspection by the individual or an official or a semi-official, I take it that you would advocate that that was made by a man who is not paid by the amount of mineral gotten. His wage must not be dependent upon the amount of mineral gotten?—No. I expect he would want something extra for the time he went round with the official inspecting the mine.

4316. You advocate it being made by an official, that is, a man paid a standing wage, I take it? Really you advocate the adoption of the clauses bearing on the inspection of working places?—Yes.

4317. I mean the clause in the Coal Mines Regulation Act. You think that there should be a similar provision in the Metalliferous Mines Act? I will read it to you and see if it meets your views. It practically covers the ground. It says: "As to inspection before "commencing work. A competent person or persons "appointed by the owner, agent or manager for the "purpose not being contractors for getting minerals "in the mine shall, within such time immediately before "the commencement of each shift as shall be fixed by "special rules made under this Act, inspect every part "of the mine situate beyond the station or each of the "stations, and in which workmen are to work or pass "during that shift, and shall ascertain the condition "thereof so far as the presence of gas, ventilation, roof "and sides, and general safety are concerned. No "workman shall pass beyond any such station until "the part of the mine beyond that station has been "so examined and stated by such competent person to "be safe." You would add to that that the man making the inspection must be accompanied by another man because of the dangerous hanging conditions of roof and side?—Certainly.

4318. At what mine are you working?—Lord Leconfield's.

4319. Do they make a charge there for the use of the changing-houses?—I think not.

4320. You would know, would you not, if they did?—Very likely.

4321. (*Chairman.*) Have you felt much effect, or any effect, from bad ventilation?—I think our mines are very well ventilated.

4322. Your candles have not burned dim?—No, I think not; they do not at present, anyhow.

4323. (*Mr. Redmayne.*) Have you a double or a single shaft at the mine at which you work?—Double. There are means of communication.

4324. (*Mr. Thomas.*) When the mine is being worked continuously in three shifts, what would you do with regard to these inspections? Would it satisfy you if a man working at the face should be held responsible for his own face, there being in addition the supervision of those places by the officials who are appointed, the captains or agents, or whatever they are called? In order to be perfectly clear about it, you say in regard to the inspection of these places that previous to starting work you would have the places inspected by an official of the mine accompanied by a man who should go round?—Yes.

4325. What would you do where they were working three shifts and the working places are being continuously worked?—There are very few mines where the workings are continuously worked.

4326. There are a good many?—There are always some workings where there are no men.

4327. A good many are continuously working if they have a good place?—I think that there are a good many mines that have not any night shift.

4328. (*Mr. Greaves.*) Some have?—Yes.

4329. (*Mr. Ainsworth.*) It would mean, if a working stood empty, a whole shift or more, that it should be examined before the men went in?—It would have to be examined.

4330. That is what you mean?—Yes.

4331. (*Mr. Thomas.*) I do not know whether it is the custom in the mining districts in this part of the country (I know it is in many mining districts) to place responsibility as much as possible upon the men to see that their place is in a safe condition for working. Would you be agreeable to doing that?—I should place the responsibility on the official if he was the man inspecting.

4332. Give him some responsibility, but also give the men responsibility. Let him use his skill to see that his place is in a safe condition for working?—That is with regard to working it and keeping the place in a safe manner for working?

4333. Yes?—Yes, that is quite right.

4334. (*Mr. Lovett.*) If it is made compulsory for employers to provide changing-houses, would you agree that they should be situated as near as practicable to the shaft?—Certainly.

4335. That is important, in your opinion?—Yes.

4336. You think that it will be injurious to say you are compelled to put up a changing-house and place one up at a shaft half a mile away and for the men to have to change there. You think it should be compulsory, but that it should be as near as practicable to the shaft?—It would not be satisfactory. They would probably be going half a mile from home.

4337. (*Mr. Lewney.*) With reference to signalling, do you agree that it would be an advantage to have a universal code of signals in metalliferous mines?—Yes, I think so.

4338. In reference to the changing-house accommodation, do you agree that it is necessary that all changing-houses should have two compartments? It is a rather important question. We may have to make a recommendation, and it is necessary to obtain all the evidence that we possibly can upon these points?—It is the wish of the majority of the men in the district.

4339. What is your opinion about it?—It is not a question of my opinion. I have never changed in one of them: I would not. They are not fit to change in.

4340. I am sorry that that condition of things prevails here. Would you still insist that it is necessary to provide two compartments?—I think it is necessary, but still I would not insist upon it if proper means were taken to provide sufficient room. You want enough space for each man.

4341. That is a very important point?—Yes. At the present time they have not got it.

4342. (*Chairman.*) You mean room enough to prevent the clothes being messed about by the splashing of the water?—Yes.

4343. (*Mr. Lewney.*) I am ignorant upon these points, and that is why I wish to ask you about them. Have you any idea of the conditions prevailing so far as a good supply of clean water is concerned?—So far as I know, I think a good supply of clean water will be sufficient.

4344. In all changing-houses now in use you think that there is an ample supply of clean water?—I cannot speak for all of them.

4345. So far as you know?—So far as I know.

4346. You think that is an essential condition?—Of course it is very essential. I do not believe in anyone washing in another man's dirty water. If there was not a sufficient supply of water they would have to do that.

(*Mr. Lewney.*) You would not agree to water being pumped out of the pit into a reservoir and afterwards being used in the changing-houses. That would not be satisfactory?—No.

4347. (*Mr. Greaves.*) If you were to make the changing-house in two portions, one the washing portion and the other the dressing portion, the dirty clothes would be left in the washing portion and it would be necessary to take some garment from the washing portion into the dressing portion for the man furthest away from the partition, otherwise he would have to walk a long way with nothing on?—Yes.

4348. He would have to take some clean clothes to the place where he takes off the dirty clothes?—Yes.

4349. (*Mr. Lovett.*) Would he walk in his pants and change them?—Yes.

4350. (*Mr. Greaves.*) He would walk in his clean pants?—Yes.

(*Mr. Greaves.*) It does not seem to be a very convenient arrangement.

4351. (*Chairman.*) Is there anything else you can think of which you wish to bring before us?—I do not know that there is, except the question of timbering which has been referred to. That was in regard to the men being brought out of their working place to put a set of timber in somewhere on the road, probably the main road. In many places the men are brought out at different times. They have a contract to get so much out per shift to make a day's wage.

4352. It is a wage question more than anything else?—It is a question of the men being brought out from their own working place to go back on the road to put a set of timber in for which they get nothing. We think that ought to be done——

4353. By a special set of men?—Yes, by shift men, or probably we would be satisfied if the men were paid for it.

4354. The men would be satisfied to do it themselves without a second shift?—Probably, if they received pay.

4355. Provided they were paid for it. Is that so?—Yes.

4356. It is rather more a question of the mode of payment than anything else?—Yes, but still in a good many cases I think it would be better to have shift men employed to do those things.

4357. (*Mr. Redmayne.*) Supposing the men are working in a place and are taken back say 100 yards to put in a set of timber, how long would it take them to do that—half an hour?—It probably might be that—probably half a shift or a whole shift.

4358. And then they go back again into their working places?—Yes.

4359. Nobody has been there during all that time?—Certainly.

4360. They do not know what has happened?—In their working places, you mean?

4361. Yes. A stone may have got loose?—Yes, probably.

4362. Would you advocate remaining in the place for reasons of safety? Even supposing that they were paid for doing work "back bye," would you not still advocate their being restricted to their working place?—If they were paid for a set of timber.

4363. You would let safety go?—No, that is not what I mean.

4364. It is safer for two men to remain in their working place all the time?—But if the men were brought down the road they would not be in the working place.

4365. They would go back to their working place?—Yes.

4366. Something might have happened during their absence?—It would depend upon the nature of the place.

4367. It might commence to "work"?—Probably during the shift that working place might have been inspected and they would know whether it was a good condition or not before they left. If it was not, they probably would not be asked to leave it to put the timber in. They would get other men to do it.

4368. The unsafe conditions might begin to come into operation during their absence?—It is probable, but it is rather doubtful, I think.

4369. (*Chairman.*) Is that the last point you have, or is there anything else you wish to put before us?—There is one thing in regard to shot-firing, which is carried out to a great extent as safely as it is possible to do so now. Great care, I believe, is exercised in preparing the charges, and I have heard it suggested that there should be only a small amount of stemming placed on a hole. I think it was 2 or 3 inches. I would say 6 inches.

4370. Apparently you are satisfied with the way it is done?—Yes, I would not advocate any change.

4371. At all events as far as we are concerned there appears to be sufficient power to make it satisfactory if it is not at present?—Yes.

4372. Is there anything else you wish to say?—In the Act it reads, in regard to the question of unramming a charge, that you shall not unram a charge of powder. It does not say anything about the unramming of any other explosive. I should like it to be clear upon that.

4373. Is that all you have to say?—I do not know that there is anything else I can remember.

4374. You have been speaking on behalf of four other miners. We do not want to lengthen the proceedings unnecessarily, but if any of the other miners have anything to say we should like to hear it?—They might have different views.

4375. If there is any point you have not dealt with we should like to hear them upon it?—There may be other suggestions they wish to make which I have not made.

Mr. William Tinnion called and examined.

4375*a*. (*Witness.*) In the case of a cage getting out of the slides when in action, I would like to impress on this Commission to get a clutch drum, so that if one side was wrecked they could lift the men on the other side.

4376. (*Mr. Redmayne.*) You mean that you would like to have double winding arrangements?—Throw one side out of gear and get the other into action. If one side was wrecked, the side the ladders are on, the men could be lifted into the other.

4377. (*Mr. Thomas.*) You might get an accident on the clutch portion of the drum. When you throw that out there might be an accident on the other drum?—You can do that; I have seen it worked. I have seen a cover over the men when sinking. I have worked under that in the coalfields at a place not many miles from Cockermouth, at Brigham.

4378. (*Mr. Greaves.*) A cover in the sinking shaft?—In boring.

4379. (*Chairman.*) You have worked under a cover?—Yes.

4380. In sinking?—No, in boring.

4381. We want to ask you how you got air?—It is easy to get air: it forces itself with the water coming down.

4382. (*Mr. Greaves.*) You had no stuff to get out?—No.

4383. You were simply boring at the bottom of the shaft?—Yes, but the apparatus worked up and down with a lever. We could let it down to the side and anything passed through. When the stuff was drawn you got it with a handle—with a crab winch.

4384. (*Mr. Ainsworth.*) Where do you work?—One of Mr. Scoular's mines, the Parkside Company.

4385. (*Mr. Lewney.*) You agree with Mr. Gavan-Duffy, to carry that down within 4 feet of the head of the workmen?—I do not know that I agree.

4386. Say 6 feet?—I do not know that I agree with the method, but I have seen it worked.

4387. You were boring?—Yes.

4388. Did you ever work in a sinking shaft where you had to blast?—No; we have had an eye, another level above, and we have run a tram over a cover for anything that came from the top. That is what I have worked in.

4389. (*Mr. Redmayne.*) Are you charged for dressing-houses?—No, I do not change. I am very sorry I do not change, but the place that I should have to change in is not fit for a pig to change in. It is not the company's fault. The company is willing to do anything for us, but it is the dirty filthy miners.

4390. Are they charged anything?—Yes, I think a woman charges them; the company does not charge them. The woman charges them 3*d*. a week. It is the company's wish for it to be clean, but the woman is paid for looking after it and she does not do it, and the clean clothes and the dirty clothes are all mixed up together.

4391. (*Mr. Lewney.*) Surely it is a very unsuitable place for a woman to look after?—The place is all closed up, and the next morning you know what meets you by the smell of sweaty feet and skins.

(*Mr. Gavan-Duffy.*) Perhaps you would like to ask the last witness whether the changing-house money is paid to the woman or to the office.

(*Chairman.*) Is it paid to the office?

(*Mr. Dawson.*) It is paid directly to the woman. She stands on the pit top on Saturday and gets the money.

(*Mr. Ainsworth.*) It has nothing to do with the office.

Mr. John McCusker called and examined.

4391*a*. (*Witness.*) I think the present mode of mining is old and antiquated both from a commercial and a safety point of view, even from the mine-owners' point of view and from the method of mining as regards the safety of the miners themselves.

4392. (*Chairman.*) What is the first great change you would introduce? Will you tell us the most important of them?—The most important is this. I think I am voicing the opinion of miners that have worked in different parts of our colonies and this country, and they find out that we are not very far removed in the science of mining; we are a deal out of date.

4393. What is the first great change that you would introduce?—I would suggest that it should be compulsory to have any place in a mine not more than 10 feet high and 11 feet wide. That would be a gain to the mine-owners from a purely commercial point of view in obtaining the ore, and it would also relieve the anxiety and dread of the workers.

4394. How would it save the ore?—By a proper method you would be able to win the ore. Under the present method there is great danger to the workers and a great loss of mineral to the mine-owners.

4395. What is the next point?—As regards the method of signalling I agree with our general secretary. I would go so far as to suggest that we should have a duplicate method of signalling, both by electricity and by mechanical means. There is one very important mine in this district at which, I understand from men that work there, there is no down signal from the engine man. That is a very important point. At one of the largest mines, employing the largest number of men in this district, I understand that there is practically no down hammer from the engine man.

4396. What is your next point?—As regards the closets.

4397. You agree generally with what has been said upon that question. We have heard a great deal about it, and I do not think that we need go into it in further detail?—Then the inspection is a very important point. We want some person upon whom we can fix the responsibility. As the law stands at the present time the mine-owner shoves the responsibility on to the manager, and the manager shoves it on to the overman, and the overman shoves it on to the miner.

4398. Whom would you shove it on to?—I would appoint a man and place the responsibility on him.

4399. That is the mine manager?—We must have someone to look forward to.

4400. What is the next point?—I think what I first said about these high places. I do not think that these high places should be allowed.

(*Chairman.*) I will ask the Commissioners who know more about this point to ask questions upon that.

4401. (*Mr. Redmayne.*) What would you do, supposing the place fell? Supposing you started with a place 10 feet high and it fell to 15 feet, it would be 15 feet high?—I would reduce it to 10 feet.

4402. Would you fill up the roof?—Yes.

(*Mr. Redmayne.*) By doing that you would make it more dangerous than before.

(*Chairman.*) How could you fill up the roof?

4403. (*Mr. Lewney.*) By putting timber in?—You could pack it up, what we call locally "pillaring."

(*Mr. Lewney.*) I agree with the witness that it is practicable to put a pillar in.

(*Chairman.*) What do you think of the suggestion to not allow places to be more than 11 feet in width?

(*Mr. Lewney.*) I think that is a reasonable suggestion.

(*Chairman.*) We shall, no doubt, hear what some of the engineers have to say about that.

4404. (*Mr. Redmayne.*) Supposing a place was 10 feet high and it fell to 15 feet, how would you put the timber in?—I should reduce it. I should pillar it up to make it solid.

(*Mr. Redmayne.*) I must confess myself that I do not see how you would do it.

4405. (*Mr. Thomas.*) This suggestion is when you work in horizontal galleries?—Yes.

4406. Do you know what I mean by a deposit working at a steep angle?—Yes.

4407. You could not do it with an incline deposit?—No. I would not suggest it in new mines.

(*Mr. Greaves.*) If you are stoping you could not do it.

(*Mr. Thomas.*) You have been in other countries. A deposit inclines at a steep angle, it would be impossible to work the mine at all as you suggest. It is possible to confine it where the horizontal is being worked in planes, but where you have gallery after gallery you could not do it.

4408. (*Chairman.*) If it is a steep road you would get 15 feet. If you had it only 10 feet high you would not be able to work in it?—You could fill that up again if necessary and make it solid. You would never have more than 10 feet to work at. I suggest it because it would minimise danger.

4409. (*Mr. Thomas.*) There is very little danger from falling roof. There are very few accidents from that, are there not?—There are very few accidents from falling roof, but the danger is always there.

4410. It has not been indicated in the ratio of accidents. You have been remarkably free from accidents from falling roof, have you not?—Yes.

4411. You are anticipating what might occur, that which has not occurred in the past?—There has been danger of accidents in the past.

4412. (*Mr. Ainsworth.*) Where do you work?—At Lord Leconfield's.

4413. How long have you worked there?—21 years.

4414. You do not look that age?—I have worked that time.

4415. (*Mr. Greaves.*) You are referring to mining in this district. You are not referring to other mining when you say 10 feet?—I am suggesting a further method of mining which would be beneficial to the mine-owners and safer for the workers.

4416. Just for iron ore?—Yes.

4417. In this district?—Yes.

4418. (*Mr. Redmayne.*) When you say 10 feet high and 11 feet wide, you do not really lay that down as a hard and fast line?—I would suggest that.

4419. Supposing you say 10 feet 6 and 11 feet 6?—I would not exactly put a 2-foot rule on to it. I would not make it definite. I would allow a foot either way.

4420. Would not some wording to this effect meet the point, that it should not be of such a height nor of such a width as to render the place unsafe?—Yes.

4421. (*Mr. Lewney.*) I take it what you mean and what Mr. Redmayne has got from you is this, that as a matter of safety you do not like to go upon a ladder to work down a hole which may have shattered the ground and left it hanging?—No.

4422. You want a reasonable height so that you can fix a permanent stage in order to do that?—Yes. It is obvious the nearer a man is to his work the more efficient he is and the more prepared to do the work.

4423. (*Mr. Redmayne.*) Do you change in a changing-house?—Yes.

4424. Do they charge you?—No.

4425. What mine are you working at?—Lord Leconfield's Croft Pit. We give a gratuity to one of the firemen to supply us with water.

4426. (*Chairman.*) Have you suffered from bad air?—Yes, some years ago.

4427. Are you suffering now?—No.

4428. When did you last suffer from it?—13 years since.

4429. For the last 13 years it has been all right?—Yes.

4430. (*Mr. Redmayne.*) Have you two shafts?—Yes.

Mr. George Bewshar called and examined.

4430*a*. (*Witness.*) I would like to emphasise what has been said about the workings. I believe that while mining in the district now is a lot better and safer in every way, the workings are a lot less than they were a number of years since, but I still think that there remains a lot more to be done for the safety of the men as regards the workings being kept so that they can always be worked.

4431. (*Mr. Lewney.*) You mean without getting up a ladder?—Yes. The workings are sometimes worked where they cannot put them, and I believe that is more dangerous. I believe that the mines can be worked without making them so dangerous. They ought always to be kept so that a man can wood his place safely. I would not like to say that 10 or 12 feet would be any real fast way of putting the size of the place, but keep within bounds so that a man can wood the place and make it safe. There ought to be some rule made in that way for that purpose. I think it would be a good thing if this Commission would say that places should not be worked so large, although they are not worked so large as they have been in days gone by. They are better, but I believe that a lot can be done in the way of safety for the miner, and I believe in the long run that they will get more out if they work the places in a less way. It looks as though they could not be always worked. A great many experts who have not had so much experience in iron ore mining as I have had would say that they could not work places without them being very large, but I believe that they often can work them without being so large. The men lose control of their places when they come to a fault, and the ore is easier to get. It runs up to the fault and begins to fall. They let it fall and the men get a good quantity of ore, perhaps a bit cheaper, but perhaps not so much cheaper; anyway it comes that way till it falls, and they lose control of their place and they cannot wood it. Something has to be done, and it is let run on. That is not the worst way of working the mines. I believe in places where there are good roofs they are made more dangerous by taking the latter part of the ore than by taking in places that run in that way, because where there are good roofs the men are employed and they work the places very large. The roof is good for a considerable time, but they get the place that large they could not put one in it. Then the men have to do the best they can, and often there is a great amount of danger. I think there ought to be some fast law to prevent mines being worked out of the reach of wood, no matter whether safe at the time or not. When they have got a quantity of ore out it is not safe. I know mines where thousands of tons of ore come out and they were all right for a certain time, but after a while it got dangerous altogether and men lost their lives. This is what I have seen. If it had been worked in a systematic way, where men are forced to keep their work so that they could wood it, and the managers helped them, these lives could have been saved. It seems that we cannot get the ore when it gets high. People were talking about 10 feet. There is no height of ore but that it can be got from stage to stage. We can put a vertical rise anyway we like. As practical men we go rise up and work in sections, so that instead of being brought in as it is sometimes, it can be brought to come naturally down by working it in a systematic way. A lot can be done in that way, and it ought to be compulsory to keep those places so that men can work them.

4432. (*Mr. Redmayne.*) It would meet your views if there was a rule to the effect that every working place should be worked in a systematic and proper manner?—Yes.

4433. So as to prevent danger?—Yes.

4434. (*Chairman.*) Is there bad ventilation where you are at present?—I think that it is more of the inspector's place to answer about the ventilation.

4435. Are you of opinion that there is bad ventilation? Have you felt the effect yourself?—Bad ventilation is a very bad thing, and there is too much of it.

4436. Have you had much of it?—Yes.

4437. When and where?—I could not exactly point out when, but I have been a miner for 40 years and worked in different mines in the district and in other places.

4438. (*Mr. Ainsworth.*) Where do you work now?—At Postlethwaite's.

4439. (*Chairman.*) I do not want to press you, but I should like to know at what particular place. I do not want you to condemn this or that mine, but I want to know whether you are suffering from the effects of bad air?—I could not say that I am suffering now.

4440. I should not have said that you looked like it. I only wanted to know?—I know that many men have suffered from it if I have not myself.

4441. Is that chiefly from explosive or the carbonic acid?—Possibly from both, and I daresay if I said both I should be saying rightly—from want of proper current of air and explosives as well.

4442. Do you think that it is a matter of common complaint among the men you have associated with in the mines that there is not enough ventilation?—Certainly, in a great many of the mines. I know that there are mines in the district which have very good ventilation, but there are other mines which are not good. Generally the new mines are the worst to get the ventilation in. When places are opening out it is the worst time to get ventilation, and there ought to be some means of getting ventilation. While I believe in having two shafts I think even without that there ought to be better ventilation put into the mines, and it could be in many instances at almost nearly first cost.

4443. (*Mr. Redmayne.*) Do you change in a changing-house?—Yes.

4444. Do they charge you anything?—Threepence a fortnight we pay to a man who looks after the changing-house.

4445. Through the office?—No, to the man who looks after the changing house.

4446. (*Mr. Thomas.*) Are you aware of any charge made by the company to the men for the use of the changing-house in the district?—No, they make no charge.

4447. You come to a mutual agreement to give whatever gratuity you like?—I suppose we have to do this. I do not know whether a man would have to leave if he did not pay it. I daresay that it is not altogether compulsory, but still you are expected to pay 3*d*. a fortnight to the man who washes the changing-room and looks after the clothes.

4448. (*Mr. Lovett.*) Is the man employed in any way by the company?—I do not suppose he is, except that he might wash the official clothes. I do not know.

4449. (*Mr. Thomas.*) It is clear, so far as you are aware, that the mining companies in this district do not charge the men for the use of the changing-house?—I do not know particularly.

4450. Are you aware of any mines where the officials of the company charge you and deduct from your pay or make you pay to the offices a certain amount, whatever it may be, for the use of the drying or changing house? I do not mean any gratuity you may agree to give the man to wash the clothes or keep the place clean, but generally speaking is it the custom that the mine-owners do not charge you for the changing-house?—There are some mines where they do, I think, but I am not positive.

4451. (*Mr. Ainsworth.*) You have not been charged?—We pay 3*d*. a week to the man.

4452. It is not done through the office?—No.

4453. (*Mr. Lovett.*) Do the men have any control over the man they pay the 3*d*. to?—Yes.

4454. The company has control?—Yes.

4455. It means what the men pay this man goes to make up his wages?—I do not think that the man gets anything else except what the men pay him.

4456. And the company has control over him?—If they like to employ him I daresay they have control over him.

4457. (*Mr. Greaves.*) Have the men any control over him?—Certainly the men have a little control, and would tell him, if he was not doing his duty, to do it

better, but for anything more I do not know that they have.

4458. (*Mr. Lovett.*) Have they power to discharge him?—No.

4459. The company has that power absolutely?—Yes.

4460. (*Mr. Thomas.*) He is put there by the company on the men's behalf. They select a man and pay him?—Yes, as I understand.

(*Mr. Lovett.*) If I paid him I should want to select him.

4461. (*Mr. Redmayne.*) Who selected him?—The company, the manager of the mine.

4462. (*Mr. Jones.*) Would you be allowed to use the changing-house if you did not pay the 3*d.* a week?—I do not know exactly about that. I am not so sure about it. At any rate I would not like to do it.

(*Mr. Jones.*) That is one condition of using the changing-house, that you pay 3*d.* a week to the man in charge. That is compulsion, in a way.

4463. (*Mr. Greaves.*) Is it a condition? He says he does not know?—It is a condition, so far. I am not going to say that it is compulsory, or that a man would be sacked if he did not pay.

4464. The question is, could you use the room if you did not pay the 3*d.*?—I would not like to do it, but I could not say.

4465. (*Mr. Jones.*) It is an understood thing that the condition attaching to the use of this room is the payment of 3*d.* a week. You understand that. Everyone who goes to the mine for the first time knows that he has to pay 3*d.* a week for the use of the room?—Yes. He stands there on pay-day and he has a book, and when you pay he books it down.

4466. (*Mr. Greaves.*) What does he do for that?—Washes the changing-house out and looks after it generally.

4467. He does not wash the clothes?—No. I daresay he would if you paid him for it.

4468. That would be an extra?—Yes.

4469. (*Chairman.*) He does not for that sum of money?—No.

4470. (*Mr. Lewney.*) You regard it as a moral obligation on your part to pay this 3*d.* a week?—Yes, but it is a rule that it should be paid.

4471. (*Mr. Lovett.*) It would be nice to know what would happen if you did not pay?—They would withdraw the man and we should have to do without a changing-house looker-after.

4472. (*Mr. Lewney.*) That is not a universal practice throughout the district?—I cannot say how many other mines do that. I do believe that we want a better system with changing-houses. We want a better space. I would not care whether there were two rooms or not if we only had plenty of space. There is an inadequate amount of space for every man in the changing-house. We have a good changing-house where I am working. It is a stone house, and might be very comfortable for about half the number, but it is too small.

4473. (*Mr. Lewney.*) Who engages this man in the first place?—The company.

4474. The company engages the man and they expect you to pay a voluntary levy for his support?—Very likely.

4475. (*Mr. Redmayne.*) What mine do you work at?—Postlethwaite's.

4476. (*Mr. Thomas.*) Would you say 75 per cent. of the mines in this district charged 6*d.* a fortnight for the use of the changing-house?—I could not say that. I suppose our secretary has a better knowledge of that than I have.

4477. You would not support a view of that kind?—I could not support it, so far as that went, not conscientiously.

(*Mr. Gavan-Duffy.*) Mr. Chairman, there has been hesitancy on the part of some of the witnesses in going into detail in regard to their mines. There is a secret fear on the part of some men, justified or unjustified—unjustified, I think, myself—about coming here and giving vent to what is the truth. I feel sure that the employers would not take advantage of them, but I think the men would like to have a word from you to the effect that they need have no fear in telling the truth. The Royal Commission has certain power to guard those men in regard to their work, and so long as they speak the truth the men need have no fear.

(*Chairman.*) We will consider what you say.

At Egremont, Cumberland.

NINTH DAY.

Friday, 21st October 1910.

Present:

Sir HENRY HARDINGE SAMUEL CUNYNGHAME, K.C.B. (*Chairman*).

Richard Augustine Studdert Redmayne, Esq.
John Stirling Ainsworth, Esq., M.P.
Richard Methuen Greaves, Esq.
Richard Arthur Thomas, Esq.
Robert Thomas Jones, Esq.
William Lewney, Esq.
Uriah Lovett, Esq.
T. E. Bettany, Esq., *Secretary.*

4477*a*. (*Chairman.*) Before we commence hearing evidence to-day I should like to say that we have just been considering the question of the possible unwillingness of witnesses to give evidence. I am particularly desired on behalf of the Commissioners to say that of course, as our duty is, we are earnestly desirous of hearing everything—it does not matter what—from everyone. We desire that the greatest freedom of expression should prevail so that we can hear every shade of opinion. With reference to the point of people being afraid to give evidence, of course we could not guarantee anything. As in a court of justice, you give evidence, but there is no guarantee one way or the other. I say that because I wish the position of things to be clearly and distinctly understood. However, if anyone felt that he was in a position of being afraid to give evidence, the only thing we could do would be to consider an application to hear his testimony in camera—in an entirely private way—and if any such applications are made to us we shall be perfectly willing to receive them. Of course, evidence that is given privately, and cannot consequently be contradicted, is not as valuable as evidence given where other people can hear what you say, and then afterwards come and say "I "have heard the evidence and I object on such and

" such grounds." It would be a curious thing if the defendant was not allowed to hear the case of the plaintiff in a court of justice. Yesterday a number of witnesses came forward to put all the points very fairly before us connected with the district, and some of the employers were present and were able to hear what was said and proposed. Of course, we shall ask the employers to give their evidence, and say how far they think these things will be possible or impossible. It therefore seems most necessary that the employers should be present if the men give their evidence. At the same time evidence given publicly without exclusion of the Press, and without the exclusion of anyone, is of course much more valuable—it is not a question of terrorism, but it is the question of whether what is said can be contradicted. That is the important point. You may be quite sure we shall not decide anything without hearing both sides. The great advantage of a Commission like this is that you have a collection of gentlemen representing all sides and of all modes of thinking; there is, for example, the Chief Inspector of Mines, there are the owners and their skilled workmen, who know the subject thoroughly; and when suggestions are made it is not like suggestions to people who have not seen a mine or quarry in their lives. From a technical point of view, I am probably the least instructed, but from an administrative point of view I probably know more than Mr. Leck, who is an inspector and an expert. Therefore, you will not be giving evidence to ignorant people. If Mr. Gavan-Duffy has anything to say upon what I have now said I shall be happy to hear him.

(*Mr. Gavan-Duffy.*) I think we may end this matter in a word. I raised the point last night by request; and then we had the assurance of Mr. Burnyeat that the men would not be interfered with in any way whatever, consequently we do not desire you to hear any evidence privately, and we unreservedly accept Mr. Burnyeat's assurance on behalf of the employers.

(*Mr. Burnyeat.*) Speaking for perhaps one of the largest groups of mines, I should like to repeat what I said; there is no sort of idea in the nature of intimidation or terrorism on the part of the employers. Most of these men know their masters perfectly well, and I think most of them know me, and we shall be only too pleased to hear everything they have to say.

(*Mr. Helder.*) Mr. Burnyeat has asked me, as representing the mine owners as a body, to endorse what he has said, which I do. There is no intention on the part of anyone to interfere with the men, and the owners hope that they will come forward and give a straightforward account of what they know upon the various matters.

Mr. JOHN DIXON (Miner), Lonsdale Mine, Frizington; Mr. GEORGE ATKINSON (Miner), Kelton Mine, Rowrah; and Mr. JOSEPH BRAITHWAITE (Miner), Margaret Mine, Frizington; called and examined.

4478. (*Chairman.*) There have been handed to us some points on which you would like to speak. I will address my questions to Mr. Dixon, and then if either of you at the end think there is anything else of importance you would like to say we shall be glad to hear you. I may say that we have already a good deal of evidence upon those points, therefore there is no need to go through them as if they were brand-new things presented to us for the first time. At the same time we should like to have the views of the intelligent miners in this part of the country. But I may say I have had large experience of miners in different parts of the country, and I am certainly impressed with the intelligence and good character and altogether the fine physique of the men of Cumberland. Now, Mr. Dixon, the first question is in reference to the need of a second shaft in a mine. Of course, everybody would wish for a second shaft always where possible; the only question is that in cases in which there is but one shaft—and it is a good shaft, we will suppose—and there would be no other way of getting a second shaft except to make a brand-new one, and the mine is steep, there may be very large expenditure which might have a deleterious effect upon the industry. What are your views upon that?—My idea about that is that there ought to be two shafts to a mine.

4479. At all costs; close the mine rather than go on with one shaft?—Yes, rather than go on with one. Of course, you must bear this in mind, that in some cases it would be very expensive to the employers to put two shafts down, but I think it is the safer way.

4480. We all think that probably. Would it not be enough to have some provision of this kind, that where an inspector was of opinion that there ought to be a second shaft he could serve a requisition on the owner to that effect, and then the matter could be decided as in section 18—the matter is referred to the Secretary of State and an arbitrator is named, and the whole thing is heard out and decided?—That would meet it.

4481. There would be a power of exemption in very strong cases, but then, of course, the men would be fully heard as of right, and the Home Office and everybody else would be heard. Would that do for you?—I daresay it would.

4482. It seems to me the only way short of making an absolute rule which might have the effect of closing a mine. Personally I should be inclined to think it was probably sufficient, but you know your own business better than I do. Give us your views?—There is one thing with respect to that: so far as my mind and experience is concerned, up in our quarter of the district there are two shafts to every mine nearly. The only thing that I think is required about it is to keep the airways open.

4483. That has been brought before us. There is another point which has struck us all: sometimes there will be a shaft running down, and then a road leading from that, and then a rise at the end of that, and then in a T shape there will be a gallery. That gallery ought to run, particularly where there is the least danger of water getting into the main shaft, so as to give men an opportunity of getting out?—Quite right.

4484. You agree with that?—Yes.

4485. I think I am reflecting the opinion of the members of the Commission when I say that ought to be done. Now about change houses: the law at present is that there shall be a change house, and we are all impressed with the necessity of having a change house that is fit for a respectable clean man to use. We have been considering what the conditions could be as to size, and so on; but the point has arisen whether the men of the district would be prepared to have it made compulsory to use it. What do you think they would say about that?—So far as I am concerned I am in favour of a change house.

4486. Would you have it made compulsory so that they are punished if they do not use it?—I would not like to say that, because there are a great many men who would not change at the mine if they had the opportunity, and I would not like to force it on them; but so far as I am concerned I think a miner is only doing his duty to change at the mine to keep his home comfortable and clean.

4487. You would be rather favourable to compelling them?—Yes, I am that way inclined.

4488. And they would know they would be brought before the magistrate if they did not, because that is the only way we could do it. The question is whether there should be such provision. If you are in favour we have no objection, only we do not wish to put too severe conditions upon them?—I think it should be made compulsory.

4489. (*Mr. Greaves.*) I am not sure that the witness understands. Are you in favour of punishing them if they do not change?—I am not altogether in favour of punishing them if they do not, although I am in favour of the idea.

4490. (*Chairman.*) There is another point in connection with the change house which has puzzled us a

little. It is said charges are made, but on examination it turns out that in a good many cases it is not so much a charge as a payment to a man for doing something there. Is a charge made in your mine?—We pay 3*d.* a fortnight to a man for attending to that house.

4491. Is he your man or the employers' man? Have you a right to dismiss him?—Not that we know of.

4492. If he was not doing his work properly could you dismiss him?—We could complain, no doubt, that things were not going on right, and then it would be rectified, but we have no power to dismiss him.

4493. What does he do?—He cleans up, attends to the water, and gets the water fit for the men to wash in.

4494. It would be regarded as a relief, I suppose, if the employers undertook not merely to provide the house, but to keep it reasonably clean?—I think they ought to.

4495. In addition to that I suppose you pay him occasionally for washing your clothes—that is a private affair?—That is not so.

4496. How do the men get their clothes washed?—Fetch them home every week or every fortnight, as the case may be.

4497. Then there is a question I need only lightly touch upon. Charges are made, I suppose, for candles and explosives and different things?—Yes.

4498. Are you aware that there is no right for the employer to charge more for those than the cost value of them?—I am aware of that.

4499. You have always been aware of that?—Yes.

4500. How long have you been aware of that?—A good number of years—probably 15 or 20 years.

4501. Have any men you know of anywhere had reason to complain of that charge as being too big?—I could not say I have heard anyone complaining. They say it is like the Truck Act, the charges are too high—they think so.

4502. You are aware you have a redress in that respect?—Yes, I daresay there is redress.

4503. I mean it could be put right if it was wrong?—I daresay.

4504. Have you anything to say about explosives?—I might say I have used explosives now for about 28 years as a miner and I have never once had a mishap with them.

4505. Now how about fumes. Do you know any people who have suffered, or have you suffered yourself, from the fumes of explosives?—I have been in places where the air is very poor and the fumes are very strong upon people in that particular part.

4506. Did the candles burn dim?—Yes, very dim; in fact, you have to put them like that (*illustrating*)—on the side—to make them burn.

4507. On the whole, is the ventilation of the mines of the district—not your own mine particularly at all—considered good or not?—Well, not at all times good.

4508. Is it the general opinion that a little more might be done?—Yes, the general opinion.

4509. You think that occasionally more might be done to freshen the air?—Most certainly so.

4510. Is there any matter in reference to timbering you would like to speak about? You know the point at present is this: the men working at a particular working place are responsible for the timbering in that place, and they might be called off to put up timbering right away in the road. Do they get extra pay for that when they are called off?—Not always.

4511. It differs in different mines?—Yes. My opinion is this, so far as I am concerned, that the miner ought not to be supposed to keep the wood good any further back than two fathoms, and for anything further back than that the miner ought to be paid by the employer for repairing it.

4512. There is no objection to the men working at the particular breast going back to it. It is a question of not doing it unless paid?—Just so.

4513. It has been suggested that they ought not to be allowed to do it even if they are paid, and that there ought to be special shift men kept for that purpose?—I think that is a matter for the employer to pay the miners for doing it.

4514. It would be equally safe whichever way it was done?—Yes.

4515. Your point is that it is desirable they should receive specific pay for that particular work if called upon to do it?—Yes.

4516. I suppose they would answer "But we have "considered that occasional liability to be called off "as part of their job"?—On that line of working you mean they should keep that good.

4517. I mean they would answer "That is the bargain"?—If I understand aright, these men would timber the place as they went on with it, but in case of the timber breaking down after they have gone by, then I think it is the employer's place to repair that timbering and pay for it.

4518. They would say that the liability to have to go back and do it has been considered in the bargain?—Yes.

4519. They would perhaps say, "You are wanting it twice over." I do not know whether they would say that, but they might?—They might. Well, that is my opinion.

4520. It is only a matter of safety?—Yes.

4521. You say it is merely much of a muchness, so far as safety goes, which way it is settled?—Yes.

4522. (*Mr. Redmayne.*) With regard to the bad ventilation you spoke of just now, have you noticed that the ventilation is particularly bad at certain periods of the day?—Yes.

4523. At what time?—After 10 o'clock, probably lunch time.

4524. When do you fire most of your shots?—Lunch time.

4525. The ventilation is affected by the shot-firing?—Yes, it is difficult to get into the place afterwards—we are very much annoyed with the fumes of the dynamite where we are working.

4526. Have you suffered from a bad head at all?—Sometimes.

4527. This deficient ventilation you speak of occurs in a pit which has two shafts?—Yes.

4528. Have you any complaint of the ventilation at other times of the day?—Well, I cannot say. It is generally all alike through the week, but on the Mondays is the best.

4529. There is no shot-firing on Sundays?—No, the week-end's rest.

4530. Do you know whether the ventilation is worse in the summer than in the winter months?—I cannot say, probably it might be; but we have bad air now.

4531. You cannot say definitely whether the heat adversely affects the ventilation?—I think it does.

4532. With regard to your working-places, I take it, from what you said to the Chairman just now that you see no harm from the point of view of safety in leaving your working-place to go back to timber—it it only a question of payment?—There would be no harm in leaving your place to do it, that is provided you are paid for it.

4533. As a miner do you not think it would be safer if you were kept at work in one place during the whole of your shift?—I do not think so; I do not think it would interfere with our course of work.

4534. In some class of mines the rule is that a man should not leave his working-place during the shift without special permission, but you do not think that obtains at hematite mines?—I do not think so.

4535. There would be no danger in leaving his working-place during a shift and then going back after the lapse of an hour, say?—I do not think there would be any danger.

4536. With regard to sanitary arrangements; what sanitary arrangements have you for men relieving themselves, and so, at your mine?—We have only the shaft foot. We have to dispose of it the best way we can.

4537. Have you any suggestion to make upon that question?—I have not any suggestion; it has been that way all my time.

4538. Do you not think it could be very considerably improved?—It could be in cases.

4539. Would you advocate the provision of earth closets that could be taken out of the mine at certain periods, and cleaned and replaced?—Yes.

4540. That would meet your views?—Yes.

4541. You think it would be an improvement on the existing system?—Yes.

4542. Have you ever worked about the shafts at all?—Yes.

4543. I take it you would advocate a universal system of signalling throughout the district?—Yes.

4544. Men go from one mine to another, and there may be a different code of signals?—Yes.

4545. What is your work at present?—Mining, breaking ore.

4546. What time do you go down the pit?—Six o'clock in the morning.

4547. You go straight into your working place?—Yes.

4548. Has anyone been there before you go there?—Yes.

4549. Who?—He is supposed to be an inspector of the mine, and inspect the places in the morning.

4550. How many places will he inspect that morning before the men going in?—He is always in our place; he leaves the date on some of our tools; that is the way in which we know he has been in there.

4551. He chalks the date up in some way?—Yes.

4552. You have to go into the place before you know he has been there?—Not direct into the forebreast, probably a few yards back. We leave our shovels, or anything we have been using, and of course he marks it there before we go to the place.

4553. It is not customary for the men to meet at the bottom of the pit, or some agreed place, and to be informed whether the places are all safe before they go into them?—If there is anything he comes and tells you. For instance, if there is any bad ground he makes it his business to tell you; he has always done it with me, at any rate.

4554. Then you know definitely; but do you suppose he goes round to all the places?—I cannot answer for any other place but my own.

4555. How many working places are there in your mine?—I could not tell you; probably 15 or 16.

4556. One man could go round?—It is a good wide district, I could not say the time he has to do it in; he does it in about an hour.

4557. That would be pretty quick travelling for the number of places?—Yes.

4558. Does he make a written report?—Yes, I suppose so; but we never see it.

4559. Have you the right to see it?—I could not say that, but we do not see it.

4560. Would you wish to see it?—Not necessarily; but if it was where we could see it, probably we might look at it.

4561. How high is your working place?—10 or 11 feet.

4562. How wide?—7 or 8 feet.

4563. Have you any views with regard to whether a place should be very high or very wide?—I certainly would not favour a great height.

4564. What would you call a great height, roughly?—Not above 12 feet.

4565. And what width?—12 or 14 feet wide.

4566. As a rule have you observed whether the places are unduly high or unduly wide?—I have seen very high places.

4567. So high as to be dangerous?—Yes, if there was anything up there, of course, you could not get up to see what it was.

4568. Has it been worked down or anything fallen away?—Odd pieces fall: I have seen them fall.

4569. Are the high places the rule or the exception?—It is not a rule to work high places.

4570. Is it a very exceptional thing?—A very exceptional thing; it is a case of robbery or something of that kind.

4571. It may be due to some cause over which there is no control?—Yes.

4572. (*Mr. Ainsworth.*) Where are you working now?—The Lonsdale Mining Company.

4573. (*Mr. Thomas.*) You were saying that your working place is generally inspected and a chalk mark put to show that one of the officials has been there?—Yes.

4574. In addition to that you of course inspect your place and see if it is in a satisfactory working condition?—Yes; when we go in.

4575. Does that responsibility rest with you under any special rule in this district?—I think so. I think it is a miner's duty to see his place is safe when he goes in as well.

4576. Would you be content with a rule such as this which obtains in another large mining district: "He shall, before commencing work and whilst at "work, satisfy himself of the safety of any climbing "way, ladder, tub, bucket, kibble, skip, chain, rope, "hook, windlass, or other appliance for his personal "use, and shall not use anything that he finds unsafe." The next clause is: "When employed in driving, "sinking, rising, or stoping, he shall properly secure "his working place to the satisfaction of the captain"?—Yes, that is right.

4577. ". . . . and if he thinks a sufficient "supply of timber has not been provided, he shall "report the same to the captain or agent who is in "charge. He shall before commencing work, and "during the course of it, especially after blasting, "carefully examine and sound the roof and sides of "his working place, and shall remove any loose stone "or ground that might be dangerous." The object and intention is to throw responsibility upon the miners, who as a rule are most competent to see that their place is in a proper state for working?—Yes.

4578. You would agree that if provisions of that kind do not exist in your district that rules should be framed on similar lines to throw upon the men equal responsibility to the officials of the mine?—Well, that is usually what we do. In the case of blasting we always go in and dress down the ground.

4579. My point is this, that manifestly it would not be to the advantage of the men to have the whole of the responsibility thrown from them on the officials, but that the responsibility should, so to speak, be divided in such a way as indicated by provisions of this kind?—Yes, that is, the miner ought to examine the place for himself when he goes in.

4580. You agree with that?—Yes.

4581. I gather from what you answered Mr. Redmayne that your sanitation is rather bad. I suppose pails or anything of that nature properly designed would be rather desirable?—Yes.

4582. I think you emphasised the need for keeping airways open in the mine, and if it was properly done there would not be then such a need for a second shaft as otherwise might be the case?—It needs something, of course to cause the air to travel.

4583. Supposing you had a single shaft in a mine which was sinking into rock, and that shaft was properly divided, the pump road from the cage roads, which would act as a ventilating part of the shaft, that would be quite satisfactory?—It would be satisfactory to an extent, but I do not think it would be wholly satisfactory. I do not think the mine could be properly ventilated through that means.

4584. That may be possible, but there is a question upon it. You would probably agree that in cases where you had such a shaft as that, and which shaft was only furnished with a winding-engine, that to meet a need that shaft should be fitted with a ladder road in a pump compartment away from the cage road—that is, you should have another means of exit?—Well, I cannot say that that would act in all cases.

4585. Still, if anything happened to the winding-engine as at present situate, you would be there until the winding-engine was repaired?—I quite agree with that. At times there is great difficulty in getting up a pump shaft where there are ladders—there would be a great rush of water probably and you could not keep any lights, for instance.

4586. Possibly not; still those cases have never arisen that you remember?—Not that I am aware of.

4587. Generally you would agree with some provision being made that a shaft, in addition to being furnished with the winding-gear, should be furnished with another means of exit in case of an accident?—Yes.

4588. If that were so, the urgent need for a second shaft need not be so pressing, and could be referred in case of dispute to an arbitrator properly appointed?—Quite so.

(*Chairman.*) There are several rules in this district which provide for that. For instance, Rule Number 22 of the Special Rules for the Montreal Mine: "On "entering their working places, and previous to com- "mencing work, miners must satisfy themselves as to "the safety of such workings." That is the principle of the thing.

4589. (*Mr. Thomas.*) I drew attention to the point because I was rather afraid that the responsibility of miners might not be properly appreciated. With reference to this payment by men to the man in charge of your change house, do you know if that man is paid by the company in addition to what the men pay him?—I could not say.

4590. Is your 3*d.* a week a contribution to him?—Yes.

4591. You give him that?—6*d.* a fortnight; he stands there collecting it.

4592. Supposing you say you are not going to give him the 3*d.*?—We should have to clear out; he would probably throw our clothes outside.

4593. Do you ever remember any custom obtaining in this district where you used to give them candles instead of the 3*d.*?—I do not know. I did not do it, and I do not know of anyone else doing it.

4594. I did not know whether one was the outcome of the other?—I do not know.

4595. (*Mr. Ainsworth.*) With reference to what you said about some doubt as to whether you were charged the right price for dynamite and candles and other things supplied by the employers, do you know that if there is any doubt on that subject that all a workman has to do is to communicate with the inspector, and he, without mentioning anyone's name, is able to go to the employer and have everything put right?—Yes, I knew that.

4596. So that if there was any doubt in the men's minds as to whether the prices were right, all they would have to do would be to ask the inspector to inquire into it?—Yes.

4597. (*Mr. Jones.*) I might inform the witness that I have done that same thing exactly myself on behalf of the quarrymen; they complained that the charges for explosives were too high, consequently I informed the inspector, and the inspector went there and made an investigation into the whole thing. You could do the same thing exactly?—I am quite aware of that.

4598. (*Chairman.*) I believe you have worked with rock drilling machines?—Yes.

4599. Had they any spray on them?—No.

4600. Were you covered with dust?—Yes.

4601. Did you suffer in health in consequence?—Well, I might say it affected my hearing a great deal.

4602. Did it affect your breathing?—It did. We sunk a shaft with them about 25 fathoms, or something like that, and then we drifted off with it; and in the drift it was most particularly dusty, because we had a good deal of dry boring to do with them.

4603. Did you have a respirator or anything of that kind?—No.

4604. Would you like to have respirators?—I do not care about using them myself, they are difficult things to be handling and bothering with.

4605. Do you mean you cannot breathe properly with them?—You can breathe, but they affect you a bit.

4606. A good deal of evidence has been gone into on this matter; and men say that if you put a respirator on you cannot work hard because it prevents your breathing unless the respirator leaks a bit. Candidly, what do you think one way or the other? If you can wear them easily perhaps we might request you to do so for your own good?—Well, I cannot say. I do not know what they are.

(*Mr. Braithwaite.*) I worked with them and we wore a sponge. It did not interfere with me, I did not breathe quite so free, but it saved a lot of dust coming into my mouth and nose and inhaling it.

4607. (*Chairman.*) If it was siliceous dust, and really dangerous, would a sponge be sufficient?—I do not know about that; they are not very healthy, and my companions and I when we were working could not see each other for dust.

4608. You are aware that siliceous dust is a very different thing to other dust?—I know stone dust is a lot more detrimental than iron ore dust. I know that that dust if you had taken it and laid it on a plank and wetted it the next morning you could not break it.

4609. There are bad lung cases in the Transvaal and Africa with this siliceous dust; you have not it here?—No, it is the limestone, and different kinds of rock.

4610. (*To Mr. Dixon.*) You have not seen a wetted drill of any kind?—We had drills you could use water with, but you had to pour it in. Our drills had a hole through them, and we drilled with compressed air.

4611. Was it Flottman's?—Yes.

4612. (*Mr. Greaves.*) When was it?—Within this year.

4613. That is a small hammer drill?—Yes, about that length (*describing*).

4614. That is not a machine drill?—No, you hold it in your hand.

(*Chairman.*) Do you two gentlemen agree with the evidence that has been given by Mr. Dixon?

(*Mr. Braithwaite.*) I agree.

(*Mr. Atkinson.*) And so do I.

Mr. Richard Davy (Woodend); Mr. James Mathews (Moss Bay); Mr. George Thomas (Park House); Mr. Mark Daniels (Wyndham Mines); called and examined.

4615. (*Chairman.*) You are a working miner, Mr. Davy?—Yes.

4616. You have heard the evidence which Mr. Dixon gave. Is there anything you would like to add to it, or anything you differ from, or would you like to say anything else? If you agree generally with his views it does not strengthen it to repeat it, but you can simply say "I have heard him and think what he has said is right"?—I think so far as Mr. Dixon has spoken I agree with him.

4617. As regards the other points, is there anything else you can think of that I have not asked you about which you would like to call attention to?—I do not think so.

4618. (*Mr. Ainsworth.*) Where do you work?—Woodend.

4619. (*Mr. Redmayne.*) Have you a changing-house?—No.

4620. Do you know of any charge made to those that change?—I believe the workmen at Woodend pay 6*d.* a fortnight.

4621. Is that a voluntary contribution?—I do not know. There is a man that cleans it out, and I believe that is the subscription they give.

4622. How many men will change?—Perhaps 50, on a rough estimate.

4623. You prefer not to change?—At the present time I would rather change at home.

4624. Why?—Because I have always been used to it, and I do not feel as if I would like to go into a big company.

4625. I quite see your point of view. You have been into the changing-house?—I cannot say that I have.

4626. I was going to ask you if it was properly kept and sufficient for its purpose, and so forth, but if you have not been in it you do not know?—I cannot tell.

4627. (*Mr. Greaves.*) Would you be in favour of compelling men to use the changing-houses whether they liked or not, and prosecuting them if they did not change in the changing-houses?—I would not compel

them to change. I think a man should have his liberty.

4628. In your case the men who do not use the changing-houses do not pay; only those who use them pay?—Yes.

4629. Do you know where the men have to pay whether they use the changing house or not?—I have never heard tell of it.

4630. (*Mr. Lewney.*) In relation to the size of your workings have you any suggestion to make as to what you would consider a suitable size for carrying the workings?—I consider if a man has a 12 foot working he has enough working himself.

4631. That is as high as it ought to be?—I would call that a very good working.

4632. (*Mr. Greaves.*) He does not want any more?—It is quite big enough for me.

4633. (*Mr. Lewney.*) A suggestion was made yesterday that a limit should be put to the size of the working, and that no working should be more than 10 feet high and 11 feet wide. Would you agree that that was sufficiently large?—Of course I should not like it to be compulsory that you should keep it to the exact size.

4634. Why?—Because you might go a little wider at times and you might convict yourself.

4635. The timber you would use would be a specified size. Do you think on an average that is a good size?—I think that 11 or 12 feet is not a bad place. If a man could not get a living in a 12 foot working he is not going to get it in 18.

4636. I will put it in another way. Would you consider that a drift of that size was safer to work in than a working 18 feet high?—Yes.

4637. That is what I wanted to get at. The men would be less liable to accidents?—Yes; the smaller the bounds the safer.

4638. (*Chairman.*) Supposing a man is working in a place 12 feet high and from flaking off the roof it becomes 18 feet, if a number of bits fell off, what is the method of procedure? You have a thing 20 feet high; what do you do to make that safe?—If your ground sounds heavy in the first place you put timber in.

4639. Long timber?—No, sets.

(*Chairman.*) You have the roof 20 feet high, say, by an accident?

(*Mr. Lewney.*) Shall I ask about it?

(*Chairman.*) Yes, I want to understand it.

4640. (*Mr. Lewney.*) In the event of a piece falling from the roof do you put a pillar on the top of your timber?—Yes.

(*Mr. Lewney.*) They put a square pillar on the top of the driving timber.

(*Mr. Greaves.*) How is the square pillar made?

(*Mr. Lewney.*) Crossing timbers in that way (*indicating*).

(*Chairman.*) You make a roof where you are working and put that on the top?

(*Mr. Lewney.*) Yes.

(*Chairman.*) That might be a danger?

4641. (*Mr. Lewney.*) It is less dangerous to do that than have nothing. If you went far enough and left this open space behind there would be the danger of the roof collapsing?—Yes.

4642. (*Chairman.*) Where the working by any cause gets to be more than 12 feet, something like 20 feet, and becomes a danger, this is the proper method of dealing with it?—Yes.

4643. (*Mr. Lewney.*) As a rule this does not often occur?—No.

4644. It is not often that you require to put a pillar on top of your timber when it is 10 feet or 11 feet high?—Not one case out of ten.

4645. In regard to the ventilation do you find the ventilation fairly good?—It is at our place.

4646. Is there any suggestion you could make with regard to the ventilation?—I am quite of the opinion myself that there should be two ways out.

4647. I am coming to that in a moment. If you have anything to say in regard to ventilation I would like to have your opinion. I did not hear the evidence given by the last witness, but only his answers to two or three questions. Do you not think it would be possible in a shaft of sufficient size to have a ladder road separate from the pumps, which might be made dry so as to enable a man to carry a candle through at any time?—That is where there is not a second shaft?

4648. Exactly?—Yes, I agree with the ladder road if you are not connected with the pumps.

4649. It is possible to divide it from the pumps?—Yes.

4650. To prevent these rushes of water coming on to the men going up the ladders?—I agree with you there.

4651. In the meantime, between the sinking of the first and second shaft, you would regard that as a means of safety?—Yes, it would be a way out, for instance.

4652. You think it ought to be adopted?—Yes, where there is not a second shaft.

4653. (*Chairman to Mr. Mathews.*) Have you anything particular to say in addition?—No.

4654. (*To Mr. George Thomas.*) Have you anything further to say?—I did not know what subject I should be questioned on, and I got up a few notes on the question of two shafts or outlets. Will you allow me to read them in my own way? What I say about things that have happened is that they may occur again

4655. Do you agree generally with Mr. Davy and Mr. Dixon or not?—Generally, with the exception of this ladder road in the shaft.

4656. Will you please tell us about that?—If an accident has occurred in the shaft it might affect the ladder as well as other parts of the pit. Say there is a fall of ground between the working and the shaft, the ladder would be no good because you could not get at it.

4657. It strikes me one may suppose anything happening. You know what I mean. You may say about this point or that point there has been a danger and it has been shown to be a reasonably likely one to occur in practice. Those we must guard against most zealously?—It might suffice in some instances to have the ladder road in the shaft.

4658. What is your opinion?—My opinion is that it is necessary there should be shafts sunk. In this district in a good many instances the different employs are so close there could be a way made between the two employs.

4659. Where it could be done?—It would be much cheaper than sinking a shaft.

4660. Secondly, you would agree with the water seal. Where there is a shaft like this and a gallery, the gallery ought to be run on so that men would not be likely to be trapped?—Yes, I agree with that.

4661. Is that all you have to say?—May I read this? I submit that preservation of life and limb should be the first consideration with employers. My reasons for supporting this proposal are a breakdown of the machinery at the top, for instance. I remember reading about this accident at the Hartley Colliery.

4662. Where is that?—It fell down the shaft and 200 men lost their lives.

4663. It is a very relevant remark, but that is a colliery?—I can remember in Cornwall a good few years ago there were three men who lost their lives in one instance, and a few years ago there was an inrush of water and 21 men lost their lives, and their bodies are there yet.

(*Mr. Redmayne.*) In the case of the Hartley accident the conditions were rather peculiar, were they not? There was a large pumping beam, a large pumping engine. I know that, because I used to manage the colliery.

4664. (*Chairman.*) The witness does not know much about the Hartley case, except what he read in the paper?—My point is this. Any accident that might happen to the pumping machinery or the haulage machinery will considerably affect some of the pits about it.

4665. (*Mr. Redmayne.*) If the pumping beam was to split and fall down the shaft, you would produce the condition of things that happened at Hartley in 1862. As the Chairman said, it is an extremely rare

thing to suppose; anything might happen. The breaking of the beam, as at Hartley, I believe was the only case that I knew of a beam breaking and falling down the shaft?—My point is this, that any part of the machinery might break down, I do not say fall down the shaft; that was just an illustration of how the shaft might be obstructed, and communication might be stopped. Any part of the machinery might give out when you could not use the drawing machinery. The men would have to stop down; they could not get up.

4666. (*Chairman.*) On the other hand, I suppose there are a certain number of accidents which might be very dangerous in any event. Suppose the rope broke in two while they were raising men. You cannot make mining a perfectly safe occupation?—No.

4667. It is a question after all of good sense and degree, is it not?—Yes. If the pumping machinery gave out the water might rise in the shaft and there would be no means of escape.

4668. Generally speaking your view would be that it should be made as safe as a reasonable man could demand?—Yes. These outlets into the other employ could be made more cheaply.

4669. I think we have entirely apprehended that where it is near another mine, and a place could be driven into it, that ought to be done?—Yes.

(*Mr. Thomas.*) I think some question may arise between one mine and another as to whether rights exist with regard to holing. There may be questions appertaining to water. If one mine is below the other the one gets the water of the other.

(*Chairman.*) It must be subject to that.

4670. (*Mr. Thomas.*) You cannot generalise upon a suggestion. You instanced the need for two shafts by an accident that happened at Hartley in 1862, and also some accident you say happened in Cornwall where 21 men were drowned?—Yes.

4671. When was that?—About 30 years ago.

4672. Did they lose their lives entirely owing to the fact that there was only one shaft?—I do not know. There was no means of escape.

4673. It was not 30 years ago. I happened to be on that case. That was a case of holing into an old working the position of which was not known, there was a sudden flooding and the men had no time to get out. There were plenty of shafts?—The mine the water broke into, I understand, was a shaft to itself; it was not into any other.

4674. You are wrong there. They were driving a drift and went into an old mine full of water. That is for your information, it does not bear on the point. You would be satisfied with what the other witnesses said, in case the desirability for a second shaft would appear to be necessary, that the inspector be informed of that, and if the inspector could not agree with the employer then the matter should be referred to arbitration, an arbitrator being appointed by the Home Office to settle the matter. You agree that is a reasonable proposition in regard to the circumstances?—If it could not be otherwise examined.

4675. The final appeal would be an arbitrator appointed by the Home Office who would be a practical man capable of giving judgment, and mutually agreed upon between the employers and the Home Office. You would agree that would meet your general views as to the provision of a second shaft or outlet?—Yes, if there is no alternative.

4676. (*Chairman.*) Is there anything more you wish to add, Mr. Daniels?—No.

Mr. Charles Quayle (Montreal Mines, Cleator Moor); Mr. James Smith (Sir John Walsh Mine, Bigrigg); and Mr. Mossop Rothery (Ullcoats Mine, Egremont); called and examined.

4677. (*Chairman.*) You have heard the evidence that has been given by the previous witnesses, Mr. Quayle; have you any remarks to make upon it?—I agree with the whole of it nearly, that we should have two roads out. In the mines I work at there are plenty of roads out.

4678. We asked Mr. Dixon this. It comes to this, that wherever two ways out can be reasonably and practicably made they ought to be made, and in every case the best means of egress should be made that is possible?—Yes.

4679. But in mines with one shaft, if the inspector is of opinion there should be a second shaft, which is a formidable undertaking, the matter should be dealt with by an arbitration if he cannot agree with the owners. That is the best way of dealing with it?—I agree with that.

4680. At which arbitration, I ought to say, the men would be heard?—I quite agree.

4681. With regard to the sanitation of the mines you agree with what has been said by the previous witnesses?—I do not know. In our mines there is generally plenty of water which takes it away to the sump. We never pick a spot. We have plenty of places.

4682. Your mine is clean?—Yes, we never find any stench in it.

4683. You would be in favour of making mines clean at all events?—I would.

4684. With regard to changing-houses, would you advocate compulsion? We have heard about the general conditions, but would you compel men to use them or not?—Certainly not.

4685. You would leave it as at present, let them use them if they like?—At our employ there are two good changing-houses. I think I have worked in this employ for 32 years, and I do not think I was in them 10 times, but I know they are good. I have sons changing in them, but still I prefer to go home to the lass to get a drop of water to wash me.

4686. (*Mr. Ainsworth.*) It is at Montreal you work?—Yes.

4687. (*Mr. Greaves.*) Is there any payment made by the men who use the houses?—None whatever.

4688. By none of them? They do not pay anything to anybody?—To nobody.

4689. (*Mr. Lewney.*) In regard to the question of the single shafts, do you agree that all the shafts in future should be sufficiently large to carry a ladder road?—I do not know about that. It is a long way to travel 200 fathoms on a ladder, and the men's clothes are generally heavy, full of iron ore. It is not like coal dust.

4690. I do not suggest that this ladder road should be used for ascending and descending the mine every day in the week, but it should be there in case of the rope breaking or something happening to the slides, or the drawing shaft being interfered with in any way, so that it should be there as an emergency, a second means of exit?—It would be very good.

4691. You agree with that?—Yes.

4692. You know as a matter of fact between the sinking of one shaft and the development of the mine, before the employers could possibly get down a second shaft something might occur to interfere with riding in the shaft?—Yes.

4693. In that case you would agree that the provision of a ladder road would be a good thing?—Yes, we should still have a way of escape.

4694. That is the point. You agree that would be advisable?—It would be advisable at the time, but where there was a good prospect they should have two shafts. A master might find a mine, and if there were not good prospects he might drive a bit. It might be if there was compulsion he would not sink it.

4695. In regard to the size of workings do you think it would be a good thing to limit them to 10, 12, or 14 feet, as the case might be?—My opinion is that a man should limit it himself if he has any sense.

4696. Do you think it is a good thing to allow a man to carry a working 18 feet high?—If it is strong metal.

4697. If there is no danger?—Yes, if there is no danger. I have carried them 20 feet high.

4698. Do you think all men are sufficiently careful?—I know nothing about that.

4699. (*Chairman.*) Do you carry them 20 feet without anything?—Without any wood.

4700. (*Mr. Lewney.*) In these cases how do you get to the top, supposing you are working 20 feet high?—Sometimes we drive the top first and stope it out. In others we use a ladder.

4701. Supposing there is a hole blasted, leaving the ground hanging, and you have to get up to work it down?—You go up and charge it.

4702. Supposing it would not carry a charge?—Then you bore another hole. It is sure to carry a charge sometime.

4703. I put it to you that on many occasions you have seen a hole in such a condition that it wanted a slight touch with a bar to carry it down. What would you do with it?—Put a pick on it and put it back again.

4704. Would you not go up on a ladder?—No, you can get clear of it. Many a dozen times I have done it.

4705. Going to the neck of the hole with the ladder you cannot tell exactly how that would fall in the event of falling away?—You pick it up and see; that is the only way I know.

4706. (*Mr. Redmayne.*) Is your place inspected by anybody before you go into it?—It generally is, but in the part of the pit I work in now there are only five miners and a labourer or two.

4707. Before you go in has there not been somebody to inspect it?—Not always.

4708. Should not there be, in your opinion?—I do not think it makes a deal of difference. I was 16 years on that job and I gave it up through bad health.

4709. That was as an inspector? What were your duties as an inspector?—I went round and saw the spots and reported them, and if a spot was bad I met the men at the shaft and told them if it was not safe. If it was safe we marked on a board, about that size; we put our initials and the day of the month on it.

4710. You never allowed men into a working place if it was not safe?—No.

4711. How many places would you inspect in the morning?—About seven generally.

4712. After you had inspected those places what did you do?—We marked it down and the underground manager signed it, and anything we had to tell him we told him.

4713. Did you do that work?—Yes.

4714. Did you get ore?—Yes.

4715. Were you paid for the inspections apart from the ore getting?—Yes, we got 10*s.* a week.

4716. Plus what you earned by getting ore?—Yes.

4717. (*Mr. Lewney.*) Do you know whether provision is made at the offices or anywhere at the surface for cases of accident? Do they provide liniment and dressings to tie up a wound?—Yes, the gentlemen here can tell you.

(*Mr. Lewney.*) I am sorry I did not put that question earlier.

(*Mr. McWilliams.*) There is an ambulance box kept in the engine house.

(*Mr. Lewney.*) At all mines?

(*Witness.*) No, the mine I am at. It is kept for that purpose.

4718. (*Mr. Redmayne.*) You are working at Montreal mine?—Yes.

4719. Is that system of inspecting fairly common throughout the iron ore district?—I think it is. There are three or four men at our employ inspecting where there are a lot of men working.

4720. After they have made the inspection they return to ore-getting?—Yes.

4721. (*Chairman to Mr. Smith.*) Have you anything to say in addition?—I endorse what Mr. Dixon has said.

4722. Would you like to add anything?—There are one or two things I have not heard touched upon yet With regard to driving a place to old workings that are likely to contain water, I think it is necessary there should be leading holes.

4723. A bore hole in front they call it?—Yes.

4724. You are quite right; that provision is in the Coal Mines Act, but there is no corresponding provision in the Metalliferous Mines Act?—That is so.

4725. You would wish that to be inserted in the Metalliferous Mines Act?—Yes, and flank holes on each side.

4726. It is such absolutely good common sense I should imagine that no one would dream of opposing it. What other point is there?—As regards two shafts I think it would be necessary to have two shafts where the mine is sufficiently developed.

4727. Do you agree generally with what the other gentlemen have said upon that point?—Yes.

4728. I do not know that we need go into it more we have had a great deal of it. Is there any other point?—As regards sanitary arrangements I think it is necessary to have places where men could do their needs.

4729. You agree with that? Is there anything else? Have you any new point?—It does not strike me at present.

4730. With regard to the height of working places do you feel as safe as Mr. Quayle does?—No, I do not prefer them very high—12 feet or 14 feet according to the nature of the ground, of course.

4731. Perhaps you do not think everybody is quite as capable as Mr. Quayle to deal with anything?—No. Then there is the question of ambulance work.

4732. You would like improvements in that respect?—Yes. I think there should be places where these materials can be kept so that miners could get them, if possible, below.

4733. I will not ask much about that, and I will tell you why. There is a departmental committee appointed on that question of dealing with rescue work in mines, both coal and metalliferous, and it is dealing with the whole subject. It is no good overlapping. I think we are all of opinion that something must be done to provide proper ambulance. Have you any other point?—With regard to inspection I think there should be more inspection.

4734. More Government inspection, do you mean?—Yes.

4735. You think there is not enough at present?—I think so.

4736. You want more inspectors?—Yes.

4737. Is there anything else?—As regards sinking any more shafts at present I think it is necessary to have three or four compartments in a shaft, two for the drawing side and one for the pumps, if pumps are necessary, and one for the means of egress.

4738. You agree with what Mr. Lewney asked, that there should be some arrangements for getting out in case the cage got out of order?—Yes. There is one thing, I do not know whether it has been before you, the safety hooks on cages.

4739. I have put that down to ask two gentlemen questions upon it who especially know about it, but we will hear anything you have to say. I was told there are two engine-men who have had a lot of experience on that point, but we will hear you if you have anything to say?—I think it would be necessary to have keps on the surface and safety hooks attached to them, and if anything occurred, if these safety hooks did not catch, there would still be the keps to fall on.

4740. (*Mr. Thomas.*) You mean what is sometimes called a Scotch gear, when it comes up the catch opens?—Yes.

4741. Keps is the common term for them?—Yes.

(*Mr. Thomas.*) It is always the practice in collieries.

(*Chairman.*) I thought they existed here.

(*Mr. Thomas.*) Not in all cases.

4742. (*Chairman.*) Have you any other point?—Where there are other levels in the mine there should be communication from one to the other. I agree with that.

4743. That is what we were talking about, to get men out in case of water coming in, or a fall of roof. You agree with what has been said about that generally?—Yes.

4744. (*Mr. Ainsworth.*) Have you anything to say with regard to changing-houses?—I would like sufficient

accommodation for them, and also a bath where you could have a wash all over.

4745. (*Mr. Greaves.*) A bath for each man?—I do not mean a washing tub, but a bath where you can slip all off and get in.

4746. For each man?—No, one or two would do for each changing-house. A large bath I mean, not small washing tubs.

4747. You would have to take it in turn?—Yes.

4748. Would you be in favour of men being compelled to use the changing-houses whether they liked it or not?—Some of the houses about the neighbourhood are not fit to live in.

4749. Assume they were fit; imagine the houses were of certain dimensions and fit, in that case would you be in favour of men being compelled to use them whether they liked it or not?—I do not know about being compelled, but I would like to see everyone using them.

4750. Would you be in favour of a man being prosecuted if he disapproved of using them?—No.

4751. (*Mr. Ainsworth.*) Is there any charge made at your place?—Yes.

4752. How much?—6*d.* a fortnight for those that use the changing houses.

4753. For keeping the house clean and so on?—Yes.

4754. (*Mr. Greaves.*) Do all the men use the changing-house?—No.

4755. Do those who do not use it have to pay anything?—No.

4756. (*Chairman.*) Have you any other point?—Not that I can think of.

4757. (*Mr. Redmayne.*) In answer to some questions put to you about the height of the working places, you said, I think, that it depended entirely upon the nature of the ore you were in, whether it was safe to work 10, 12, 14 feet or whatever height it was. You would be guided by the nature of the ore in stating whether or not the height conditions were safe?—Yes, up to a certain height.

4758. Who is the best judge of that?—The manager should be the judge of what sort of ground he is working in and what sort of top he has.

4759. Something like this would meet your point, that the places shall not be of such height or such width as to render them unsafe?—Yes.

4760. Would you advocate the use of keps, fallers, or pillars at the top of the pit?—Yes.

4761. Is it the case you draw from several levels in a shaft?—Yes.

4762. Would you advocate the use of keps or not, in the interest of safety, at some of the levels?—No, I do not think I would use them in the level.

4763. Because they might be left open and a cage would descend?—Yes.

4764. You would advocate their use for surface only?—Yes.

4765. I have been informed you have taken considerable advantage of science classes?—Yes.

4766. You think a good deal might be done in the way of missionary enterprise in that respect, to use the Chairman's phrase?—Yes.

4767. You think it would do good in the interest of safety if lectures were delivered occasionally, in the mining districts, on safety arrangements?—Yes, it would improve the minds of the miners.

4768. (*Chairman.*) Are there no such lectures here at all? Have not the county council done anything?—Yes, but there were not many miners who took it up.

4769. (*Mr. Redmayne.*) What sort of lectures did the county council inaugurate?—They were mining classes.

4770. They were not attended?—Not very well.

4771. Did they specialise in respect of iron ore mining?—You could take the two branches, either the metalliferous mines or the coal mines.

4772. If lectures and classes were especially directed to the method of working in vogue in the district, that would be better than general mining classes?—Yes.

4773. They might be coupled with ambulance instruction?—Yes.

4774. Do you think they would be well attended?—I would not like to guarantee that. I think they would be better attended than they are at present.

4775. (*Chairman.*) They are at Whitehaven at present?—No, we had one at Cleator Moor.

4776. (*Mr. Redmayne.*) I think Mr. Leck delivered a lecture the other day in Cleator Moor on metal mining which was very well attended?—I know Mr. Leck gave one, but I was on the afternoon shift. I was not there myself.

4777. (*Mr. Lewney.*) In your reply to Mr. Redmayne you agreed with his suggestion that the size of the working should be left to the discretion of the manager. Is that not so at the present time?—It is.

4778. Have you known a case where it was different, where a man could fix the size of his working?—No; but when I said that, I did not mean it in that sense.

4779. Would you agree with me that a working 20 feet high is an unhandy working?—Yes.

4780. Would you agree that it is not always safe?—Yes.

4781. Do you think that it is safe at any time?—No, not to call it thoroughly safe.

4782. Not as safe as 12 feet?—No.

4783. Never so easy to work?—No.

4784. (*Mr. Greaves.*) Why would it not be as safe at 20 feet as 12 feet in some cases where the rock is solid and sound. What is the danger?—One danger would be in rigging up to get to the work.

4785. You use a ladder?—For stages.

4786. Ladders are dangerous things to go on?—Yes. If a hole did not do its duty you would go up and work it down as a bar. It is not nice to stand on a plank when working it down. Perhaps the spring of the bar when you are trying to get the piece down would throw you off the ladder. It might turn over and hit the ladder.

4787. You regard the ladder and the stage as a dangerous place to be on?—Yes.

4788. It is dangerous out of doors or anywhere?—Yes.

4789. That is the chief danger?—Yes.

4790. (*Mr. Thomas.*) Are there many working places exceeding 12 feet in this district?—Not that I have come across.

4791. There are very few exceeding 12 feet?—Yes, very few.

4792. Have such places had many accidents from that cause?—No, I cannot say that there have been many.

4793. Men who are put in places of this kind are skilled miners?—Yes.

4794. Having a lot of mining knowledge and common sense to deal with it?—Yes, I think so.

4795. (*Chairman.*) That is all you have to say?—That is all I can say.

4796. Have you anything to say in addition, Mr. Rothery?—No.

Mr. Isaac Watson, Pallaflat Mine, Bigrigg; Mr. James Nelson, Longlands Mine, Egremont; called and examined.

4797. (*Chairman*) (*to Mr. Watson*). You have heard the evidence given by previous witnesses to-day?—Yes.

4798. Do you generally agree with it?—Yes.

4799. Have you a special point you would like to add to it?—There is one thing I would like to refer to, and that is the appointment of managers, gaffers, and shiftmen in connection with the mines. I think it is right that every manager, gaffer, and shiftman should pass an examination and hold a certificate to prove they are qualified to work the mine and have the men under their care.

4800. Is your opinion due to the fact that the present men are not good enough owing to not having had an examination, or is it a theoretical opinion?—It is my opinion that men are simply in many instances

pitchforked into their positions and they have not been qualified.

4801. You mean there are incompetent people existing?—Yes, I believe there are incompetent people existing not fit to manage the mines.

4802. Have you met any?—I am not going to mention names. I believe there are men who are not qualified for those positions.

4803. Those cases come within your experience?—Yes.

4804. Is the want of competence such as would be removed by their passing an examination?—I believe that these things would be removed altogether by holding a certificate proving that they were qualified for their positions.

4805. Would the examination do it?—Of course they would have to be qualified to pass an examination. An examination would prove whether they were qualified or not.

4806. You cannot examine a man in certain things. You cannot examine him in readiness and courage and promptness to deal with new situations?—Of course not.

4807. You can only examine him as to what oxygen is and things like that, and ask him how he would set his props in a theoretical way. Would such an examination as that remedy the faults of the men you have had experience with?—If men were compelled for a period of time to work in the mines and get a practical experience and then be examined, it would be a very good thing, especially if we had practical men for those places. There are good practical men in the district.

4808. You mean the men that are appointed are not good practical men?—I cannot see how a man who has served his time at another business can be qualified to take charge of a mine any more than a captain over a vessel.

4809. As a fact in this district do you mean that men are appointed to take charge of mines who have been brought up to totally different trades?—Do you think it would be advisable to answer a question like that?

4810. I think it would be, generally?—I think there are men appointed in this district that have never had experience in connection with mines, I mean to take the management of mines. I am saying things that are pretty strong and might involve danger. I do not know, but I will take the consequences.

4811. Pray do not say anything you think dangerous?—I am not mentioning names.

4812. It is no use having examinations and certificates if this system would not produce better men. I want to know what the defects are and whether they would be removed by examinations. Will you tell me your general opinions?—I will put a question to you. Would it be any use putting a tailor to manage a mine, or a draper?

4813. I should have thought not, but no tailors are being put in charge of mines at the present time, are they?—Possibly they may not, but men in a similar position who have been something else.

4814. It comes to this, at all events, whatever examination there is you would like a certain number of years of practical experience in a mine as a qualification for managing the mine?—Before they are allowed to sit for an examination they should serve seven or eight years in a mine. That is my opinion. I have never heard it suggested by anybody; I have thought it out myself.

4815. You would have as a commencement a qualification that they should have done practical work in a mine for a number of years?—For seven or eight years.

4816. Five years they put in the Coal Mines Act. Suppose you put as a qualification first of all so many years' practical experience before you were allowed to be manager, would it be an advantage to have an examination in addition. Supposing you had a provision of five years' practical experience in a mine as a condition of managing, would you put in addition to that in this district a written examination?—Yes; I would consider that anyone who was desirous of making progress would be seeking to learn the theory of mining as well as the practical part.

4817. You would not make that a condition in the case of existing managers?—No, I would not interfere at all as far as possible.

4818. There are a number of men in this district now who are at present 45 years of age. I will assume such a man has had a long mining experience. Would you exempt him from the examination and say that it was the future generation you want to get at?—That is what I mean.

4819. You mean that you would make some consideration for the men who are already managing and overseering, the older men in the district, but you would like in the future the younger generation to be made to have some more mining knowledge?—These men are really responsible for our lives, and we ought to have the very best men possible.

4820. We are all agreed upon that, but the question is how to get them. We have been told that in some cases the very best men are men who could not pass such an examination, and yet these same men are more capable of taking care of the lives of the people in a mine than anyone else?—I think if you had the practical part as well as the theoretical part it would be a grand improvement.

4821. It is the younger generation you want to improve a great deal?—Yes.

4822. With a certain amount of tenderness towards the present generation under the old system?—I would not interfere with the men at the present time as far as possible. I do not think that every manager that is the head manager, and I daresay we have a few at present, is fit for his position if he is not able to command everybody that is under him and know every rope from the engine-house down to the lowest dip in the mine. He is not fit to command other men if he cannot do it himself.

4823. Is there anything else you would like to add?—I do not know anything in particular.

4824. Is there anything else in addition which has not been threshed out?—I do not know of anything.

4825. We are very much obliged for that opinion about examinations?—I would like to emphasise the necessity of providing proper ventilation in the mines. I know it is a thing that causes a lot of suffering among the workmen.

4826. It might be improved through Cumberland?—Yes, if means were used, but there is this to take into consideration: if they consider wealth more than men's lives it is no use interfering with it. The question is whether gold or men's lives are more valuable.

4827. Those are theoretical considerations. Is it not always a question between your money and your life in every place? You go to sea and catch fish, although you would be safer at home. Your principle is that proper precautions should be taken if they can be taken?—I think there are special instances when special means should be used to provide proper ventilation: for instance, if there were two shafts it would be a good thing for safety and ventilation. If you are driving in a rise you get up 20 or 40 or 60 feet, and there is scarcely any ventilation, and you are almost choked with dynamite. They could have a compressed air engine, or a fan, but these things should be insisted on to protect the men's health.

4828. Your general opinion is that more might be done with regard to ventilation?—Yes.

4829. (*Mr. Greaves.*) Do you think that there is anything poisonous in compressed air? We were told yesterday that it was injurious?—I have not had a great deal of experience with compressed air I have been sometimes where there have been fans, but never any compressed air used. I think they are bound to be a good thing compared with dynamite smoke.

4830. (*Mr. Ainsworth.*) The object of compressed air is to drive the bad air out?—Yes.

4831. (*Chairman.*) Is there any other point you wish to mention?—There is one thing in reference to the height of the workings. A manager that is not qualified to tell the men what size the workings should be is not fit for his place.

4832. We should probably agree with you, but the question is whether any rule should be brought in making it compulsory to use workings of a certain size?—I do not think it would be possible to bring in a hard and fast rule, because they generally work according to the nature of the ground. Sometimes you are working in stone drifts, sometimes in metal workings, and sometimes fallen ground, and when you are working in solid ground it is necessary to timber for safety.

4833. There are places where it would be desirable to have such rules owing to the nature of the metal?—I do not know, I think a thing like that might be left to the management. I think the management knows best how to work the place; if they do not they are better out of it.

4834. (*Mr. Ainsworth.*) Have you anything to say with regard to changing-houses?—I cannot say very much about them. We are blessed with a good one where I work. We have upstairs and downstairs.

4835. What is the upstairs?—It is a very nice room with racks all round.

4836. The rooms are the same?—One for washing and the other for changing in. I work at Pallaflat.

4837. (*Mr. Jones.*) Do you pay anything?—3*d.* a week, at the office. I should think it would be agreed on by the men, but it was before I went to the mine to work.

4838. (*Mr. Greaves.*) Do the men who do not use the changing-house have to pay?—No.

4839. (*Chairman.*) Does the 6*d.* go to some man for keeping the place in order?—Yes. There is a man kept specially to clean the place out and provide water.

4840. He gets the 6*d.*?—It is kept up in the office, and the management look after it.

4841. (*Mr. Greaves.*) 3*d.* a week?—Yes, 6*d.* a fortnight.

4842. (*Chairman*) (*to Mr. Nelson*). Have you anything to add to what Mr. Watson has said?—I agree with what Mr. Watson has said, but there is one point I should like to mention. I think a miner ought to be paid on the weight of the ore he produces.

4843. That is not a matter affecting safety?—Certainly not.

4844. No doubt there may be a good deal to be said for it, but it is not within our province?—I beg your pardon for referring to it.

4845. We are only dealing with health and safety. Is there anything else you would like to add with regard to health and safety?—I suppose the question of the payment for explosives will not come within your region, that is getting them at cost price. That is not a question of health and safety, is it?

4846. No, but it has been raised, and I took the opportunity of saying that the law already is that the men are to get it at cost price, and in any case where they are not getting it it is their duty to call attention to it through the union or directly to the inspector, and it will be put right?—I think it will be an easy matter, and make it better if it was mentioned in the Act that these explosives had to be supplied at cost price.

4847. It is thought important enough to apply to the whole kingdom in every trade, and to have an Act all to itself, of which I can give you a copy?—It is not carried out here, even if it is in the Act.

4848. If you make any complaints certainly that Act will be enforced. It has been my special duty to look into those cases, and I can assure you that they have been enforced wherever we can. It is the law.

4849. (*Mr. Ainsworth.*) Where do you work?—S. and J. Lindow's.

4850. (*Mr. Greaves.*) Do you have a changing-house?—Yes.

4851. Do you pay?—Yes.

4852. To whom?—The fireman.

4853. You pay him direct?—Yes.

4854. Do those who do not use the changing-houses pay?—No. It is important that there should be proper accommodation.

4855. (*Mr. Jones.*) How much do you pay?—3*d.* a fortnight.

4856. (*Mr. Thomas.*) Assuming there is proper accommodation provided at all the mines and made compulsory, would you make it compulsory on the part of the men to change in the places?—I would, subject to certain exemptions. That is, supposing a man was not deemed fit to change amongst his fellow men.

4857. (*Mr. Greaves.*) If he disapproved, you would compel him although he did not approve?—Certainly.

4858. Against his wish?—I would make him change at the mine. I think it conducive to health.

4859. Whether he liked it or not?—Yes.

4860. (*Mr. Redmayne.*) He would have to be brought before the magistrates if he did not?—Yes, but you could refer him to the manager.

4861. If he does not change at the mine it would be a breach of the Act?—Very well.

4862. (*Mr. Thomas.*) You would make him take advantage of the facilities provided for him?—If he would not change there I would make him work somewhere else. It is the same thing.

4863. (*Mr. Greaves.*) No. Would you have him prosecuted and punished by the magistrates for not using it?—I understand the point, but in most cases he would be dismissed from the mine if he would not change there.

(*Chairman.*) In most cases the threat of a prosecution would be sufficient?

(*Mr. Lovett.*) Does not that raise another point? If the man knows he is going to be compelled he may go from the mine. If he leaves the place there is no necessity to prosecute him.

(*Chairman.*) Either wash, or go.

4864. (*Mr. Thomas.*) You evidently would not make any provision limiting the size of a working place, but you would leave that to the discretion of the management?—Yes, altogether to the discretion of the management.

4865. So many variations occur in mines that it is impossible to make a hard and fast rule?—Yes.

4866. You are satisfied with the general conditions at the present time in that respect with regard to the working places?—Yes.

4867. (*Mr. Redmayne*) (*to Mr. Watson*). Would you advocate permission being given to the men to inspect the mine on their own behalf at certain periods?—Going through in the morning.

4868. If the men elected two of their number to see if the mine was safe from their point of view, would you like something of that sort?—That is independent of the management altogether—get permission to inspect the mine?

4869. Yes?—I do not think it would be a bad thing.

4870. You think if allowed it would be carried out?—I think so. I do not think they would object to it if they want things brought to light. There would be no need to object.

4871. (*Mr. Lovett.*) Would you like to see the men have power to accompany the inspector when he is inspecting the mine, either one of the men or a representative of the men, to go with him? At the present time I do not think they have that power?—You mean to say would I like to see the men have power to appoint an inspector?

4872. No, would you like to see the men have power to accompany the Government inspector when he is inspecting a mine?—I do not know what good that would do, unless it was to show him through it.

4873. The question has been raised that they might call attention to things?—Sometimes the Government inspector might go and not see a quarter of the places.

4874. It is impossible for the Government inspector to inspect every working place in a mine on every occasion he visits the mine?—It would depend upon the size of the mine. If he had somebody competent to carry him through I think he ought to be carried through apart from the management, if possible.

4875. A member of your union, if you like?—I do not think it would be a bad thing, but he would have to be acquainted with the mine. It would have to be some man connected with the employ.

4876. (*To Mr. Nelson.*) Are you in favour of certificated managers?—Certainly.

4877. Can you give any idea what kind of examination you would like, oral or written?—A written examination and the other as well. Let him appear before two or three inspectors and let them put questions to him.

4878. How long should a man work in a mine before he is allowed to sit for an examination?—Five years.

4879. You would agree that practical knowledge of mining ought to count very heavily in these examinations?—Yes.

4880. You think it would raise the status of the mining community as a whole?—I do. I think it would be a big advantage to the working men as well.

4881. And to the industry?—Yes.

4882. (*Mr. Redmayne.*) You would be agreeable to what Mr. Watson said in answer to the Chairman, that before a man has permission to sit he should have had five years practical underground experience or something of that sort?—Yes.

4883. That would be an important qualification?—Yes.

4884. (*Mr. Jones.*) Do you not think five years underground is rather a short time in the way of practical experience?—Perhaps it is, but five years is quite a long time.

4885. Take a lad of 16 going down the mine. At the age of 21 he has worked five years. Would you consider that man a practical miner?—No. When he started as a boy of 14 he does not do practical work. As a rule the boys who start in a mine push the bogies.

4886. You mean five years as a miner?—Yes.

4887. That means a lot more?—Yes.

4888. (*Mr. Redmayne.*) I take it that there would be the stipulation that he must be of such and such an age before he had permission to sit. The man should not sit for an examination under the age of 23?—I do not think so.

4889. You propose adopting in the Metalliferous Mines Act the same provisions as there are in the Coal Mines Regulation Act?—I do not know the Coal Mines Act, but I think a man ought to be 25 before he holds a certificate of managership.

4890. Of the nature I have been sketching to you?—I agree to that.

4891. Of course it is a minimum?—Yes. I would not affect the present managers in any way.

Mr. Charles Edmonds; Mr. Richard Rooney; and Mr. Andrew Wishart; called in and examined.

4892. (*Chairman*) (*to Mr. Edmonds*). You have heard a great deal of evidence given to-day. Have you anything to add, or any remarks to make?—One of the miners said that the men would not use the changing-houses. I change myself, and I think one of the causes is that they have not been clean. That is the biggest excuse why they do not use them. There is not sufficient accommodation. It would be a big advantage, I think, if the changing-house was under the control of the sanitary inspector for the district.

4893. I have seen a changing house that was only used by half of the men, but it was impossible for anything to be much better in point of cleanliness. Nobody would have minded changing his clothes there. There was no smell, and it was very respectable, but only half the men would do it even there. I do not think it is enough to say that it is always the want of cleanliness?—I do not say "always," but I have asked men why they did not change.

4894. In some cases that would be so, but it would not account for the whole thing?—Certainly not.

4895. You would be in favour of a respectable clean changing-house sufficient in size?—Yes.

4896. And, I presume, with nothing to pay?—Nothing to pay.

4897. What do you say to compulsion?—Yes, I think everybody should be compelled.

4898. Absolutely?—Most of the young men change, but most of the older hands have not changed when they were younger, and they do not like to change. I think it should be made compulsory.

4899. That is exactly what I have heard. I enquired at that particular mine who changed, and I found that it was the younger men who did. There is no doubt about it. Some people said it was the necessity of having three suits that was in the way in some cases?—I do not think so.

4900. You would be in favour of compulsion?—Yes.

4901. Is there any other point you would like to mention?—As a labourer, I would like to say where there is a single jack roll in one road it ought to be compulsory to put a break on it.

4902. (*Mr. Greaves.*) What is a jack roll?—(*Mr. Lewney.*)—A windlass.—Where there is a single jack roll pulling up one and not letting the empty down, I think there ought to be a brake on it compulsorily, and let them down with a brake. The last two or three years there have been slight accidents with the jack roll handle on the single roads.

4903. (*Mr. Ainsworth.*) The bogey running away?—Yes.

4904. (*Chairman.*) We will pay attention to that point. You would like to speak as to the different roads they have to trail the ore?—I think it should be compulsory for the timber to be so far off the roads, because there have been a good few hands smashed, especially at snout plates at the junction, running up against it, and the bogey bumping back where the wood is too near. That is perhaps a question of management.

4905. You are perfectly right to bring that question forward. We do not take so long over the details, but it is quite right to mention them. They are all put down, and shall be looked into. I do not know whether you would put such things into an Act of Parliament, but if necessary they could be dealt with by special rule. Have you anything to say as to the kind of accidents that labourers meet with especially?—I think it should be compulsory with regard to brakes for letting the metal down—sometimes you let the full one down, and the empty comes up, and there is only a handle on one side—you have a brake handle on both sides. Once I was shoving a full bogey over, and in jumping the other chain to get at the handle I caught my foot and slipped. If I had been a short chap I could not have done it, but I reached over and caught the handle, and stopped it in time. If there had been a brake handle I could have shoved it over and braked it from this side.

4906. The same point is raised with regard to railway trucks, a double handle on both sides. As to the term of apprenticeship they have to serve, I want to ask you about this, because Mr. Gavan-Duffy called attention to it?—Some serve 12 months, and some 12 years.

4907. Does that affect the question of safety?—Yes. I think it would be advisable to make it compulsory for a labourer to serve no less than five years.

4908. Before he is what?—Before he is put in full; before he is put in to be a miner.

4909. (*Mr. Greaves.*) He should serve as a labourer for five years before he is a miner?—Yes.

4910. (*Mr. Thomas.*) That is, before he shares with the other man in front the results from that bargain?—Yes.

4911. (*Chairman.*) As to the need of breaking large lumps of ore, goggles are not provided?—No. I think they ought to be provided.

4912. Have you known accidents from that to people's eyes?—Not very serious, but minor accidents, such as sparks, and in time it tells.

4913. Are goggles not generally used?—No; I have not seen them.

4914. What sort of mining classes have you got in the neighbourhood?—I have never attended them.

4915. Do you think there ought to be more of them, or better ones? Perhaps you cannot tell if you have never attended any?—I could not say anything

about that, because I do not go much on the theory myself.

4916. Do you not think it is a pity that a young man like you should not go to something of that sort?—I do not think it is any advantage as a miner. A man holding a certificate does not get on any better, I will put it in that way. In fact, I have known cases where men with certificates are sneered at by the management.

4917. I suppose that might be if they were to consider that they were wiser than others just because they had more book learning. Is it not something of that kind?—It might be.

4918. You do not despise a certain amount of theoretical learning of the right sort?—I think there ought to be lectures. I am in favour of that.

4919. Do you think the men would take advantage of them?—I think the younger men would.

4920. If you got a good sympathetic lecturer who was a practical man?—Yes. With regard to the lectures, I live in Moor Row, and it is two or three miles to Cleator Moor, which is a good long walk.

4921. I agree with you that it is too far. You want something brought to where the men are?—Yes.

4922. It is a big thing to walk two miles after your day's work for a lecture?—Yes.

(*Chairman.*) I should like to know what is being done by the county council about that point in that district. Something ought to be done. Miners ought to have their share of education. You have education of all sorts. Bee-keeping and agriculture are taught and I do not see why the miners in a district should not get their share of the money.

(*Mr. Helder.*) There is a member of the technical committee of the county council here.

(*Chairman.*) I am not depreciating what has been done, because I do not know; but I know in other districts in England and all over the country enough has not been done.

(*Mr. Scouler.*) Speaking on behalf of the county council education committee, we are anxious to establish classes in every mining district, but the difficulty has been that they are not attended.

4923. (*Chairman.*) If they sent a lecturer up to where you are, will you undertake to try a course and see what it is like?—I have other things which I think would be of more advantage, perhaps, than mining classes. I, perhaps, have not the time.

4924. Not in your spare time?—No. I have not gone to the classes.

4925. We will hope that you will persuade some of the others to come if you do not go yourself. Now with regard to ventilation, what do you say about that generally in the district—is it good or bad?—I have found it bad. I have seen it very bad. I have seen a candle put upright and go out in about a minute.

4926. Have you seen men continue to work in a place like that?—Yes.

4927. After the candle was out?—Yes; and that after the working has been standing over the week-end.

4928. When the candle was out how did they see?—We put it on the side to burn that way. That was an upright candle went out in one minute. That is just at one period of the year, about September, or round about that time.

4929. Had you been blasting there?—No. That was after the working had been standing at the week-end.

4930. Were you working on the rise?—No; down a dip.

(*Mr. Ainsworth.*) That is just as bad.

4931. (*Chairman.*) Now with regard to the sanitary accommodation in the mines, you would be of the same opinion as the witnesses we have heard, that there should be something decent provided for the men?—Yes.

4932. Have you any notion as to the best way of doing it?—I think if there was a closet put somewhere where the water would run to the shaft and disinfect the place it would be all right.

4933. After you had mixed the fæcal matter with earth, in some way or other, we know that will deodorise it. If you put enough dry earth on it, after a certain time you can handle it with your hands—there will be nothing left. If that was buried away in the mine would that be unhealthy? It is what they do in the coal-mines, in the goaf. At present the plan is to take it up to the surface. Should that be the plan adopted here?—Yes.

4934. It would not be a good thing to put it into the sump, for instance, where water is?—That is what we do. If the water-box is disinfected I do not think it would do any harm.

4935. Do the boxes smell a bit now from the habit of putting it into them?—I cannot say that they do. It is just a question of management, but the managers ought to insist on the men making water in water, if possible, as there is often a bad smell in the place with that. The water leaves a bad smell.

4936. Would you not consider it undesirable that all this stuff in a big mine should be put into the sump? I am not taking one view or the other. I want to get your view?—I should think it would be, because men have to clean that sump after. I really could not say about that.

4937. You would be of opinion that what the sanitary authorities said was the sensible thing to do is the way to get at it? Is there anything with regard to the position of labourers you would like to mention, having regard to health and safety?—I would like to insist on the five years apprenticeship.

4938. They have something of the same kind in coal mines—two years?—Yes, but I suggest five.

4939. Is there any other question you would like to speak to?—No, I do not think there is.

4940. (*Mr. Greaves.*) You say the changing-houses are mostly used by the young men and not by the old men?—Yes.

4941. You think the old men should be punished for not using them?—It is hardly for me to say that. I think in the interest of the public health of the district they should be compelled to.

4942. That is the same thing. They should be punished if they do not use them. Do you pay for your changing-house?—The management pays so much and we pay 3*d.* a week.

4943. To the man who looks after it?—Yes.

4944. Do those who do not use it pay?—No.

4945. (*Mr. Ainsworth.*) In whose employ are you?—Postlethwaite, the Moor Row Mine.

4946. (*Mr. Redmayne.*) In justice to yourself, with regard to what you said respecting these technical education classes, you are a man of hobbies in another direction. You go in for literary work?—Yes.

4947. That is what was in your mind when you said that you devoted your energy and spare time in other directions?—Yes.

4948. (*Mr. Lewney.*) In regard to the objection of the elderly men to use the changing-houses, I take it that it is merely a matter of sentiment?—Yes.

4949. They have so long been accustomed to go home to change that they do not like the idea of changing anywhere else?—Yes.

4950. Provided sufficient accommodation existed, that is a matter that would gradually right itself?—Yes.

4951. The young men would all use the changing-houses?—Yes.

4952. As a matter of fact in time everybody would be using them?—Yes.

4953. (*Mr. Greaves.*) In that case compulsion would not be necessary?—I do not know, but I think compulsion would not be necessary.

4954. If everyone used them compulsion would not be necessary?—Of course it would not be. In the meantime it would have to be compulsory, I think, before a lot of them would.

4955. The older men, probably?—Yes.

4956. (*Mr. Lewney.*) Do you think that if ample changing accommodation was provided even a lot of the old men would throw sentiment aside and change?—Yes, I am sure of it. There was a good few changed at one changing-house, and they all left because the changing-house got lousy.

4957. I can understand that point. So should I. Is it a rule that a sufficient supply of good clean water is provided in these changing-houses?—With

regard to our mine sometimes there is a shortage of water.

4958. I would not like you to suggest any particular mine. Will you express your opinion generally? Is there sufficient clean water provided, without particularising any mines?—In the summer it is not, and it is sometimes got from an old pit. I think it was before the council that they had not enough water to supply the mines, so that sometimes they go short, and when we are short we use the water that is pumped out of an old pit.

4959. Do you not think that is a most objectionable thing?—I am sure of it. We had to put soda into it.

4960. It would account for many men refusing to use the changing-houses now in existence?—Certainly.

4961. The use of this water was probably accountable for some of the men refusing to use the changing-house?—Yes. I am confident if changing-houses were better than they are now, more would use them.

4962. Are the clothes well looked after as a rule?—That all depends on the man they get. Sometimes they get a man that attends to them well, and sometimes they do not. I have known men leave the changing-house because their clothes were not looked after and were not dried properly.

4963. (*Chairman to Mr. Wishart.*) Have you anything to add. We are taking Mr. Edmonds' evidence on behalf of all three of you?—I agree, but there is one thing about the clearing roads which should not be missed, they should be wide enough to supply a gutter. That is to allow water to run down and wash anything that is on the road. In some roads there is no gutter and it lies there thick.

4964. You are over your ankles in water?—Yes, it should be properly cleaned.

4965. (*To Mr. Rooney.*) Have you anything to add?—There is one little matter I would like to speak of. At the bottom of a dip when the bogey is full and they are sending it up, there should be something on the back in the shape of a fork or a bogey devil, so that if the bogey is on the way up and the rope breaks, the bogey will tip over. If the fork is on the back it will tip the bogey on the road.

4966. (*Mr. Greaves.*) You mean a sprag?—I have seen cases where labourers have to jump up.

4967. (*Chairman.*) Are there any further points that occur to you or your colleagues, which you wish to put before us. The points have been shortly put, but they will be none the less effectively attended to?—No.

Mr. DAVID TIDYMAN (miner), Beckermet Mine; Mr. ALEXANDER CRAMOND (miner), Ullbank Mine, Egremont; called and examined.

4968. (*Chairman.*) You have heard the evidence of Mr. Daniels and others; have you any new points to put before us? We have heard the others at considerable length. (*Mr. Tidyman.*) There is one thing I have not heard mentioned yet, and that is as regards the ladder business up the side of a shaft—in what form will these ladders be—will they be one above another?

4969. I can answer you so far, of course you could not have one ladder from the bottom to the top of a great big shaft with no landing places?—I mean different stages.

4970. There must be something for a man to rest a minute?—And just thrown so that one man may be able to get through. For instance, supposing there are a few going up the ladders, something might go wrong and a man might fall—unless there was something lower down, naturally he would knock those down that were climbing too.

4971. You mean go right from the top to the bottom and knock the whole lot down?—Yes.

4972. The chief inspector of mines says in ladder ways there must be intermediate stages. It is in the rules already and of course there should be intermediate stages because no one contemplates having an immense ladder from the bottom to the top without anything between. That is not meant. General Rule 15 is: "A "ladder permanently used for the ascent or descent of "persons in the mine shall not be fixed in a vertical or "overhanging position, and shall be inclined at the "most convenient angle which the space in which the "ladder is fixed allows, and every such ladder shall "have substantial platforms at intervals of not more "than 20 yards." That meets the point you are dealing with?—Yes; there is another thing in connection with the changing-house business, as regards the employers making it compulsory for men to change.

4973. Are you in favour of this?—On certain conditions.

4974. What are the conditions?—First of all that they provide all that is necessary for men's comfort.

4975. We assume that of course?—Not only that, but if men are to be compelled to change, not to be compelled to pay.

4976. We quite understand you; we see the point?—That has not been raised before.

4977. We shall consider that. Have you any other point?—Not in particular at present.

(*Mr. Cramond.*) I do not think I can add anything; I agree with the others.

(*Mr. Redmayne.*) Are you in favour of compulsion?—(*Mr. Tidyman.*) No, not of compulsion really.

4978. (*Chairman.*) I thought you were, providing those things were provided?—No, I said if it came to pass that they were compelled to change—that is one thing.

4979. I should like a decent house myself, whether I was compelled to change or not?—Certainly.

4980. We agree then. You have nothing else to say?—No.

Mr. GEORGE MCWILLIAMS (engineman), Cleator Moor; Mr. JOSEPH ENNOR (engineman), Egremont; called and examined.

4981. (*Chairman.*) I think you have been fifty years in the employ of your present firm?—(*Mr. McWilliams.*) Yes. Fifty years in the present employ.

4982. Where are you working?—Mr. Stirling's Montreal mine.

4983. You have come to tell us about the necessity for a good hook?—Yes, and about the signals.

4984. We will deal with them separately. This is a technical point upon which we should like to hear your experience. You think there should be a hook?—Yes.

4985. And you have tried King's patent hook?—We have had it for many years at the pit I am working and I like it very well. I never saw it miss.

4986. You would not prescribe in an Act of Parliament "King's patent hook," but you would like any hook that acted properly?—Yes.

4987. A better one, if there was one?—If there was a better one.

4988. You also would like patent clutch cages?—Yes, I am working with them.

4989. What is a clutch cage?—Springs in cylinders; there are a pair of cylinders and the weight of the cage opens the springs and opens the catches.

4990. There has been considerable objection to this in coal mines—do you know that?—It may be.

4991. I may put the difficulty to you at once—in coal mines the cages go very much faster than they do here?—We have a pretty fast winding-engine.

4992. It would be considered nothing compared with the winding in a coal mine?—I do not know—both coal mines and iron ore mines wear them out, you know—we raise both.

4993. I have been down one or two mines here, and I was informed, on asking, that it was nothing at all to be compared with going down a coal mine. It may be it does not answer in coal, but answers here?—It is pretty fast here.

(*Mr. Greaves.*) It is a question of velocity.

4994. (*Chairman.*) However, I will leave the experts to ask you about that presently. You would like uniform signalling?—I would. I think when a man shifts from one place to another he should not have the signalling to learn.

4995. You would like some form of sanitary accommodation near the engine-house?—Yes, close to —as near as possible.

4996.—That would be a small matter?—Very small; it would not be a costly affair.

4997. You would like a telephone from the pit bottom to the engine-house?—Yes, I would like to have a speaking tube or something.

4998. Would you have it all the way to the pit mouth as well?—We have one to the pit mouth, as it is.

4999. It would not distract the engine-man to be rung up on the telephone?—I do not think it would.

5000. Are you in favour of enginemen's certificates?—I think the miners could speak for that.

5001. Would you be in favour of an examination to-morrow?—Yes, and be quite prepared for an engine-driver.

5002. Are you prepared to pass one?—My experience would pass me, I think.

5003. I do not know whether that would be sufficient; I should suspect it ought to be?—I would think so; but I would not be frightened to pass one.

5004. To put it in another way, I suppose you have a good competent set of engine-men in your district?—There are very good engine-drivers at present round this district.

5005. There is another point with reference to the electric bells. Have you used both electric bells as well as knocks?—Yes, I have had both; but I would just as soon have the plain hammer as the electric bell—the wires get wrong many times, and if anything strikes them it is dangerous—if the wires come together, the bell rings.

5006. I have some knowledge of electricity, and I should be inclined to agree with that view; I am a little frightened of electricity, because if you did get a bad contact it might be awful if you mistook the signals sent up owing to the contact not being made properly?—It would be so.

5007. Then as to the desirability of independent inquiry in the case of cage accidents; there I suppose you are aware that it is competent for the Secretary of State to order independent inquiries—I mean in addition to the coroner's inquests—in all important cases?—Yes.

5008. Have you had any important case where such an inquiry has not been held?—I cannot say that we have.

5009. I suppose you are aware that the Secretary of State does order independent inquiries wherever it is deemed necessary; like at Whitehaven, for instance?—Yes.

5010. And of that you approve?—Yes.

5011. You advocate also the daily inspection of all driving gear?—Yes.

5012. By whom should that be done?—An engineer, if there is one kept.

5013. And if not?—We could do it ourselves as well as the engineer.

5014. And that is important, you think?—Yes; we keep a report book in the engine-house, and if there is any deficiency in the machinery we put it in the report book and the engineer takes it off.

5015. Does that include the cage, ropes, and everything?—Everything about the machinery.

5016. Does someone look down the guides, because part of it is down the pit?—Yes; that is examined once a week—the shaft and signalling wires.

5017. Is there any other point you would like specially to call attention to? You have been here all the morning?—Yes.

5018. You have heard the evidence already given?—Yes.

5019. Is there anything else you would like to comment upon in reference to the evidence given?—I do not think there is anything I can improve on.

5020. (*To Mr. Ennor.*) Do you wish to add anything?—As regards the oiling of the sheaves and the wheels on the headgear top, it is partly a ladder outside the leg and they get ordinary steps and stairs up. In a good few places they are outside the leg on the ordinary faces, and it is awkward to climb up to the top. I think it would be possible to have a stairway up through.

(*Mr. McWilliams.*) We have that at all our places.

(*Chairman.*) You mean it is dangerous?

(*Mr. Ennor.*) Yes.

(*Mr. McWilliams.*) You get up perpendicular like that (*illustrating*) and it is very dangerous to go up that way, and then you have to climb over the top and very often with an oil tin in your hand.

(*Chairman.*) That is an administrative point? I daresay Mr. Leck will take notice of it.

(*Mr. McWilliams.*) He knows all about it.

(*Mr. Ennor.*) I should like to bear out Mr. McWilliams' statement as regards the engineman going in for a certificate, because it is not only in reference to the driving-engine but it practically gives him a grip of the whole thing appertaining to his work—and in charge of boilers for instance—it would be a safeguard to the manager as well in and about the mine because then he would know by his certificate that he was competent. If a stranger comes into the district you have just his word to take.

5021. (*Chairman.*) I do not think the management would take on an incompetent man without enquiry?—Quite so.

5022. Supposing there had been a system of certificates in force for the last 15 years, say, in this district, would it have made any practical difference in the actual men who would have been chosen—would you have had much the same set as you have now?—It would make them study their work more.

5023. That is not my question at all. My question is whether as a matter of fact it would have made a real difference. For instance, I could say "Take such " and such an office—if they had had examinations, it " would have got them a different set of men " altogether." Can you say that with regard to the enginemen if they had had a system of certificates it would have got them a better set of men?—No, I do not think they could get better.

5024. Is there any other point you wish to mention, Mr. Ennor?—There is this point with regard to rope barrels. I think there should be a brake on the barrel where there is cog gear attached to the engine.

5025. (*Mr. Leck.*) It is at most places?—I think it ought to be at all places.

5026. (*Chairman.*) Anything else?—I think that is all.

5027. (*Mr. Redmayne.*) Mr. McWilliams, have you ever had a case of over-winding?—Yes.

5028. What was it due to?—It was just taking my mind off on to something else.

5029. In a case like that of course a detaching hook would be of some considerable service?—Yes, it would be of great service.

5030. Supposing men were in the descending cage how would the detaching hook help them?—It would not do them any good.

5031. Seeing that is the case, would you go a little further and advocate the compulsory use in respect of every winding-engine of a speed-controlling device?—We generally have the speed controlled when we lift the men. We do not lift the men at the same speed as we draw the metal.

5032. You depend to a great extent on the winding-engineman—he has the controlling device?—Yes.

5033. In addition to the human factor which might take this man off the engine would you have a mechanical controlling device?—I do not know. You could hardly fasten a man's mind on to that work.

5034. Would you have a piece of mechanism attached to the engine?—To remind him.

5035. Not to remind him—so that even if he had a fit and took his hands off the engine at all it would come into play?—You might have a regulator on the machine that would regulate the engine.

5036. You would advocate that?—Yes.

5037. In all shafts beyond a certain depth?—Yes. If you had a regulator to shut the steam off it would be a good thing; and they have that at Whitehaven.

5038. It shuts the steam off and puts the brake on?—I do not know about putting the brake on, but it shuts the steam off.

5039. There are such devices?—There are several.

5040. You would advocate some such mechanism in all shafts beyond a certain depth?—Yes, if they could make the machinery in that way it would be a very good thing.

5041. You would not advocate it perhaps in a shallow shaft?—I do not think it would require it so much as a deep shaft.

5042. In a deep shaft you get up a higher speed?—Yes, but the further you get down of course there is the more weight below.

5043. That point has been considered by the Royal Commission on Coal Mines?—Yes; where there is a deep shaft it would be a great improvement.

5044. Then with regard to the point you made in answer to a question put to you by the Chairman as to the safety clutches—by safety clutches you mean an arrangement which operates if the rope should break?—Overwinding?

5045. No, I do not mean that?—You mean a safety clutch—if the rope broke the cage would stick?

5046 Have you that?—Yes.

5047. You advocate the use of that?—Yes, and a very good thing too.

5048. Is it not the fact that such arrangements only come into operation on the tension of the rope being released?—If the rope breaks or anything, it comes into operation.

5049. Supposing the rope does not break, but the cage sticks a little bit—a descending cage going down—so that the rope may be actually going quicker than the cage itself at some period of the winding?—Well, I never saw that.

5050. I have seen it?—The shaft is not right if the cage sticks.

5051. Suppose it for a moment; in that case the safety clutch would come into operation?—The safety clutch would come into operation—if it stopped and got the weight the catches would catch.

5052. That would be a danger would it not?—Well, I do not think it would slip away.

5053. It might come partly into operation? There was a very disastrous accident in Westphalia a short time ago due to that?—Well we have these double cylinder cages and we strike them up pretty often, once in three weeks or once a fortnight and I have never seen one miss yet. We knock the rope right away.

5054. Have you had such an accident?—Yes, with the single clutch—it was always supposed he was a tall man and he got his shoulder underneath the catch and that let the springs drop. That is how it was supposed it happened. But with these double cages they cannot do it.

5055. There might be another tall man going down a pit?—He could not do it with a double-cylinder cage. This was a single-cylinder cage.

5056. You would limit the use of that type to double-cylinder cages?—Yes; double-cylinder cages are the safest.

5057. Turning your mind to signalling, have you ever heard of an accident in this district due to the use of electrical signals?—I have not.

5058. Not a hauling accident?—No.

5059. With regard to the inspection of winding-engines, you would carry that a little further and apply it to all the machinery?—We have it with respect to all our machinery about the place; it has to be inspected as well as the winding-engines—pump engines, and everything. The engineer inspects all round every day.

5060. Would you make that compulsory?—Yes.

5061. And have a written report on it?—Yes; we have to write a report every day.

5062. Is that by your rules?—Yes.

5063. By the special rules?—That is by our own rules.

5064. Would you go so far as to make it a general rule in an Act of Parliament?—Yes; I would make it a rule that the engine-driver should inspect his machinery and see if all was right, and if there was anything defective to put it in the report book.

5065. Would this wording, which is the wording adopted in the Coal Mines Regulation Act, meet your point: "A competent person or competent persons "appointed by the owner agent or manager for the "purpose, shall, once at least in every twenty-four "hours, examine the state of the external parts of the "machinery, the state of the guides and conductors in "the shafts, and the state of the head gear, ropes, "chains, and other similar appliances of the mine "which are in actual use both above ground and below "ground, and shall once at least in every week examine "the state of the shafts by which persons ascend or "descend; and shall make a true report of the result "of such examination, and every such report shall be "recorded without delay in a book to be kept at the "mine for the purpose and shall be signed by the "person who made the inspection." Would that cover the whole of your requirements?—That is what is done at our place, and I would suggest that that should be done at other places.

5066. Would you advocate the use of an adequate brake on every winding-engine?—Yes; I would advocate a good strong brake.

5067. How would you define the word "adequate"?—I do not understand "adequate."

5068. Would an adequate brake be a brake which would hold the cages in mid shaft?—That is the sort of brake we have; that will hold two bogies of metal at any part of the shaft.

5069. You would have the word "adequate" defined in that sense?—Yes.

5070. (*Mr. Lewney.*) In regard to safety-hooks, are they universally adopted in this district?—No; I do not think they are. There are a good many places that have them. We have had them at our place many years.

5071. You think that they are capital things?—Yes.

5072. You would go so far as to recommend that they should be made compulsory in all cases?—Yes.

5073. Mr. Redmayne put a question in reference to the down cage. Have you known an accident occur through that?—There was a slight accident. A man got his leg broken in that way. The engine went away with the man and he lost control of it.

5074. Have you known a case in which the clutches refused to act?—Only this one case; the clutches did not catch and it was a single cage. I never had much to do with the single cages. These are what are called double-cylinder cages. It was supposed that he was a tall man, and got his shoulder underneath the spring, and it would not let the springs go in.

5075. Have you known a case where the rope broke?—Yes; we have had the rope break two or three times, and the cage and the two bogeys of metal were there.

5076. Stuck in the shaft?—Yes.

5077. Have you known the cage become detached with a number of men on it?—Yes.

5078. Did the clutches act in that case?—First class.

5079. If those clutches had not been there, those men would have been precipitated to the bottom?—Yes.

5080. In that case the clutches saved their lives?—Yes. Of course we had the old monkey on at that time in the patent cage. Both the patent cage and hook we have now. At that time we had the old monkey, and the monkey unloosed the rope and the cage stuck.

5081. In regard to the telephone into the engine-house, would you also favour a separate service to the pit-head or do you mean to have the telephone from the shaft-foot to the engine house only?—Right to the engine-room. There is such a thing as the bell-wire breaking; sometimes it happens. You can do nothing. It was only about a month since the bell-wire broke, when they knocked the first cage away.

5082. Do you not think in a case of that sort that it would be sufficient if one service was to the banksmen and another to the engine-house. I understand it would be only used in the case of emergency?—I would rather have the signal from the bottom. I do not care about having it from the banksman.

5083. (*Mr. Redmayne.*) Would you not advocate the man at the bottom signalling simultaneously to both the winding-engine man and the banksman?—We have it. We have the signal on the pit-top to the banker and the signal in the engine-house. I would advocate that because it often settles the case. If you lift away without a knock, sometimes they will say they did not knock and we say they did. The banker says it did not knock. He says his hammer knocked, and that settles it.

5084. (*Mr. Lewney.*) You agree with Mr. Ennor as to the necessity for a proper stairway to the pit-head?—Yes; we have capital stairs up the sheaves.

5085. Have you anything to say as to the age at which youths may be allowed to draw men?—I think they should not be allowed under 22 years of age.

5086. Have you keps at the mine where you work?—At the top.

5087. In our district we call them snacks?—We have them at the top but not on the eye. We hang without the keps at the eye.

5088. The level or exit you call it. Do you find any difficulty in keeping the cage level with the flat sheets?—No. You can set the cage level for the road, and he runs the bogey on.

5089. I am speaking of the absence of the keps?—That is without the keps.

5090. There is no difficulty?—Not any trouble at all; it is handier without them. When the keps are in at the eye I have seen them leaving them in, and they have been down and made a smash with the down cage.

5091. I am speaking of the pit top?—Of course we use keps at the pit top.

5092. (*Mr. Greaves.*) With regard to the telephone to the engine-man, it would be no use in an emergency. When a man was winding he could not leave his engine to go to the telephone?—He might have the speaking trumpet *here*, and be winding *here*. There would be no trouble.

5093. (*Mr. Ainsworth.*) He would have to put it to his ear. He would have to take his hand off the engine?—Yes, but we have one to the pit top, it is just *there*. We have a pipe that we can speak through.

5094. (*Mr. Greaves.*) I am talking of the telephone?—If it was a tube that anybody could speak down, that would be as good as the telephone.

5095. For the ordinary form of telephone a man would have to use one hand to listen while winding. Would not that be awkward?—He would have to stop winding to attend to the telephone. He could not wind and attend to the telephone.

5096. (*Mr. Thomas.*) It might be awkward, because you would get another signal with the telephone. The telephone bell would have to be rung, and he might confound it with the other signal?—We use a whistle.

5097. You mean some means of communication?—Yes, a speaking trumpet.

5098. Anything you can talk down?—Yes.

5099. Have you any inclines in this district where you have winding engines working on the incline pulling up trucks?—No, we have them at the bottom, none at the surface. We have one at the bottom working 700 yards.

5100. Underground?—Yes.

5101. You will agree with me that it would be impossible to use a detaching hook?—You could not use it. It is not often men ride on an incline. It is very seldom.

Mr. Luke Cowan called and examined.

5102. (*Chairman.*) You have something to say about vertical shafts?—Yes, I have something to say for the safety of man as to what should be done.

5103. You sometimes get out of the vertical without intending to?—Yes, I think it is necessary, after the charge is fired, that the chargeman of that shift should be compelled to examine the shaft.

5104. To see that it is going down vertically?—To see that no stones are sticking in the timber.

5105. That is a different point?—That is a vertical shaft, is it not?

5106. There are two different points?—It was a perpendicular shaft I was meaning.

5107. You think steps should be taken to keep it vertical, going down?—I do not understand; there are no vertical shafts here.

5108. Some of the borings are not vertical. I suppose they put it right afterwards. Your point is, when vertical shafts are being mended, care should be taken about the stone?—Yes, if a blast has gone off, the chargeman should examine the shaft to see no stones are sticking in the timber.

5109. (*Mr. Greaves.*) Stones thrown by the shot, you mean?—Yes.

5110. (*Chairman.*) Have you anything to say about the difference between skeleton cages and the kibble for pit sinkers?—When the kibble is full it ought not to be filled within 4 or 5 inches of the top, and the chargeman should be compelled to see that it is not full to the top.

5111. Have you known pieces come off when it is too full?—Yes, I have known men killed by stones tumbling off the kibble.

5112. How about wooding down? How low would you wood down when you are sinking?—It depends. Sometimes you may go 20 or 30 feet, but before you start you have a jump of 4 or 5 feet to start from.

5113. Is there some practice in connection with that which is not as safe as it should be?—I do not know anything in the timbering line. I think it is safe. The managers see the timber is got as quickly as possible as soon as they get a solid footing.

5114. What is the general practice of the district?—I know of no occasion where there has been any objection made to the timbering.

5115. Now comes a point we have had evidence about, and that is the desirability of some covering being adopted over the men sinking?—That ought to be done in a new shaft.

5116. It is to prevent things falling on them?—Yes.

5117. That would be 3 or 4 feet above their heads?—By folding-doors we keep the shaft closed.

5118. Would that interfere with the ventilation?—No. If the pit top doors were a certain height above the surface, and it was covered all round, you could have the air-pipes underneath the covering.

5119. I was asking whether there ought to be a suspended hood, over the workers, lowered down when they are working in the shaft at the bottom?—I do not think that is necessary.

5120. You are advocating something like the combing of a ship round the shaft, to prevent things accidentally tumbling down?—Yes, and when they are not drawing stuff, to have folding-doors.

5121. That seems a sensible provision, a movable platform over the top?—Yes.

5122. (*Mr. Thomas.*) The pit top door should be sufficiently strong and fenced round to give protection to the men working in the bottom of the shaft from being struck by falling stones from the top?—Yes.

5123. Further you do not see any necessity for what was described as some suspended covering within about 4 feet, over the pit sinker's head?—No, keep such stuff out of the pit altogether.

(*Mr. Thomas.*) I personally think you are right.

5124. (*Mr. Ainsworth.*) How would you prevent anything falling off the kibble?—By not filling the kibble too full.

5125. (*Chairman.*) Is it possible to get a head gear over the men working to protect them more than at present?—I believe in having the shaft as clear as possible except for the folding doors. You should have no obstruction while you are sinking.

5126. The miner's ordinary stiff leather hat is a good thing?—Not in this county. In the other counties they have a leather hat so that a small stone would not hurt their heads. In this county they might as well be with bare heads except for the weather.

5127. Would it not be a good thing for sinkers to have a leather hat?—Yes.

5128. It would be a good thing for the sinkers to have a hat of stiff leather?—They generally have a leather tail on the back of it and a hard leather hat, and it is beeswaxed to save small pieces hurting them.

5129. Has that saved you from a knock?—Many a score of times.

5130. It has been suggested that something more than that should be put on, some kind of head armour?—I would prefer to have the shaft clear.

5131. Could a man work with a heavy iron thing on his head?—No; if it was a great lump that fell, and the iron thing was on your head, it would hurt you too. If a leather hat will not save you, you are better without the other, or else you would be in the box.

5132. You are in favour of taking care to keep the shaft clear?—Yes.

5133. When you know that the shaft is being kept clear it gives the men greater confidence, and they can go to work better without looking about them and wondering whether something will come down?—Yes.

5134. Now with regard to the preparation and firing of shots in pit sinking?—That is the thing I mentioned first.

5135. What is your suggestion?—When the shots go off it is right that the chargeman should examine the shaft before he allows the men in the bottom of the shaft.

5136. The bits of stone in the woodwork?—Yes.

5137. What about the signals used?—They are generally universal.

5138. Before the men go down there ought to be an examination of the top gear?—Yes.

5139. And all the gear, in fact, rope and everything else?—Yes.

5140. Each shift before the shift goes down?—Yes.

5141. We have heard a good deal about the changing-houses. May I take it that you generally agree with your comrades on that point?—The changing-house is a very good thing.

5142. I have dealt with the special points you as a sinker deal with. Is there any other point you would like to bring before us?—There is more difficulty in getting dry clothes for sinkers, because every shift there are wet clothes. It is a question more of shifting the clothes before they are dry, to put the others on. Many a time you do not get dry clothes.

5143. I thought they would be dry in the changing-house?—You expect it after leaving them 16 hours, but you might not find them so.

5144. Is that due to the pipes not being hot enough?—Sometimes they burn them. It is on account of the men following you on being rather selfish and looking after their clothes, and throwing yours aside before they are dry.

5145. That points to somebody in charge going round and seeing that the clothes are being dried?—It is not often, in sinking, that you have a man in charge.

5146. Do you get wet through in sinking more than in other operations?—Yes.

5147. I suppose in fact the changing-house is more important for sinkers than for other men engaged, if they get so wet?—It ought to be.

5148. (*Mr. Redmayne.*) Have you sunk pits in other parts of the country?—Yes, in Northumberland and here, and in South Africa.

5149. (*Mr. Ainsworth.*) What pits have you sunk here?—I am in one now at present, Oregill.

5150. (*Mr. Redmayne.*) You have a wide experience in shaft sinking and you will be able to tell me whether you think a code of rules, sinking pit rules, could be drawn up, which would be applicable to all sinking pits throughout the country?—I think it could.

5151. You mentioned just now in your examination by the Chairman, that you thought that the chargeman should go down the bottom of the pit before anybody else, after a round of shots had been fired?—Not before anyone else. He might require two men with him with long poles, to examine it. He must be there when the shots are being examined.

5152. You advocate examination before the gang of sinkers goes to the bottom, after a round of shots has been fired?—Yes.

5153. You gave in support of that the necessity of examining for loose bits of stone?—Yes.

5154. Is not there another reason, namely the effect of the fumes?—There is not much in sinking. The water shifts it up.

5155. I had before me the other day a serious accident, with disastrous results, in which a body of ganger men went down shortly after the chargeman, and they fired a heavy round of gelignite shots with the result that all the men were overcome, and the effects were most noticeable after they returned home. One man died that night?—I have not experienced anything like that.

5156. Have you not heard in South Africa of the number of men who get gassed?—Yes, that is right enough after the use of explosives in a mine.

5157. Of gelignite?—Yes.

5158. The fumes have not got swept away?—Yes.

5159. It is desirable, after heavy charges, that an interval should elapse before the men enter the bottom of the pit?—Yes, it is nothing but right that there should be a small interval between the blasting and the going down, to let the fumes get away.

5160. Sinking flap doors fixed to an overhead platform over the tops of sinking pits are pretty generally adopted?—I think so.

5161. You think that they should be made universal?—Yes.

5162. Or some movable cover?—I prefer them before the bogey goes to the top, because when the doors are closed the shaft is probably closed in.

5163. (*Mr. Lewsey.*) At the present time are we to understand that the only cover you have is the bogey that takes the kibble?—No. I have seen folding doors. At the mine where I am working they have folding doors now.

5164. As a rule what distance are your slides from the bottom of the shaft, speaking generally?—About 9 or 10 feet in the shafts at present.

5165. It was suggested yesterday that a covering should be used in the shaft. Have you heard of a pent-house?—I do not believe in them. I think there is danger.

5166. I am asking for your opinion. This was advocated and the idea was to have it a few feet above the men's head. In that case it would necessarily follow that the pent-house must be at any rate above the bottom of the slide?—Yes.

5167. You could not possibly have it below?—It is a thing I would not agree with. I believe a shaft should be properly clear when a sinking operation is going on. Where there is a pent-house, there is a liability of something catching it and coming down on the top of you.

5168. Providing a pent-house was put in you would be bound to have it at the bottom of the slides?—You might have a pent-house where you would not have the slides at all.

5169. You do not think it would interfere with the kibble?—There ought to be nothing to interfere with the kibble. There should be no pent-house to catch the kibble.

5170. If you put it in one end there would not be so much protection after all?—I do not know the reason for putting the pent-house in. I cannot see that it will be any protection to the sinker. If anything catches it it will come down on the top of the men in the pit. There is no protection. I say keep the shaft clear.

5171. (*Chairman.*) That ends all the witnesses for the miners in this district. There is a point I wish to mention in connection with what I said before. Although it is quite unnecessary to deal with it now, I am very pleased that it is unnecessary. I was doubtful whether there was an Act of Parliament applying to the protection of witnesses giving evidence before Royal Commissions. I find that there is an Act which provides that any terrorism exercised upon a witness who has given evidence before a Royal Commission, amongst other things, is punishable, but in this instance it is quite unnecessary to cite it, because before they knew of such a provision the employers, in a very proper spirit indeed, stepped forward and at once repudiated any idea of intimidation and said they would be glad to hear any opinions expressed by the men, provided the opinions were given fairly and *bonâ fide*, as they have been, temperately and sensibly on the present occasion. Therefore I need not further allude to it. I have alluded to it so that it should not go forth, as my view, that there was no such Act. There is such an Act but fortunately, in this case, it is not necessary to have recourse to it.

Mr. John Briggs called and examined.

5172. (*Chairman.*) You come here on behalf of the Furness Iron Miners and Quarrymen's Union?—Yes.

5173. You come from the Furness district?—Yes.

5174. You have had 25 years' experience working in both soft and hard hematite mines?—Yes.

5175. The ventilation question is a very important ?—Yes.

5176. Do you think that enough is done, generally speaking, in the Furness district?—Generally, I believe so.

5177. Occasionally, I suppose, there are places which are not sufficiently ventilated?—Yes.

5178. You attach considerable importance to keeping those as well ventilated as possible?—Yes.

5179. Have you seen anything of firedamp in a hematite mine?—No.

5180. You have heard of it?—Yes.

5181. Have you heard of men being burned actually?—Yes.

5182. A real gas explosion in a hematite mine would be an impossibility. There are only small pockets of it?—Yes.

5183. Have you seen a candle go out?—Many times.

5184. What do you do when you see a vertical candle going out?—Go back to where the air is better and light it again.

5185. What do you do to cure the ventilation? What is the method of doing it?—I have seen various ways, lifting the water to the top and letting it go back again down the shaft.

5186. Sometimes I have heard of lighting a fire in the middle of a gallery. Is that done?—No.

5187. Is it a usual thing to get it right again if you take the proper methods?—Yes, I think so.

5188. You are in favour of the method of rising a stole or middling when you are working in the shafts on the rise?—Yes.

5189. I think we know what that means. I will not ask you to describe it. Where there is only one shaft it is very essential that there should be a good ladder way close to it?—Yes.

5190. Part of it should be screened off as a good ladder way with proper resting places?—Yes.

5191. Are you of opinion that under no circumstances whatever should a mine be worked without two shafts, whether it cost much or little, or is that asking too much?—Too much, I think.

5192. You would be content with a provision we have heard the other miners say, that in case an inspector considered that the whole thing was unduly dangerous, there should be powers of reporting that and getting it referred to a proper tribunal to settle?—Yes.

5193. That would be a satisfactory method of settling the matter?—Yes.

5194. Any inspection of metalliferous mines ought to be carried out by practical men with a practical knowledge of mining?—Yes.

5195. From that point of view you would like, I suppose, some of the class of working-men inspectors, I mean inspectors of a second grade. Do not answer if you do not know what I mean. It has been suggested by another Royal Commission, viz., the Commission on Coal Mines, that there should be in addition to the very highly qualified class of inspectors we have now, a second grade of inspector drawn from the class of practical working miners. Do you mean something of that kind?—Yes.

5196. That sort of thing would meet your views?—Yes.

5197. You would not be against power being given to the men in a Metalliferous Mines Act, as in the Coal Mines Regulation Act, to depute two of the men working at the mine to go and look round from time to time if they wished to?—I would not be against it.

5198. They would look round, and if they thought there was anything wrong they could report it to the inspector and call the attention of the management to it?—Yes.

5199. If you think that power quite unnecessary you can say so. You do not think it would be very much used, perhaps?—Not in metalliferous mines.

5200. In these small mines the men know pretty well the whole of them. It is not like the coal mines. There is that difference. After a fatal accident you would like somebody representing the deceased workman to have the right to look at the place, and that the place should not be altered without necessity, that the condition of things where the accident occurred should be left untouched for a certain time, to give opportunity to the inspector to see it?—Yes.

5201. You would be in favour of only one code of signals?—Very much.

5202. I am not going into great detail. We know so much about it that we need not ask you to describe it all. We know what you mean by uniform code. It would leave power to have special signals in the mine, but the general code is what we want to unify?—Yes.

5203. With regard to changing-houses you think it essential that a changing-house should be close to the pit?—Yes.

5204. So that the men can get readily from one to the other?—Yes.

5205. Are they sufficiently good in the Furness district, or would you like them improved?—Generally they are all right, I think.

5206. Clean water, too, is a desirable element, of course?—Yes.

5207. Speaking generally in Furness does the sewage matter which accumulates at the bottom of the pit go into the sump? How is it got out? If men ease themselves at the bottom of the pit what becomes of it?—It goes away with the water, as a rule.

5208. Into the sump and is pumped out?—Yes.

5209. Does that cause foulness in the sump?—Not where there is plenty of water.

5210. If there is a great volume of water it would not be felt?—No.

5211. In some cases it would if there was a very small quantity?—Yes.

5212. A great many witnesses have told us that it would be desirable to have improvement, generally speaking, in the sanitation of mines below ground. Is that the case in Furness, or not?—I do not think so.

5213. (*Mr. Lewney.*) In regard to the inspection of mines by workmen, you do not insist upon that as a necessary condition?—No.

5214. As a matter of fact it would be very little used if the power were given?—Very little.

5215. In regard to a universal code of signals, I believe that on one occasion you were very nearly having an accident through not understanding the proper signals?—Yes, moving from one property to another. They had different signals.

5216. That made a great impression on your mind at the time?—Yes.

5217. In the case of changing-house accommodation you think it is most desirable, in fact necessary for the comfort of the workmen, that these should be situated as near the shafts as possible?—Yes.

5218. In the Furness district some of the workings are exceedingly hot?—Yes.

5219. And it is dangerous to the health of the workmen engaged in these places to have to walk long distances from the pit to the changing-house?—Yes, dangerous to their life.

5220. (*Mr. Ainsworth.*) In the changing-house in the Furness district is there any charge made for the use of the houses or for payment of the man who keeps the house tidy?—What there is is voluntary.

5221. The houses are kept in order by the employer—That is so.

(*Mr. Lewney.*) That is universal in the district.

5222. (*Mr. Redmayne.*) At the mine in which you are working is there an inspection of the working places made by somebody before you go to work?—There is if they suspect gas or anything of that kind.

5223. Not unless?—No.

5224. Would you prefer that there should be an examination always made before the men go to work?—In those kinds of places, yes.

5225. They would not know whether they were dangerous unless there was an examination?—There is some class of ground where it is very rare there is anything dangerous.

5226. It would make assurance doubly sure if there was an examination?—I would be in favour of it.

Mr. James Orr called and examined.

5227. (*Chairman.*) You have had 40 years' experience?—Yes.

5228. Where has your experience been?—In the Isle of Man, South Africa, and the Furness district.

5229. When were you in South Africa?—Fifteen years ago.

5230. Did you do rock drilling there?—Not with a machine.

5231. By hand?—Drilling by hand.

5232. How long were you engaged in rock drilling by hand?—About 10 months.

5233. Did you suffer from it?—I do not know that I can say I suffered from that directly, but I suffered from the country generally.

5234. South Africa is a splendidly healthy country, is it not?—It is for some, not for all. The climate did not agree with me.

5235. You have not had any phthisis or bronchial complaints from rock drilling?—From atmospheric pressure I had when I came home. I suffered a certain percentage of bronchitis which caused me a deal of trouble.

5236. Do you not think it is more likely to have been the dust?—I attribute a percentage of it to lead mining, working in the lead mines prior to coming to the Furness district, and going to South Africa.

5237. We are chiefly on the Furness district, so I will take that. You would like means taken to prevent overhauling?—Yes.

5238. Will you explain what you would like?—I need not detail what I mean, but simply say that in the present age we are suffering from a craze for output, and if a man is standing at his engine for 7 hours and 40 minutes drawing on an average 9 tons per minute, I think it is necessary that we have something to prevent overhauling, seeing that there is an extra pressure brought to bear upon that man's mental powers.

5239. You would like an automatic appliance?—Of some character.

5240. An arrester?—Yes, to throw out of gear the engine, providing he made a mistake.

5241. And intergear the brakes?—Yes.

5242. That would be necessary more in deep mines than in shallow ones?—Coal mines principally.

5243. Is that necessary in a very shallow mine?—Not absolutely.

5244. It becomes necessary in proportion as the mine is deep?—Yes.

5245. And whether you have it or not depends on whether you are sure you have an appliance which will work?—Yes.

5246. Then daily inspection of ropes, patent rings, and cages you would like made?—Yes.

5247. That is done at present?—By a competent person, I mean, not an engine-driver; not the engine-driver to come out of the house to make the inspection of ropes and headgear. He should have nothing to do with that. That belongs to a man specially appointed to look after this kind of work, and make him responsible for such work.

5248. You do not think that the majority of enginemen have sufficient knowledge for such work?—Their duties are sufficient without having any of that character.

5249. You mean it casts too great a responsibility upon them to do both, or do you mean that they are not able to do it?—I would not like to question their ability, but there might be inability in some cases.

5250. In a small mine where you had a very small number of men to lower, and the engineman was competent to do it, he might be able to do it without undue pressure?—I am not able to grasp what you mean.

5251. I understood it was not a good thing that the engineman should do it, because having to do that as well as to wind, it threw too great a responsibility on him and was more than one man could do?—Yes, that is what I mean.

5252. I can imagine that may be so in a big mine, but where you had a small mine with a small number of men to raise and lower he might have time to attend to the two if he were competent?—Yes. Under certain conditions it might be necessary, but where there is a large mine with a small pit or sinking pit this man appointed to look after ropes and headgears and the rest of it might look after the little as well as the large.

5253. You point is that it is essential it should be done by a thoroughly competent man who has time to do it—Yes.

5254. With regard to the sanitary condition in the mines, how is that in the Furness district? The last witness told us it was not so very bad?—It is very good at the mine I am employed at. I would suggest that our manager's system should be carried out in most mines, and that is to disinfect each shaft-foot or bottom with hot lime occasionally. This is frequently done at our place, and it has good effects.

5255. Lime is sent down from the surface?—Yes.

5256. What do they do with it afterwards?—A man is sent down with the lime and he applies it to the walls and a portion of the main roads.

5257. Wet, or dry?—Dry, in all the gutterings.

5258. Take it out of a bag and scatter it?—Yes.

5259. Does that diminish the smell?—Wonderfully, and it does not allow an increase of microbes.

5260. How often is that done?—I could not say, but frequently.

5261. We know the disinfecting effect of lime. It is largely used in agriculture for animals; when they are sent in trucks they disinfect them in that way. How much lime does he use each time?—I could not say the amount, but I know that he puts a fairly good dose round about.

5262. How big is the box in which it goes down?—He does not fetch it in a box; it is in buckets.

5263. How many?—I could not say how many.

5264. It is a small matter. He does not use much?—I have no idea.

5265. It would not be a very costly business?—No.

5266. (*Mr. Ainsworth.*) Whose mines are you working at?—The Barrow Hematite.

5267. (*Chairman.*) How about the ventilation, generally speaking, in your district?—It is fairly good where I am.

5268. If the ventilation gets bad is there difficulty if you take the proper means of putting it right?—No, not a great difficulty. The ventilation in our mines is affected by the atmospheric pressure. In the summer months especially we suffer a little in some workings. There are certain days when we are hardly able to work. On other days it is fairly good—exceptionally good.

5269. Do they light a fire when it is not good enough? Do they use a fire to cause ventilation?—I have seen fires lit in the bottom road.

5270. Do they act?—Yes, very good at times.

5271. Can you offer any suggestion as to any amendment of the law about ventilation? At present the law is that a mine shall be kept properly ventilated?—That covers the whole thing, if the mine is well ventilated.

5272. You are inclined to urge greater attention being paid to that point?—Yes.

5273. Have you seen the men suffer much from want of ventilation?—I have seen men suffer materially from want of air.

5274. How does it affect them?—It affects their limbs in some cases; in other cases their heads; in others their stomachs.

5275. How long does the effect last?—Probably a day or so. I have seen some clear it off very sharp. Younger men full of vitality would clear it off very sharp.

5276. I suppose some men suffer in a peculiar way from want of oxygen, and some more than others?—It affects some differently altogether. Up to recently I never knew what it was to be affected by the fumes of dynamite, but I am now seriously affected by that in the wind and in the head.

5277. That question of ventilation is receiving our careful attention, I may as well tell you. You think that the present regulations are enough for explosives?—I am satisfied with the present conditions as regards explosives.

5278. Would you make the use of changing-houses compulsory?—Yes.

5279. You advocate a sufficiently large room and a sufficient supply of warm water?—Good fresh water.

5280. You do not know of any charges made for the use of those things in the Furness district?—Not directly. I think there is one mine that does, but it is a voluntary gift; it is not a charge.

5281. And then only in one mine?—One mine, I think, but I would not be positive about it.

5282. Is there any voluntary gift where you are?—Only at Christmas. We give a little present to the changing-house men. They are old miners, as a rule, and we make them a little present. That is voluntary.

5283. You would not suggest that should be abolished by Act of Parliament?—No.

5284. Subject to that you do not make any regular payment?—No.

5285. You also want an increase of the staff of Government inspectors, and that they should be practical men?—Yes.

5286. When working to the rise you would like the stull or box system?—Yes.

5287. So that men have something to stand on firm?—Yes.

5288. The Committee are aware of it, and have seen the system in operation. We need not go into it. With regard to ambulance, what work is being done by the ambulance people? Does the St. John Society come up here and instruct people? There is a class in your district, I understand?—Yes, and we have an instructor and an ambulance brigade for boys.

5289. The mines are provided with ambulance conveniences at the top?—Our mine has a good supply of appliances, and also a good supply of ambulance men.

5290. How many have you got who have passed the class and got a certificate?—I could not give you any accurate account, but I know several. Our storekeeper and lamp-keeper are always at hand, and our second manager is really the instructor, or was up till recently.

5291. What is done with the man who gets rather a bad accident in your mine, such as a leg broken, or something of that sort? Where do they take him to?—If an accident happens in our mine those associated with the accident bring news to the office, and the stretcher is at once despatched to the place of the accident.

5292. Where is the stretcher kept?—In the washhouse, close to the office, in close proximity to each pit.

5293. That is sent down the cage at once?—It is sent down to the place of the accident, and the man is removed to the office or washhouse, and attended to; and if it is considered his wounds are serious he is despatched to the hospital by the ambulance cart.

5294. Is the washhouse a place where a man can be examined satisfactorily?—There is ample provision for everything in that respect.

5295. (*Mr. Redmayne.*) With regard to the inspection of machinery, you advocate that. Would you advocate the competent person who is appointed by the manager being appointed in writing?—I am not exactly able to grasp you.

5296. I thought you advocated the inspection of machinery by a person apart from the winding engineman, or the person who inspected ropes?—The ropes, headgear, patent hook and patent ring.

5297. Would you include the winding-engine?—No; I would not have the man who inspected the outer part or the pit top. I would have the engineer to look after his own business.

5298. Would you have an inspection made by the engineer of all these parts, ropes, detaching hook, and all the machinery?—One man might be qualified and able to do the whole, but we have a man set apart for that business, and after 30 years' experience under the Barrow Company I have never known an accident.

5299. I am just with you. That is what I am driving at. You would have a person set apart to do all that?—Yes, decidedly.

5300. I agree with you, but would you not favour that person being directly appointed in writing by the manager?—It is not absolutely necessary.

5301. You do not think it is necessary?—It is not absolutely necessary.

5302. What I mean is this. Supposing something goes wrong with the machinery and the Inspector of Mines comes along and says that machinery has not been properly inspected, and asks "Who does it?" the reply is, "Oh, So-and-so," and then you take proceedings against that man and say he is not competent, but the manager says that is not the person who is competent, there is another person, and he changes his ground. I mean that there ought to be an individual who can be got at if anything goes wrong with the machinery. If you have a person appointed in writing you are certain of him. Would you advocate that?—A condition of that character would not exist at our place.

5303. I have not the least doubt, but it might exist at some places. Never mind that, I will not pursue it. Do you advocate the inspection of the working places underground before the men are admitted to them, by a competent person?—Not all round, necessarily. There are certain places sometimes which need special inspection. At present, with us, we have a certain portion of our mine which is inspected every morning before a man is allowed to pass a certain place.

5304. Because of apprehended danger?—Because of a certain leakage of gas, and all the workings in that vicinity have to be looked after and reported by this captain or man in charge.

5305. On account of gas only?—And workings, and timbering, and that sort of thing.

5306. Might not the places that are not inspected, and which you considered safe, be unsafe once in a while? Your inspection is restricted to certain parts of the mine, is it not, because of gas?—Yes. That is before the men go to their work.

5307. Might there not be a danger from overhanging rock, or weakness of the sides, or improper timbering, against which the men should be cautioned, and at other places?—There are certain conditions under which it would be necessary for the place to be inspected, and if such conditions exist with us there is an inspection of the place.

5308. A place cannot be certified to be safe unless it has been inspected. You cannot tell whether a place is safe till someone has been able to see?—We have a daily inspection by the underground captain.

5309. Before the men go in?—No, after, and sometimes with the men.

5310. Would not that be better before the men go in?—It would throw a lot of inconvenience for one man to go round the whole of a mine and inspect all the workings prior to the men going to work.

5311. Could you not make two or three men do it, allocate to each a district?—Yes, that could be done.

5312. I think the method of working in vogue in your district of Furness lends itself more easily to inspection than other parts of the Cumberland ore district. Yours is the caving-in system—the shrinkage system?—That is the principal standard of our mine.

5313. You are not apt to get places of such undue height as in other parts?—No, not in our mine.

5314. (*Mr. Ainsworth.*) You are always working under timber. You have a good roof over you in most of the Furness mines?—It depends if we are working in an ore drift or a soft pick drift. Then we are under cover of timber, but when we are working in a rock place then we are not.

(*Mr. Redmayne.*) That is my point. They are always under timber.

Mr. Thomas Frederick Cottier called and examined.

5315. (*Chairman.*) You have had 40 years' experience in metalliferous mining?—Yes, but not in the Furness district all the time. I have had about 38 years here, and about 40 years altogether.

5316. And also three years in the lead mines in the Isle of Man?—Yes.

5317. In some mines in the Furness district the men have to walk long distances from the pit to the changing-house?—That is so.

5318. That is a disadvantage?—Yes, especially at the mines that I have worked at. Very often coming out of a very warm place they have to walk perhaps a quarter of an hour, and on a frosty night when the wind blows very keen it goes through the men.

5319. Is that a mine which has two shafts?—Yes.

5320. How is it the mine extends so far apart?—Some of them are close together, but there are not changing-houses at all the pit tops. They are so far away.

5321. There is not a changing-house at each mine?—That is so.

5322. One changing-house acts for more than one?—For two or three mines.

5323. (*Mr. Jones.*) Different companies?—No, two or three pits.

(*Mr. Ainsworth.*) Two or three shafts in the same mine.

5324. (*Chairman.*) I should have thought "at the mine" means that each mine should have a changing-house. It would be hardly enough to put one changing-house for a great many mines, at least I very much doubt it. We will discuss the legal aspect of it amongst ourselves, but it would be convenient to have the changing-houses as near as possible to the place where the men come up?—Yes.

5325. Otherwise the changing-houses are not bad in the Furness district?—That is so.

5326. Is the water good?—Only sometimes. Sometimes the men have had to wash in water that came out of the mine.

5327. Is it the sewage that has damaged the water, or what has made the water bad?—What comes out of the mine is never pure where there is dynamite used, because it pumps out all that belongs to the mine.

5328. I do not think I would mind washing in some water where there had been a little remnant of exploded dynamite?—If it was red you could hardly get yourself clean.

5329. It would not be red from dynamite, but from hematite?—Yes, from hematite.

5330. It is the dynamite that surprises me. Surely dynamite cannot soil the water in the sump?—But the dynamite is poisonous if it goes on to the skin and goes into the pores.

5331. I am surprised to hear it. I should have thought it was the sewage in the sump. That would be worse than any amount of dynamite?—There has never been any of that in the mines I have worked at.

5332. What have been the symptoms of the badness of the water? It does not smell from sewage?—No, it does not smell from sewage, but nevertheless it smells, and it is very hard.

5333. What causes the smell?—That is a question. There are different kinds of things used underground.

5334. I thought dynamite was blown into gas completely. There is not much left of it solid?—I should think not. After a blast you will find it will smell for some time.

5335. The air would, but I should be surprised to hear that it contaminated water and made it smell?—Really it is very evident. I have seen it many times.

5336. Is there any other cause that could make it smell?—No, not in the mines I have been used to in the Furness district.

5337. Suppose the water has hematite in it, if it settled the red ore would settle down and leave it clear?—No.

5338. It might be difficult for a mine to get water quite free from hematite?—Yes, but they could provide outside of the mines by making a reservoir for that purpose and other purposes.

5339. Where would they get the water from?—There is always plenty of water about the Furness district.

5340. At all events you think the water should be as pure as it could be reasonably got. You are in favour, where you are working on the rise, of a solid centre?—Yes.

5341. We all understand that?—I would like to say, especially where there is blasting, it requires a ladder road up either side of the solid centre, so that when you fire a shot in the top, whatever side your shot is made you can go up the opposite side, so that nothing comes down as you go up.

5342. That is to say, after the blasting has taken place?—Yes.

5343. Is the ventilation generally good in the mine?—In my experience in some parts it has been very bad.

5344. Is that the whole ventilation of the mine road, or bad pockets?—Some parts of the mine where the air is often bad, and other parts you hardly come across any bad air, but always fairly good ventilation. There are two different kinds of ore; one is blast ore and the other getting with the pick. The latter part is often troubled with bad air.

5345. It is not the blast that makes the air bad?—No.

5346. It is the pick work?—Yes.

5347. Is it the breath of the men?—For the want of ventilation.

5348. What is it that produces the bad air?—That is a question I cannot answer, because there is no air there.

5349. There is air of some sort?—No.

5350. There is gas of some sort?—I have seen it myself that we could not get a candle within many yards of where we had to work.

5351. I have seen a place where you could not light a candle, but there is plenty of air. There is too much of it; a lot of air, and gas too?—I do not follow it.

5352. I think I could make it clear if I had half an hour with you. Do you mean a current of air?—Yes.

5353. The part where the blasting is carried on is not so bad as the part where the hand labour is?—No.

5354. We want to get at the reason of that. You cannot give any reason apparently, except to say it is a fact?—Because the air holes are not kept open.

5355. They are not kept more open where there is blasting than where there is hand work?—Simply because there are often large lumps of stone. There is a certain amount of circulation which goes through them, and it is not so in the other parts of the mine, because it falls solid and no ventilation can go through.

5356. In case of accidents you wish the workmen's representative to have a right of entering the mine and examining the workings, and that the workings should be left alone till the inspector can see them, I suppose?—Yes.

5357. And you wish the workmen's representative to have a right to appear at the coroner's inquest?—Yes, I think the workmen's representative ought to.

5358. Have you known a working man representative present himself at a coroner's inquest and be refused?—I do not know that I have.

5359. I do not know of many such cases. Coroners generally welcome any person who comes from one of the men who has been injured. In this case it would be a death?—He would have the power to turn him away.

5360. The coroner has power over his court. I do not suppose you would wish to interfere with the general power of a coroner over his court?—No.

5361. If you did, people might talk till Domesday and nothing would stop them. You would leave some power to coroners, I suppose?—Yes, but I have thought sometimes that the coroner has rather too much power.

5362. You have been at inquests?—I have not been at any, but I have known about them and read about them, and I have been near where they were.

5363. Could you mention a case, never mind the name of the coroner; just give an instance of what you mean, of what he did that showed that he had too much power?—I do not think I can give you a case.

5364. Generally speaking, is there a feeling that the coroners as a general rule do their best to bring out the truth impartially and fairly?—I would not like to say anything about that.

5365. After all, is not that enough for us as laymen, if that is substantially done through the country?—It may be.

5366. And even if they have power, is it not sometimes exercised quite in favour of the workman, to get out the truth?—Yes.

5367. You would like the people who come down to inspect metalliferous mines to be men specially acquainted with the nature of the work?—Yes, just so, and more than that.

5368. Do you maintain that it is impossible for a man, however clever, to be capable of inspecting both classes of mines, coal mines and metalliferous mines?—No, I do not think so.

5369. You think that one man cannot understand both?—No.

5370. At all events the great point for you would be that they should be practical workmen, thoroughly acquainted at all events with the metalliferous mines?—I would like to say that inspectors ought to visit the several mines without the knowledge of the manager.

5371. How is it possible for an inspector or anybody else to get down the mine to the bottom without their knowledge?—I do not mean that. It is the time of coming I mean, without writing beforehand.

5372. Is it your idea that the inspector invariably writes to the owner saying that he is coming to see the mine, "Now mind you have everything nice"?—That is my impression.

5373. I have been asking Mr. Redmayne, who is the chief inspector, and I can tell you that that is directly contrary to the instructions given to the inspectors They are instructed that their visits are to be surprise visits?—I do not dispute that. I believe it is so, but nevertheless the other is done.

5374. If it is so, then what you think ought to be done is done. You would be in favour of instructions being given to inspectors to pay visits, without saying they are coming, what may be called surprise visits?—That is what I mean.

5375. We have heard a good deal of evidence about shafts. Were you here this morning?—No.

5376. I can only tell you that we have gone at great length into the question of shafts, and the point you are suggesting here is that no shaft should be without two ways out in case of a breakdown. That means in addition to the cage-way?—It means a ladder road in addition to the cage-way.

5377. A proper ladder road with resting places?—Yes, and a landing at every ladder.

5378. (*Mr. Lewney.*) In reference to the question of ventilation, this arises in your opinion in a large number of cases from the fact that the airways are allowed to become too low?—Yes, just so.

5379. It is really a question of cost?—It very likely will be. I should think it will be.

5380. There is no insuperable difficulty in keeping up these roads to allow circulation?—I should say not, but sometimes we put in a pillar of wood to try to keep open the airway, and after a while that wood is flattened up together, so that they cannot keep it open. If we could find some way of putting a pillar in in such a way that a man could go on his hands and knees to the end of it and keep it open, that would serve the purpose.

5381. There are always means of having these places re-opened?—Of course, that is so; there are always means, certainly.

5382. After all, it is only a question of cost?—Yes, no doubt.

5383. In your opinion would it not meet the case if the Commission advised the Government to insist upon a standard of ventilation?—Yes, it ought to be done, by all means.

5384. (*Mr. Redmayne.*) You advocate a special class of Government inspectors namely, inspectors who are metalliferous mining men only?—Yes, because there is a lot of difference between the iron ore mines and the coal mines. There is no comparison between the two.

5385. Do you not think it possible for one man to deal with them both?—I do not know about that, whether it is possible or not.

5386. Part of the examination of the junior inspectors nowadays is that they shall pass in metalliferous mines?—If they have no practical experience of the iron ore mines how will they know about it?

5387. He must have it, otherwise he cannot pass the examination?—That would be only theory, perhaps, and the theory does not go very far.

5388. Would it meet your views if it was insisted upon that the examination should be of an intensely practical character, and show that the man had practical knowledge of metalliferous mining as well as the other class of mining?—Yes.

5389. For the purpose of administration it would be awkward to put an inspector down at two metalliferous mines with 40 or 50 coal mines near by and say to him "You must not go to those." The man would have a very happy time of it?—That is so, but there are plenty of ore mines about the district of Cumberland and Furness.

5390. There are some districts where it is not so?—That is so.

5391. It would be better to have a thoroughly sound knowledge of mining in general?—That would serve the purpose, no doubt.

(*Mr. Redmayne.*) I quite see your point.

5392. (*Chairman.*) Supposing the Government inspector inspecting the metalliferous mines was a thoroughly competent practical man for those mines, I should have thought it would be an advantage if he was in addition an expert in coal mining, because he could compare one with the other and make suggestions from the one to the other. You do not want him to be a man who is able to bring down most ore with a pick: you want him to be an intelligent man understanding the difficulties?—Yes.

5393. If he thoroughly understood coal mining, too, he would be able to make suggestions from his experience in coal mines which would be useful in metalliferous mines?—He would be no worse for it.

(*Mr. Redmayne.*) May I state on the Rand in South Africa the Transvaal specially sent to England two years ago to secure a colliery manager particularly for the management of a large group of mines in order that they might have the benefit of his special coal mining knowledge, both for the working of the flatter deposits and to bring about a better state of ventilation.

5394. (*Chairman.*) It comes back to this, you must trust the Secretary of State's department, which is a responsible department, to take care that they appoint men who thoroughly understand the work. Provided they do that, the more they know the better?—That is so.

At Seascale, Cumberland.

TENTH DAY.

Saturday, 22nd October 1910.

PRESENT:

SIR HENRY HARDINGE SAMUEL CUNYNGHAME, K.C.B. (*Chairman*).

RICHARD AUGUSTINE STUDDERT REDMAYNE, Esq.
JOHN STIRLING AINSWORTH, Esq., M.P.
RICHARD METHUEN GREAVES, Esq.
RICHARD ARTHUR THOMAS, Esq.
ROBERT THOMAS JONES, Esq.
WILLIAM LEWNEY, Esq.
URIAH LOVETT, Esq.

T. E. BETTANY, Esq., *Secretary.*

Mr. JOSEPH WILLIAM NOON called and examined.

5395. (*Chairman.*) What are you by occupation?—A sett maker—paving stone cutter.

5396. At what quarry do you work?—Threlkeld Granite Quarry, in the Keswick district of Cumberland.

5397. You have been deputed to come here by the Cumberland Branch of the National Union of Quarrymen?—Yes.

5398. How many men roughly would you be probably representing here, do you think?—Our own branch consists of about 80 or 90 members.

5399. And you can give us evidence in respect of those 80 or 90 members?—Yes.

5400. There are 200 men working at the quarry?—Yes.

5401. But the 200 men are not all in the union?—Some are organised workmen.

5402. The others are not?—No.

5403. You directly speak for 80 or 90 who are organised, but your proposals would be for the benefit of all?—Yes, for the benefit of all.

5404. Your first point is that the inspection of quarries under the present system is insufficient?—Yes.

5405. Can you give us some idea of the reasons why it is insufficient, and the respects in which it is insufficient. Describe to us what more you would like to have?—In the first place, we have about 365 quarries in the Newcastle district. This will give you some idea of the extent of the requirements of inspection so as to have each of the quarries visited.

5406. In those 365 quarries do you mean 200 men work?—That is the number of quarries in the district.

5407. How many men work in the 365 quarries?—That, of course, is given in the report.

5408. Roughly speaking?—Somewhere about 4,000 or 5,000. They are over 20 feet deep. It would require, even to get one visit a year, that one quarry should be visited each day of the year, including Sundays.

5409–10. (*Mr. Lovett.*) You mean that an inspector could only visit one quarry once a year if he took one each day, including Sundays?—Yes. I have no note regarding the visits given to the quarries, but it is quite evident to us that the visits of the inspectors are quite inadequate. I would venture to say that not more than two visits a year are put in by an inspector at these quarries.

5411. (*Chairman.*) And is it only one inspector that visits 365 quarries, or more than one?—To our knowledge, they are generally visited by one of the inspectors.

5412. What is that gentleman's name?—Mr. Leck.

5413. The present inspector here?—Yes.

5414. Your point is that he cannot do such an extended mass of work?—It would be impossible under the circumstances.

5415. Can you describe the result of his not being able to do that. Before you answer that question, let me ask: I suppose some of them are very small indeed, little holes in the side of the road from which a highway authority gets its stone—those come within the definition of quarries?—The Quarries Act?

5416. Yes?—I do not know how many of the quarries are notified under county councils.

5417. Some of them might be mere holes in the road, as we see passing occasionally, where some stone is got?—Yes.

5418. It would not follow that all of them were substantial large quarries?—Quite so. These officials, by putting in such a small number of visits, are not likely to come in contact with the various forms of danger that exist from time to time; and even then it would be quite impossible to expect any real effectual results of a visit by an inspector who, if I may be allowed to say so, is button-holed at the office in the works, and led round the works and off. We submit that in order to get into close touch with danger an inspector must necessarily come in contact with the workmen directly.

5419. Your view perhaps would be rather this, that you hardly need, for some of the work of inspection, an inspector of very high attainments—scientific attainments—but you rather want someone who is a thorough practical quarryman?—Decidedly.

5420. What are the chief dangers to be looked at in a quarry? For instance, if you were going to inspect a quarry to see whether it was safe, mention some of the points you would think would be important to look at carefully?—In the first place, quarries vary considerably according to the position and the way in which the rock is deposited. In some quarries it differs considerably. There are quarries in Durham where the rock stands perpendicularly—whinstone quarries—and in Northumberland also. In Cumberland we have a rock deposit in various forms, chiefly on the slide. They want to come in contact with the workmen engaged in the quarrying of this rock.

5421. What I want to know is, supposing you were going to a new quarry to look at it, what are the points you would chiefly consider important to look at. There is machinery and things of that sort. I want to know what you think are the most important points an inspector should look at. What would you do first if you went to inspect—would you see whether the rock was formed vertically or horizontally? When you got there what would you proceed to look at?—I should certainly get into touch with those engaged at the face of the rock.

5422. When you got into touch with them, what would you look at?—I should find out on what department of the work they were engaged, and I should, in fact, make a close inspection along with those workmen, undoubtedly, as it varies considerably in our quarries. There is a good deal can be advanced by a man who has by practice got accustomed to it.

5423. You would hear what they had to say?—Yes.

5424. Take your own quarry; supposing I was coming to your quarry, and I said to you, "Now, Mr. "Noon, what do you think are the chief dangers to the "men here?" What would you say they were?—If I was questioned in that way I should say certainly I was in a position to refer to various things, not exactly the quarry face, but other things such as the tramway, etc.

5425. Well, take the tramway?—For instance, we have a locomotive coming along without any instrument of warning, and other sources of danger, which might be notified just on the spur of the moment.

5426. I see your general reasons, but I want to come to detail. Take your own quarry; what are the things you would suggest which might be done which are not done at present?——

5427. (*Mr. Lovett.*) Have you had any particular instances of danger coming under your notice, say, where a more frequent inspection might have prevented accidents. Could you give us any instances?—Well, yes, I could point out cases where compressed-air drills are being placed in elevated positions at the quarry face and men working immediately underneath. There have been accidents from that.

5428. (*Chairman.*) That is a second instance. Can you give us another or two either in your own or other quarries?—Then we have the various systems of blasting operating in the different quarries; the regulating of blasting hours and various systems introduced by the men, probably for convenience in some cases—they insert the explosives in various ways, and we find, without getting into touch with the men in the actual operation, it would be impossible to conceive the ideas that the men have.

5429. For instance, the present methods of blasting are not satisfactory according to your view?—No.

5430. Mention some practice which has come under your notice where it is bad?—I am prepared to submit this, that they are far from being satisfactory in regard to blasting. I might refer you to whinstone quarries in Northumberland where the blasting is carried on under most dangerous practices—for instance, the irregularity of blasting hours.

5431. The stones fly about and hit people?—The blasting is carried on by a system that is irregular. For instance, men scarcely know when another man is going to shout "fire."

5432. Have accidents occurred?—Yes.

5433. A large number?—A small proportion—they are quarries scarcely within the scope of the Act, perhaps 20 feet.

5434. Anyone killed?—Some instances.

5435. In those cases the inspector has gone there?—Necessarily, in order to inquire into the circumstances.

5436. Have the cases been taken before the coroner?—Yes.

5437. Have they been reported as due to the irregular method of blasting?—I am not particularly in touch with the result of the inquiries, but we know the nature of the accident and the cause of death, but as to how the inquiry went, I am not fully in touch with.

5438. It is important, because if the accident was not caused by irregularities in blasting, the question would then arise, what was it due to and what is the remedy? For instance, there may be improper shelter in such cases?—We certainly believe that there is improper shelter for this special blasting.

5439. As a matter of fact, is quarrying in these 365 quarries a very dangerous occupation—are the number of deaths and accidents very large?—About the average proportion. According to the last report out the larger percentage is due to tram-lines.

5440. What is the percentage of accidents, both fatal and non-fatal, in the Newcastle District?—I have not the report, probably Mr. Lovett has it.

5441. I suppose you have heard that the Secretary of State has announced his intention to appoint some working-men inspectors?—Yes.

5442. If that were done, and you had enough of them, that meets the very point you were driving at?—Yes, to some extent that would meet the requirements.

5443. It is the type of man you want?—That is by practice and experience.

5444. And supposing competent men of thoroughly practical experience are appointed, that is just the type of man you want?—Yes.

5445. If there was a sufficiency of them I suppose that would meet the point you are driving at?—Well, it ought to do, to some extent.

5446. There is another point: suppose also the same rule were made for quarries as already is in force in coal mines, so that the men in any quarry would have a right to depute two of their number to go regularly through things and look at them—would that do you much good? I see a difference, because a quarry is open to all the world—still I should like to know whether that privilege of appointing two of their number to go regularly and systematically and look at everything, and report anything they thought wrong, would be valued by your men?—We quite believe that facilities already are granted to the workmen; but there is strong objection to that on the ground that it has to be done at their own expense. These facilities are taken advantage of to some extent, but not to a large extent, by the colliers.

5447. I am not dealing with the colliers because you have not the right in quarries?—Indeed?

5448. You have not the same rights in that matter as the colliers have?—Not with regard to inspection?

5449. Not in regard to appointing two of your number to go round and see everything. You have not got those powers like the colliers have. I ask you, if the same powers were extended to quarries, whether you think it might be useful?—It might be useful, but I am not prepared to say whether it would be taken advantage of.

5450. It comes to this, that you would rather rely on the more frequent visits of a thoroughly practical Government inspector?—Yes, that is our contention.

5451. Is there danger from the over-hang—I think that is what you call it—in your quarries?—We call it over-burden.

5452. Do great quantities of material come down occasionally?—In our quarries it varies. Of course there are the differences of the deposit.

5453. As a matter of fact are there many accidents from that cause?—There are a good number, fortunately not fatal.

5454. We can look at the figures afterwards. Is it that the machinery is old and antiquated, the cranes, winches, and what not?—We have no winches; we have steam travelling cranes on the floor of the quarry.

5455. In some of the smaller quarries there is a derrick?—Yes, and hand winches.

5456. What is the state of the derricks and hand winches through the district?—In a general way they are quite sufficient to cope with the requirements regarding the hoisting of stones, but in regard to the over-burden, it is very seldom you find them used in removing the over-burden of a quarry.

5457. Is the quarrying industry in your district in a prosperous condition generally?—Yes, it is quite safe to say that.

5458. Very prosperous?—Yes.

5459. In some parts of the country I daresay you know difficulties do arise from the quarries being in a poor way?—Yes; it varies very much according to the deposits on the quarry tops; in some places they are working at a disadvantage because of a deposit of soil.

5460. You think more may be done in the way of precautions to secure safety without any undue depreciation of the industry?—Yes.

5461. I gather, although the state of affairs as regards safety might be improved, it is not what you call in a very bad state—if it is so, tell me. It is fairly good, I should have gathered?—The whole stone trade.

5462. The safety of the men is fairly good in your district?—In our own locality we have a fair reputation for that, but we are favoured with good fortune. We find a number of minor accidents, but they seem to be very fortunate—there seem to be miraculous escapes. We find that as they have developed the quarries have introduced modern machinery, such as pneumatic and compressed-air drills; these have added to the dangers which were previously existing. We find that the noises have increased, and that it requires, as I have suggested, instruments of warning on the locomotives.

5463. Is the state of things very bad from the point of view of safety, or fairly good?—They are a long way from what they should be.

5464. Is the machinery on the whole tolerably good?—Yes. I might say this, too, that if such things as ladders and these accessories to the face of the rock were better inspected it would be as well—there might be more diligence shown by those responsible.

5465. Have you had many accidents from the ladders?—No, but we in general use a ladder with probably one step in the place of four. For the last six weeks I could have taken any member of this Commission to a ladder used in an elevated position in the face of the rock with one step in place of four.

5466. If there are no accidents at all generally throughout the district from those causes, it is a little puzzling to know whether you can say there is much harm, although it is very inconvenient for the workmen?—Yes, but a poor ladder is better than none. It would vary according to the system the man was working under; if working by the day he would probably look after getting it away, but when working by the piece it depends upon the kind of means he has to get to his work.

5467. A good workman likes good tools?—Yes, but it is very difficult to enforce that things should be up to the mark. If these things were liable to a more regular inspection they would be looked after—they do not come under observation often enough.

5468. Our impression is that in your district the number of accidents is not large; your district compares favourably with other places. Then, as regards quarry managers, you would like some certificate of competency?—Yes.

5469. I suppose the real reason you would like one, is that there should be one definite man told off by law who should be responsible, which there is not at present?—That is it.

5470. It is a good deal like this: there may be blame, but it is difficult to say who is to blame unless you have a definite man to look to?—Yes.

5471. That is your main point?—Yes.

5472. Would you say generally, speaking now for the whole of the district which you have come to represent, that the quarry managers have a competent knowledge of their work? Do you think they have?—We find that not only would my remarks apply to our own locality, but in general in the district, that these men are not practical quarrymen.

5473. How do they manage to do the work if they are not practical quarrymen?—Their foremen are certainly practical quarrymen drafted from the ranks of the quarrymen.

5474. The foremen are good practical men?—Yes.

5475. And it is the foreman who directs the operations and says what is to come off here, and what is to be done there?—Yes.

5476. How many foremen of that kind would there be in your quarry?—Two in the quarries.

5477. So that if there were required to be a manager of a quarry it is one of those two men, I suppose, who would be called the manager—it would not be the man above him again?—Yes, the person above those two. They work to a great extent according to his dictates, but at the same time the practical ideas are dependent entirely on the foremen.

5478. So that in a way there are three men in charge, and you do not know which of them is responsible really?—Well, if cases do not come out just for the best it is difficult to say which of them would share the responsibility.

5479. Taking the three together, there must be competent knowledge amongst the three?—Yes, but there is not sufficient knowledge on the part of the authorising person, on behalf of the managing directors generally.

5480. If the two practical men under him supply that want, and the necessary work gets done somehow, then there is sufficient knowledge. First I want to know whether, between the three of them, there is knowledge enough?—Yes; but we find the knowledge is handicapped generally by the inefficiency of the managing director—he handicaps to a great degree the operations.

5481. Impedes, you mean?—Yes, impedes.

5482. By giving directions that are not in accordance with good quarrying?—He probably has ideas with regard to economy which are not altogether suitable.

5483. If you had a certificated manager, do you not think he would have ideas of economy as well?—Yes, but he would see the greater necessity for the requirements.

5484. It comes to this, that if you had one responsible man who was a certificated manager, he would be likely to give greater consideration to safety requirements than to economy?—Yes.

5485. What kind of an examination would you put that man through—a paper examination, or practical examination, or what?—I should certainly put him through the practice.

5486. You are of opinion that the practical side is the important one, so far as safety is concerned, anyway?—Yes, in quarrying.

5487. What have you to say about mess-rooms?—I cannot say anything favourable about mess-rooms, because in the quarries I have been engaged in I have never met with one yet that was really decent. There is no provision made to my knowledge that such things shall be provided. I have reason to believe that better provision is made under the Factory Acts (I may be wrong) for proper mess-rooms and places provided for partaking of refreshments. In quarries where we are exposed to the adverse weather, especially in the winter months, we have little bits of hovels provided which are not respectable.

5488. Are they close to the blast stores?—Yes, sometimes attached to the blacksmith's shop, and within a stone's throw at the outside of the powder magazine.

5489. That would not matter much if they were good places?—They vary according to the location of the quarry. Some quarries are confined for space, but in a general way in the district there is insufficient accommodation of a sanitary description.

5490. You are speaking of the sanitary condition of the mess-room?—Yes. It would certainly horrify any member of this Commission if he was to put his face into some of the mess-rooms that we have provided for us.

5491. What should we see?—A mass of filth, really.

5492. On the table or floor?—On the floor; no tables provided whatever, just simply a shelter made of some zinc or corrugated iron, and probably accommodation for about 20, to cope with the requirements of about 60 or 70 men. These men have to dine at different intervals of the day in order to get its convenience. From the fact that those mess-rooms are provided on a temporary principle, there is no system, of course, for keeping them clean, and no one responsible for them.

5493. Do the men bring their dinner with them when they come?—Yes, in most cases. The quarries are located three or four miles from the chief villages, and necessarily they take their dinners in a basket.

5494. Are there any means of heating it up there?—Just on the open smithy fires.

5495. There are no other means?—Sometimes a stove is provided in these places, but altogether inadequate to cope with the requirements of 70 men. We certainly submit that we should have better conveniences in the way of mess-room.

5496. That is a point we will certainly consider. You were mentioning sanitary conveniences. Is there much difficulty about that?—I do not know that we particularly demand those conveniences so much as the proper sanitary conveniences of the mess-room.

5497. With regard to ambulances, do your members suffer much from small cuts on the hands?—Yes, a very large number. As a member of the ambulance brigade, I have very frequently to go into cases of that kind—some do not come within notification, I daresay—and I certainly submit that we should have the most up-to-date equipment to cope with it.

5498. Do the men use any form of glove or leather on their hands to protect them from the edges of the stone?—Very seldom unless the finger tips are worn.

5499. It is not possible to work with those things?—Not very well.

5500. Are there a good many small cuts, for instance, from sharp pieces of stone?—Yes.

5501. Do they fester afterwards?—Not very much; the stone we are engaged upon is not very poisonous.

5502. If a man gets really a nasty cut across his hand what would he do?—He usually goes to the member of the ambulance who is nearest to him—we have a number of these—and he, of course, renders such assistance as the material permits in the way of dressing the wound.

5503. Have they a sufficient supply of clean ambulance material?—I could not say whether they have or not. We sometimes find a supply and sometimes we find none at all. In a general way we find none at all. Most of the quarries, I am prepared to say, are not equipped with any ambulances at all.

5504. It would be a good thing to have somewhere a box containing proper materials to tie up a wound like that in a safe way?—Yes.

5505. As for the bigger accidents, such as broken limbs, you have seen such cases?—Yes.

5506. What do they do with the men under those circumstances?—I could mention instances where I have had to carry men to the nearest farmhouse.

5507. Have you had an ambulance stretcher to do it with?—No, none at all. I have carried men with fractured skulls from the quarry to the nearest dwelling.

5508. How did you carry them?—Shoulder high, with the assistance of other workmen, not having a stretcher. In one case we brought the matter up before our union branch, and we insisted that something should be provided or we should report it to headquarters—the Chief Inspector. Well, some provision was made, but under particular pressure. Since that time we find that these supplies, such as bandages and such things, have run out, and there is a great deal of indifference as to whether they should really renew the supplies.

5509. You want an occasional inspection of the ambulances to see they are sufficient?—Yes.

5510. Where is the nearest hospital that a man would be taken to if he had a broken leg?—Four or five miles, and the nearest doctor is the same distance.

5511. How do they get him from the farmhouse to the hospital?—Sometimes, for expedition, we have had to get a farmer's cart to the station, and from the station to the hospital by train.

5512. Would not the hospital have an ambulance cart and send it out, and could you not take him straight away on that?—The hospital has not got one; it is connected with the ambulance brigade of the town.

5513. Would not an ambulance cart come from somewhere to the place where the man was temporarily carried and take him off?—Yes, it could be done but with delay.

5514. It is better to delay it under those circumstances, is it not?—It might be.

5515. You want a more regular system?—Yes, subject to inspection. I would like to say in addition, in reference to the ambulances, it is an injustice on the quarries occupied by a smaller number of men that it should require 25 workmen to qualify for the equipment at the expense of the owners according to the rule.

5516. You mean 25 is an unnecessary number?—We believe the number should be modified. There are a number of quarries carried on which are to our knowledge dangerous, and have no equipment at all.

5517. You mean, under the St. John's rule, the number is 25?—No, 25 is in the quarry rule at present. That wants looking into.

5518. Your point is that there should be a well-arranged, and a sensibly arranged, ambulance system connected with each quarry, whereby the men could be treated on the spot or taken away as quickly as possible?—Yes, we desire that.

5519. If the doctor is four miles off, you cannot help that?—No.

5520. There are many houses in which people live where the doctor is four miles off?—Quite so.

5521. The number of broken legs is not sufficient to keep a doctor residing on the spot?—No, but in such cases as public works we really require these ambulances on the spot, as the rule specifies.

5522. Not the doctor?—No, ambulances.

5523. Now as to blasting, you have something to say upon that?—I mentioned the irregularity of blasting was a very dangerous system. It will be very probably thought by some that there has been in a neighbouring parish great irregularity of blasting. I may mention the quarry is closed now.

5524–5. That is dealt with by the model code. You evidently do not know what I mean by the model code—I mean the model code of special rules for quarries proposed by the Home Office. Is it in force in your quarry?—I think it is—the code is given.

5526. Your quarry has a code of special rules, but you are not sure whether it is the model code. I daresay you can get us a copy of your code in force at the quarry and let us have it?—Certainly, I will.* I mentioned that there was lack of shelters for the special blasting. For the ordinary course of blasting from what are commonly called shot or pop holes it is, perhaps, inadequate; but I venture to say it is quite adequate and there is not sufficient shelter for special blasting.

5527. You mean large holes?—Yes, and what is commonly known as cracks are the most dangerous to quarrymen.

5528. Have accidents occurred through the want of those shelters?—We have not a large number of cases which have occurred; but we have had narrow escapes. It depends entirely on the activity of the men in moving about when the stones are flying.

5529. (*Mr. Ainsworth.*) Dodging the stones?—Yes, dodging the stones.

5530. Very dangerous work?—Yes, I have seen some very narrow escapes indeed.

5531. (*Chairman.*) The Chief Inspector points out that really all the points that you have brought before

* Since giving evidence, the witness has informed the Secretaries that the code in force at Threlkeld Quarry is the code of rules in force in the Newcastle district, *i.e.*, the model code of special rules with two slight variations (*see* Codes of Rules in force in Mines and Quarries in the United Kingdom, p. 173).

us are dealt with in this model code except the mess-rooms point. I do not think you have this model code in force in your quarries, but if it was brought in it would meet all your points I think. It says, "A sufficient "number of proper shelters shall be provided, which "must be used by the persons employed." That is the shelter point—there are a number of them. We will look up your code and see how far it conforms to these. As to the question of inspection, that, of course, also must be considered. Is there any point you have in your mind besides those you have specially mentioned to us?—With regard to blasting, there is the conveyance of explosives. I am not certain exactly what rule covers the conveyance of explosives from the magazine to the quarries, but I have noticed some very haphazard ways of conveying these explosives—powder in quantities of 1 cwt. in barrels.

5532. The model rule says this: "All explosives "shall be conveyed from the magazine to the quarry "and kept till used in secure packages so made and "closed as to prevent any escape of the explosives and "any danger from sparks." If that rule were carried out would that satisfy what you are mentioning?—It might do.

5533. It would seem to meet the point you are raising?—Yes.

5534. Then it says: "Every workman or gang of "workmen possessing explosives shall keep them when "not in actual use in his or their own locked box "provided for that purpose exclusively"?—Yes.

5535. Whoever drew that seems to have considered it. The point is whether they are in force. Of course if they are not in force they ought to be?—Then there are premature explosions. There are cases where explosions occur in regard to blasting earlier than what is expected.

5536. How would you deal with those?—In getting into touch with the system that the men sometimes adopt for charging and re-charging holes. I can refer to a case where a man was killed by a hole exploding in the face before he had arrived at a place of safety: the hole had been sprung two or three times half-way up the face—of course the rock was severed in such a way that when the re-charges were inserted there would be deposits of the small gunpowder lodging at a distance from the hole mouth not at all safe when the final charge was put in and lighted.

5537. Then the first shot was not properly charged?—There is a system of springing holes in order to expand the rock to such a degree that it would allow for a larger quantity of explosive.

5538. In putting in loose gunpowder, you mean?—Yes.

5539. (*Mr. Lovett.*) You mean that it had shattered it towards the mouth of the hole, and the men might expect to find the powder about five or six feet from the mouth of the hole; whereas, as the consequence of the springing it had lodged about two feet down, and when the fuse burnt down to that the explosion came?—Yes.

5540. Therefore his calculations were entirely wrong?—Yes.

5541. How about the use of a funnel in a case like that?—It would probably avert such consequences. There are accidents occur from this cause unquestionably.

5542. (*Chairman.*) The question is how we could prevent it by any rule. Is there any other rule you would like to call attention to?—I should like to refer to the importance of workmen carrying out their obligations according to the rules. It is very few workmen that we come in contact with that will commit himself to report certain accidents unless he finds he is doing so behind the shelter of his organised work mates. I have actually been placed on notice of dismissal for insisting upon reporting accidents as a local correspondent of the "West Cumberland Times."

5543. But reporting to whom?—Reporting in the newspaper just the simple facts of an accident that has occurred, as a workman brought into contact with it, as a member of the ambulance brigade, and rendering voluntary service towards the workman. I have simply stated the facts in a small paragraph to the newspaper, and this has had the effect of bringing an inspector on to the scene, as I am informed.

5544. The accident ought to have been reported, but had not been?—Presumably it had not been. The result of it all was that if I insisted upon pursuing this course of transaction I should probably be dispensed with. It is, therefore, very difficult for a workman to commit himself in the way of reporting accidents which might slip the notice of the inspector.

5545. What was the date of that accident?—I should have to refer two or three years back, I suppose.

5546. (*Mr. Lovett.*) I remember the case quite well; it was about two or three years back?—Yes.

5547. (*Chairman.*) The inspector did come at last?—Yes, he was on the scene, but I presume it had not been reported.

5548. (*Mr. Greaves.*) Your statement is that it had not been reported?—No, I presume it had not been, but I could not say for certain.

5549. (*Chairman.*) The gist of the complaint is this, here was an accident that ought to have been reported and it was not reported?—Yes, probably, not in the specified time. It has been suggested that the employers might slip, for a time, giving notice within twenty-four hours. It might be reported two days after, and there is time for it to appear in the newspapers.

5550. Would not the other way be to tell the employer, or the proper official, "An accident has "occurred, I have treated the man"?—There is no system rendering a man under that obligation. His services are volunteered, and in some cases he would have to go miles to find the manager.

5551. When an accident occurs, whose duty is it to let the manager or overman know, so that he may report it? He cannot report it if he does not know of it. Whose duty is it to bring it to his knowledge?—The workman himself, if possible, and if not the doctor could on his behalf.

5552. Did not the workman, in this case, bring it to the notice of the manager?—I am not aware that he mentioned it to the manager.

5553. I mean the workman who was injured?—I could not say in that sense. It would be difficult for a workman to get injured without the foreman knowing.

5554. In this case the foreman knew?—Yes.

5555. (*Mr. Redmayne.*) Are you aware whether the inspector did or did not visit the place before he saw the notice in the papers?—It was not till after it appeared in the paper.

5556. Do you know whether or not the management reported it? Do you know for certain?—I am not certain, but it was suggested to me.

5557. It is supposition purely?—Yes.

5558. (*Mr. Thomas.*) In regard to the notification of accidents, do not the men notify the proper officials in order that they may have the advantage of the Workmen's Compensation Act. That would naturally follow upon an accident?—These men certainly are under an obligation to report an accident if they are able to. The man who sustains the injury does, if not, somebody on his behalf.

5559. It is usual, is it not, in the case of an accident of a more or less serious nature, to make notification to the officials so that he may be put on a club?—Yes.

5560. So that he may receive pay during the time he is off?—We have a club in connection with the works; the certificate would be handed in within three days.

5561. Presumably your view is that if any accidents arise they are not reported——! (*Mr. Jones.*) Not directly?—They might get indirectly reported, and ignored, as we have known them to be.

5562. (*Mr. Greaves.*) You have known them to be?—Yes, even the foreman claiming ignorance. Probably he forgot that such a thing happened, and it had not been notified in 24 hours to the inspector.

5563. (*Mr. Thomas.*) The reason for not notifying the Inspector may be that the accident at the time does not appear sufficiently serious to require notification probably?—There is a big risk.

5564. (*Mr. Greaves.*) Of what?—Even in a slight accident there is great risk if it is not notified.

5565. A risk of what?—There are risks attached to a trivial case.

5566. (*Mr. Lovett.*) The probability of it becoming serious?—Yes.

(*Mr. Greaves.*) I understand what you mean. Of course a sting from a bee has killed many a man.

5567. (*Chairman.*) It is the duty of the man who has an accident to report it?—Yes.

5568. And it is the foreman's duty, under a penalty, to report it to headquarters?—Yes.

5569. That is a better system than allowing reports in the newspapers by members of the ambulance. That would not be suggested as an alternative. If men write to the papers upon points of that kind I do not know what we can do.

5570. (*Mr. Lovett.*) You did not send that paragraph to the paper as a means of communicating the fact that an accident had taken place?—No.

5571. You simply sent it as a correspondent?—Yes.

5572. You had no idea but what the manager knew about it?—Yes.

5573. (*Mr. Jones.*) It was sent as a piece of general news?—Yes.

5574. (*Chairman.*) In this Newcastle district there are four inspectors who go round the quarries. Did you know that?—Yes, we know there are four different men.

5575. It is not only Mr. Leck. Secondly, they pay surprise visits, at least in the sense of trying to come without notice?—We quite believe that due courtesy should be shown to these gentlemen.

5576. It is not a question of courtesy, but it is desirable that an inspector should simply go down without any notice and see how things are getting on, without notice to men, or to masters, or to anybody else, just appearing at the place in the normal state of things, and that is done. It is not always a case of being shown round. You would admit that?—Remember what I suggested, that to get into touch with the workmen more directly, it is very often men are very often handicapped in exposing——

5577. You would desire that an inspector should go to the men and say, "Have you any complaints to make"?—Get as intimate with the men in the discharge of their work as with the employer in his responsibility.

5578. I quite understand the point. With regard to the accidents in the district, the returns show (I have only got fatal ones, but they are very good) in the whole district there was only one death last year, and none in Cumberland. That is good having regard to the number of men?—Yes, in quarries.

5579. I know you do not wish to exaggerate anything. You have given evidence most fairly, but it is not as bad as it is in some other places we can name?—I quite agree we are very fortunate.

5580. Is there any other point you would like to mention. Mr. Lovett will ask you questions presently, to be sure that we have elicited everything?—I do not know that I can advance any other point.

(*Chairman.*) We will consider the question of what is provided in this model code. It does not seem to be enforced in your place.

5581. (*Mr. Lovett.*) With regard to the question of inspection, I take it that you have no desire whatever to cast any reflections upon the present inspector, it is just a matter of wanting more inspection?—Certainly, yes. Personally we have no biassed minds against any individuals, as inspectors.

5582. Do you think it would be desirable that we should have new regulations, or is it, in your opinion, a matter of not carrying out sufficiently, and more stringently, the present regulations?—Yes, a more stringent adherence to the present regulations would be a remedy, with certain modifications.

5583. What is your idea about the Quarries Act. Do you think it would simplify the matter of inspection considerably if we had a Quarries Act as simple as possible, self-contained, with no reference whatever to any other Act, no special rules—perhaps that is going too far, but that it should be self-contained and under the Quarries Act entirely. At the present time, some of the men, particularly those working about the face of the rock, would come under the Quarries Act, but you as a sett maker would come under the Factory Acts. Do you think it better to have a self-contained Quarries Act?—Yes, we are actually in the face of the rock.

5584. Have you any definite idea as to the working of a quarry? Do you think it would be advisable to work a quarry, where practicable, in galleries. At present there is no limit to the height of a quarry? I have one in mind which is 200 feet high. If it was practicable, and could be managed, do you think it would be safer to work that in two galleries?—It depends on the position even of that. Our own quarry, St. John's-in-the-Vale, almost reaches that height. I do not think it would be safe to work that in a gallery.

5585. In one single gallery?—That is, dividing it into two sections, working the top and the other portion of the face below. They could work one half at a time. It would not be safe to work the bottom.

5586. Supposing the floor was half the height of the face, it would be safe enough then?—The safety would depend entirely on the slope behind.

5587. The overburden?—Yes, we have the overburden in the shape of a mountain.

5588. It will gradually rise, of course?—Yes.

5589. The mountain would not be overburden, it would be rock. The overburden would be the loose stones and boulders and dirt?—Yes.

5590. You agree that it should be removed a certain distance back?—Yes, loose material.

5591. Supposing we were framing a regulation, would it be safe to remove the overburden back a distance equivalent to its height. Take a quarry; the overburden at this end might be a foot above the workable rock. Further along it might be 6 feet. Whilst it is reasonable to remove it where the overburden is 6 feet deep, and it is reasonable to say that should be 6 feet back, we could not say that should be moved 6 feet back, because where it was a foot it would be safe?—Yes.

5592. If we removed it a distance equivalent to its depth, do you think that would be safe?—I think that would be ample.

5593. (*Chairman.*) You mean so as to leave an angle of 45 degrees?

5594. (*Mr. Lovett.*) Yes. With regard to blasting, stump holes constitute a considerable amount of danger?—Yes.

5595. Sometimes it is known that 30 of these holes are charged by one man?—Stumps?

5596. Yes.—Yes.

5597. Have you ever seen a case where a man has found it impossible to keep count? They would start to light at one end of the set of holes, and before they have got far they began to go off, and he is engaged lighting the others, and when he has done he does not know whether 28 or 30 holes have gone?—Yes.

5598. Have you known a case of missfire to constitute a danger to the life of men?—Yes. I have known the hole exist for a length of time and be discovered later. Sometimes we have found that one shot has sent a piece of stone and cut off the burning fuse of another, and in the confusion of the counting of the exploding it has been missed. There has been an uncertainty. It has been discovered later.

5599. How have they treated that hole where the fuse has been cut off by a stone?—I have known where it has been burnt down level with the hole mouth, and I have known holes have stemming partly uncovered to get sufficient fuse to ignite within the mouth of the hole.

5600. How do they get out of the way?—It requires an active person to do it, to get out of the road in time.

5601. He is running a great risk?—Yes. These things are done very generally.

5602. Do you agree that it would be a good idea where a number of holes are to be exploded that there should be a man told off to count the holes? One man should have nothing more on his mind than lighting them, and some other person should be

responsible for the counting?—He would have plenty to do. He would get confused then, perhaps. I have myself.

5603. Do you think after the firing of holes that the man who lighted them should examine and see they are properly exploded before the men return to work who have had nothing to do with drilling, loading, or lighting the holes?—Yes, necessarily so.

(*Mr. Lovett.*) The reason I put this question is because I have known cases where men have gone back to work and there has been an explosion and life has been lost.

(*Mr. Greaves.*) This would apply only where there was a great number. Obviously with three or four there could be no mistake.

(*Mr. Lovett.*) There could, where there were three or four.

(*Mr. Greaves.*) Not where there was one.

5604. (*Mr. Lovett.*) It is a matter which should have attention, because it would only cost about 3*d.* for half an hour for a man to watch the whole proceedings. Now about fencing, this is an important point. All quarries, you think, should be fenced. Have you any idea as to the kind of fence to be used?—There is no description of fence, but we find various fences in existence, some dangerous, some otherwise.

5605. What are the dangers?—A stone wall built without mortar, simply a turf laid along the top, in moist weather growing a quantity of grass in some cases. I have known grass growing on the wall top tempting the sheep on the top of the face. Mountain sheep accustomed to jumping would knock the stone many a time down the quarry. That is where the quarry is working close to the boundary.

5606. You think those loose stone walls should not be allowed?—No, unless they are built with some kind of mortar or other substance to keep the stones pretty well intact.

5607. You said something about certificated managers. You are in favour of them. You think that would minimise the danger to a considerable extent?—Yes.

5608. Then, with regard to the ambulance question, have you had any particular case come under your observation where a man has been mortally injured and you have not had any appliance whatever, bandages or splints or anything else, and where if life had not been extinct you could not have helped?—Yes. I was brought into contact with a case where a man was killed instantaneously. If it had been otherwise, there was no material. In order to bind the man's flesh and bones together I had to get the rags off some of the other workmen.

5609. (*Chairman.*) That would not be so in the present day?—That was under the present rule, where ambulances should have been.

5610. There is no quarry in such a state as that. There is no quarry utterly unprovided with any ambulance appliances, is there?—Yes, several.

5611. (*Mr. Lovett.*) That points to the fact that the inspector should have an eye on the ambulance basket?—Yes. I worked in a quarry in Durham where we had to split the hammer shafts to make splints for fractures.

5612. (*Mr. Ainsworth.*) I think you said the Rule did not apply in quarries unless over 25 men were employed?—That is what is specified.

5613–8. What would you suggest as a minimum number?—I should not like to be unreasonable on any account, but with due respect to all parties, I do not think that five is out of the question.

5619. You would suggest that ambulance provision should be made if you have five men?—Yes. I do not think that is an unreasonable number. If there is less than five they should be responsible to some extent for their own equipment.

5620. You would make the management responsible if there were five or upwards?—Yes.

5621. (*Mr. Greaves.*) One of the dangers is that powder is carried in barrels. These are the ordinary 25- and 56-lb. barrels?—1-cwt. barrels.

5622. You object to it being carried in that?—No.

5623. You said you had observed them being carried in barrels?—Yes, these barrels conveyed in open waggons from the magazine to the works with a steam locomotive in front of the waggons.

5624. They are conveyed to the quarry by the ton in steam locomotives?—Yes. After the men deposit accumulated quantities into a magazine, then it is taken from the magazine to the works by another loco in open tubs. I have known a 1-cwt. barrel brought to the works 2 miles away in open tubs and they have had a barrel of gunpowder in the wagon. If there is a shower of rain they bundle it into a cabin where five or six men have lunch, a mess-room, or a substitute for a mess-room.

5625. You think it safer to open the barrel in the magazine? It must be opened somewhere?—It would be safer to run it into the magazine instead of placing it in a mess-room. The foolhardy act of a workman will injure many people.

5626. You object to the powder, before it is opened, being in the mess-room?—Before it is opened.

5627. You say, "I have observed powder is carried "from the magazine in barrels." You object to that?—No.

5628. As to shelters, you said that they are not proper or sufficient—what there are are not proper, do you mean?—No.

5629. There are not enough of them?—That is in the form of a mess-room.

5630. No shelters?—There are no shelters. I have not met with any for special blasting. There are the sheds we are engaged in in making setts. These are to some extent favourable for the ordinary shot-firing, pop-holes we call them. We have to clear out of them into the open space for special blasting. We have no special underground work that would resist a blow of a stone coming, half a hundredweight. A stone like that a man might dodge, but when it drops on to a rail there is no telling what might be the result.

5631. I wanted to know what you meant by "proper and sufficient."

You said working-men inspectors would meet the requirements to some extent?—Yes.

5632. Would it only meet them to some extent?—A working-man inspector would be accustomed to the habits of the worker.

5633. You qualify it by "to some extent," which I presume means not all you require?—I do not conceive your meaning.

5634. The Chairman said, "Would working-men "inspectors meet your requirements," and you said "Yes, to some extent"?—There are certainly unforeseen circumstances which arise, as I have mentioned, by the thoughtless action of a workman, which it would be impossible for any inspector to come into contact with.

5635. You mean an inspector would not make you absolutely safe?—He could not come into contact with the foolhardy action of another man directly.

5636. You said in your quarry there were two foremen. Are there two foremen over the whole quarry, or is the quarry divided into two with a foreman in each part?—The quarry is in three sections, one foreman supervises two of them and acts as a co-partner with the other, who is responsible for the main portion. He travels backwards and forwards.

5637. Both foremen go over the whole quarry?—Yes.

5638. As to not reporting this accident which was referred to, you do not know whether it was reported or not?—I am not certain; it might have been.

5639. Or it might not have been, so far as you know?—Yes.

5640. (*Mr. Thomas.*) You are not aware of the special rules, the model code which has been proposed by the Home Office but which has not been adopted by your quarries?—No.

5641. You are not familiar with them?—No.

5642. Mr. Greaves has asked you with regard to inspection, but I rather gathered you said you would rather rely on frequent visits from Government in-

spectors than an inspection by two men appointed by the employers?—Practical inspectors.

5643. That would meet your requirements, if you had more frequent visits from competent inspectors?—Yes; it would be the means of relieving the foremen who are the men who might have the responsibility unduly shoved on to their shoulders. It has been told me the system of inspection is unsatisfactory where an inspector was coming once in 12 or 6 months. We claim it to be insufficient for a foreman to have the responsibility during all that time. I do not know why notices for inspections by foremen should relieve the managing director and the foremen giving special instructions to the men to make certain observations of the face, and yet if anything happens sometimes the whole secret is buried with the victim. Another time it might be possible to shove the thing on to an individual who may be innocent or otherwise of the cause, but a more frequent inspection would certainly be a good thing.

5644. I think it is clear. You have a good deal of inspection from the officials, who are apparently competent to do the inspection?—The foremen.

5645. By "officials" I mean foremen, but in addition to that you think if you got more frequent inspections from the Government inspector that would meet your requirements rather than to have an inspection by two men appointed from among your men?—Yes.

5646. (*Mr. Ainsworth.*) How many men are employed?—I am not sure of the number employed outside.

5647. Altogether, I mean. Can you tell me, roughly?—Probably about 200.

5648. (*Chairman.*) In your quarry should you say there is an inspection by some employers' official every day, once in the course of the day, of the parts where the men are at work? Is there any part where a man is at work which would not in the course of the day be inspected by one of the overmen to see it is safe?—We find very often a high quarry, the foreman does not get on to the top, probably he gets on once a month.

5649. At all events he has a look from the bottom?—Yes.

5650. I do not mean detailed examination, but is the work overlooked, each part of it?—The fear of a man is intensified when he gets on to the top. The surface part always appears from the bottom.

5651. I am not speaking of Government inspection, but inspection before working, by a foreman, to see that the men are not doing that which is dangerous. Is there enough of that kind of inspection at your quarry?—It seems fairly reasonable.

5652. As a fact, in the course of the day would everybody's working place be looked at, I do not mean minutely inspected, but sufficiently looked at?—It might be under general observation.

5653. (*Mr. Lewney.*) You suggest that in all cases the manager of the quarry should have a certificate of competency?—Yes.

5654. What do you mean by "the manager"?—I mean the manager who represents the managing director, the firm, the syndicate, the head. We generally find that we have to submit to the dictates of these men whether they are practical or not, these men I refer to as managers and foremen. The manager is probably on the work once a fortnight or a month. In my experience it is generally once a month.

5655. You say that the foremen are good practical quarrymen. Am I to understand that you are satisfied with the management of these men?—The foremen's share?

5656. Yes?—Yes.

5657. You do not suggest that the foremen should be certificated? It is unnecessary, in your opinion?—Their experience would certainly qualify them whether a system of certification was granted or not.

5658. Would it add in any degree to their efficiency to have a certificate?—It would be a testimony, no doubt.

5659. In what way?—A man cannot very well show his knowledge without in some way demonstrating it. If he had a certificate of proof, of course the matter is in black and white.

5660. Would not the qualification of a man rather be shown in the way he carried out his duties as foreman?—Yes. It would take time to test a man on his practical knowledge.

5661. Altogether I take it that you are perfectly satisfied with the class of men you have as foremen?—Yes, I am generally satisfied.

5662. You suggest that the managing director should have a certificate?—Yes.

5663. To qualify for this certificate you also suggest that he should undergo a practical training as a quarryman?—Yes.

5664. That would be quite a new experience for managing directors?—It probably would.

(*Mr. Lovett.*) There is a misapprehension altogether.

(*Mr. Lewney.*) No. I have it in my notes.

(*Mr. Lovett.*) I mean in the witness's mind.

(*Chairman.*) You will be able to clear it up.

(*Mr. Lewney.*) I want to find out whether he suggests that all the overmen in the quarries should be certificated. My idea is that the foremen in the quarries correspond to the foremen in our iron-ore mines. They are selected for efficiency as miners or quarrymen as the case may be.

(*Mr. Greaves.*) We have not heard whether the witness approved of certification or not.

(*Mr. Lewney.*) That is what I have been trying to find out.

5665. (*Chairman.*) I understood he did not desire it. You do desire it for the manager over all, but not for the foremen?—The fact is there is a difference in the two sections as far as competency is concerned. In a general way my experience has been that the foremen are generally men drafted from the ranks of the workers.

5666. Are they efficient without a certificate or not? It is a plain question. Are you not very strong on the point, or do you not desire to express an opinion one way or the other? Will you say Yes or No, or you can take a third course and say that you have not got a strong opinion about it?

(*Mr. Lovett.*) There are three classes of men; the managing director is one, he may or may not go near the quarry. Then they have what we term a quarry manager, he has absolute power to carry out certain instructions with regard to the management of the quarry. Then there comes the foremen. The foremen are practical men. They cannot, notwithstanding that knowledge they may have from practical experience, carry out any instructions or any ideas they have unless they have the instructions from the chief manager, not the managing director. All the foremen are under him. It is the chief manager that the witness wants to see certificated.

(*Chairman.*) Does he want the foremen in addition?

(*Mr. Lovett.*) That is not his point. It is the man who may be pitchforked into a position to manage a quarry with practical men under him, and yet he will not allow them to give instructions which are for safety.

(*Mr. Greaves.*) I am in a fog. The witness said there was a managing director in his quarry and two foremen. He never mentioned this manager on the spot. Is there such a man?

(*Chairman.*) Do you not think we have the point before us sufficiently?

(*Mr. Lovett.*) I think so.

(*Chairman.*) I think we have the witness's opinion, and understand it pretty well.

(*Witness.*) You do not understand the three I have referred to as being responsible for the management or operations. They are the manager, the sub-manager, and a foreman.

5667. (*Mr. Greaves.*) You said two foremen?—There was a third person mentioned.

5668. You said the managing director and two foremen?—There is the managing director, and the two foremen.

5669. That is two foremen?—Yes.

5670. But no resident manager. I am very sorry if I am stupid, but I cannot make it out.

5671. (*Mr. Thomas.*) I gather on general broad lines you would require the responsible head official for the actual working of the quarry, to be certified?—Yes.

5672. But you do not press the matter in regard to the foremen under him who are responsible for the daily routine of the work, and are generally practical quarrymen raised from the ranks?—They are generally practical quarrymen.

5673. (*Chairman.*) Is that what you mean?—Yes, certainly.

Mr. Marshall Jordan called and examined.

5674. (*Chairman.*) You have heard Mr. Noon's evidence?—Yes.

5675. Do you generally agree with it?—Yes, in general. I would like to say a few words in regard to these ambulance appliances.

5676. With regard to the certificate of the chief manager, I will call him, do you think that there ought to be a certificate or not?—I am fully persuaded there should be what I should class as the head foreman.

5677. Is it more for the purpose of having one responsible man to look to that you want it?—That is my idea.

5678. Or is it that it is a question of his capacity you are dealing with? Which of the two is it? There are two different reasons. Which of the two weighs with you? Please just understand the question. There may be two reasons for having the chief manager certificated, one, that you will have somebody to look to as responsible, and his name is written down and known. That we have had evidence about. There is another reason, that he should pass certain examinations. Which of the two reasons is more pressing on your mind?—The first one. We must have a competent man to look to.

5679. I will ask you upon the three points opposite your name, and then I will ask you with regard to Mr. Noon's evidence. First, as to the duties of firemen: that means shot-firers?—Yes.

5680. What have you to say with regard to that?—I am fully persuaded that it is the duty of a fireman, after he has charged and lighted holes, to go back and examine every place to see whether they are exploded or not.

5681. That is the same point Mr. Noon brought out on Mr. Lovett's examination?—Yes.

5682. You agree with that?—Yes.

5683. Secondly, you agree about the dangers of dry walls at the top of the quarry?—I do not think they should be there.

5684. Not if fixed with cement or mortar?—Not on the top. If built with cement from top to bottom it will do, but not on the top. I have seen holes drop out of walls of that description.

5685. You want mortar all through?—In fact, I think a wire fence is ample, of this description. I have seen a wall fall, and I have found the stone 40 feet down the road from the face. There is a great deal of difference. Then in most cases from the face of the quarry to the wall it is on a big slope, the ground is rising. If it was flat it would be different. Where the ground is sloping from the face of the quarry the most danger lies. There are 20 feet, or there may be further, from the edge of the quarry, and the wall rushes and comes down fast and no one sees it. In fact, I have seen it in a most dangerous state.

5686. (*Mr. Thomas.*) You would prefer a wire fence in almost every case to a stone wall?—Yes. I think a dry stone wall is a danger anywhere.

5687. (*Chairman.*) As regards the overburden, does that mean the baring of the rock? It should run away at an angle of 45?—I do not think I mentioned any angle.

5688. Mr. Noon said it should be as wide as it was high. That would make it a run-away at that angle?—That is my opinion. I have come to the conclusion it is dangerous.

5689. You think that all quarries should be inspected irrespective of depth?—Yes.

5690. Would you propose to include as a quarry even a little place at the bottom of the garden, that a gardener gets gravel from, 3 feet deep? You would hardly want that inspected regularly? That would be carrying things to a foolish point?—Yes.

5691. There must be some reasonable limit?—In those quarries where workmen have to make a living I would regard inspection as necessary—where it is necessary for a certain class of men to make a living.

5692. Where there is an occupation carried on to which there is a certain amount of danger attached. That is what it comes to?—Yes.

5693. With regard to Mr. Noon's points, is there anything you would like to add? His chief ones are the mess-rooms—you agree with what he said?—Yes.

5694. And better ambulance provision. Is the ambulance good where you are?—No, I am sorry to say it is not. I believe we have rules in the codes dealing with this question, but I am fully persuaded that we do not get an inspection of this thing.

5695. If the model code is not in force in your quarry, there are no rules about ambulance. You think the ambulance is not sufficient at your place?—It certainly is not.

5696. What is there there?—There is an ambulance, but we scarcely find any bandages of any description for use.

5697. Do you think it would be a good thing to have that looked at from time to time, and somebody specially sent round to see to that matter and report about it?—Where we work at the present time we have a quarry standing near to the office, and we have another standing half a mile away, and we have another standing 2 miles away, and they want to keep all the supply at the office over 2 miles away, and we object to that. We have come to the conclusion that the ambulance basket should be at each quarry, and where the men are there should be a stretcher.

5698. How many men are working at your quarry?—On the whole place I should say 200.

5699. How many of them are qualified ambulance men and have a certificate?—I could not say. There have been several classes. There were 16 in one class and nearly 20 in another.

5700. Probably about 25 or 30 men qualified to do the work?—Yes.

5701. (*Mr. Thomas.*) Have you ever pointed out the inadequacy of your supply of ambulance materials to the management?—Yes.

5702. Are they properly aware that there is not a supply?—Yes, I believe they have been notified. I have happened to be secretary of our branch, and in a fatal accident we had, which Mr. Noon referred to, I wrote to our manager regarding this affair, and asked whether he would supply us with what was necessary at a certain quarry. There were something like 100 men at that quarry. There was nothing whatever there, and I asked him whether he would supply these things. I sent a letter to him, but I heard nothing for three or four days, and then he came to me and inquired what we wanted in regard to the quarry, did we want to manage the quarry, did we want various things. I said I did not know that we did, and I asked him what he referred to. He said, "The letter you sent to me." I said, "I did not think there was "anything but what was bearing on our rights and by "law," but he talked a long time in a strong strain.

5703. Your position is that your ambulance is not sufficient. You pointed it out to the manager, and the manager is meeting you a little with regard to the matter. You think they could meet you more, and if you had more frequent inspections by competent Government officials, that matters would be improved?—Yes, if these things were asked for by the inspectors.

5704. (*Mr. Lovett.*) Have you had any experience of the working of quarries by local bodies, such as the

urban district council or the county council?—Yes. That is what brought this question into my mind, the inspection of all quarries. I find one facing the quarry where I am working. Part of it is a parish quarry and part under royalty. There are four or five different classes of men going to work in that quarry a year under different headings. There are road men. They will quarry a bit, and then the foreman of another section will go with his men and quarry a bit. There are contracts let for widening district roads. At the present time there is a contract let to a coach driver who is not a practical man, although he has the contract. He is quarrying, and sometimes farmers and suchlike men. There is no one to safeguard that quarry in any shape or form in my idea.

5705. (*Chairman.*) It would not be possible to have certificated managers for the whole lot of them?—No.

5706. You want a headman to look to for each?—When these quarries are worked for those employers, it does not matter in what part, they should notify the inspector that they are going to be worked, and it will give the inspector a chance of visiting the quarry while it is being worked.

5707. Secondly, we have had evidence that it is desirable there should be somebody who is responsible for seeing that the quarry is being properly worked?—I am persuaded that there should be a competent man working in the quarry to advise.

5708. A responsible man, it comes to?—He would be responsible, but not to the necessity of a general quarry. I do not think it is necessary to go that far, but a practical man should be in.

5709. (*Mr. Lovett.*) You think where a quarry is worked spasmodically and by different men, it is possible for an inspector to be round the district and drop down there many times, and never find anyone at work?—Yes.

5710. You think it would simplify matters considerably, and minimise the danger, if the owner notified the inspector that the quarry was going to be worked?—Certainly.

5711. (*Chairman.*) I think those are all the points you have to bring before us?—Yes.

Mr. William Cowen called and examined.

5712. (*Chairman.*) Do you represent any association?—The Cumberland Quarrymen's Association.

5713. How many is that composed of?—About 300 men.

5714. What is the stone they work?—Limestone.

5715. Practically you represent the whole industry?—Yes.

5716. They are all in a union together?—Yes.

5717. There is nobody outside it?—No.

5718. Or practically nobody?—Practically nobody.

5719. You have heard the evidence given by the last two witnesses?—Yes.

5720. Does that evidence apply to your case? Does it cover it a lot?—We are under better conditions in some respects, but I should like to emphasize the rudding point, that is the top stuff.

5721. (*Mr. Greaves.*) The overburden?—Yes. I am of opinion if that was kept a certain distance from the face that it would tend to safety. During my experience we have had half a dozen men injured by stuff falling from the rudd. I would suggest that there ought to be a stipulated distance how far according to the height the rudd should be from the quarry face. Some of our quarries in Cumberland are very light, and it would not be necessary to be so far back. We have others about 20 or 24 feet high. In these cases it ought to be a good deal further back than it is. It would tend to safety, at least.

5722. (*Chairman.*) It is rather difficult to lay down a hard and fast rule. Something would depend upon the nature of the overhang?—I think it is a hard and fast rule, in fact I do not want too many rules myself, but I think in cases like this there ought to be some provision made whereby the employer would find it was necessary to have this back.

5723. A rule of this kind, that the overburden on top of the quarry and all loose ground and material shall be cleared far enough back from the edge of the quarry to prevent danger to the persons employed, with power to enforce it, would be sufficient?—We have that in operation now.

5724. Is not that enough for you?—No. I think there ought to be a certain distance stated for the rudd.

5725. It might be impossible to have the distance fixed. Might not other means be adopted, such as a fence, to keep the stones from rolling?—My idea, from the point of view of safety, is this, that as it is absolutely necessary for the rudd to come off before the stone can be taken out, it might as well be taken off to-day as six months hence. It is not going to increase the burden of the employer, because he has that to do, and it would be to the safe working of the quarry to have it done.

5726. In some quarries it might be impossible to take it off in that way owing to the shape of the mountain: you might have a granite mountain?—I am only speaking for Cumberland. We are not troubled with mountains in that way.

5727. We will consider that point very carefully. It has to be considered with regard to all the different districts. What other point is there you would like to mention?—The cabin, as we call it. There might be some attention paid to these cabins, that is the messhouses, as you have called it this morning. I may say that upon the whole we are fairly well up in Cumberland. The owners of our largest quarries at least have provided so well with these things, but there are others where I think a great deal of improvement could be made, and that would tend very much to the benefit of the workmen and their health and safety.

5728. I think that point is fully before us?—The next point is with respect to the 25 men and the provision of the ambulance. I am of opinion that that ought to be deleted, I mean the word 25. I consider that it probably would be difficult to get a rule to cover a quarry where one or two men were working, but all the same, wherever there is any man employed in any occupation where he is liable to an accident, there ought to be provision made for the lessening of the suffering and pain of that man.

5729. I think you may take it that that point is fully before us, and we will consider the whole matter. With regard to the large quarries, the necessity of some provision is clear. With regard to the very small ones, it would be desirable to have a stretcher handy, at all events?—The stretcher is not such an important point as the bandage and suchlike.

5730. I should have thought that it was a very important point, because if you put a man on a stretcher in a proper way you prevent a simple fracture becoming a compound one, and prevent his death, perhaps?—I mean the word to apply to a quarry where there are one or two men. Where there are a good number of men and there are likely to be accidents of a serious character, it is absolutely necessary to have these stretchers.

5731. We will attend to the point carefully. Is there any other point you wish to mention?—With respect to inspection, I am of opinion that we have plenty of rules already if they were carried out better. I am of opinion that it can only be carried out better by a better provision of inspectors.

5732. You agree in fact with what Mr. Noon said?—Yes.

5733. Is there anything else you wish to say?—No.

5734. I did not want to hurry you, but when a thing has been well said you can only say, "I generally agree"?—Yes.

5735. (*Mr. Ainsworth.*) Where are you working, in whose quarries?—I am secretary of the Quarrymen's Union.

5736. You do not work yourself?—No.

5737. You act for the limestone men only?—Yes.

Mr. James Flynn called and examined.

5738. *(Chairman.)* You are the general secretary of the Cumberland Iron Ore Miners and Quarrymen's Association?—No, I am general secretary of the National Iron Ore Miners Association. Originally I was the secretary of the Cumberland Iron Ore Miners and Quarrymen's Association—for years and years.

5739. That is split into two?—Yes. The quarrymen have a separate association of their own, and there are two sections of the ore miners. I had them all, quarrymen, enginemen, iron ore miners and others for many years. I have been secretary now for between 14 or 15 years.

5740. I think you have attended the Miners' International Congress as a representative?—I attended five Miners' International Congresses; the Miners Federation of Great Britain I always attend, and about 13 trade union conferences. I have been to very nearly all, and I have attended two accidents in Ireland, quarry accidents.

5741. A good deal of your work has been looking after workmen's compensation cases?—I attended a lot of the compensation work, but I think the principal part was trying to get the miners more wages. That was the principal thing I attended to, because I always thought that was most essential.

5742. For some years you have advocated an amendment of the Metalliferous Mines Act?—13 years ago I brought it up at the trade union congress. At the Plymouth conference we carried it and it was brought before Parliament, and they appointed a departmental committee to inquire into it. Since then great improvements have been made in our mines, but it has been done jointly between ourselves and the owners. There is a different condition in the mines now to 13 years ago.

5743. You have found the mine owners of the district amenable to reason in that respect?—Yes. Whenever there has been an accident, if it was proved there could be a remedy effected, we have found the owners and the inspectors, and conferred and tried to remedy it, and in a lot of cases we have improved it. In regard to ventilation they have met us. So far as Cumberland is concerned, we have had no trouble if we could find out a remedy and point it out to them.

5744. There has been a slight increase in the number of accidents in this district?—We used to take no account of the accidents, but when the Workmen's Compensation Act first came into force, for the sake of compensation, we began to take keen interest in it, and every accident was notified. You will see in my annual report for 1899 and 1900, of which you have a copy, that that was the first time we took any notice of accidents and compensation. At that time we were working under the heading of the West Cumberland Workmen's Association, which embraced quarries.

5745. Therefore the fact of the Workmen's Compensation Act and the more accurate notice of accidents has caused, to a certain extent, an apparent increase?—As far as we were concerned we got to know the actual number that did take place. We had all accidents reported, fatal and non-fatal.

5746. To a certain extent the increase may be due, if not entirely, to the greater notice that was taken, and is continuing to be taken?—That is so. To the Workmen's Compensation Act probably would be due a great number of accidents in one way. Before that Act came into force you had a man who would attempt to work, but if he had been getting compensation he would not have been working at the time, possibly against himself.

5747. There are several points you would like to bring before us. I will mention a few of them. In the first place, I suppose you would be of opinion that it is desirable there should be alternative ways of getting out of a mine?—Yes.

5748. Whether in two shafts, or else an extra emergency exit from one shaft?—It varies. In some of our shallow mines, if we have not two shafts, possibly we have a way out through a drift in the mountain or some other way through some old places. In our shallow mines I do not think it is as necessary to have two ways out as it is to have plenty of ways into the workings where you have a number of men working.

5749. I suppose you would be of opinion that where possible it is desirable to have two shafts, or else an outlet into some other mine, and that in any case it would be desirable, where an inspector was of opinion that the provision in respect of outlets was insufficient, that that should be dealt with under section 18?—I think so.

5750. That is to say, a demand could be made upon the owners and it could be settled by reference to an arbitrator, if they could not agree?—I agree with that, but I think that the owners would be quite agreeable, wherever it would be possible, to make two ways out. Still I think there ought to be compulsory powers up to a certain number of men, to have two ways out.

5751. What I meant was something rather more general than that, viz., that the whole question, which may be a very difficult one, in case of difference, should be referred in some way to a tribunal to decide exactly what should be done?—Yes.

5752. Upon the whole that would satisfy you?—That would satisfy me.

5753. We were told yesterday by the witnesses that that view would satisfy them?—I think that would satisfy everybody. If you could point out to the owners that it would be to their advantage.

5754. You would call the attention of the inspector to it and have it thrashed out?—I think that could be done.

5755. In certain cases I suppose one could say, where you had just proved the ore and it was very uncertain that there was much ore there at all, and where there was a good substantial ladder in addition to the cages, and where the expense of making a second shaft would be enormous, it might be doubtful whether it would be necessary?—I do not think it would be necessary in that case.

5756. Not in all cases?—No.

5757. What it comes to is that each case must be treated upon its merits?—Yes, exactly.

5758. With regard to changing houses, would you be in favour of compulsory changing?—I would.

5759. You would make every man change?—Yes.

5760. It comes to this, you would punish him if he did not?—Yes, I would see that every man had to change at the changing house.

5761. On the other hand, you would desire that there should be a clean changing house and sufficient room?—A sufficient supply of clean fresh water and sufficient room. To a certain extent 10 or 12 years ago I took up this question, and we wrote to the owners and the Government inspector, Mr. Hedley, at the time; Mr. Leck will remember it, and the owners promised to provide changing houses if the men were wishful. Some men did not require it, but the owners in all cases have provided them where the men have made a demand.

5762. In consequence of that action a good deal was done by the owners?—Yes. I believe in compulsory powers to make every man change. I worked at Hodbarrow for 15 years and we had a beautiful changing house there. I am speaking as a practical miner.

5763. What is the general condition of the ventilation through the district?—Ventilation in some places is very good, but as far as I have ascertained, and for the 15 years I have been miners agent, I have had very little complaint from the miners. The miners usually write to me and I would write to the Government inspector, and he would make an inspection, but I have had very few complaints on ventilation. I do not think in my 15 years experience as a miners agent that I have had six letters from miners complaining of ventilation in our mines.

5764. What would be your view with regard to the certification of managers?—I agree to a certain extent

with certificates for managers, but at the same time a great deal of attention must be paid to the practical part of the management, especially in iron ore mines. We differ from coal mines, we have not the gases to contend with, and therefore in iron ore mines I have found a practical manager far better than a theoretical man, although I believe if he had five years working at the face, and then you allowed him to sit for an examination, it would be better all round.

5765. I suppose the Government would have to have some regard to the existing men?—Yes.

5766. Those who are managers and those who shortly hope to be so, and let them down easily. You would rather apply such a requirement to the future generation?—I agree that the present managers have done their work for years, and it would be a hardship not to allow them to be taken over as they did in the coal mines, and grant a certificate on account of long experience.

5767. (*Mr. Greaves.*) You are in favour of certification?—I am.

5768. (*Chairman.*) Rather to my surprise the other day, it was alleged that the general health of the miners in this district was not very good, but I have not been able to reconcile that with the published figures. Would you say they were an unhealthy or an ailing body of men?—You have a specimen before you, Mr. Chairman.

5769. Of course one swallow does not make a summer?—I commenced to work in the copper mines when I was nine years old. I worked for 15 years at Hodbarrow and in close places. I found the occupation of an iron ore miner very healthy. If you take our old age pension list at the present time—I was on the committee for old age pensions—you will find that a large number of them are miners. They live to 70 and 80 years of age; we have one now who is 100 and he is not like dying yet.

5770. We shall ask the official doctors upon that too. With regard to Government inspection, it has been suggested, and the Government have apparently adopted the suggestion, that in coal mines some of the inspectors should be practical working men. Do you agree with that view so far as metal mines are concerned?—I do, because a practical working man has a great knowledge of timbering working places, and we ought to have additional inspectors. I think that they would do a great amount of good.

5771. I suppose that in some places, particularly in small metalliferous mines and quarries, a practical man is often good enough to do everything that is necessary He need not be a theoretical expert to do that?—No. I should like to see in our district metalliferous mining placed in a department of its own, with assistants, and not linked with the coal, because it is as wide apart from coal mining as any other trade.

5772. That is a big question. If you were to put every different class of mine in this country under a different class of inspectors, you would get a very complicated system?—I do not think so. The coal is quite distinct from ore. With regard to the metalliferous mines, copper, lead, tin, and iron ore are worked practically on the same system.

5773. Still the dangers are very different. Take the question of phthisis in the mines where they have the quartz to deal with. That hardly occurs here, and you have lead poisoning again in the lead mines, which is quite different?—That is right. It may differ there, but that is for a mining expert; that is not for a practical examiner.

5774. Do you not think it would be sufficient if the gentlemen appointed to inspect the mines were thoroughly competent to look after the class of mines they were dealing with, without having a different set of inspectors for different classes of mines?—We have had upon occasions to consider this, and we have made representations to the Home Office and Parliament upon it at different times.

5775. Still if you had practical men who thoroughly understood iron ore working to examine the iron ore mines and look after the men, it would not matter what department they belonged to in London and what department printed their reports?—I do not know what they do with them in London.

5776. That is the very point, if you mean a separate system?—I mean by a separate system, separated from the coal mines. You would not interfere with the system at the Home Office?

5777. I quite understand your point. Have you anything to say about coroners' courts and the investigation of accidents generally?—I have attended 131 inquests since I have been secretary in connection with iron ore mines, top and bottom.

5778. You have had a big experience?—My experience is this, that our coroners have given us every facility. We have had every privilege we could desire to investigate. We have been rather blest with coroners, but I have cross-examined witnesses in all cases; I have had everything that is possible, sometimes I may have gone a little too far, but I have not yet been pulled up by a coroner, and I have had every facility for asking questions and making inquiries. Further, the employers have thrown open every place for inspection, and allowed me to do so.

5779. I suppose it would be desirable in the case of a fatal accident that things should be left exactly as they were when the accident occurred, until the inspector at least had time to see them?—I agree with that. I have worked in different places. Not only have I met with an accident, but I have worked in places where my mate has been killed. We have not touched the place after, and we have had strict instruction not to touch it till the Government inspector has seen it. I have heard of cases where they have altered it.

5780. Do you think it desirable that there should be a rule to that effect?—Yes.

5781. Except in case of necessity?—Unless it is to protect other places, it should be left as it was until the Government inspector sees it.

5782. Have you any view about men riding against men in shafts where you have two sets of men in the cages?—I do not think there is any danger in men riding against men. The engine-drivers, as a rule, are very careful. They are a trained body of men, and I can speak for them as a respectable body of men. I have always found that with care there is no danger. I do not remember any accident with men riding against men, and I have ridden against men time after time. The miners are anxious to get down, especially when on contract, and I have never found danger.

5783. We have had it represented to us that the men were unwilling to ride against men?—I have never found it so.

5784. In the Furness district they do not?—At Hodbarrow we do.

5785. On the other hand, I am bound to say that the chief inspector says it is common to ride men against men in the mines all over the world?—I have worked in mines for years and we have never considered it anything but right, and never objected. I have never heard of any objection in our district. I do not see where there can be any. Both ropes could not break at a time.

5786. A point has been brought before us about timbering the working places. It has been said that it is not safe to allow men to go from their working places into the road to put up timber, but when it was inquired into it turned out to be chiefly a question of pay. Do you think it is an unsafe practice?—The man in the working place ought to timber his own road, because a practical miner does not want to work under another man's timbering. If I was working in a mine I should want to timber my own roadway, and I would not trust to anyone else, because we have had timbermen who are not competent.

5787. In one way or another you get proper pay for it?—Usually you take that in the contract. You take it to timber and work it, and if you have not sufficient price, you must ask for it if you have to put in sufficient timber.

5788. (*Mr. Lewsey.*) You are under a misapprehension altogether as to the point the Chairman is raising. It is not so much timbering the drift as the road back, say, 10 or 12 fathoms from the forebreast.

In the event of timber breaking someone has to replace it and do other necessary repairs. The point is, some of the witnesses advocated a special staff of men to look after that class of work?—They have a special staff of men for that, but if they asked a man to go out of his face to timber that, he would not object if he were paid.

5789. (*Chairman.*) That would not be an unsafe practice?—No, it would be a perfectly safe practice.

5790. Have you anything to say with regard to explosives?—I think in all cases the men ought to have a little to say on explosives. They pay for them and they have a right to buy them where they like, but they buy them from the employer. In the case of bad fuse or bad explosives—I know it is not the wish of the owners to get bad stuff, but it happens that bad stuff is served out—if the men had an opportunity of appointing someone, if there was a complaint, to examine it, I think that would remedy any grievance which existed, and they could make suggestions.

5791. Does not that power already exist? They would be able to go to the employer and call attention to the bad fuse and explosives?—I have had a lot of complaint as agent, and I daresay Mr. Lewney will have had the same, where the man does not like to complain to the employer, but complains to the agent.

5792. Would he not go to the employer?—We write and complain, but in that case possibly we hear no more complaints, and we do not know whether it is remedied till we get another complaint, but if the men had something of that kind, and could ask to have them examined themselves, the fuses or the detonators, that would put an end to it.

5793. I should imagine, having regard to his liability for accident under the Workmen's Compensation Act, that an employer would be anxious to get a good explosive for his money?—I do not think that there would be any objection on the part of the owner. The better the explosive the cheaper it is in the long run.

5794. You may take it with regard to explosives, that there is not a very great deal of difference in quality?—Yes, there is a great difference.

5795. In the quality of explosive?—Yes.

5796. (*Mr. Greaves.*) Do you mean to say that they ought to have the power of examining the explosives in the magazine?—Yes.

5797. (*Chairman.*) I was not under the impression that a large quantity of bad explosives was used. Perhaps I am thinking of coal mines?—Yes, coal mines have a permitted list.

5798. I had forgotten that?—We have not that list. I do not want anyone for a moment to run away with the idea that there are a lot served out in Cumberland, because I do not think so, but to prevent that and remedy it, I think that should be done. I have had complaints that it was the fault of the fumes.

5799. Do you think it would be a good thing to have a permitted list for all mines, and strike out of the list the bad ones. It comes to that. In coal mines we only allow certain explosives that have been tested?—That is so.

5800. It might be possible by a simple test to cut out the bad explosives for all mines. We will consider that point. It would not require elaborate tests which are necessary in the case of coal mining?—No.

5801. Then you are in favour of an amalgamation of all the rules affecting iron ore mines into one Act as much as possible, and let them have one code, so that people could know it?—Yes, I would be in favour of that, that the rules should be all in one Act as near as possible so as not to be complicated. We should then know what we were working under. I think it could all be in one.

5802. You have no women's work in Cumberland, in the mines?—No, none are employed about the iron ore mines.

5803. What about boys?—We have boys but not to a large extent.

5804. Are they employed too young?—I do not think they are here; in fact it is the opposite if anything. Our boys are of very little value until they are strong and robust enough to do men's work, because the nature of the work underground in the metalliferous mines tends that way.

5805. Is there any strong feeling in the Unions about the question of the employment of boys in this district, speaking generally?—No, there is not. They are ready for marrying before they get employed in our mines.

5806. There are 17 in the whole district?—They are very big in Cumberland, and they marry young.

5807. It is not a burning question here with the boys or the women?—The only trouble we have is to find them employment.

5808. (*Mr. Greaves.*) At present there is not much trouble?—No, we have no employment to put boys to till they go into the mines.

5809. (*Chairman.*) Have you anything to say with regard to the ambulance?—I might say we are rather favoured as far as that is concerned. We have a splendid system of ambulance work in our district and all the owners and workmen have joint committees. We have taken it up keenly in Cumberland. I believe that every man should be a qualified ambulance man and we have a large percentage of our men at present who are so.

5810. Are you well supplied with apparatus?—I have never had any complaints. There seem to be bandages, stretchers, and everything. We might make a little better arrangement for an ambulance van, but that is the only thing we could improve as far as iron ore mines are concerned. That is required in order to get them quicker to the infirmary. We have to telephone down to them.

5811. The infirmary sends up a car?—Yes.

5812. That is the best way?—It is at present. In our district it would be an expensive matter. We would have to have one at Frizington, one at Cleator Moor, and one at Egremont. The one at Whitehaven is as near to Frizington as to Egremont, because, geographically speaking, wherever it was fixed, Cleator Moor or Egremont, it would not be convenient for the other places, and we have to depend on Egremont.

5813. (*Mr. Lewney.*) It would not be a big matter for each Urban Council to provide one?—It would be an easy matter, but sometimes you have a few little sky property owners who object to the rates; they think more of them than of their own lives.

5814. (*Chairman.*) It would be desirable in every mine to have it provided, that there should be a horse ambulance to come from a proper place?—I would go beyond that, I would have a motor ambulance; it is quicker. I have taken a fancy to a motor ambulance now. Seeing our owners get about so quickly, I think it would be a good thing to get quickly to the infirmary.

5815. You might have a difficulty in getting a motor over some of the roads?—The main roads are very good. The workmen do not travel much upon them.

5816. But an efficient ambulance should be able to go from some place, properly fitted out, to attend to the case?—Yes.

5817. Have you anything to say with regard to the rules?—The rules are 50 years ahead of the Act of Parliament. We make rules at times, and I daresay there is a code of rules in every mine which is a good bit ahead of the Act.

5818. We ought to let the Act creep up to the rules?—I believe you can do more by a little common sense talking in joint committee than by Act of Parliament, because the object is to protect the lives and limbs of the workmen, and that has been our desire in Cumberland. We have done a lot of good from it.

5819. Leading is better than driving?—Yes, but I have not great faith in Acts of Parliament, because you can drive a carriage and pair through any of them.

5820. With regard to sanitation underground, we have had it in evidence that it is not all it should be?—As far as underground sanitation is concerned, where there is a good supply of water it is better than in the dry mines. I should suggest more chloride of lime and new lime in all the mines. We supply chloride

of lime and Condy's fluid free in our urban district council.

5821. The urban district council would supply chloride of lime free to the mines?—No, but they usually supply the people. The inhabitants can get as much chloride of lime as they choose, or Jeyes' fluid, as they wish for sanitary purposes, but I do not suppose that they would go as far as to supply the owners. They would not go below.

5822. We were informed by one gentleman who attended that a good plan was to take quicklime and scatter that?—Yes, I have seen it used in the mine. They used it at Hodbarrow. Many a time they used to take bags down and send men down with it.

5823. That would be a good thing?—A very good thing. I do not know anything better.

5824. Have you anything to say with regard to winding hooks?—We have a practical engineman coming who has been an engineman for 30 years. I think he will be able to give evidence upon that.

5825. I think I have taken you through all the questions. We have not gone into the points at great length because they are all very well known to the experts. I think you have gone through most of the points before us, but is there anything else you would like to add before introducing your witnesses?—I do not think so. I would like to say that our witnesses have no proofs or written statements, but if you would just put the questions before them and allow them to answer, I think you will find that they will be able to answer them.

5826. Perhaps you will sit here and suggest anything I might put to them when they have answered the other questions?—Yes.

(*Chairman.*) Before we have your further evidence there are four miners from Hodbarrow whose evidence I should like to interpose, so that they can go back.

Mr. Robert Irving, Mr. Timothy Harris, Mr. John Plummer, Mr. Joseph Philips, called and examined.

5827. (*Chairman.*) We have seen the Hodbarrow mine ourselves, which possesses almost a European reputation as a hematite mine, and it is a very remarkable mine. I think you have heard a good deal of the evidence which has been given. (*To Mr. Plummer.*) Is the management of the Hodbarrow mine satisfactory so far as safety is concerned?—It is satisfactory in every respect.

5828. Is there any point you would like to bring forward?—No.

5829. There are several points as to the changing houses. You are no doubt in accord with what you have heard. Is there any point in which your mine ought to be improved or is deficient?—We do not see anything; not a single point.

(*Mr. Irving.*) Our changing houses are everything that could be desired. We have ample room as regards accommodation, and we have both hot and cold water and everything that we require in that line. I do not think it could be improved.

5830. (*Chairman.*) The managers of that mine have a disposition to do all they can?—(*Mr. Plummer.*) There is nothing left undone.

5831. (*Chairman.*) Have you any other point you would like to bring especially before us? (*Mr. Plummer.*) There is not a point I know of.

5832. (*Chairman.*) We have heard a great deal of evidence and I do not know that it is necessary to supplement it. If you have nothing special to say, I think we may say that ends the Hodbarrow case. (*Mr. Irving.*) Our ventilation is all that could be desired. Our mines are ventilated naturally, and if that is not sufficient our employers take steps to help us out, in the shape of compressed air, that is, artificial air. If through blasting operations or any gases or anything arising from the timbers, the ventilation is not as it should be, they introduce the compressed air to the end of the workings. It is a very good idea.

5833. (*Chairman.*) I heard it suggested by somebody that air, when it was compressed, became unhealthy somehow or other. I tell you frankly I do not understand what is meant by that. Have you any opinion about that?—(*Mr. Plummer.*) It is not as good as the natural air, we must all admit.

5834. (*Chairman.*) Why?—(*Mr. Plummer.*) It is of a much warmer nature as it is brought in.

5835. (*Chairman.*) When compressed air is released it freezes, but I do not understand why it is unhealthy?—(*Mr. Plummer.*) It is not so healthy to work in. (*Mr. Irving.*) As regards the health question, there are small particles of oil and dirt at times, and there is great pressure behind, which carries with great facility, and blows these particles into the workings. It is much better than it would be without it. It has a tendency to cool the atmosphere and make the workings much better. If it was not for compressed air there are places which would be unworkable.

5836. (*Chairman.*) It may be a little odorous but it is probably healthy.—(*Mr. Irving.*) It is healthier.

5837. (*Chairman.*) That is what I am inclined to think. In many engineer's shops you get a smell of oil about, but I do not know that it is unhealthy. Eau-de-Cologne would be nicer perhaps?—(*Mr. Irving.*) In very hot places if we require it we mention it and it is put in. We can work better because it cools the atmosphere, and makes the surroundings better in every respect.

5838. (*Chairman.*) You like it?—(*Mr. Irving.*) We like it and ask for it. (*Mr. Plummer.*) There is no stint of anything for the workman. Whenever we require anything we have it. If a place is dangerous our employer takes us out of it, and does not let us go to work. There is no scarcity of timber. (*Mr. Philips.*) There is a point on explosives perhaps. We are a little in advance of the regulations. If we get a box of cartridges we find that the instructions are, in the case of a misfire, to bore a hole at a safe distance from it to explode it. Experience and a little investigation have taught us a different method which we think is far safer.

5839. (*Chairman.*) This is an important point. Will you please mention it briefly.—(*Mr. Philips.*) It is putting less tamping on the dynamite, only tamping it two or three inches, so that in the case of a misfire, you can put a cartridge on and explode the whole lot, without running the risk of drawing a charge.

5840. (*Chairman.*) As you have no gas about there will be no danger in doing that. It would be a dangerous thing to do in a coal mine?—(*Mr. Philips.*) Yes.

5841. (*Mr. Lewney.*) Would you have it inserted in the general rules, that a limited amount of tamping should be put on a charge?—(*Mr. Philips.*) I think it is far better. We have found it to our advantage, especially with dynamite, because of the quick explosion.

5842. Do you find a great deal of difference among the men in your mine, some will put more than others on the charge?—(*Mr. Philips.*) Yes, there are some, but if you go among them you will find that it is because of use. It is an old habit they have, and generally they acknowledge after all that the new system is as well, and more safe.

5843. Did you blast any holes with a little clay round the neck?—(*Mr. Philips.*) You mean with none at all on the dynamite?

5844. Yes, none at all on the dynamite?—(*Mr. Philips.*) Only on the occasion where there has been water in the hole. We have fired them simply with water tamping.

Mr. James Flynn recalled and further examined.

5845. (*Mr. Lewsey.*) I am not sure whether I understood you correctly in regard to the outlets to single shafts. Did I understand you to say that one outlet was sufficient?—No. I do not consider one sufficient, but it depends on the circumstances of the shaft and the place. One outlet is all that you can possibly get, and if you insist on two outlets——

5846. (*Chairman.*) Two shafts you mean?—You mean two shafts, do you?

5847. (*Mr. Lewsey.*) No, two means of exit?—Yes, we have mines where we have that. We have a shaft in a drift at the side as well.

5848. You would agree, in cases where only one shaft was possible, that that shaft should be provided with a sufficient ladder road to allow the men to get out in case of anything happening to the winding gear?—I think where there is only one shaft, there should be a travelling way in them all. It is easily fixed.

5849. You would also agree that in many cases it would probably react on the workmen if the employers were compelled to put down a second shaft?—It would probably close one half of the mines in Cumberland. They could not stand the cost of it. The small deposits may be only a few thousand tons of ore, and if they put that down, the ore would have to remain there.

5850. With regard to compelling men to change at the mine, that, of course, would be conditional upon proper accommodation being provided?—Yes. I am only speaking of changing at the mines of which the past witnesses have given evidence. There was very good accommodation there, and we preferred it to home.

5851. In regard to certificates for managers, do I understand that you would compel all underground foremen to have certificates?—No, certainly not. What I mean by managers is this, every general manager or engineer should hold a certificate. You might have a most illiterate man in an iron-ore pit who was the most practical man as a miner.

5852. It would meet your views if it was insisted upon that every mine should be supervised by a fully-qualified engineer?—Certainly. In the case of the other it would be a hardship on men who could not qualify and gain a certificate. You might have a young fellow of 22 sitting for a certificate who had never worked a mine in his life.

5853. I daresay in your experience you have met very capable miners who would hardly, from a nervous temperament, be likely to pass an examination before a Board of Examiners?—I think one of the best miners I ever met was my father, and I know he could not have passed an examination.

5854. You would not regard it as an essential qualification for a mines' foreman or manager to have a certificate?—Not in that sense, but if we had fiery mines, and gases to deal with I would insist upon both the general manager and the underground manager having certificates; we have not those to contend with in metalliferous mines.

5855. Pardon me putting this question in this way, but there seems to be a misapprehension about the system prevailing in this part of the country, and I want to make it absolutely clear to the other members of the Commission that even at the present day we have capable men supervising all our mines. Do you know any mine in the district where the work is carried on without the superintendence of an engineer?—No, not one. I might say that we have some very practical men at the present time who possibly cannot read or write.

5856. In regard to the inspection of the working places after an accident, I see you say that the owners are always very agreeable and invite you to inspect these places in all such cases. Would you agree that it should be a recommendation to the Government to give it as a right rather than as a privilege?—It is a very broad question. I would either restrict it to the miners' agent, or to a representative who was working in that particular mine, because if you allowed a representative to go from another mine he might go because he had a feeling against the managers. I would make it compulsory in this way, that one of the men working in that particular pit ought to be able to inspect it, or the miners' agent if he wished.

5857. Would you agree that the miners' representative should have that right providing that he was a practical miner?—Certainly, I would see that he was a practical miner.

5858. In regard to men riding against men at the change of the shift, is that a universal practice in your district?—I think it is in large places. Sometimes in small places they are all up and have a chat round the surface and a talk about the working places. They are not very particular in our place, because if they want to have a chat with their pals they allow them to before the others ride, and that puts the others up to anything.

5859. Do you not think that is an advantage even to the employers?—Possibly. In a large mine it would be a big loss.

5860. Why?—If you had 200 or 300 men to let down it is delaying drawing the material.

5861. Supposing the morning men found it necessary to tell the on-coming shift that they required a set of timber, that the place was in a bad condition in any particular part, what possible chance would they have to do that if their mates were riding down against them?—In that case if we propose to have inspectors to visit the places before the men commence to work, that would remove that difficulty.

5862. I do not know that that has been suggested?—I think it has been.

5863. I am suggesting this as one reason?—It would be a very good reason, and I do not think there would be much loss to the employers by it. In our district they are not very strict about it. In this district at present they do allow them to have a talk about their working places before they ride down.

5864. In any pit where they are drawing from two eyes or levels, do you not think it dangerous to have the attention of the top hand divided between the up-coming cage and the down cage?—I would not allow them to draw from two eyes. It is a dangerous practice to use two eyes in that way. The safest way would be to let them finish the bottom eye, and if there is any amount of ore to be drawn from the next, put in snacks or make sure that the bottom eye was not to be worked till they finished drawing from the other.

5865. (*Mr. Thomas.*) What is a snack?—Pieces you put across the shaft and drop into little places to hold the cages. Keps is the right name. We call them snacks in Lancashire, and they vary in name in different places.

5866. (*Mr. Lewsey.*) I am not speaking of drawing ore, but when men are riding. You think that it would be a dangerous practice when men are riding, to draw from two different eyes. Supposing your ropes were set to draw from 50 fathoms and you had men out of that, and you had men at 40 fathoms, you would let the men down and the top cage would have to be lowered down the shaft and brought to a standstill, to enable the men to get on the bottom cage?—The best practice when drawing men would be to make them go to one eye to be drawn from. That is the safest practice. I do not believe in drawing men from different eyes. Many a narrow escape has occurred by drawing them from different eyes. It would be all right from one eye.

5867. Do you not think it would be better to have the morning shift out before allowing the others to go down?—It would be a better practice, I agree with you there, but sometimes the men wait in the workings for the others to come down. In our place the majority are up and talking around the pit yard arranging matters before they go down.

5868. In regard to the purchase of explosives, you do not recommend that the men should be allowed to purchase explosives?—No, but the Truck Act gives them that power. Contractors can buy explosives where they wish, and the Truck Act provides that they must get it at cost price. It gives the men power when they take a working to get that; I do not approve of it, but when the men pay for the explosives they have a right to see that they get the best, and to examine them to see that they are the best.

5869. You want the men to have the best possible explosives at cost price. It comes to that?—Yes.

5870. You would not countenance, under any circumstances, men going up and down purchasing explosives on their own account?—No.

5871. (*Mr. Greaves.*) Is there any difficulty about men refusing the explosives?—If men say they do not like the explosives, and send them back and say, "We want what we had before"?—I am not saying that we are troubled much with bad explosives, but this would be a preventative. Plenty of men would get a bad explosive and would not like to send it back.

5872. Why not?—They may have reasons for not doing so. They may not want to give trouble, and there are other reasons. If you had them properly tested before being given out it would be all right. You might have a man who had charge of a working who would not have the experience of an old man, who would have great experience. That would prevent him using them if he wished to and did not want to complain.

5873. You think he ought to look at them in a store. Sometimes you get a bad cask of coil, and no amount of examination would tell you that till you tried it?—But you would try it.

5874. Examining it in the store would not help you about that?—You could take a piece outside and let it off. There is no danger in examining a piece of fuse.

5875. (*Mr. Lewney.*) It does not follow because you get one bad one that the lot is bad?—No. For one bad coil you should not condemn the lot, but if you got one bad coil they would be careful as the others came out to see that they were right. It would prevent their being distributed. It may mis-fire where the fuse has been folded. That fuse has been distributed all over the place, and it has to be called in in order to get new fuse sent out. The managers do it, and so do the owners. They call it in if they know it is bad, but if there was an examination that fuse would never have gone out.

5876. I can hardly follow you there, because the man that got the first coil out of the barrel might get a coil of good fuse, and the bad fuse might be distributed over a dozen others afterwards?—That might be. It might be where there is a general complaint, until an accident arises possibly nobody complains.

5877. (*Mr. Greaves.*) They would complain of bad fuse if they were working on piecework?—Not at all times.

5878. It is impossible for the management to know that a fuse is bad if the men will not say so?—The management get a barrel of fuse and keep it till the men want it. They send a man to the office to give it out, and he has had no experience, possibly. Miners get it and carry it away, and possibly the first charge of fuse he cuts off causes the accident.

5879. That is unavoidable. If the men will not report it, what can be done?—They are to blame themselves in a great many instances. I agree with you that the men ought to complain.

5880. (*Mr. Thomas.*) Are there charges made in your district for the use of changing-houses?—There is this kind of charge made. They put an old retired miner or someone who is not very strong, and who possibly has worked in the mines, in charge of it, and the men are expected to give him 3*d.* or 6*d.* a fortnight for keeping it clean, but I do not think that it is compulsory.

5881. It is a voluntary contribution on behalf of the men who have taken charge?—Sometimes if the poor fellow was dependent on it I would pity him.

5882. (*Chairman.*) It is collected occasionally at the office?—Yes.

5883. And deducted from the pay on the pay-sheet?—No. I do not think it is deducted on the pay-sheet.

5884. In a very few cases. I do not mean without the men's consent, but it is done in cases.

(*Mr. Thomas.*) That is the exception rather than the rule?—Yes.

5885. (*Mr. Lewney.*) You do not approve of that?—I do not approve of it.

5886. (*Mr. Thomas.*) In regard to two shafts, o two outlets, you would agree, doubtless, that a stringent provision of that nature would jeopardise the enterprise, having regard to the speculative nature of some of the mines in this district?—It would practically kill our industry at the present time. It would annihilate it, because you might get a bore-hole put down and a little deposit of ore, and you might find enough cost to sink one shaft, but if you had to sink two they would never do it. Take a man who has a little royalty. It is impossible for a man to sink two shafts in that piece: therefore it would remain till he could acquire the adjacent royalty.

5887. You would treat each case on its merits?—That is what has been suggested.

5888. I was not clear what was your position as to men riding against men in the shaft. My note is that you see no objection, and you remember no accident owing to that score?—That is so.

5889. From your varied experience you think that it would be unwise to make any regulations in regard to this?—As far as riding is concerned, I do not think it is necessary; as Mr. Lewney suggested, allowing the men to talk on the top together is a benefit, but I think we could leave it safely as it is. There have been no accidents from it, and no danger, and I do not think there is likely to be.

5890. Obviously a rule of that nature applied to large mines would——?—Injure them.

(*Mr. Thomas.*) Quite so.

5891. (*Mr. Ainsworth.*) With regard to separate inspection of metalliferous mines and quarries on the one hand and coal mines on the other, of course an inspector, or indeed anybody, an inspector particularly, would be all the better for understanding collieries. You think that there should be separate inspection for metalliferous mines and quarries?—I think we ought to have a separate inspection for metalliferous mines and quarries. I do not think there is anything to prevent an inspector of a metalliferous mine dealing with quarries, and *vice versâ*, because for 10 or 12 years I was agent for the quarries and inspected them, and I think the one inspector could do both. I think we ought to have a larger number of inspectors, and it ought to be entirely under its own, separate from the coal mines. It might be allocated to allow the quarrymen to have theirs if it was large enough, but I do not think that it is necessary to confine quarries to separate inspectors and metalliferous mines to separate inspectors. I think one inspector could do both of those.

5892. You would have them apart from the collieries?—Yes.

5893. (*Mr. Lovett.*) Are you thinking of this district in particular?—I am talking of Cumberland and Westmorland and the North. I have been through Cleveland, Mr. Toyn and Mr. Hobbs' district. They come under the non-fiery Act. The quarries do not, only the ironstone mines. They got a clause inserted through the Miners' Federation.

5894. Many thousands of quarrymen are employed throughout. You are aware of that?—In Wales and other places there are large slate quarries, and it might be beneficial to have a separate inspector.

5895. (*Chairman.*) Have you had any knowledge of sinking?—Yes.

5896. It has been suggested that it would be a good thing to have hanging in the shaft, not far from the men's heads, a cover to protect things falling on them, but another witness deprecated that, as it would be in the way and a source of danger, and said the best thing was to have the top properly fenced so that things cannot tumble over, and have the shaft properly tubbed down with wood, to prevent pieces falling off. Have you any opinion to offer upon that question?—I thoroughly agree with the last. I do not agree that the covering below would be a benefit. It might be a detriment from getting into the bogey quick,

or where there was a fire. You could not have a covered platform in the shaft. I do suggest in sinkings, and I have had a good many in my time, that it is always necessary to have the shaft, if you possibly can, taken from the top and divided. You want a place divided, and if you divide your shaft from the top and have it cleaned and covered, I think that is the safest plan you can think of at the present time.

Mr. William Eldon (Miner), Cleator Moor; Mr. Thomas Hogg (Miner), Moor Row; Mr. Michael Burns (Miner), Cleator Moor; and Mr. James Dobie (Engineman); called and examined.

5897. (*Chairman.*) You have heard the evidence given by Mr. Flynn here on your behalf?—(*Mr. Hogg.*) Yes.

5898. Do you agree generally with that evidence?—Yes.

5899. First of all, you agree generally with the views that have been put forward by Mr. Flynn?—Generally.

5900. Do you want to add anything to what he has said?—I think there might be a little said about the changing-house question.

5901. Do you wish to say anything about the sanitary conditions?—Yes, there is a point or two on the sanitary affairs I should like to mention.

5902. Apart from those two points is there anything else that occurs to you?—I think you will hear something from Mr. Dobie, who is an engine-driver, in respect of signals.

5903. Is there any other point in addition to what Mr. Flynn has said? He has explained the points clearly to us?—I do not know of anything. Mr. Flynn went through them.

5904. Now, first as to the changing-houses, what have you to say?—Only a few words. It has been advised here that changing should be compulsory. Under certain circumstances it would suit, but under others I am afraid it would not. The miners in this district have been accused of being ignorant and illiterate, but there is one thing still attaching to them and that is that there is a little bit of sensitive nature about them. Some of the miners would wish to change in the works if there was proper accommodation, and if they could have proper baths, but under the present circumstances (I am speaking from my own personal experience) there are certain conditions allowed where a man can wash himself in the ordinary way, but if he wishes to have a proper bath from head to foot, he must exhibit himself before the whole pit crew. We have men who wish to do it but would not expose themselves before the whole community of the works. There is, therefore, a desire to change at home under the present circumstances. I daresay some of the changing-houses are in a fairly good condition, but others are not. If means could be provided where men could bath in a proper manner then I think that they would get the full approval of the whole community; but I doubt whether it would cause any such desire among the workmen to compel them to change under the circumstances which exist at the present time.

5905. In one of the mines I saw some men washing themselves from head to foot; but what they did was to put a towel or cloth round their body when they did so; the cloth got wet, of course, but there was no exposure of the person, and they were washed. Would that not satisfy their feelings?—I do not think so.

5906. I looked at them, and I thought to myself that so far as exposure was concerned, there was nothing indecent in it at all, or indeed anything that I should have objected to myself?—Speaking from my own personal experience, I may say I have used changing-houses for something like 16 or 17 years, and I have never stripped completely but twice in that time, and that was when the changing-house was completely empty.

5907. If you put a cloth or a kind of bathing dress round yourself, is that not all that is necessary?—How are you to get the dirt or iron-ore from the part which you have the cloth round?

5908. In the first place there is not much there, and in the second place I saw them managing it?—You have not worked in an iron-ore mine or you might change your view.

5909. Of course you have more experience than I have, but as I am here to have your views, of course it is natural and proper I should put those points to you and hear your answers?—Well, your idea is plausible enough.

5910. It is not a question whether it is plausible. We have come here to try and see what the case is, and what is reasonable and right to be done?—Certainly. Eventually you would have to expose your person to wash yourself properly as you ought to be washed.

5911. Not more than people do in Turkish baths, for instance, which exist all over the country?—I suggest that shower-baths could be adopted at very little cost, and requiring very little more room than they have at present.

5912. I have seen them in Germany; but there the men went in perfectly naked and exposed themselves to everybody there. You do not want that?—No. If you have shower-baths you would use the same means as have been suggested, put a towel or bathing dress round you and wash yourself.

5913. How would that enable you to do it even with a shower-bath?—You could take it off when you got inside the shower-bath.

5914. In Germany they are not separately railed off shower-baths at all—there are about 20 openly all round the room. The water comes from the ceiling, but they are all exposed?—My suggestion would be this—of course it is only my own idea to some extent, but I have been supported in this by some of the workmen—that a changing-room might be divided in such a manner by these shower-baths running down the centre so that a door could be easily placed on one side and another on the other, and one side used for the red clothes and the flannels to dry, then they could walk into the shower-bath, and after they had washed they could walk out into the other side of the changing-room, and into their clean clothes.

5915. Come up from the pit one side and then get into their clean clothes and go away?—Yes.

5916. (*Mr. Thomas.*) That would be a slow operation—only one man at a time could go into it?—I mean a separate bath for each; it would take but a little more room than it takes an ordinary man to wash in—2 feet of room would be quite sufficient.

5917. (*Chairman.*) That suggestion, we think, is well worthy of careful consideration?—I have brought it before the Commission, and I may tell you I have been supported in it by other individuals working under the same circumstances as myself.

5918. Is there any other point in connection with the changing-houses that you wish to bring before us?—I do not think so.

5919. (*To Mr. Eldon.*) Have you anything you wish to say?—I should go in for making it compulsory for a man to change. The iron-ore mines are very dirty, but I would not make it a hard-and-fast rule to make a man who had a poor mine build it.

5920. The law is that every mine, poor or rich, shall do it—that is the law now—where there are over 12 men. We should not propose to go back from that. You would like that there should not be any charges in connection with it?—I think the man ought to be employed by the employers.

5921. With respect to the sanitation, do you think the sanitation of the mines leaves anything to be desired now?—I agree with Mr. Flynn's scheme. I think he said quicklime should be used.

5922. Either chloride of lime or quicklime?—I agree with that.

5923. (*To Mr. Burns.*) Do you wish to say anything?—Yes, with regard to the changing-houses. At the mine I work at we have a first-class changing-house there, and the looker after the changing-house is paid from the office, and it is the miners' own option

whether they give him anything or not. He gets his salary from the company.

5924. (*Mr. Ainsworth.*) What mine is that?—Moss Bay. (*Mr. Hogg.*) With regard to the sanitation question, I do not approve so much of the quicklime being placed to destroy any smell of any kind that should be caused by human beings below ground. I should like to have it that human deposit be taken from the mine altogether.

5925. (*To Mr. Hogg.*) You think that that should be done in addition to the [quicklime?—If that is intended, that is my meaning.

5926. You want the deposit removed?—Yes.

5927. I suppose you are aware that quicklime not only destroys the smell, but also any deleterious germs?—Yes. I am not objecting to the lime being used in any way. I want the deposit removed from the mine.

5928. Do you know cases in which the deposit is put into the sump?—Yes.

5929. Does it smell there?—I have had experience in mines where there is a watercourse of some length, it may be 100 or 200 fathoms or further—a very swift watercourse—but people using it in extremities and its running to the shaft will cause a very objectionable effluvia right from there down to the shaft.

5930. You have smelt it yourself?—Yes, very strong.

5931. And the matter is pumped up by the pumps?—That is so.

5932. It never causes a stoppage of the valves of the pumps?—No, it goes right up.

5933. (*Chairman.*) Have you any other point to make on behalf of the miners?—I think the only other thing I have to speak of now is the signalling apparatus.

5934. You would like a uniform system of signalling?—Yes.

5935. Anything else? Do you prefer electric signals, for instance?—I do not think so in shaft signalling—I prefer the hammer and bell.

5936. Why?—I think that it is more of a sure signal. There are one or two instances where signals really affect the mine, and that is the down signalling. I think from experience that every stage or eye or level, whichever you care to term it, ought to have a direct signal with a separate wire from the engine-driver to notify anything required by signalling to the individual in charge of that eye or level.

5937. How is it done at present?—Generally with one down signal. I daresay in deep mines it may vary, but I think the usual thing is one down signal.

5938. To the man at the bottom?—Yes, in any part of the mine, one down signal.

5939. Do you wish to say anything about shot firing, particularly with regard to mis-fires?—(*Mr. Eldon.*) We have nothing to suggest, only we are very careful so far as mis-firing is concerned.

5940. Have you any idea about the time that ought to be allowed after a mis-fire before people are permitted to approach the place?—They allow half an hour as a rule.

5941. Is that long enough?—In my opinion, if it does not go off then it will never explode—not unless it is tampered with.

5942. You have never known a fuse to hang more than half an hour?—Never.

5943. I suppose it is important to get good fuses?—It is very important.

5944. In the course of your experience have you used various qualities of fuses?—Yes; twice I have complained; I reported to the overman, and of course he did away with it right away.

5945. He looked into it?—Yes.

5946. And that is the right thing to do?—The proper thing to do is to report it.

5947. Are the fuses much better now?—Yes.

(*Mr. Hogg.*) There was a question brought up when Mr. Flynn was here as regards timbering required by men working in the face outside the regulated distance. I would like to ask you or Mr. Flynn if there is a regulated distance upon any rule or statute?

(*Chairman.*) Not at present.

(*Mr. Hogg.*) Because I think in all metalliferous mines in our district it is an understood thing that there is a staff of men kept for repairing or replacing sets of timber within a certain distance of the face.

5948. (*Chairman, to Mr. Hogg.*) I am told not always. That is sometimes done; in some cases men are taken from the face to go back and do it. If that is done, is that an unsafe practice?—I cannot see where it can be in any way unsafe. It only affects the men financially.

5949. Provided they are satisfied with the pay there is no danger?—There is no danger as regards the work.

5950. (*To Mr. Dobie.*) You are an engine-driver?—A winding engine-driver.

5951. Tell us any alteration you would like to suggest in regard to the law with reference to engine-winding?—I will hand you my notes, and you can go over them if you prefer to do so. (*Handing paper.*)

5952. I will read them and ask you about them. I observe you would not have repairs or alterations in the engine-room during working hours?—Quite so.

5953. On account of distracting the men's attention, I suppose?—That is the fault.

5954. You think that no obstruction ought to be put in the way of the engineman at the pit-head that in any way might obscure his view of the cage, or divert his attention while winding?—That is it.

5955. Is it the practice in some mines to have something in between the engineman and the cage?—It is not the practice, but it is sometimes done, and there is danger in it. I think it should be on the statute that these things should not be done during winding.

5956. How far ought the engineman to see?—He ought to see the cage on the pit top level.

5957. He cannot do that in all cases now?—Most of them.

5958. See the actual cage?—In most of them.

5959. I am told that in coal mines he cannot?—At some places, no.

5960. In most places not, I am told?—There are a good many at which they do.

5961. You think it a safe practice?—Yes, a safe practice.

5962. What is the reason why it makes it safer for him?—The danger is from bringing some obstruction in the way while you are winding.

5963. Do you mean people get in his way?—They obscure the view. I have no objection if you do not see it at all; but you get so used to seeing it, and then something attracts your attention and you might be landed in mischief.

5964. You desire that no person should have charge of a winding engine under the age of 22?—That is so.

5965. We are all conversant with that?—But it is 18 at present.

5966. Then you think that the boilers from which the winding engines get their steam should be washed out at least every three months. Why would you do that?—If you are getting bad water the boilers get dirty, and when the boilers get dirty the danger is the priming, and if you are running perhaps you cannot handle your engine.

5967. The big engines prime, and then you get into a difficulty?—Yes, sometimes when the water gets very dirty. When the boiler is dirty it lumps up, and then goes right through.

5968. What steps are taken to examine the boilers from time to time?—The insurance inspector examines them.

5969. You would take care in that inspection to see that they had been washed?—It is a matter of inspection for safety alone. I am speaking for safety in winding. We should like them washed out. It is generally done, but if you make it a rule you will have a guarantee that it is done. Sometimes it may be running too long.

5970. That washing out makes the engine more effective?—Yes. Sometimes you have good water and then you might get bad water through no one's fault.

5971. Then you would like a spare feed-pump or injector in case of a breakdown?—Yes.

5972. (*Mr. Greaves.*) Do you say they should be washed out at least every three months?—Yes, every three months.

5973. (*Chairman.*) Then you would like a separate return signal for each eye from the engineman?—Yes.

5974. And every eye where ore is brought from to have a separate signal from the man in charge who would be responsible for signalling?—Yes.

5975. Would it be necessary in every case to keep a man in charge even if there was no work being done there?—If there is no work there is no signalling.

5976. The machine might be there?—Yes, but if there is no person there, there could be no person to signal it.

5977. Where there is work being done is what you mean?—Yes.

5978. Then you would like a speaking-tube from the pit head to the engine-man?—Yes.

5979. How about from the pit bottom?—It is no use speaking up through a tube from the bottom; it is too far away at most of the mines now.

5980. Have you ever worked with electric signalling?—Yes, I have.

5981. Did you like it?—We have it now where I am, from the mine top.

5982. How about from the bottom?—From the bottom I do not think it is reliable. It is too easy to make a miss. I would not be so much afraid of the wire as I would be afraid of the men who were handling it. You want to be careful that it rings; whereas with the common signal you pull it up and it is bound to ring. Then again in lifting a little, the hammer is more effective.

5983. You would like an arresting apparatus on all cages where a number of men have to ride the shaft?—Yes.

5984. Where there are more than a certain number of men riding?—Yes; I do not mean one man going down, but where there are men riding in the cage I say there should be an arresting apparatus on the shaft.

5985. Automatic?—When the rope is detached, so that it will arrest the cage in any position.

5986. I thought you meant an automatic apparatus in the engine-house to stop the overwinding?—I did not mean that.

5987. You mean an arresting apparatus in all cages?—Yes.

5988. And you want a w.c. provided for the engine-room?—Yes.

5989. What provision is there now?—There is nothing; that is why I ask for it. I think we ought to have it.

5990. Where have you to go if you feel the need?—Well, mostly we take it home with us; we do not want to keep the place standing, and we have no time to go away.

5991. Supposing an engineman wants to go there, how can he leave his engine to do it?—He has to leave all the place standing and go away. Well, if I go now, it is a couple of hundred yards; it is too far.

5992. According to a proper system you think there ought to be accommodation near. I suppose when the men are not being wound down there is an interval now and then when the engineman can absent himself from the engine-house?—Sometimes, but it is not very often. You are leaving everything free when you go away. Another thing, it is mostly for health. If it was handy there you would use it, otherwise you would not, sometimes.

5993. You mean close to the engineman?—In the engine-house for the engineman that is there on duty.

5994. Do you use the changing-room there?—No, we are practically clean, and change at home.

5995. (*Mr. Lewney.*) I think it was you, Mr. Hogg, who raised this point about the changing-house accommodation. Do you find that, apart from the separate cubicles, which I think you intended to suggest, that the space as a rule is sufficient in the changing-house?—Under the special regulation.

5996. At the present time?—Well, in some cases it is and in others it is not. There is not a regular standard.

5997. Do you think it would be an improvement if a standard was fixed?—I do.

5998. In regard to separate accommodation for clean clothes and ordinary pit clothes, do you think that changing-houses should be in two compartments?—I do.

5999. Do you think it necessary then, in that case, that both of them should be heated?—Decidedly.

6000. And that where separate accommodation was provided for clean clothes it would not be pleasant, in fact it would be dangerous, if there was not some heating apparatus?—It would be dangerous to health—the men's clothes being put off wet would be wet in the morning.

6001. And perhaps in the afternoon?—That is so.

6002. Would you not rather than encourage a system of that sort have the changing accommodation in one compartment, where the clothes could be dried and the men wash and clean themselves, providing there was ample room?—No, I prefer the divisional, on the conditions that both were heated, understand.

6003. That is what I wanted to get at; rather than have one cold and the other warm, you would prefer the one place?—No, I would prefer to have both and have them both heated.

6004. A suggestion was made yesterday that the working places should be limited in size to, say, 12 feet. What is your opinion about that?—It would a good deal depend upon the conditions of the ground.

6005. Do you think 12 feet sufficiently large?—I do.

6006. Would you favour a regulation preventing any one from carrying a working more than 12 feet high?—Yes; I know there has been a suggestion made here, but, of course, as I said before, it rests a good deal on the nature of the ground. Are you speaking of solid ground or are you speaking of robberies. If you draw up a statute that 12 feet must be the height of a working, will that be called in compulsorily in the case of robberies?

6007. You think it would be too large for a robbery?—In a robbery you are apt sometimes to get a greater height.

6008. And is there not more danger likely to arise in the case of a robbery?—Decidedly.

6009. In that case it seems a 12-ft. working would be too high?—Yes, in the way you put it, it might be. But the question is, under the system in which the ore is mined in the Cumberland district, it would be awkward and difficult to put in a statute that a working must not be more than 12 feet high, because as a rule the ground is taken from the bottom first and then taken from the roof secondly.

6010. Have you never considered it dangerous to go up after blasting, when perhaps the hole did not throw its burden entirely? Would you consider it dangerous to go upon a ladder to bar down what was left?—Not under the system in which the Cumberland mines were worked with a practical man.

6011. Would it not be much easier to get at the roof at 12 feet than at 18 feet?—Decidedly it would be easier to get at the roof, but under the present system of working you would have to work off the timber.

6012. What height would you put the timber?—You regulate it 12 feet high; and then, supposing you had 24 feet of ore and 12 feet above your timber, that would allow of your working the remaining 12 feet of ore from the top of your timber, and if you do that, that would be all right.

6013. Is that in robberies?—That is in robberies.

6014. Do you not find it dangerous to have the timber 12 feet below the roof of your working?—Do you mean the main roof?

6015. In the event of a big stone coming down, say?—You know you cannot work a robbery as universally as you can work a solid working.

6016. Why?—Because the circumstances will not allow it.

6017. Instead of working out in one height should it not be worked in two?—Decidedly it could be.

Under some systems I daresay it is, but not, so far as my knowledge goes, in the Cumberland district.

6018. A suggestion has been made here to-day that the quantity of tamping should be limited. What is your opinion about that—should the hole be filled up?—I think from 4 to 6 inches of tamping is quite sufficient.

6019. (*To Mr. Dobie.*) The next point is one I should like to ask you, Mr. Dobie; whether there is in all the mines in the district a down signal, so far as your information carries you?—There is a down signal, but one mostly acts for the two or three places as far as 50 fathoms away from a certain eye or level.

6020. 50 fathoms?—Yes, 50 fathoms; it is too far to listen to make sure, and of course there are mistakes made at times.

6021. There is a down signal in all the mines?—Yes, so far as I know.

6022. Do you know of any mine where there is more than one signal?—I do not know of any where there are more than one. There are some different signals attached to one wire, but there is no safety in that.

6023. That would be misleading?—Yes, we want a separate wire. For instance, there is a case like this: you are winding, you get a signal from the middle eye, or top eye, to stop; you cannot move until you get the signal from that same eye again. If you signal down to see if there is anything wrong, or to get clear, you will only get the signal from the bottom; no one else pays attention to it, and you might stand there for long enough. If you do the best you can to get away there is always a danger, and we want to keep clear of that danger.

6024. (*Mr. Ainsworth.*) From what you say, I understand you are in favour of the hammer signal?—Yes, I am in favour of the hammer signal for shafts.

6025. And of course all the signalling would be from the bottom up to the pit-head man, and he would have to communicate with the engineman?—I do not agree with that.

6026. How would you do it?—Straight from the bottom to the engineman.

6027. He hears the hammer?—Well, a story twice told is never as good as the first time.

6028. If you have any further means of communication—a tube or telephone—you mean that should go to the pit-head man—you would not confuse the engineman by having signals of that kind from the bottom of the pit to him?—Do you mean such as a telephone?

6029. Yes?—He should have it in the engine-house.

6030. Would it not be in the engine-driver's way?—It is not in his way, because it is not often used it is only just for special purposes. We have it at present, and it is a very useful thing in the engine-house. For instance, you have many things to bring up, and if you have anything dangerous and they want to come slow they signal to you, and do it easily.

6031. How do they communicate with the engine-house?—By a telephone.

6032. A speaking-tube?—The speaking telephone.

6033. Have you not to put the instrument to your ear?—Yes.

6034. And have you not to take your attention off the engine?—The engine is standing then; we go to the side for that, get our signalling done, and then return to the work.

6035. You said something about the importance of being able to stop the cage in the middle of the shaft if anything went wrong. What is the system that you have in use at your place?—The system is four chains attached to the cage, we have no arresting apparatus whatever in use.

6036. We had the engineman here from Mr. Stirling's mine, who said that their apparatus had acted very well on several occasions?—I saw one 30 years ago, working at the Moresby Colliery when it began. Then I saw a rope breaking with a bogie of coal on it, and it did not drop 6 inches. I saw it overwind a dozen times and I never saw it once fail. So far as I saw that one in use, I think it is absolutely certain to stick, that is to say, if it is kept in working order.

6037. (*Mr. Thomas.*) As the result of your examination by Mr. Lewney, do I understand, Mr. Hogg, that you are perfectly satisfied with the present practice with regard to working places, and that you do not favour a limitation of size?—Not in the robberies.

6038. You are satisfied with the present practice?—Yes.

6039. (*To Mr. Dobie.*) I think it was perfectly clear, Mr. Dobie, that what you objected to was the practice, if any practice does exist, of any repairs taking place in the engine-house during the winding?—That is so.

6040. And when you refer to an obstruction between the winding engineman and the shaft top you mean an obstruction such as a man working there?—Yes.

6041. You would not go so far as to say that you must have a perfectly clear space between your starting and reversing handles, and so on, and the pit top?—No; what I mean to say is this: if I have a clear sight of that pithead, using it as it is usually used in the general practice of the district, I want nothing unusual to come between me when I am winding. The cage may be coming near the top and something take my attention off for half a second, and that would be too much.

6042. As a practical engine-driver you say if there was obstruction there, that is to say, if there were buildings or anything of that sort to always obstruct your view there, you would be perfectly content to rely upon an indicator gear and would not make it absolutely necessary to see the shaft top?—No, not absolutely necessary, if it was a practice to have it closed from the beginning.

6043. You mean you winding men want some regulation that you shall have the engine-house clear to yourselves during the responsible time that you are winding men?—Yes, so that nothing will take our attention away.

6044. You say that the boilers should be frequently cleaned; is it the practice here that the engineman attends to the boilers, or have you a stoker?—We have a stoker under the charge of the engineman.

6045. That is in the big mines?—Yes, the engineman does not attend to the boilers.

6046. Is it not customary for boilers to be blown-out frequently by the stoker in charge?—No, the stoker does not do so; as a rule, we have boys here doing these things.

6047. Surely boys would not be in charge of boilers?—Well, they are stoking the boilers, as you call it—we frequently blow the boilers out.

6048. You do?—Yes, once a week perhaps.

6049. Blow off and scum them?—Yes, what we call sludging them. We sludge our boilers.

6050. Once a week?—Yes.

6051. So that the difficulty which you anticipate in regard to priming is not prevalent here?—Yes it is; that is why I am speaking of it.

6052. In spite of the fact that you blow them off once a week?—Yes, the water is so dirty coming out of the mine—the water is practically puddle sometimes. There is the danger of it occurring, and it is a simple thing to wash the boilers out.

6053. These are rather exceptional cases, I take it?—Not altogether exceptional when they are what may occur. The thing we want to keep clear of is any danger of accident.

6054. These are rather administrative questions than statute questions?—We have a reputation at stake, and we want to avoid them in that way. We are met, I must admit, very well with the manager, but I want to see it a compulsory thing, and then we shall have no further trouble.

6055. (*Mr. Lewney.*) You want it made universal?—Yes.

6056. (*Mr. Thomas.*) You want it made universal where the circumstances make it necessary?—Yes, universal in the district.

6057. (*Mr. Greaves.*) That is in reference to the iron mines?—Yes, I am only speaking of the iron mines.

6058. (*Mr. Thomas.*) With reference to the question of signalling, would you prefer simultaneous signalling to the pit-head man and to the engineman?—From the bottom?

6059. Yes?—I would not.

6060. I do not mean to suggest you should not have it yourself—the main signal should be to the engineman, it is perfectly clear?—Yes.

6061. In addition to that you would think it necessary that the banksman should have an additional signal?—That is immaterial, we should only want it with the one inside. I object to the pit-head man getting up and then transmitting it to us. I object to that.

6062. (*Mr. Lewney.*) As a rule the signal is to both, is it not—it is connected with the surface and with the engine-house?—That is so sometimes.

6063. Would you like that rule adhered to?—Yes. It is immaterial for that, but I want the signal from the man using the cage to the engineman.

6064. The reason I put it is this: there is a considerable difference of opinion about it, and we want to get the information as clear as possible?—The only difference I see in it is this. You are having a check by the banksman against the engineman, and then you have the banksman working away at his other work and not paying attention to it.

6065. There was also a suggestion made yesterday that a tube should be placed in the shaft in direct communication from the pit-bottom to the engine-house. Would you approve of that?—I would never hear him.

6066. Supposing you had a shaft where you could hear him, do you think that would be a good thing?—That might be all right.

6067. Do you not think that it would be liable to confuse the engineman if you had men coming to the tube time after time and speaking to him?—That is so; I would not have that and a hammer as well. I would not go in for any two things that you could use for the one purpose. If you are going to have a hammer signal, have it; if a bell signal, have a bell signal. Tubes might be right enough in case of the cage being fastened, or a wreck in the shaft, so that you can speak down to them; but I would put it at the side so that it would not come in contact with the engineman while he was working, from the pit bottom.

6068. I do not think it was suggested that the tube should be substituted for the bell, but that in addition to the bell there should also be a tube. Would not that be liable to confuse you?—It would be liable to confuse if it came to where you were standing.

6069. And rather than have it come to the engine-house, you would put it to the pit bank?—Yes.

6070. (*Mr. Ainsworth.*) You think we cannot make any improvement on the hammer signalling?—There is no improvement on the hammer signalling yet, so far as I know.

6071. And it has the advantage that both the pit-head man and the engineman hear it at the same time?—Yes.

6072. (*Mr. Lewney.*) You are in favour of the clutches or arresting apparatus on the cage; that would necessarily mean a detaching hook?—No, this acts as a detaching hook as well—it acts for over-winding or a rope breaking in the shaft. If anything takes the weight away, these things fall in and catch the cage. As to over-winding, there is what is commonly called a monkey which sticks out—there is a beam across the head gear purposely for it—it comes up, knocks it out, breaks a copper pin, the slot comes out and the rope goes over the wheel.

6073. That is the detaching hook?—Yes, but it has this advantage—the advantage of arresting the cage in the shaft if the rope breaks, whereas the common detaching hook is no good, only when the over-winding goes up and through the hole.

Mr. James Armstrong called and examined.

6074. (*Chairman.*) You are an engine-driver, and belong to the National Amalgamated Society of Enginemen, Cranemen, Boilermen, Firemen, and Electrical Workers?—Yes.

6075. Where do you work?—Moor Row.

6076. Is that near here?—The other side of Egremont.

6077. You have been deputed by the National Amalgamated Society to come here?—Yes.

6078. That is an association. Do you represent a local branch?—Yes.

6079. You have a number of suggestions to make?—Yes.

6080. I do not think that it is necessary to go into them all at length, because they speak for themselves. First of all, the minimum age for winding and haulage men you wish to be raised to 21 years?—Yes.

6081. Then the second is the regulation of the hours of labour. That would be put forward before us on the ground of safety?—Yes.

6082. How long does an engineman work at the longest?—In our district here we have the eight hours' system.

6083. So that he winds the men one shift up and the other down?—He lowers one into the mine.

6084. And raises the old one out?—The other one coming on brings those out.

6085. Here there is nothing to complain of on that point. It is all eight hours?—Excepting that I should like to see it legalised.

6086. In practice there is nothing to complain of in this district?—No.

6087. You have never seen a man working more than eight hours here?—Yes.

6088. Where?—In our district.

6089. In old days?—Yes.

6090. When was the change brought in?—About 20 years ago.

6091. You want a minimum age for haulage and pumping-engine men, whose duties do not include the lifting and lowering of men along any inclined plane, to be raised to 18 years?—Yes.

6092. What is the object of that?—In the present Mines Act there is no age. You may send a lad as soon as he leaves school to do this work.

6093. Do they, as a fact?—Not necessarily.

6094. Not necessarily, but do they do it?—No, but I think we should have some safeguard so that it cannot be done.

6095. I do not want to minimise the safeguards, but perhaps there is hardly any use in passing a law that people should not do a thing they do not do. You might suggest that no women should be employed as winding-engine men. You might suggest that they might be employed?—It says it has to be a male.

6096. Is it necessary to provide against things which do not exist?—If you do not provide against them they might exist.

6097. There might be women employed. If you provide against all the evils that might exist we might have a tremendous code?—Yes.

6098. We will take your point, at all events. Do not think I am treating it jokingly. Then you suggest the granting of certificates of efficiency to winding-engine men, haulage-engine men, and pumping-engine men, before they are allowed to take charge of such engines. What accidents have you had in your district due to the want of certificates of efficiency?—I do not know that we can say there are any. I was thinking that in the present Act the only safeguard, or the only thing that was needed, was a person to be a male of 18. You have to have no qualifications at all in the present Act.

6099. This is a certificate of efficiency to a man no matter what age: it is the granting of certificates of

efficiency to winding-engine men, haulage-engine men, and pumping-engine men. What accidents have you had for the want of certificates? Are the men at present engaged in doing that work in this district fit for their work, and a good set of men?—Generally they are.

6100. Why do you want them to go through an examination?—It proves their efficiency, that they are fit for the work they are put to.

6101. According to that you might have an examination for county councillors before they were allowed to be county councillors, to see if they understand finance, and matters of that sort?—But this is very responsible work, and you are placing men's lives in their hands.

6102. The point is they are admitted to be a perfectly efficient set of men. You get what you want without the certificates, apparently?—Yes, perhaps the present set of men are efficient, but what about those who are coming on?

6103. Have you any reason to anticipate that a bad set of men are coming on?—I do not know about that, but I believe that there ought to be a system of certificates. A man ought to prove his efficiency before he is allowed to act.

6104. You are aware that in China they have a universal system of examinations for everybody, from the Prime Minister downwards. Do you propose such a system as that?—No, but this is responsible work.

6105. No accidents have arisen from want of it at present, and you have an efficient set of men. That is what would be urged against you, and it would be also said if you attempt to have an examination for the enginemen you might cut out some of the very steadiest men with nerve and judgment. An engineman depends less upon book-learning than upon a cool head and judgment, and if you get that you get what you want?—It would prevent a man being sent there who had no experience of engine-winding. The certificate would prove that.

6106. Would it be sufficient for your purpose in case it should appear to an inspector that any engineman was unfit for his post, that steps should be taken to remove him?—That would suit me.

6107. Then your next point is, while engaged in winding operations no winding-engineman to have charge of any other machinery, and to have the help of a competent assistant to stand by in case of accident at such times. In the big mines that is so?—Yes.

6108. Is it the case that in all the mines where there is an engineman, they always have an assistant?—No.

6109. You think that they ought to have one?—I would not enforce it in all cases. In the big mines it should be so.

6110. In the big mines you think they ought to have one?—Yes.

6111. It would not be necessary in the small mines to have one?—No.

6112. Still you think it is desirable?—Yes.

6113. Then the next point is, persons in charge of pumping or other machinery to be capable of taking such charge. There, again, your answer would be that if an inspector was satisfied that somebody was put in charge who was inefficient, there might be means for removing him?—You might have a man on a pumping-engine who is perhaps ill, and often in our district the winding and pumping engine men are under one roof, and you can see both engines. If he was ill it might be necessary to send a fireman to take charge of the engine. The responsibility of that engine would practically fall on the winding man, and that ought not to be so. That is what was in my mind at the time.

6114. Supposing you had not another man you could put there, would you stop the mine for the day?—No.

6115. It would be difficult to know what to do?—You might attract the winding-engineman's attention from his operations, and it would prove dangerous.

6116. The only thing would be to leave some power to remove him if unfit. It may be necessary for a man to take charge of an engine if the regular man, or two or three men, are struck down?—Of course for two or three men to be struck down at one time is not likely.

6117. It does not apply to emergency cases, but you do not want men working regularly who are unfit?—No.

6118. Then you would like a daily report of the condition of engines and boilers. Who examines the engines and boilers every day?—We examine them ourselves.

6119. Who examines the ropes and head gear?—Generally, the fitter or the blacksmith is responsible for the cages and ropes.

6120. Would you like a book with a note every day, "Good" or "Efficient," to refer to?—Yes.

6121. A book that can be seen by the persons in charge of the mine, and also by the inspector?—Yes.

6122. Then you say, "All machinery except that "which a person is in charge of, to be screened off "from observation." That is not to distract the attention of the winding man?—Yes.

6123. You would like the pit-head to be screened, or, if it is in view, not to have persons crossing backwards and forwards?—I would have it in full view all the time, always.

6124. How about electric signals as against mechanical signals?—I would take the mechanical signals.

6125. Then you are in favour of the provision of telephonic communication between the shaft-foot and winding-engine room, and between an inclined plane and haulage-engine room?—Yes.

6126. Would it distract the attention of the winding enginemen if people were calling him up by telephone?—It would only be used by the engineman for an explanation of any special work.

6127. Would it be better that such telephonic communication should only go to the pit-head and not direct to the engine-room?—I prefer it to the engine-house.

6128. You are not afraid of being disturbed?—I would not go to the telephone unless the engine was standing.

(*Mr. Ainsworth.*) I think the last witness said he preferred the telephone, thinking there was a telephone from the pit bottom to the engine-room, but he would only go to it after he had stopped his engine.

(*Chairman.*) I have not understood him rightly.

(*Mr. Lewney.*) The other was with regard to the speaking-tube.

6129. (*Chairman.*) Then you are in favour of the provision of separate signalling bells or hammers for every underground level which is in use, such bells or hammers to be in full view of the engine-drivers?—Yes.

6130. We have heard about that before. Then you are in favour of one general code of signals being in use throughout a district, and you think that speaking-tubes should be provided for use between the pit-head and engine-house?—Yes.

6131. That would not be necessary where they are close, and a man could speak across?—There might be a lot of people shouting, or a noise, and if we have not the tubes it is inconvenient.

6132. Are those tubes general?—No. They have them at various places.

6133. Then you say no single engine or an engine working on the cut-off system to be allowed in sinking operations. Are single engines used?—Yes.

6134. What is the danger of that?—In the case of the single engine there is the point of the centre; when the engine is on the dead centre you cannot stir the engine. The sinkers require in shot-firing the kibble or bucket to be at a certain place, for riding from the shots. What is to their advantage might be to the disadvantage of the engine. That is the position in starting.

6135. How is that difficulty got over where there are single engines and starting on the dead point?—

I do not know. I have never been at that kind of work. I have been at the sinking operations with double engines.

6136. (*Mr. Thomas.*) You mean a single-cylinder engine?—Yes.

6137. Operating a drum by means of some gear, probably?—Yes.

6138. Your objection is the difficulty of starting or stopping?—Yes.

6139. You might get a dead centre?—Yes, or come near to the centre.

6140. Do you know any serious sinking operations where such engines are used?—Yes, it has been done often locally.

6141. Just for temporary small shafts?—Yes.

6142. Have you known any accidents arise from it—No, I will not say that I know of any.

6143. Simply a little inconvenience to the engineman, whereby he may have to lower before he can take up afterwards?—Yes.

6144. There is no danger?—It is not efficient.

6145. It is a matter more of convenience to the engineman than danger to the men employed?—It is both inconvenience to them and the inconvenience of the sinkers in riding safely from the shots.

6146. (*Chairman.*) You like the cog and worm system of indicator?—Yes.

6147. (*Mr. Greaves.*) What do you mean by that?—The spiral thread with a cog run in.

(*Mr. Greaves.*) You mean a worm wheel.

6148. (*Mr. Thomas.*) It is a matter of preference?—I do not know whether that is the name. That is what I call it.

6149. There is an expression of opinion that you wish to have a reliable indicator?—Yes.

6150. (*Chairman.*) Are some of the indicators in this district not reliable?—I have seen them very unreliable.

6151. What has been the fault of them?—It was the construction. The indicator worked on a bobbin from the drum shaft centre with a cord attached and a weight and a pulley, and as you ran the engine this went up and down. They were subject to breakdown.

6152. (*Mr. Greaves.*) The breaking of the cord?—Yes, there was the adjustment of the cord.

6153. Owing to the weather?—Yes.

6154. Shorter in wet weather, and longer in an east wind?—Yes.

6155. The length of the string will alter with the weather?—Yes. You must know the position of the cages in the shaft in braking them, and how much string you have in the bobbin to make it correspond in the shaft.

6156. (*Mr. Thomas.*) A common practice with indicators which are extensively used and very reliable is to have a flat-threaded screw in front of the engineman. On either side of that would be a pointer indicating where the cage may be in the shaft. Those are quite positive. You would not confine yourself to a cog and worm. You want something reliable?—Yes.

6157. (*Chairman.*) The cog and worm type would be a dial going round?—Yes.

6158. Then you are in favour of the provision of some underground alarm signal in case of fire, to the pit-head or engine-house. How is the alarm of fire given at the present time?—There is none.

6159. There would be if there was a speaking-tube from the bottom?—That would be of use in some cases.

6160. Do you mean an automatic alarm?—An alarm controlled by the engineman. I was thinking of working at nights, when men are down underground, perhaps, fathoms away in the mine from the shaft, and it is to alarm these men in case of fire to the pit-head or engine-house. I have felt that it is a great responsibility as an engineman with these men down at night.

6161. He ought to be able to communicate with them somehow?—Yes.

6162. Then you propose the employment of a regular shaft-foot man or hanger-on. Do they not have a regular one at present?—Not always.

6163 Then you favour the provision of stop valves in the engine-house for use in case of breakdown of the regulator or throttle valve, and you think that all engine brakes should be put through periodical tests. How do you test a brake? Do you put the brake on and see whether it stops the cage practically?—Yes.

6164. Then you wish for the regulation of engine-driver's duties. Do you want a code drawn up?—We ought to know what the engineman's duties ought to be. Sometimes his duties take him outside the engine-house, outside the hearing of his bells or hammers. It may be for half an hour or so. It may be that signals have been used, that men have been knocking, and you cannot attend to them owing to your other duties.

6165. Then you are in favour of the provision of waterclosets adjacent to the winding-engine room?—Yes.

6166. Then you want the provision of more than one outlet where steam pipes cross an engine-house. I am not sure that I understand the reason of that.

6167. (*Mr. Thomas.*) Do you mean the provision of more than one outlet where steam pipes cross the engines to the engine-house?—Supposing steam pipes came across *here*, my duties require me *here*, and the door is *there*.

6168. (*Chairman.*) The engineman is cut off completely. We have heard about that before. Then you believe in practical Government inspectors for machinery, drawn from the ranks of engine-drivers?—Yes.

6169. Would you not be content with a practical miner as an inspector generally for the whole mine, machinery and all?—A man who knows nothing about machinery.

6170. A mining inspector might, I should have thought?—A mining inspector.

6171. A man might know sufficient to understand hematite mines, and also be competent to look and see that the engine-house was in order?—If he knew, that is all right.

6172. You do not suggest that there should be necessarily a completely different set of inspectors to inspect the machinery, different from the men who inspect the rest of the pit?—I mean that.

6173. Will that not complicate things very much? Is it not as well that the inspector appointed should inspect everything?—No, I do not think that the mines inspector is really competent in all cases to deal with the engines.

6174. Do you not think he might easily make himself competent?—I do not know.

6175. Is the inspection, in fact, of winding machinery and gear so difficult that a man within a reasonable time cannot acquire enough knowledge to see that it is in order?—Seeing the number of mines in our district and the whole of Cumberland, I think there is sufficient work for a mines inspector to examine. I think we should have a daily report and see it is done, and that we should have the best winding arrangements from the engineman's point of view.

6176. Again, one reflects upon this, that there are so few accidents. It seems to me to be so well done?—If you could only make less I would be quite satisfied.

6177. How many accidents have there been in Cumberland to winding engines?—Very few.

6178. How many fatal accidents?—Very few.

6179. That is not an answer?—I do not know the number.

6180. Would you have an inspector to examine all the railway carriages and engines when a train starts from anywhere?—They are generally inspected.

6181. Not before a train leaves every station. They do not inspect all the carriages and engines then. A Government inspector does not do that?—No.

6182. I am only putting it to you to show that there must be a limit somewhere to Government inspection in the mine?—At present most of the mines inspectors' work appertains to the mines.

6183. You would be for having more inspection by the Government?—Yes.

6184. That I understand, but it is a little different to suggesting that there should be constant inspection?—Yes.

6185. You want it in moderation?—Yes.

6186. (*Mr. Thomas.*) We have already dealt with the question of the indicator to be employed?—Yes.

6187. It is not clear to me what you mean by the employment of a regular shaft-foot man or hanger-on. What would be his duties? Would he be the underground signalman?—Signalman, and also his duties are to put into the cage every bogey that comes up.

6188. What do you mean by the employment of a regular shaft-foot man?—One man for that work regularly.

6189. What is the object of appointing one man to do this? I should have thought it would have taken many men in a big mine?—One man could do it regularly.

6190. You cannot generalise from one mine?—I can only take it from what I see about me.

6191. You heard what I said to the previous witness, Mr. Dobie. Do you wish to have an uninterrupted view between the engine-house and the approaches to the pit-head, or simply that while you are winding men your attention should not be distracted from your engine by people passing, or by anything which would throw you off your work and prevent you from attending properly to your engines?—I prefer the uninterrupted view between the pit-head.

6192. You would not make that a statute?—I would—with all machinery.

6193. But you must know that in some big undertakings it is impossible?—I can only deal with what I have seen here, and I appreciate the uninterrupted view. It ought to be so, so far as we are concerned.

6194. As a winding engineman, you would be satisfied with an adequate indicator gear and good signalling?—It is not for winding purposes I ask for this. Take it the banksman goes home at 2 o'clock or 2.30, and you have a shift of men coming down the mine. Someone goes up and there is no banker. You are responsible for that man getting off the cage or going back. In such a case we ought to see this man is going down safely and that he leaves the gates and everything properly shut.

6195. This is a practice in the particular mine you have to work in?—And the district.

6196. There is no suggestion of any alteration in the Metalliferous Mines Act in your mind? Obviously you cannot provide against that?—These duties are thrown upon you.

6197. (*Mr. Greaves.*) Are you bound to see the gates are shut?—Yes.

6198. Is not that the banksman's business?—He is not there at this time.

6199. (*Mr. Thomas.*) Your proof says that you require the provision of stop valves in the engine-house for use in case of a breakdown of the regulator or throttle valve. I take it you mean you would have that throttle valve in the engine-house for use in the case of a breakdown. That is when the main steam-pipe conveying steam to the engine crosses your escape through the door?—No.

6200. You would have two exits in every case?—You are confusing the two questions. I advocate a stop valve.

6201. (*Mr. Greaves.*) Could you not stop by means of the link motion?—Yes, sometimes, but it is dangerous work, and where you have three or four boilers coupled together and working together, the provision of this valve would simplify matters very much.

6202. You want two stop valves?—A stop valve in the engine-house.

6203. You have one?—Yes.

6204. You want two?—Over and above the regulator valve.

6205. You have not one in your engine?—No.

6206. There is in most?—No.

6207. (*Mr. Thomas.*) You mean you wish, in addition to the throttle valve which directly governs the engine, for the main steam-pipes to be furnished with a stop valve in the engine-house by which you cut off the steam independent of the throttle valve?—Yes.

6208. Is not that usually the case?—No.

6209. Where is the throttle valve in the boiler-house?—What we term the throttle valve is the ordinary steam valve for working the engine.

6210. The terms vary, but the stop valve on the main run of steam pipes is in the engine-house or boiler-house?—Generally on the top of the boiler.

6211. In case you have three or four, the stop valve is nearest the engine-house. You want it in the engine-house instead of the boiler-house?—Often we have none, only one valve on each boiler.

6212. Do you go to the boiler and shut the steam off? I do not see the point. You have a throttle valve on the engine by which you govern the winding of the engine. That shuts off the steam effectively. You want another in the engine-house?—In case of failure.

6213. To cut it clean off?—Yes.

6214. To prevent your engine creeping, probably?—Yes.

6215. Anticipating your brakes would not be sufficient to hold?—Yes. Of course there are differences in engines, and some are worse to handle.

6216. You have not known accidents from that cause?—I have known some narrowly averted.

6217. In your experience, as far as you can gather from the neighbourhood, the accidents from winding are very rare?—Yes.

6218. You said you wished to have another outlet where the steam pipes cross an engine-house, that is to say, where the steam pipes cross your means of exit?—Yes.

6219. In that case you wish to have——?—Two roads out.

(*Chairman.*) There was nearly an accident once. I remember a case in which one of those pipes burst opposite the door, and it was a desperate business. One man dashed through and was badly burned, and they might have had a serious accident.

(*Mr. Thomas.*) Following the Special Rules appertaining to metalliferous mines in Cumberland, the duties of the engineer are very clearly defined in regard to the examination of the various machinery on or about the mines, and one scarcely sees the necessity for a Government inspector to inspect the machinery, seeing that you have that provision, which is probably very well carried out. You are inclined to generalise from one mine.

6220. (*Mr. Ainsworth.*) Where do you work?—Postlethwaite's Mines, Moor Row.

6221. (*Mr. Greaves.*) I suppose you advocate a brake on the drum itself?—Yes.

6222. Have you got that?—Yes.

6223. (*Chairman.*) You will quite understand that a great many of the things you have suggested are capable of being dealt with under the present Act; under section 18 there is a large power on the part of the inspector, if anything appears dangerous, to make representations to the owners, and, if the danger cannot be removed, to take means to have it set right. It would be impossible to put down into writing absolutely everything that ought to be done in and about an engine-house unless you put in the Act a treatise on engineering?—No, you cannot cover everything.

At Seascale, Cumberland.

ELEVENTH DAY.

Monday, 24th October 1910.

PRESENT:

SIR HENRY HARDINGE SAMUEL CUNYNGHAME, K.C.B. (*Chairman*).

JOHN STIRLING AINSWORTH, Esq., M.P.
RICHARD METHUEN GREAVES, Esq.
RICHARD ARTHUR THOMAS, Esq.

WILLIAM LEWNEY, Esq.
URIAH LOVETT, Esq.

T. E. BETTANY, Esq., *Secretary*.

Dr. GEORGE CALDERWOOD called and examined.

6224. (*Chairman.*) Are you medical officer of health for the district round Egremont?—Yes.

6225. How many years have you been medical officer of health?—Twenty-seven years.

6226. During that time have you had a good opportunity of observing the general health of the district, and the different complaints and diseases that are prevalent here?—Yes. I get the returns weekly from the registrar of deaths in the district.

6227. It has been asserted here that the health of the miners is not good. Would you give your views impartially upon that question—apart from accidents, of course?—The general health of the iron ore miners is very good; the statistics show very clearly that it is better, in fact, than the general health of the population.

6228. Give us the statistics which, in your opinion, show that?—I have taken out the statistics for phthisis, bronchitis, and pneumonia, as being the chief diseases which are most important in a matter of this kind. I have the annual report of Whitehaven, Cockermouth, and my own district, and I am able to compare them, and I can give you the comparisons of those with England and Wales generally.

6229. Take, first of all, the deaths?—In the Whitehaven district there were 20 deaths from phthisis, equal to an annual death rate of 1·03 per 1,000 per annum. In Cockermouth there were six deaths from phthisis, equal to a death rate of 1·10 per 1,000 per annum. In Egremont there were six deaths, equal to a death rate of ·95 per 1,000 per annum, but of those only two were deaths of miners; the others were an accountant, farm labourer, and two female servants.

6230. (*Mr. Thomas.*) That is two out of the six?—Yes. Taking all the deaths, it gives a death rate of ·95; but if you take the two miners only it is ·31 per 1,000 per annum.

6231. (*Chairman.*) To what cause do you attribute the good health of the miners round Egremont?—The death rate and the general health of the country has improved through increased sanitation and other matters.

6232. Egremont, curiously enough, stands three times as healthy, so far as those diseases go, as Whitehaven or Cockermouth?—If you take the deaths of miners alone it does; but if you take the general death rate from phthisis it is rather better—that is all you can say. Then I have taken bronchitis. In Whitehaven, with a population of 19,300, there were 49 deaths, equal to 2·5 per 1,000 per annum. Then I come to Cockermouth; and that is the nearest to our own district, because you have the town of Cockermouth, an old town, and you have the town of Egremont, another old town, and a country district; the two are very similar, only in Egremont we have iron ore pits and iron ore miners, whereas in Cockermouth you have not got those, so that it is a very good comparison to make. In Cockermouth there were five deaths from bronchitis, and the death rate was equal to ·79 per 1,000 per annum. No death from bronchitis occurred in Egremont or among the miners at all. Then I take pneumonia: in Whitehaven there were 27 deaths, equal to 1·4 per 1,000 per annum. In Cockermouth there were seven deaths, equal to 1·2 per 1,000 per annum. In Egremont there were seven deaths, equal to 1·11 per 1,000 per annum. Of the seven deaths that occurred in Egremont, two were miners, and in that case the death rate would be equal to ·31 per 1,000 per annum—so far as concerns the miners.

6233. You are representing that the rates are small, but curiously the miners appear to have a smaller rate even than the average of the population?—Yes, I think they are the healthiest part of the population.

6234. About which is the worst district, so far as you know, for phthisis?—The worst district, so far as I know, is Moor Row, but that is chiefly because it is a great place for miners coming home from South Africa with miner's phthisis. They go out to Africa from that part, and they are out there for a variable time, 5 or 10 or 15 years, and then they contract miner's phthisis from the rock drills. They then come home and we have a good few deaths there.

6235. Are the deaths of those who come from the Transvaal included in the figures you have given?—Yes.

6236. So that even including the deaths from the Transvaal, these are the figures?—Yes.

6237–8. At Moor Row are there many resident miners who work here?—Yes.

6239. I mean who work at the mines round about Egremont?—Yes.

6240. It is included in the urban district?—Yes.

6241. How do these figures compare with the general death rate in England and Wales?—The general death rate from phthisis in England and Wales in the last 50 years has ranged from 2·5 to 1·5 per 1,000 per annum. At the present time the general death rate in England and Wales is about 1·5 to 1·6.

6242. In this district the death rate, taking miners and all, is distinctly very considerably below the general death rate of England and Wales?—Yes, in Whitehaven it is 1·0, Cockermouth 1·10, and Egremont ·95 for the whole, so that we are under the general death rate of England and Wales—we are healthier than the general community.

6243. Is there any other particular district in England and Wales that you can point to as being equally as healthy as this?—I cannot say. I daresay there are some country districts where they are quite as healthy. Our general death rate for the last 10 years has been about 14·3.

6244. What is the general death rate for England and Wales?—I really do not know, much higher I think.

6245. They are rather striking figures and show the healthiness of the district. To what do you attribute that?—It is a healthy district, and the miners' occupation is quite a healthy occupation. There is nothing the miners contract on account of their occupation except their liability and tendency to accidents.

6246. There is really no ground for apprehension that the miners are suffering abnormally from phthisis or bronchitis?—No.

6247. But rather the contrary, they are far healthier than the population in general, and very greatly better than the miners in other parts?—Yes, miners in the tin mines, lead mines, and copper mines are far less healthy than iron ore miners. The statistics do not show that the iron ore miners suffer in the same way as they do.

6248. I put this question in consequence of what has been said here: it is suggested that the doctors of Cumberland would not support you in this, and that they are rather afraid to say what they think, and that there is a bad state of things existing. Is there any truth in that, do you say?—No. I do not know any reason why they should not speak the truth and state the facts of the case.

(*Mr. Thomas.*) I think Dr. Calderwood's evidence is a striking confirmation of the conclusions already arrived at from the general statistics published.

6249. (*Chairman.*) Precisely the same results as those which you have arrived at here are borne out by the Registrar-General's returns, which, however, are given for the Cleveland district and the iron ore districts together. Of course we could analyse them if we went to a great deal of trouble, or got clerks to go into the matter; but according to you it is really not worth while to do it, the conclusion being pretty certain that the district is healthy?—That is my opinion.

Dr. John Clark called and examined.

6250. (*Chairman.*) What district do you superintend?—I am medical officer of health for the Cleator Moor Urban District and also for the Arlecdon and Frizington district.

6251. Are you of opinion that the health of the district, in the first place, generally is good?—Yes undoubtedly.

6252. What do you say with regard to the diseases of phthisis, pneumonia, and bronchitis?—My opinion is just the same as Dr. Calderwood's—the health of the district is highly satisfactory.

6253. Have you statistics similar to those Dr. Calderwood gave us?—Yes. The report for 1909 for the Cleator Moor district shows that the number of deaths from phthisis pulmonalis and other tubercular diseases was nine in number.

6254. What proportion per 1,000 does that work out at?—1·1.

6255. That is as against 1·7 perhaps, or something like that, for England and Wales in general?—Yes; but only six cases of phthisis; the other three were for tubercular diseases, therefore that gives ·75.

6256. That is very much smaller than the average of England, and far smaller than the average of miners in the south. Now as regards pneumonia and bronchitis?—There were 20 cases of bronchitis during the year and six of pneumonia—that would be 3 per 1,000.

6257. For what is that?—Bronchitis and pneumonia both.

6258. What is the figure for England and Wales for bronchitis and pneumonia together?—I could not tell you that. In our district it would be 2·5 bronchitis and about ·75 for the other tubercular diseases.

6259. And that compares again favourably with the figure for England and Wales?—I should say so; I do not exactly remember.

6260. Would there be any ground for saying that, with regard to phthisis particularly, the health of this mining district is bad?—I should say not; but if you wish I can give you the whole of the cases of phthisis for the last four years in males over 14 years of age in the district.

6261. I do not think it is necessary to go into those details. You are observing the public health, and we are asking your opinion with regard to the general health, so far as phthisis is concerned, as compared with the rest of the country?—Well, there is no doubt it is highly satisfactory; it compares very favourably with the general health rate.

6262. Your opinion, at all events, is that it is satisfactory, and better than the general run of England and Wales?—Yes.

6263. To what do you attribute that—is it the climate or what?—I do not know. It is near the sea and there is plenty of mountain air as well. Perhaps the mines are well ventilated—I do not know.

6264. At all events, they cannot be very badly ventilated, or else it would be much worse?—Yes, we should get very much more bronchitis, I should say.

6265. (*Mr. Ainsworth.*) Should you say that some of the cases of death from phthisis you have had here are in the case of men who have been out to Africa?—Most certainly; but I cannot give the analysis. I know there are five or six which have occurred in my practice.

6266. Men whose health has been seriously injured in South Africa?—Yes, they have come back and died.

6267. (*Mr. Thomas.*) Do you notify to the urban district council cases of phthisis?—No; it is not compulsory here; the Act is not carried out at all in my district.

6268. Would you think it advisable?—It might be.

6269. I mean where apparently so many men come from another country?—There are not so many lately; the last few years there have been fewer; but before that there were a great many.

6270. You might have a recurrence of men coming here to die, and it is quite conceivable that the statistics for this district might be credited with some of those cases?—That is perfectly true. It is really a disease contracted in the gold mines. If it was certified in the certificate by all the doctors it would be better. You could put it in as gold miner's silicosis, as distinct from ordinary tubercular phthisis.

6271. If a notification was obligatory on the doctor some additional light might be thrown upon the matter?—That is quite possible.

6272. (*Mr. Lewney.*) In your official capacity you have no idea how many of the six cases were attributable to the African disease?—I cannot tell you that.

Mr. George Scoular called and examined.

6273. (*Chairman.*) Are you a mining engineer in practice at Whitehaven?—Yes.

6274. And have you had the management of the Parkside iron ore mines for upwards of 40 years?—Yes.

6275. You are a certificated colliery manager, and have the supervision of extensive coal mines in the county?—Yes, raising upwards of half a million tons.

6276. Can you give us the proprietors whom you represent?—I could.

6277. Do you represent a large output?—Along with my colleagues I represent the whole of the mine-owners in the Whitehaven district for iron ore, and the output is somewhere about 750,000 tons.

6278. Speaking as an expert, should you say that upon the whole the present working of the mines is in

advance of the Metalliferous Mines Regulation Act, 1872?—Yes, clearly it is in advance of the 1872 Act.

6279. Therefore there would be no objection, perhaps the contrary, to amending the Act so as to bring it into conformity with present requirements?—Not any objection at all.

6280. Not from an owner's point of view?—No, we quite agree it should be amended.

6281. You approve, apparently, the present system of Government inspection, and you have no objection to working men inspectors, provided they are thoroughly competent and practical men for the work they have to do?—Yes. I think if critics have to go to the mines they should be equal to the mine managers.

6282. I mean this: when you get a practical working miner, the points you would expect him to look to would be timbering, and safety of the roof of working places, rather than the more elaborate questions, such as machinery, and things of that sort, which might require an engineer's knowledge?—Of course he will come armed with the powers of a Government inspector; and we think he should not be inferior to the the managers when he comes to criticise them.

6283. A working-man inspector would hardly have the capacity of a manager of a mine?—No.

6284. (*Mr. Ainsworth.*) He would not have gone through so hard an examination. The scheme was to set the second grade inspectors to that work which they were perfectly competent to understand?—That would be quite satisfactory.

6285. (*Chairman.*) I will give you an instance: the idea was that a great many quarries, particularly small ones, did not need inspection by a very skilled engineer; the points that arise are perfectly simple, and any good foreman could deal with them?—So long as he confines himself to that it would be satisfactory.

6286. So long as the men are perfectly competent for the task they undertake, and do not undertake what is beyond their knowledge and powers, you would be content?—Yes.

6287. Provided they are Government servants?—Yes.

6288. Now with regard to the question of a double shaft in each mine, we have had a good deal of evidence given. The evidence has differed somewhat in detail, but to sum it all up what is said is this: that it is desirable there should be two shafts or exits if possible?—I quite agree.

6289. It is always better; but again there may be cases in which it would be too much to ask people at once to put down a second shaft. I think most of the men said that in the long run?—Yes; I thought they were very fair.

6290. They would wish, in case the inspector was not satisfied with the exits of the mine, there should be power to deal with it in a way analogous to the way provided in section 18?—That would meet our views. We are strongly of opinion that to make a second shaft compulsory would be very detrimental to the district.

6291. Give us some idea of what a shaft costs?—I know what I spent myself; I spent close upon 80,000*l.* upon one.

6292. How deep was that?—150 fathoms altogether—rock. We had to abandon it and we have been thinking of opening it again; but if we were compelled to put a second shaft down of course it would never be again re-opened.

6293. You would not spend another 80,000*l.*?—No. And there are many mines in the district that certainly it would stop altogether if there was a second shaft made compulsory.

6294. You say where you had a single shaft there should be a proper emergency exit of ladders and resting places and stages in case anything happened to the cage?—We do not like long ladders for men to travel regularly, but it would be an additional safeguard.

6295. You think there should be some emergency exit in every mine?—Yes, the mine owners quite agree to that.

6296. You have given us 80,000*l.* as the cost through rock. What would be about the cheapest you could think of at present?—All the deep shafts are bound to be through rock. All the surface mining—the shallow mining—is practically over; so that all the shafts in the future must be deep shafts through solid rock. Sinking such shafts is a very expensive process; it depends upon the amount of water you have to contend with, and other things—it is very expensive indeed, and I should say probably about 40,000*l.*

6297. I suppose as a mine goes on and becomes developed it would pay them to put a second shaft down?—Yes, if the deposit is a large one a second shaft always goes down.

6298. Is there anything that a reasonable man ought to be alarmed at in going down a mine with a single shaft, provided it is thoroughly well made and has an emergency outlet?—I do not think so. During the whole of my long experience of 40 years we have never had an accident in the shaft.

6299. Of course there might be people who would be afraid to travel on a railway for fear of a railway accident; but you would term them unreasonable?—Quite so.

6300. You would say a man was unreasonable—an engineer or anyone else—who was afraid to go down a mine because there was but one shaft?—I think so. There is no reason for fear at all. The only reason they could have would be in the event of some tremendous catastrophe happening, all the boilers blowing up or some terrible wreckage, but that has never happened.

6301. It is conceivable, like a railway accident?—Yes, but it has never happened in our district.

6302. You are able to speak very well on this subject, because you have an acquaintance with coal mines. I suppose it is a totally different thing from two shafts in a coal mine?—Yes. You see we have no explosive gas or dust.

6303. In coal mines it is necessary, and you would be in favour of it?—Yes.

6304. But you represent that the whole question is entirely different here?—Yes, quite different. In coal mines of course you can sink a deep shaft, and subsequently you get your return from the deep shaft by working a large area of coalfield; but in iron ore mines you cannot protect yourself in that way—it would retard and disturb very much the industry of the district if two shafts were made compulsory.

6305. You are in agreement with the men's witnesses, really?—Yes, I thought they put it very fairly and well.

6306. As regards the examination of managers, I would like to ask you this: at present there is really no one distinct man in the mine to whom the inspector can look as the responsible person?—Well, I think he looks to the mine manager especially.

6307. In smaller mines, and perhaps in quarries, is it not sometimes rather doubtful who is really the person who ought to be responsible?—I think in every case the mine manager is there every day, and the mine is under his daily supervision. Of course, he has his general manager.

6308. There would be no objection, and it would be better, perhaps, if for each mine a name should be given as the name of the mine manager to whom the Inspector is to look?—Yes.

6309. With reference to the question of examination, there is a good deal of difference of opinion; on the one hand, it is said an examination is a good thing for a man, and on the other hand, it is said if you had it you might cut out some excellent men?—That is so. I am in favour really of a certificate for each manager, I think we could not have a better set of managers than we have over the whole district; they are all very excellent men, and they could get service certificates; but for the future generation they would be all the better with theoretical knowledge as well as the practical part.

6310. Your view is, perhaps, rather looking to the future than the immediate present time?—I think so.

6311. As to plans of mines, you are in favour of similar regulations to those in the Coal Mines Act?—Yes. They are carried out now really in the metalliferous mines.

6312. Here, at all events, the practice is carried out?—Yes.

6313. I have seen some rather elementary plans, but not from this district. You would be, at all events, in favour of decent plans being kept?—It is essential.

6314. And the same with abandoned mines; it is to everybody's interest to have a good plan; otherwise all sorts of difficulties might arise?—Yes.

6315. Then as to ventilation of iron ore mines; is it as difficult to ventilate a metalliferous mine as a coal mine?—I believe the ventilation is exceedingly good in the iron ore mines.

6316. I suppose really the chief use of ventilation in a coal mine is to keep fire-damp down?—Yes, keep the gas away.

6317. Consequently you want in many of the coal mines far more ventilation than is necessary merely to keep the carbonic gas down?—Yes.

6318. It is really sweeping the mine free of fire-damp?—Yes; that we have not to do in the metalliferous mines.

6319. Would you be inclined to say that the ventilation of iron ore mines is good or bad on the whole?—It is good throughout the district.

6320. We have had evidence that in some places the ventilation has been such that a candle will not burn properly?—That, I think, must be very rare; I do not know of a case myself. Of course, in close headings, where you follow perhaps a string of ore, it does get close away at the face of the heading; but as soon as the candle gets dim that is remedied by some means, as, for instance, sending in compressed air.

6321. With regard to ventilation, we have had under consideration whether we should say that there should be not less than 19 per cent. of oxygen and not more than 1¼ per cent. of carbonic acid. Have you had time to consider those figures?—Yes.

6322. What would you say to that?—I think that is a very high standard to insist upon in every place.

6323. It is more than would poison or injure a man?—Yes.

6324. Do you not think that it would be a good thing to keep up to that standard?—It is a very high standard.

6325. Have you tried your own mine to see?—No.

6326. Would you be surprised to hear that Dr. Haldane has tried them, and that the standard in the worst places was as good as that?—I see that in pure air in Cumberland there is only 21 per cent. of oxygen.

6327. He has not been able to find a mine with more than ·3 carbonic acid in it. If so, 1·25 would not be much hardship?—If some of those new broom Inspectors took us at a bad moment and prosecuted us it might be awkward.

6328. I would recommend that to your attention. It is a new proposal and requires consideration. Perhaps you would give your consideration to that point?—Yes, we should be glad to do that. I would rather take the easily understood standard of the candle. It is a very safe standard.

6329. When those amounts are obtained a candle burns very dimly—about half its light. I will leave Mr. Thomas to deal with this particular point, upon which he is an expert. I think they are pretty fair figures on the whole. You can see it clearly on a candle?—As long as it is the same as a candle burning dimly I do not mind.

6330. You would not object to a standard provided it was a proper one?—No.

6331. As regards the use of explosives, what have you to say?—The present Act is behind the times and the new Act should be brought up to the present practice.

6332. The present practice is that explosives should be taken in special cases or canisters, that the detonators should not be kept in the mine alongside the explosive, that the charges should be prepared and fired by an experienced man; but you are not in favour of specially appointed shot firers, as in coal mines?—No, each good miner is able to fire his own shots.

6333. Would you have an examination of the shots by a special man or by each man?—Each man should see to his own holes.

6334. He knows where he has put them?—Yes, and what he expects from them. That is done at the present time.

6335. What is the interval you would leave after a misfire?—Half-an-hour is the recognised thing. I think that is ample: it should not be less.

6336. Are you in favour of this. It has been suggested, and I think something could be done with it, that the Home Department might test the explosives used, not only in coal mines, but in these mines, and issue a report giving strength and various details that are likely to be useful to the owner, and that they should have the power of cutting out bad fuses?—I agree with that.

6337. It is said that in some places they are using very bad fuses?—In this district they are all very good. The managers know the great danger there is from bad fuses, and make sure to get the best.

6338. You would have no objection to a test and a standard?—No, I think it would be very useful.

6339. At all events, in all the mines with which you are connected they buy and pay for the best explosives they can get for the purpose?—Yes.

6340. There is no stint in that respect?—No, every man is alive to the danger of bad fuses. We have a horror of bad fuses, and make sure that we get the best we can.

6341. A charge which has misfired should not be bored out or scraped out, but should be refired by the placing of another charge upon the tamping?—I agree with the man who on Saturday said that they should be fired by another charge being put on the top of the misfire.

6342. Are you in favour of small tamping?—I think I would leave that as at present, but the tamping after misfires should be scraped out where the tamping exceeds 3 inches in depth.

6343. One of the witnesses was in favour of small tamping?—I think he said 3 or 4 inches but that is rather little.

6344. A good deal depends on the rock and the experience of the man?—Yes.

6345. At all events there is no danger, as there is in coal mines, of igniting gas?—No, a blown-out shot does not affect us in the iron ore mines at all.

6346. In no case should the hole or any portion thereof be re-bored where there has been a misfire?—There have been accidents by men reboring the hole when there has been an unexploded part of the charge left in it.

6347. I think that carries you through the explosive part. Paragraphs 7 and 8 of your proof I will deal with presently, because they are in connection with another point. Then with regard to boring in advance when approaching accumulations of water, you put 5 feet as the proper amount for this district?—Yes, the strata are much stronger than the coal strata and I think 5 feet are ample.

6348. That would not apply where you were boring under the sea, or in special cases?—We have no mines under the sea at present.

6349. There has been boring for hematite under the sea, but it is very rare?—Yes.

6350. Cases of that sort must be dealt with specially. You, of course, are speaking of boring in the ordinary course?—Yes, in the strata we have in our district.

6351. There the inspector would have power to interfere if he thought that the bore hole in front was not enough?—Yes, work of that kind is carried out in conjunction with the inspector.

6352. If you were approaching a place where you thought that there was water, you say 5 feet would be enough?—Yes, enough to keep back any water.

6353. Even in very soft places?—Yes. Perhaps then one would have to alter it, but I think 5 feet of limestone is quite sufficient.

6354. (*Mr. Greaves.*) A 5-feet advance is plenty in limestone?—Yes. Shallower soft material might require more.

6355. (*Chairman.*) It is very laborious?—It is difficult to go by hand more than 5 feet.

6356. With regard to timbering and securing the roof and sides, what have you to say?—I think that the examinations that are carried out now before the shift begins and during the shift are very proper things to do. The inspectors see the sides and the roofs, and if there is not enough timber, the men are told what to do. I think that the present system covers that.

6357. You are aware in the Coal Mines Regulation Act that Rule 22 provides that sufficient timber should be provided close to the face?—That would not do in hematite mines.

6358. Why not?—Because the timber is of varying size and there is so much of it. There would not be room to store it at the road ends the same as in coal mines. It is not like a regular seam; you have varying lengths to suit varying conditions.

6359. The daily advance into the ore in metalliferous mines is not so great as in coal mines?—No.

6360. Consequently you are not wanting such a quantity of timber from moment to moment?—No, the men take it down at the beginning of their shift—what they need for the shift.

6361. A question has been raised with regard to the height of the workings. Perhaps you have seen that?—It would never do to put anything in an Act limiting the height. It would not be workable in West Cumberland.

6362. The men were divided in opinion upon it. Some were confident that it ought to be 10 or 12 feet and the others could not stipulate any height?—I think the difference of opinion would be accounted for by the different mines in which they work. In some mines they limit the height to 10 feet or less than that, and it is desirable to do so where the ore is soft and easily got, but where you have hard material a 10 feet by 12 feet working would be unworkable. You might do it to some extent in the first working of the mine, but you could not rob out the mine and have the workings only 10 or 12 feet high. I do not think it would do to limit the height of the workings by an Act of Parliament.

6363. It has been suggested that it would be fair and proper to extend to metalliferous mines the provision in the Coal Mines Act by which the workmen have power to appoint two of their number to inspect the mine?—There is no objection to that. The owners are quite willing.

6364. Will you just look at paragraphs 7 and 8 of your statement. I have not thoroughly understood what you mean. Does that cover the point or is it a different one?—Paragraph 7 refers to the examination of the roadways and workings by the deputy.

6365. By the overmen of the mine?—Yes, paragraph 8 refers to the examination of the machinery by the officials.

6366. You think that there should be an examination every day of everything?—I think that the coal mines practice would be very good.

6367. That is before every shift?—Yes.

6368. By an official of the mine, and not merely by the workmen?—Yes, it is what we do at present.

6369. In the same way you think an examination, by a mine official, of the machinery is desirable every day?—Yes.

6370. You would like a report book to be kept?—Yes, the same as in the coal mines. It would be no hardship and it is done in most of the mines, I think, at present.

6371. Then with regard to the use of ladders in shafts, you have told us already that emergency ladders in shafts are a good thing?—Yes.

6372. You are speaking of ladders?—As a regular means of getting in and out of the mine, it would be rather a hardship upon the miners if they were to be adopted.

6373. I do not follow what you mean?—If the miners are to get in and out of the mine by means of ladders, as was suggested by some witness, that is not a good arrangement. I agree with Mr. Gavan-Duffy that it is antiquated to make ladders a regular means of getting in and out of the mine.

6374. Nobody suggested that. It was suggested when you were sinking a new shaft in the future, that you should make provision for the present emergency ladder in addition to the lowering. That you approve of?—Yes.

6375. What about ladders as the only means of exit?—In small mines it would be a hardship if that was not allowed. Ladders might be used in that case.

6376. What would you call a shallow mine?—One about 20 or 30 fathoms.

6377. 120 feet, that kind of thing?—Yes.

6378. Otherwise you are of opinion that there ought to be lowering where a mine is a deep one?—Yes.

6379. With regard to changing-houses, at present a changing-house is compulsory under the present law?—Yes.

6380. Do you think that the owners would have any objection to have a specified size given to them?—I do not think so.

6381. The size that we thought would be reasonable?—I think it was 160 feet.

6382. We suggested if you had two shifts of 100 men each, that you ought to get to the cubic space necessary by multiplying 200 by 150?—That is for the suits of clothes.

6383. We were inclined to think that some figure of that sort would not be very far from what is necessary, but it is subject to further consideration. At any rate the mine owners would be willing to do anything in reason as regards the size of them?—We do not think that the size is out of the way. It is about fair.

6384. What do you say about providing clean water?—I think nearly all, with rare exceptions, are supplied with the corporation water, and I think that is right.

6385. It would be reasonable also that there should be some warming pipes inside to dry the clothes?—Yes.

6386. You think that reasonable?—Yes.

6387. Is it reasonable that they should be provided close to the pit head as is required under the present Act?—Quite so.

6388. Now I come to the question of payment by the men. Whatever payments are made they are not universal. Most of them pay a man to clean the house out?—Yes, what we have done in the past is this, we provide the house, the furniture, the water and heating apparatus, and say to the men, "You must carry out "your own arrangements as to cleaning and keeping "your clothes tidy;" and they generally employ an old miner who should keep the place clean and attend to it generally, and they pay this attendant themselves. Except on rare occasions payment does not go through the books. No mine owners I know of reap any benefit from the payments made.

6389. Some of them pay the men for keeping the place clean?—Yes.

6390. Do you think that they would have any objection to pay one man, I do not mean for washing the clothes, but for keeping the place tidy?—You mean the owners to pay?

6391. Yes. Would they have any objection to that?—It is a small matter, I do not think they would. We think a better plan would be to get a committee of the men themselves together, a sort of management committee, to keep their companions right and the house clean, having a general supervision over it, more than they have done in the past, instead of leaving it entirely to the caretaker, and I do not think that the owners would object to pay one man to attend to it generally.

6392. It seems that such a proposal is one that ought to recommend itself to them. If they are discontented with his work it could be reported to the committee and they could stop it?—It makes the mine owners responsible for any theft in the changing rooms. That is a thing we should not be responsible for.

(*Mr. Lewney.*) Would that be so?

(*Chairman.*) I do not suppose that they are strictly responsible, but they feel if the committee of the men were managing it and they had the duty of paying the caretaker, he would be strictly in the employ of the committee, and if anything went wrong the committee would settle it, if, for instance, there were complaints that the clothes had been thrown about.

(*Mr. Greaves.*) The point was, if the company provided the house and paid the caretaker, that the company would be responsible for thefts.

(*Mr. Lewney.*) Supposing someone stole the workmen's clothes?

6393. (*Mr. Greaves.*) That is the point?—Yes.

6394-6. (*Chairman.*) The more important point is this—the question of theft could be settled by arrangement—that the committee would see that the place was properly kept, and if it was not, it would be their fault?—The responsibility would rest on themselves.

6397. Yes, and they would probably manage it better among themselves?—That is what we think, a sort of home rule among themselves.

6398. Like a club, in fact?—Yes.

6399. You providing the room, the heat for the water, and the general arrangements?—Yes.

6400. You would propose to lime-wash or white-wash the place occasionally?—There would not be much objection to that. We have not done it in the past.

6401. I suppose it keeps itself clean. There is a good deal of washing going on?—A great deal.

6402. The floor is not dirty anyway. Where the dry clothes are it would be desirable to put paint or white-wash?—There would be no difficulty about that. We are willing to do whatever may be reasonable and necessary.

6403. That would remove every complaint if that was done?—It would be a hardship on the small mines to go to the expense of the big ones you spoke of, with tiled floors and walls.

(*Chairman.*) We have not asked for them yet, we have only asked for a reasonable thing. I have seen some very clean ones in which I would not object to change my clothes.

(*Mr. Lewney.*) There is nothing better than lime-wash in changing houses.

6404. (*Chairman.*) Is there any other point you would like to call attention to. I daresay some of the smaller mines may be rather defective with regard to ambulance arrangements?—I think every mine really is provided with ambulance appliances and a stretcher.

6405. Do you think it reasonable, where there are as few as five men working, that there should be a stretcher in case a man is badly injured?—It seems a very small number.

6406. It would not be a big business to have a couple of poles and some canvas between them?—It is a simple thing.

6407. It might prevent a simple fracture being turned into a compound one?—Yes.

6408. It is hard if a man is injured to have him removed on men's shoulders?—Yes, it is a cruel thing. The ambulance appliances are so cheap that I do not think anyone would object to providing them. The West Cumberland district is very favourable to ambulance instruction. The mine owners band together and pay for doctors to give lectures.

6409. I am told that you have presented a challenge shield to show your interest in the matter?—Yes, there is keen competition for it. I have brought the balance sheet showing how the mine owners contribute towards the expense of the miners' instruction.

6410. That is teaching?—Yes. I would rather like to show that the owners are not callous and indifferent, as was pointed out by one of the men's witnesses.

6411. There is every mine in the district in this?—Yes.

6412. I do not think there is any exception?—I do not think there is any exception.

6413. There are only 35 mines?—I do not think there is a single exception.

6414. The amounts they subscribe are roughly in proportion to their output?—That is so.

6415. You have 11 doctors lecturing?—Yes, there is a regular system throughout the whole mining district where these classes are held. I am bound to say that the miners take up the work very nicely, and we have excellent classes, due, a great deal, to Mr. Leck's organisation in the past. He has resigned his position, but he still works as hard as ever.

6416. His position was what?—As general secretary.

6417. Of the Ambulance Association?—Yes, of the district.

6418. Your chairman is the mines inspector for the district?—That is so.

6419. Lord Lonsdale is the president?—Yes.

6420. We may take it generally that anything in reason, as far as the ambulance goes, the owners of the district are alive to?—They are only too glad to assist.

6421. As regards education in general in the district, what have you to say?—You mean technical education?

6422. Yes?—The county council, as was said the other day, have an elaborate system for dealing with the technical education of the whole district. In each small village or town there is a local committee to act under the county committee, and wherever classes can be organised there are continuation classes and mining classes.

6423. Take the mining classes, do you pay your missionary lecturers sufficient. Is not there a tendency here, like elsewhere, to give too little pay to them, to think it is a small place, and that you only want a moderately paid man. Is it not true that the more ignorant the men you have to teach the cleverer the man you want to teach them?—We have given up the missionary lectures, except the one Mr. Leck gave the other day at Cleator Moor, as being really a waste of money. We want the solid work of the classes. We have tried to get mining classes started in every small village. In the coal-mining villages they have been taken up, and that is due to the fact that these classes are a preparation for the colliery manager's certificate. They are all aiming to be managers, and they attend this class with a view to qualifying themselves for certificates by-and-bye. We would like the same thing to go on in the hematite district, but there has been no demand hitherto.

6424. Speaking generally, you are in favour of the gradual introduction of a certificate, so far as it can be done without hardship on the men?—That is so. It would be an improvement to the managers of the future if they could have combined with their thoroughly practical knowledge, theoretical work.

6425. Then as regards the employment of boys under 16, it was said that there were 400 boys employed. I must say the statement rather surprised me?—I do not think that is true.

6426. Can Mr. Leck tell us how many there are?

(*Mr. Leck.*) 17.

(*Chairman.*) That must have been a wild statement.

6427. (*Mr. Greaves.*) One of the witnesses said that there were 400 boys under 16 years of age, and 50 under 15?—That is wrong.

6428. (*Chairman.*) There are only 17?—That statement was quite wrong. I am afraid that the witness made a good many mistakes.

6429. I am sure over 400 was stated, but you say it is wrong. Therefore, it is not a big question as to the boys who are employed?—We never employ any under 14. They come on the surface about 14 and go underground at 16.

6430. The question does not arise, because there are none?—No.

6431. Is there any other point which occurs to you which you would like to call attention to?—I would like to call attention to a remark made by one of the witnesses about the inspection of the mines. It was said that the managers kept a look-out for Mr. Leck all over the district, and that by some mysterious means we know what his movements are, and prepare for him. There is not a word of truth in that. Mr. Leck comes and goes whenever he likes and makes inspections, and gives us no notice, and we are always glad to consult him upon any matter. It is a mistake to say that we have any dread of the inspector coming

or that we try to mislead him in any way. This was stated very strongly by one of the witnesses, but it is an entire untruth. He also made a second statement, that after an accident the managers sometimes do something to cover up the true position of things. Such a thing has not happened. We dare not do it if we wanted to, but it is an entire misstatement. I do not know how the gentleman could think of saying such a thing. It has never happened; it could not happen. I would also like to speak about the general health and age of the miners. It was stated that the general health was very bad, and that our men were dying off like rotten sheep almost. I got an interesting document yesterday as a county councillor and I would like to hand it in. It corroborates what has been said by the doctor this morning, and gives statistics respecting the death rate in Cumberland. It is the report* by the county medical officer of health. It only came yesterday morning, it is issued to county councillors, and you will see by the place I have marked, taking Penrith, which is a notoriously fine residential district, that the deaths are 1·49 per 1,000, whereas at Cleator Moor they are only ·75. At Cleator Moor they are half what they are at Penrith.

6432. Egremont is ·95 as against Penrith 1·49?—Yes. That report gives it throughout the county. He also said that there were no old men in the mines. That is a gross misstatement. I have a list I got out from looking over the men employed at the iron-ore mine I manage, and one is aged 72, who is working hard as a miner. Then there is one 73, another 72, another 69, another 67, another 71, another 63, another 65. I only mention those. I know I do not need to convince you, but I think it is right that our district should not be slandered in the way it was. It is not, as our friend put it, that there are no old men that they do not live long enough to earn an old age pension, and that their health is bad. This statement is altogether against the facts.

We quite agree with the universal code of signals. That is a thing we would like to have, and, with regard to the question of detaching hooks, we are willing that should be put in.

6433. Something was said about men riding against men in shafts. You would be a good witness to ask about that?—I never thought that there was any danger. I do not think there is with men riding against men, we do it at both iron-ore and coal mines.

6434. It might have existed in the old days when shafts were not as good as they are now?—In my experience of coal and iron-ore mining, we never thought of preventing men riding against men.

6435. It is not done in any of the Furness mines?—I was not aware of it. In none of them?

6436. Apparently?—When I worked in Furness we did it at Parkside. We rode men against men.

6437. (*Mr. Lewney.*) Are you sure of that?—Quite sure. We do it now and it is done all over the district, except in one or two cases. I can see that in a mine where there are a great many eyes it tends to difficulty, but it would never do to put it in the Act. I should leave it to the manager and the inspector.

6438. (*Chairman.*) Where there are a good many eyes that appears to be the chief point against it?—Yes.

6439. Is there any other point you would like to mention?—I think we have covered them all. I should like to speak about compliance with the Truck Act. If there is anything wrong at all the owners will put it right. I do not know of any cases where there is any injustice with regard to the present charges.

6440. The charge for candles and things of that sort?—I do not think so, but if there is any it would be put right. At any rate it is no injustice to the miner because every bargain is let specially and the miner knows that his stores are to cost so much, so that his ton price is fixed according to the price of the stores. It is no injustice, but at the same time we know that the Truck Act must be obeyed, and no doubt will be carried out in every case. I do not know where it is not carried out.

6441. You are prepared to remedy it on behalf of the owners?—Certainly.

6442. (*Mr. Lewney.*) In regard to certificates for managers, you say that at the present time you have a very excellent class of men as managers?—I am sure we have.

6443. Do you think that they could be improved by giving them certificates?—I really do not think they could. No doubt the tendency of the age is to consider that the same practical experience in the future managers, combined with some theoretical knowledge, would make them still better, but the present managers are excellent men with a thorough knowledge of mining.

6444. Do you not think there might be a tendency to overlook the practical in favour of the theoretical?—I do not think that is so in coal mining, and we should have to make it the same in metalliferous mining. The theoretical knowledge would have to be in addition to the present practical experience.

6445. These mines are all under the supervision of a qualified engineer?—They are.

6446. The engineer keeps the plans?—Yes.

6447. Would you insist, as a necessary qualification for the under-manager, that he also should be able to keep plans?—No, we do not do it in the coal mines, and I do not think we could do that.

6448. Generally speaking, you think the class of men you get at the present time is excellent?—Very excellent indeed. The under-manager should have a knowledge of plans, but not keep them himself.

6449. You select your managers for their knowledge of timbering, and the practical working of the mines?—Yes. He must have a good knowledge of timbering and mining generally.

6450. You would not select a man who had not a practical knowledge of mining?—No. If he had a little knowledge of geology, it would not hurt him but improve him, and also of strength of materials.

6451. You say the ventilation of the mines is very good?—Yes.

6452. I take it you mean those mines that you come into contact with?—Yes. I think I have been through nearly all the mines in the district.

6453. Do you suggest that that is so in regard to all the mines?—With rare exceptions. Those exceptions are in fast places, perhaps an exploring drift, a place ahead of the general current of air. In some cases you get that.

6454. And in those cases only?—I think so. Wherever the candles burn dimly or badly, the men are withdrawn until something can be done.

6455. I suggest to you, at certain times of the year in some of our soft hematite mines, that the ventilation is extremely bad?—We never had it so when we worked our mines at Lindal. There the ore was soft.

6456. I suggest in some of these mines in the summer-time that the ventilation is extremely bad, and that it is largely attributable to allowing the air-roads to come too low?—That may be probably quite true. I do not know.

6457. Do you think in a case of that sort it would be a hardship to insist upon a standard of ventilation?—No, I think it is right that there should be a standard. The candle standard is the one that would appeal to me more than the theoretical one of 19 per cent. of oxygen.

6458. (*Chairman.*) The only point about that is this. I will tell you the advantage of the 19 per cent. of oxygen, that you can fill a bottle with air or three or

* The following is an extract from the report of Mr. Morison, M.D., D.P.H., Medical Officer of Health to the Cumberland County Council:—

"Arranged in the order of their phthisis mortality rate the "urban districts stand thus:—

	1909.	1908.		1909.	1908.
" Penrith - -	1·49	1·9	Egremont - -	0·95	1·7
" Wigton - -	1·43	1·1	Maryport - -	0·87	1·03
" Carlisle - -	1·26	1·1	Cleator Moor -	0·75	1·5
" Arlecdon & Frizington - -	1·15	1·7	Holme Cultram -	0·62	0·2
			Aspatria - -	0·6	0·6
" Cockermouth -	1·1	1·1	Harrington - -	0·53	0·8
" Whitehaven -	1·03	1·2	Workington - -	0·52	0·7
" Millom - -	1·0	1·1	Keswick - -	0·44	0·6"

four bottles, or six if you like, and take them away, and there they remain as absolute proof of what was the case. People may say "I did not think the candle was burning badly, or it did not strike me," when you are out of the mine the evidence is lost, whereas if you have a bottle of air, there is no question about it?—If the sample is taken fairly, but if you take it from the floor——

6459. I assume you must take your samples fairly. That is the point?—It seems to me when 21 per cent. is the standard of the purest air you can get, that 19 is rather close to it.

6460. You have not committed yourself at present. I do not wish to commit you to those figures until you have had an opportunity of going further into the figures. I have said if a fair standard could be got there probably would not be much objection?—The difficulty would be in the future that the manager might be prosecuted if a sample was taken and it was found——

6461. No, it is not intended to do that. It is only suggested that men should not be allowed to continue to work after the air has become bad?—I agree with that.

6462. It is not merely having it, but that you must remedy it if it occurred, the same as in coal mines?—I quite agree with that.

6463. (*Mr. Lewney.*) I am not sure of the construction that may be put upon it, because men will work in places where the ventilation is bad rather than that they should be compelled to go home. It becomes a serious matter to a workman to lose two or three days a week owing to bad ventilation?—It is better to go home for a day than to get poisoned.

6464. (*Chairman.*) The point is that sufficient means should be taken, and enough air brought in to prevent that being a normal state of things?—That is done as soon after as possible, compressed air is sent in. They are not asked, and never will be asked, to work in bad air. If a candle will not burn, it is impossible to ask a man to work.

6465. (*Mr. Lewney.*) You do not suggest that it would be impossible to carry out this standard of ventilation?—So long as the standard is not too high, and the samples are taken fairly. There is the standard already by the candle.

6466. It is not always a case of standard?—I cannot agree. If the candle will not burn the men are not asked to work.

6467. You will allow me to know a little about it. I have had a long experience of mining?—I am sure you have had, but I have also had a long experience.

6468. I am going to refer to a matter I overlooked when some of the men's witnesses were under examination. It has been suggested by some witnesses that special men should be detailed off to do the shot-firing?—I do not think that is necessary. Each miner is qualified to fire his shots. It is not necessary to have special shot-firers.

6469. Have you had reason to complain of the men in that respect?—Never now. In the very early days we had reason to complain.

6470. When a new kind of explosive was introduced?—Yes. Now there is no reason to complain about anyone.

6471. I suggest to you that it would lead to a great deal of ill-feeling among the men if that system were introduced?—I am sure it would. There is no necessity for it.

6472. There is one suggestion you made in regard to the continuation of the hole that had been blasted and had not shot out clean to the bottom. Would you suggest that should be put into the Act?—It is a very necessary thing that they should not go into these holes. I do not know whether it is of sufficient importance to put into the Act. If there were special rules it might be put into those.

6473. Do you not think, by taking reasonable precautions, that this is perfectly safe and sometimes of very great assistance to the workmen?—I am sure it is of very great assistance to the workmen sometimes, but if there is a rather deepish part of the hole left, 18 inches, one does not know what might be in it. There might be half a cartridge that had not been consumed. For a man to begin and bore that cartridge is a serious thing.

6474. The trouble being, if you did not prevent the men starting, it would be hard to limit the amount?—I would almost put it into the Act so as to prevent any miner starting to bore in an old hole. Mr. Flynn made some remark. I think he agrees with me.

6475. (*Mr. Ainsworth.*) He said sometimes the old holes are best?—He can fire the hole again if there is much left.

6476. (*Mr. Lewney.*) Supposing he had only 6 inches. It is an hour's work to bore 6 inches sometimes?—Yes, but there is that risk with these old holes. It is desirable that they should have a distinct rule to prevent them from doing it.

6477. In regard to ladder-ways being allowed in very shallow mines, did I understand you correctly to say that these should be the sole means of exit?—I think for some shallow mine like that they might have the privilege of using ladder-ways as the sole means of exit.

6478. Is that temporary?—No, but usually there are only a small number of men in them, and the means of raising is sometimes only a gin, or something of that sort. In that case I would let the men up the ladders if they liked.

6479. Would you put a limit to the distance?—Twenty fathoms is in my mind, but I am not tied to that.

6480. In regard to the water for the changing-house. You are of opinion that only clean water ought to be used. Have you known water pumped out of the pit used for that purpose?—No, it never came under my notice. Generally the mines are supplied with water from the corporation, and the town supply is put on to the changing-houses. I suppose there are cases where that cannot be got, and you have to do the best you can.

6481. Would you not consider it objectionable to get water out of the pit?—I do not think it is nice for washing. Wherever it can be got, if at all possible, you should have clean water.

6482. Your experience has proved to you, I think, that water coming out of the pit not only is contaminated with dust from explosives, but with oil from the bogies?—It is not nice water for washing at all. It could be only in a case of necessity that they would get water from the mine for the changing-houses. I have not in mind any that have not a pure supply of water. I do not think it would be well to put it in an Act of Parliament that it must be only town supply, because it could not be got sometimes at all.

6483. But good clean water?—I think that is rather hard. In some cases they may not be able to get it.

6484. I would rather go home, I tell you candidly. I should feel that I was not justified in washing in water which was pumped out of the pit?—I agree with you. I would do the same.

6485. If men are going to be compelled to wash, they should have clean water?—I do not think that they should be compelled to wash. I do not think that compulsory washing at the mines should be enacted. It would not be fair.

6486. If the employers are compelled to provide additional changing accommodation, it seems to me that it would not be a great hardship to ask them also to provide an ample supply of clean water?—What would you do if there is not a supply to be had?

6487. Do you know any place where that is so?—In some of the mining districts I do not know how you would get it.

6488. You agree that in the future it would be desirable that the employers should pay the man who has charge of the changing-house?—It is a small matter; I do not think the owners would object to do that. No doubt it would lead to better order in the changing-house, and I think it would be better to be done in that way, working, of course, with the committee suggested. It should not be entirely in the

hands of the owners. They should have the assistance of a committee of workmen to keep order.

6489. That would be a matter for local arrangement?—Yes.

6490. In regard to the keeping in order of the roadways, sometimes the roadways are dangerous in ground where it is crushing heavy, and it is necessary in the middle of a shift to put in a course of timber to support the roof. Do you not think it would be better to come to an arrangement to pay the men specially for that class of work?—That does not occur. All the main roads are maintained by the shift men. There is never a miner brought out to repair the main road. The bargain is that he keeps his own road, from the main road to the working face. That is a matter of bargain, and he gets so much a ton to cover the cost of repairs to the road and of putting a set of timber. It is only his own road. It is not the main road, or one where two or more workings are using it.

6491. I suggest to you that it would conduce to safer working if the men were allowed a certain payment where they were called upon to do this work?—I think you mentioned 1*s.* 6*d.*

6492. I do not specify any particular sum. It varies?—That is a custom we had in Furness. It is different in the Cleator district. The miners are not taken out to mend the main roads, but only that piece of road, which is arranged for in the bargain.

6493. With regard to the inspection of mines, in the event of a fatal accident, have you any objection to allowing a representative of the workmen to inspect the place where the accident has occurred?—I do not think I would have, so long as he is a practical miner. I do not think any of the owners would object so long as he is a practical man.

6494. (*Mr. Lovett.*) I take it that you would fully approve of the Metalliferous Mines Act being made self-contained?—I think so.

6495. You would have no reference to any other Act at all?—Yes, the Truck Act is one by itself.

6496. Quite so?—I think they should be all combined and made self-contained.

6497. And that the men working in and about the mine should come under this particular Act?—Quite.

6498. Do you think it would be any hardship upon the employers if it was made compulsory to provide every employé with a copy of that Act?—It might be abused.

6499. Only one copy, and that the man should sign his name to say that he had had it?—I think we do that in the coal mines.

6500. It is not done generally. With regard to inspection, do you think it would considerably minimise the danger of accidents if a more frequent inspection took place?—I do not think it would have the slightest effect. We are glad to see the inspector come, but I do not think it would have any effect.

6501. It does not seem to me logical to take up that attitude. Are they inspections if they do not minimise the number of accidents and lessen the danger in that respect?—For the actual timbering I do not think it would make any difference, but there are many other things the inspector is useful and necessary for; but, as regards the actual timbering, I do not think it would make the slightest difference.

6502. If you say one inspection a year is good, would not two be better?—Not so far as the timbering is concerned.

6503. Taking the whole mine, I mean?—One must admit that the conditions have improved since the mines have been inspected, but so far as the timbering and keeping the roof and sides safe are concerned, I do not think it would affect them.

6504. You think the present Inspector is able to inspect properly the whole of the mines and quarries in this district?—I do not know what you mean by "inspect properly," but he cannot do it every week or every month. That would be too big a task, but he inspects generally, and we know that he may come at any moment. The whole thing is kept up to the mark with present inspection.

6505. The present inspectors may be desirous of doing their duty and trying in every way to carry out their obligations to the men, the company, and the Government, but they cannot get round so frequently as they desire to?—In that case, if he has too much to do, he should have assistance, no doubt; but so far as the actual carrying on of the work of the mine is concerned, especially that part you refer to, I can only repeat that I do not think it will make any difference, an additional inspector coming down.

(*Mr. Ainsworth.*) I think Mr. Lovett is referring especially to the Government inspector.

(*Mr. Lovett.*) Yes.

6506. (*Mr. Ainsworth.*) He is not referring to the day-by-day inspection?—I understand that. Supervision of mines is different from inspection.

6507. You would not object, and you do not suppose that any owner would object to the Government appointing additional inspectors if they thought it conduced to the safety of the district?—Not at all.

6508. You are always pleased to see the Government inspector whenever he comes?—Yes.

6509. Besides having the management of the Parkside Iron Ore Mines you have been employed as a mining engineer on behalf of interested parties in almost all the mines, or, at any rate, a large number of mines, in the district, acting for proprietors and on behalf of lessees?—Yes.

6510. Therefore, you have a large acquaintance with the Whitehaven district, and also in the same way with the Furness district?—Yes.

6511. With regard to the possibility of second shafts being required, not only the safety of the main shaft but also the safety of the main roads is essential?—Yes.

6512. Therefore, it might be possible, if the second shaft had to be put down, that it might be put down in the wrong place, and the development of the mine might in a short time point out the want of a shaft in another place?—Quite so.

6513. You would say of hematite mining in the Whitehaven and Furness districts that the scheme of mining has frequently to be varied?—Yes.

6514. You might say in many workings that it varies from fortnight to fortnight?—That is especially so in the Cleator district. In Furness, where there are large masses of soft ore, as was at Low Field, you can go on a long time without much change, but where the roofs are irregular and the ore is in pockets, it is a continually changing mode of working. You have to suit the mode of working to the circumstances.

6515. There is always a possibility of the nature of the working varying?—Yes.

6516. The position and the dip of the ore varying at short intervals?—The hematite is a very irregular deposit in this district.

6517. Here the surface deposits are worked out?—Yes.

6518. Mining now is different at a depth of 100 fathoms or more?—Yes, mines now are deep.

6519. You know mines of the depth of what?—Of over 200 fathoms.

6520. Which again renders the question of the second shaft extremely difficult?—It would be a tremendous mistake to make a double shaft compulsory. It would close up many mines.

6521. With regard to the height of the workings, you could not accept any fixed height?—No. One of the workmen witnesses put it very well the other day, that you must suit your height according to the ore.

6522. With regard to ventilation, the rough and ready test is the burning of the candle?—Yes. Whenever the candle goes out or burns dimly, the men should go out.

(*Mr. Lewney.*) Long before that.

6523. (*Mr. Ainsworth.*) You would have no objection, for the purpose of making the Act of Parliament clear, that the ordinary test of a candle burning should be translated into a chemical standard?—I do not think so. So long as the standard is right I do not think there is any objection.

6524. (*Chairman.*) You would not represent that a mine should be usually conducted with a ventilation

in which a candle would not just go out?—No, long before that.

6525. (*Mr. Thomas.*) Economically that would not suit mine owners?—No. A mine could not be worked in that way at all.

6526. (*Mr. Ainsworth.*) We may take it also as soon as the candles burn dimly the men cannot work satisfactorily and cannot get ore according to their price?—No. The manager immediately takes steps to bring in fresh air.

6527. It is to the interest of the management to get as good ventilation as they can?—Yes. The ore is very hard where there is bad air.

6528. With regard to clearing out gases or bad air by forcing in compressed air, have you known forcing in compressed air into the working have any effect on the health of the miners?—Never. I once did it largely and never had the slightest complaint.

6529. It is not easy to see how it could have any effect?—It is air, compressed no doubt.

6530. As soon as it is out of the pipe?—It is still air.

6531. It spreads itself all over the place?—Yes.

(*Chairman.*) It is the smell that they complain of. Some of the oil is carried off, and they think the air is bad. The oil gets somehow into the air.

(*Mr. Greaves.*) From lubricating the cylinder.

6532. (*Mr. Ainsworth.*) That would soon pass off?—It depends on the oil used and the quantity of air compressed.

6533. So long as you get rid of the dynamite fumes, that is the main thing?—The men welcome it, I think.

6534. (*Mr. Thomas.*) Is it customary, where compressors are used to supply air for ventilating purposes, to blow off the receiver occasionally?—Yes. We turn it off, and let it blow out.

6535. With the intention of getting rid of oily matter?—Yes.

6536. (*Mr. Lewney.*) Have you ever tested the air coming through this pipe?—Yes, by breathing in it a long time.

6537. Have you not known it give off an offensive smell?—One has remembered a little smell sometimes, but it soon passes off. You do not feel it for any length of time.

6538. I have known it offensive, but whether it is attributable to the cause mentioned by Mr. Greaves, I do not know?—I do not think there is the slightest danger, and there is no disagreeable effect.

6539. I do not suggest it is disagreeable, but I have known it have an offensive smell?—I have had no bad effect from it, and I have been in it a long time.

6540. It may be due to the cause which has been mentioned, bad oil?—Yes.

6541. (*Mr. Ainsworth.*) With regard to safety cages, you would agree the chief danger in connection with the shaft is not from the shaft itself but from the machinery or the ropes?—Yes.

6542. As you have had considerable experience, I would like the Commission to hear your views as to safety cages?—I do not agree with them all, certainly not in a deep mine where the winding is fast. There is a great risk of the cage when going down, especially when winding quickly being suddenly arrested by the catches coming into play when they should not, and ropes are so good that you rarely find a break. It is safer without the safety catches in deep mining. I would have detaching hooks, but not the safety cage.

6543. When the detaching hook acts you would allow the cage to go to the bottom?—No, it is caught and suspended in the head-gear.

6544. You think so long as you provide against that, that otherwise the point is to have all the machinery and slides and things of that sort in good order?—Yes.

6545. With regard to ambulance work you would say that it is thoroughly well looked after?—I think so. I do not think there is any district in the whole of England or Scotland any better than ours. They are not so good, I think.

6546. Something occurred to me when you were speaking of the difficulty of getting men to attend the County Council lectures for technical education. Do you think it would assist if the matter was taken up by the Ambulance Committee? The ambulance is a security against danger from accidents in the same way as the fact of having the miners well educated is also a safety. The better educated you can have your miners the better you can get them to understand about the principles of mining. I should think it would be a safety against accidents. It is only a suggestion of mine?—We have tried those Continuation Classes so as to bring up the standard of education in young men who have left school not very well educated, but they will not attend them. They go to pigeon shooting and look at football matches and fly pigeons, and so on, but generally they will not attend those classes.

6547. I suppose all the underground managers in the district are men who have begun life as practical miners?—I think all of them.

6548. That is the great essential of a good underground man, that he should be a practical miner?—Certainly. The resident manager should have practical experience, I do not say in actual work as a miner, but he should have personal experience in the mine.

6549. Do you think if a certificate—I mean a reasonable certificate that the candidate has been able to pass a reasonable examination—was required before a man was appointed (we are speaking now, of course, of the future), that it would be an inducement to young men in the same way as it appears to act in the coal-mining industry upon those who attend the technical classes and have opportunities of education of that kind?—I am sure it would.

6550. If this certificate was of no other use, it would encourage men to go in for them?—Yes.

6551. With regard to the boys, you said that no boys were employed under 16?—Under 14, and that only on the surface.

6552. They do not go underground till they are 16?—No.

6553. Both with regard to employment above and under ground, would it not be a good thing to make it a condition that they must attend some kind of school?—I think it would.

6554. Working only in an 8-hour shift, and the fact that a boy would in alternate fortnights be on the morning shift, he could attend evening school?—Yes.

6555. You think it would have a good effect to make that a condition?—Yes.

6556. With regard to the cost of dynamite and the possibility of any unintentional breach of the Truck Act, it is the case if any miner thinks he is being overcharged for candles or dynamite that he can apply to the Mines Inspector to go to the employ and see the whole thing?—Certainly. There would be no objection to that.

6557. Is it not the case now that any miner who thinks the stores supplied are over-charged, can bring the matter to the notice of the inspector without mentioning his name, and the inspector can go to the office and see the whole thing?

(*Chairman.*) Certainly he can complain anonymously, or he has a right of action as well.

(*Mr. Ainsworth.*) So long as the inspector is able to go to the office and see the whole thing, I do not see how anybody can be over-charged.

6558. (*Chairman.*) In coal mines I do not think there is any overcharge?—In the coal mines we had a joint meeting with the hewers' representative and arranged prices. I am sure there would be no difficulty with the hematite mines in doing it in the same way.

(*Mr. Ainsworth.*) I understand the inspector, if complaint is made, is able now without mentioning the man's name, to go to the office.

6559. (*Chairman.*) He has the right, and it is his duty under the Act to do it?—At the same time you know the miner is not robbed, because——

6560. (*Mr. Ainsworth.*) He wants a higher price?—Yes.

6561. With regard to compulsory changing, we understand you would be in favour of the employer providing the house?—I am against compulsory

changing. I do not think it would be fair to many men to compel them to change.

6562. I think we understand about that, but the better and the more comfortable the changing-house is the greater the probability the men would use it?—Yes.

6563. With regard to the supply of water, if there is not a good supply, that is a matter that might be left to the Government inspector to decide?—Sometimes it cannot be had. It might be filtered, or something of that kind, to make it better, but wherever it can be got, every mine owner supplies good water.

6564. I do not think you said anything about signalling. May we take it that you, like most of the other witnesses, are in favour of hammer signals?—Yes. I fitted one of my mines with electric signals. It was a wet shaft and they very soon got wrong. We eventually took them out altogether. They did not ring when they should.

6565. (*Chairman.*) Was that due to the contacts getting oxydised or foul?—They got damp and made contacts when they should not. We went back to the old hammer, and it was satisfactory.

6566. (*Mr. Ainsworth.*) One of the advantages of the hammer signalling is that it is heard at the same time by the pithead man and the engine man?—Yes.

6567. The two hear the same signal at the same moment?—Yes.

6568. Whereas if there was a signal apparatus in the engine house or pithead, it might become cumbersome?—It might not ring at the same time or at other times go wrong.

6569. You said in the Cleator district the surface deposit was practically exhausted?—That is so.

6570. I am afraid you will say the deposits we have to discover and work at considerably lower depths have not so far equalled in extent the size of the deposits worked in former years?—That is so.

6571. So that with deeper shafts and increased expenses of every kind the ore we have to work is smaller in body than it was?—I am afraid that is the tendency in the deeper mines.

6572. You do not look for the big deposits we have had in former years?—We have not succeeded so far.

6573. (*Mr. Greaves.*) With regard to the question of timbering and keeping the timbers on their own heading, I want to ask you a question for information. Do you think the fact of a man knowing he will have to put right any defective timbers will make him more careful to put them right in the first instance?—That must be so, knowing if they fall they must put them up again. There is no doubt about that.

6574. Now with regard to men riding against men, if you do not allow that, it is obvious the men will ride in double the number of trips?—Yes.

6575. That is so, obviously?—Yes.

6576. Say an accident must occur in a certain number of trips. That is so, is it not?—You mean by the law of averages?

6577. Yes. Therefore, there is twice the chance of men being in the cages when the accident occurs. Therefore, the law of averages comes in, and double the number of men would be injured in an accident, whereas there is only half the chance of their being in it?—I see the argument.

6578. According to the law of averages, that is so is it not?—I do not remember a winding accident of that kind.

6579. (*Mr. Lewney.*) Do you not limit the number of men that ought to ride on a cage?—Yes.

6580. (*Mr. Greaves.*) That does not affect the argument of the law of averages. If they are riding men against men there are double the number of men in the trip?—In a big mine there would not be time.

6581. It must be so. I am only putting it to you because it must be so?—In a big mine it could not be done. We never think of it in the coal mines.

6582. One argument against riding men against men by one of the witnesses was that there were double the number of men hurt when there was an accident. I was trying to point out the law of averages equalises the risk?—Yes.

6583. We have heard it stated that it is customary in many cases to make a charge to all the employés in the mine for the changing-houses, whether they used them or not, and that it was a profitable part of the mine?—It is false. There is no such instance in the whole district. There is a gratuity given by those who use it, but not by the whole of them. It is quite a wrong statement.

6584. It is not customary to charge all the employés?—No. There is not a case of that kind in the district.

6585. (*Mr. Thomas.*) With regard to the standard of ventilation, you seem to have some apprehension as to the proposed figure of 19 per cent. of oxygen and 1·25 of carbonic acid as a maximum as a practical definition of the condition in which the air would be to cause a candle to burn with half a flame?—That would be all right, if it is.

6586. I think you may take that as being on Dr. Haldane's authority the condition which would obtain?—I have felt myself, and others feel, that with 21 per cent as the standard of greatest purity, 19 seems very close to it, and one authority says that air containing 6 per cent. of CO_2 is dangerous to breathe.

6587. So it would be?—There is a big difference between that and 1·25.

6588. 1·25 is the maximum?—I do not want an impossible standard fixed.

6589. You would rather reserve your opinion upon that matter until you have further information?—Yes.

6590. You may take it from me (I think I can show you some investigations made by Dr. Haldane and myself to a considerable extent, as far as my experience in metalliferous mines is concerned), the cases would be very rare indeed where you get any air so bad as that standard, except exceptional cases where ventilation is temporarily interfered with, or in blind ends, where as prudent men from economical grounds we should put it right?—We want to guard against someone coming into close ends and taking samples, and that we should be prosecuted because it happens to be above the standard.

(*Mr. Lovett.*) It is not proposed to prosecute.

6591. (*Mr. Thomas.*) It is a definition as to the condition of the air which would obtain when a candle got in that condition?—We understand the candle perfectly.

6592. I only wanted to make that point perfectly clear. You agree that the explosives should be examined and passed by the Home Office?—I think it would be of great good.

6593. It would be a great advantage to the consumers?—To guarantee they were right to the consumers.

6594. A question has been raised many times in regard to limiting the height of the working place?—It would never do for our district at Whitehaven.

6595. The present system is satisfactory so far as the ratio of accidents is concerned?—You must have the working according to the nature of the ore.

6596. You agree that it is desirable to amend the Metalliferous Mines Act and embody in that Act many of the salient features of the Special Rules which are extant in various mining districts in the country?—Yes. We have some in our own district, but we have been waiting for this Act for some years before framing Special Rules.

6597. Amongst others no doubt you would like to retain such clauses as follows:—"Each shift of "workmen, before commencing work, shall carefully "examine and sound with a hammer the roof and "sides of their working, and if any loose or "'drummy' pieces are found, they must be taken "down before anything else is done, and if at the "termination of their shift there be any unfired shots "or any loose or dangerous ground in their working, "they must not leave their working without at once "communicating the state thereof to their partners "on the succeeding shift, and to the manager, over-"man, or deputy. All workmen must timber their "workings in such a manner as to keep themselves "safe": and such as "He shall, before commencing "work, and whilst at work, satisfy himself of the

" safety of any climbing way, ladder, tub, bucket, " kibble, skip, chain, rope, hook, windlass, or other " appliance for his personal use, and shall not use " anything that he finds unsafe. When employed in " driving, sinking, rising, or stoping, he shall properly " secure his working place to the satisfaction of the " Captain, and if he thinks a sufficient supply of timber " has not been provided, he shall report the same to " the Captain or Agent who is in charge." You would favour the retention of provisions of that kind as being an additional safeguard for the safety of the men, additional to the regular and periodical inspections of the officials and the inspector?—Yes, and that is our practice at present.

6598. That is the general practice obtaining, and from your long and varied experience you see no reason why they should be deleted in any way or lessened in their effective usefulness?—I would not delete them on any account.

6599. You would retain these provisions, and throw the responsibility on the men, and by doing that bring out the best features of miners which you draw upon for your labour, and in other metalliferous mining districts also?—Yes. That is just the present practice.

6600. In regard to mine plans, you made some suggestion. You would agree that mine plans should be either drawn to true north, or the date of the magnetic north should be definitely stated?—Yes.

6601. Preferably the former?—Yes.

6602. Would you agree with the suggestion that the mine plan should be in some way or other connected to the Ordnance Survey bench mark?—I made that suggestion in my statement.

6603. In addition to that, would you also agree that some level in the mine, possibly all, should bear some relation to the Ordnance Survey datum?—Yes. They all should be applicable to the Ordnance datum.

6604. In addition to that, in regard to the plans of abandoned mines, whatever the number of men that may be employed in any individual mine at the time of stoppage, that plan, in the interest of safety and those who come after, should be deposited?—I agree. It may be a big mine although only having a few men in it.

6605. You would, no doubt, go so far as to say that that plan should be made by a certified surveyor?—Certainly.

6606. You have, no doubt, in this district as in others in this country, occasionally suffered from the want of plans of abandoned mines, which has given considerable trouble?—Yes. It is the case in every mining district.

6607. Provisions of that kind you would welcome?—Quite so.

6608. As a matter of interest I presume that the fees the County Council charge to the men for their lectures should be no bar to the men availing themselves of the facilities?—I think they are almost free altogether. A suggestion has been made to me, and I think the owners would agree to it, that at such mining classes, if there are expensive books needed by anyone, that they should be provided, such a book as "The Elements of Mining," by Sir Clement le Neve Foster. I am sure the mine owners would be willing to present a book of that kind to any men who attended the classes.

6609. Generally the position is this. The educational facilities in this district are ——?—Exceedingly good.

6610. I will put it in this way. The educational facilities in this district are far in excess of the requirements of the district, as indicated by the attendances?—Far in excess.

6611. I noticed with considerable interest you said you would not have safety cages?—No.

6612. What prompts you to come to that conclusion?—One's experience.

6613. Might I suggest that the answer would be that statistics would seem to indicate that there are less accidents when a good rope frequently examined is put in and relied upon, than where safety cages are used and you get an undue, perhaps an unwarrantable, confidence in mechanism that goes wrong?—Yes. In deep shafts I would not have them on any account.

6614. You would rely on a rope periodically examined, and a careful account kept as to the work done?—Yes.

6615. I suppose that you appoint some man to see that those ropes are in order?—Yes. They are examined periodically and oiled, and the broken wires counted and a record kept.

6616. And a book signed?—I am afraid there is not so much of the signing. In some mines that is done. It would be a good thing to do it.

6617. In this, as in other matters, you are far in advance of the Metalliferous Mines Act as at present set forth, in your opinion?—Yes, very much in advance.

6618. (*Mr. Lewney.*) You stated, in reply to a question by Mr. Thomas, that you would be in favour of incorporating the Special Rule mentioned by him in the Metalliferous Mines Act. It says that the men " must not leave their working without at once " communicating the state thereof to their partners," that is, providing the working is, in their opinion, dangerous?—Yes.

6619. I take it you suggest this should be incorporated with certain modifications?—I think we should not relax the responsibility of the men. They should look after the working just as carefully as if there was no inspection by the officials. That was, I gathered, the wording of the Special Rules; they must examine, and if they find danger, retire themselves without being ordered to do so, and report whatever they see.

6620. There would be a practical difficulty in the way of carrying out the latter clause of this section; for instance, if the men were working on the afternoon shift you could hardly expect them to remain in the working till the shift next day?—They might write " something dangerous." They must send a message.

(*Mr. Thomas.*) Having looked into these Rules, I think that is the only one of the whole set of Special Rules that contains any provision of that nature, and apparently that is fairly old.

6621. (*Mr. Lewney.*) I am not taking exception to the whole, but certain parts would have to be eliminated?—The idea is to keep up the responsibility of the men as well as of the officials.

Mr. William Dixon, Mr. William Edward Walker, Mr. Joseph Borrowscale Adair, called and examined.

6622. (*Chairman.*) I do not know that I need go through at length the whole of the points that have been taken by Mr. Scoular, who has appeared with you, because evidence does not improve by repetition. Have you heard his evidence, and do you generally agree with what he said?—(*Witnesses.*) Yes.

6623. (*Chairman.*) Is there any point upon which you differ, or which you would like specially to emphasize, Mr. Dixon?—No. I do not think that there is anything special I wish to emphasize.

6624. I have looked through your proof of evidence. You are a mining engineer, of Bigrigg?—Yes.

6625. Your statement appears to me to go on the same lines as the evidence given by Mr. Scoular?—Yes, that is so.

6626. You would have no objection to a scientific standard of ventilation, provided it is a proper and fair one?—Provided it is a proper and fair one.

6627. You agree with what has been said about the changing houses?—I do.

6628. And with regard to two shafts?—Yes, not to make two shafts compulsory, because it would be a great hardship on the district.

6629. (*To Mr. Walker.*) Do you agree generally, too?—I do.

6630. Have you any particular points to which you would like to call attention?—The only one is the question of the two shafts in place of one. We have recently taken a royalty of over 80 acres and the depth to the bottom of the ore will be over 220 fathoms.

It will cost 100,000*l.* to sink a shaft, and in a case like that we could hardly be expected to sink two shafts.

6631. You mean that you could not get the capital for it?—No.

6632. Do you concur in Mr. Scoular's view that there is no unreasonable danger in going down if the one shaft is a good one? You would not be afraid to go down yourself?—No.

6633. You are not afraid of working there, and you think no man ought to be afraid?—I would not be afraid.

6634. If an engineer or manager would send his own son there, you think no one ought to be afraid?—Certainly. I would. I have nothing else to say. I agree with Mr. Scoular entirely.

6635. (*To Mr. Adair.*) Have you any other points you would like to add to Mr. Scoular's evidence?—No.

6636. I will take it that generally you agree with Mr. Scoular's evidence?—I practically agree with Mr. Scoular. With reference to the two shafts, I am afraid it would be a disastrous thing to insist on two shafts. When you come to a depth like 200 fathoms, it is too expensive.

6637. You agree with what has been said?—Yes.

6638. You would have no hesitation to working yourself in a mine with one shaft under those conditions, if it is a good shaft?—No, I should not have the slightest hesitation.

6639. With the provision always of an emergency exit up the side in case the cage got out of order?—Yes.

6640. That emergency ladder exit you would regard as a good one?—I think it is just as well to have it.

6641. It does not exist in all mines at present?—No, in very few.

6642. (*Mr. Thomas.*) That is to say, a ladder or another engine to hoist the men out?—Yes.

(*Chairman.*) An alternative method.

(*Mr. Scoular.*) There is one point I omitted. The dragging of the shaft was mentioned. These deep shafts will not drag. The dragging only applies to shallow places. We would not think of having a dragging shaft as the only shaft. We do not want that. These dragging shafts are things of the past. The deep shafts will not drag.

6643. (*Mr. Greaves to Mr. Scoular.*) They are sunk away from the ore, as a rule?—Yes.

6644. (*Mr. Thomas to Mr. Scoular.*) When you embark upon an enterprise entailing an expenditure of 80,000*l.* or 100,000*l.*, you take care to design your mode of operation so that you are free from any subsidence that may take place?—Yes; it would be suicidal not to.

6645. (*Chairman to Mr. Scoular.*) It would not do to have a dragging shaft as the only means of exit?—No.

6646. Where that occurs it ought to be the duty of the inspector to take action under section 18?—Yes. One of the witnesses thought the shaft might drag. That is not the position. The new deep shafts are so arranged as not to drag.

6646*a*. (*Mr. Ainsworth.*) With regard to the point of change of system of mining in this part of the country which Mr. Walker and Mr. Dixon are especially aware of, you would say the style in which a shaft is sunk, the way it is laid out, the style of machinery, the nature of the ropes, are infinitely superior in every way as regards the safety of the shafts and machinery and everything else we were accustomed to 50 years ago, although you have now to seek for the ore at a much lower depth, and as a rule the deposits are smaller and more irregular?—(*Mr. Dixon.*) That is so. The conditions are totally different to what they were. The same conditions exist with regard to the height and size of the workings. Where you have a regular deposit similar to Hodbarrow, or even at Beckermet, the size of the workings and pillars is limited. In one particular mine you may have a regular deposit, and in another portion you may have a vein deposit. In the regular deposit it will be almost impossible to limit the height or size of the workings, but in the vein deposit you can do so. When you come to a question of picking out the pillars, then it would be a matter of impossibility to have any fixed rule with regard to the height. In the Cleator district the conditions again vary. We have the iron ore in what we term seven different stratified beds of limestone. In most of them it is ore-bearing. If we take the first deposit of ore it is on an average something like 15 feet in thickness fairly stratified. Under the ore, if we take 12 or 13 feet, is our first working width. We would naturally leave 2 or 3 or 5 feet of ore, as the case might be, but between that and the solid limestone roof you might have a parting. That would make that ground very dangerous. The custom is, no matter the height, to take the ore off by the solid roof, because it is so regular and stratified it is impossible to break down. If we go further to the Margaret Pit, Winder Mine, the same condition exists. We have two regular deposits, one a stratified deposit under the gritstone, the other a vein deposit lying at an angle of 45° as against the slate. That continues up and is worked in regular heights by timber, and the widths are kept less than suggested, simply the size of the timber. They are worked through, and pillars left in equal sizes, and at the finish we commence robbing. The other deposit we have is under what we call a gritstone roof, which is very hard, and the thickness of the deposit varies: in some cases it may be 5 feet, gradually rising to 15 or 20. It is not an extensive deposit, because it is largely mixed up with limestone or rock intervening. You can practically take the whole out and leave the roof standing. It is so hard that in olden times it was stated it was impossible to get through it. In sinking shafts it is said it cost one guinea an inch to sink through this whirlstone. There is the character of the roof under the regular deposit. It would be a mistake to limit the size or make any fixed rule for the size of the workings in this district.

6647. (*Mr. Ainsworth to Mr. Dixon.*) You would say such a shaft as you sink to-day, as far as the safety of the men using it goes, is infinitely safer than the shaft machinery and ropes you used to sink with, even though they were the best to be had at the time?—Yes, larger in every way. This is what we call a four-compartment shaft.

6648. Is that the Bigrigg one?—Yes.

6649. (*Mr. Thomas.*) Presumably it is customary to brattice off one portion of the shaft from the other to get a return ventilation?—That is so. You regulate the upcast and downcast shaft.

(*Mr. Ainsworth.*) Would you have room in the shaft you are sinking now? Will you give the size of it? It is on the plan, but will you mention it to get it on the notes?

(*Mr. Thomas.*) 21 ft. 8 ins. over all.

6650. (*Mr. Ainsworth.*) In that shaft you could arrange to put a series of ladders in the pump shaft?—No; we have four compartments. We could put a series of ladders in an independent shaft.

6651. (*Chairman.*) An independent compartment?—Yes.

6652. In the middle of *that* one?—Yes. The intention is to put a cage in that particular shaft, and regulate it and work it with the winding engine.

6653. (*Mr. Ainsworth.*) To have a separate winding engine and cage for that shaft?—Yes.

6654. That would be far better?—The same thing exists at our Margaret Pit. We have not a separate compartment, but a separate engine cage, so that the men can ascend or descend independent of the winding engines.

6655. (*Mr. Thomas.*) You have anticipated the desire expressed to have another means of exit?—That is so. The general tendency of the evidence I have heard has been anticipated certainly more than 21 years ago. I have a set of rules specially by me which was framed by a gentleman who was the mine manager at that time, and the bulk of the conditions in that have been carried out in the special rules to-day. Mr. Leck is the man I refer to.

6655*a*. (*Mr. Ainsworth.*) I suppose both Mr. Walker and Mr. Adair would confirm what Mr. Dixon has said?—(*Mr. Adair.*) Yes. (*Mr. Walker.*) Yes. You mentioned the difference about sinking shafts now and

50 years ago. I do not think there was one timbered 50 years ago, but now they are all timbered. With regard to ropes, we buy ropes. We do not contract for them, and we order the best, irrespective of price. That is another improvement, and a very important one, too.

6656. (*Mr. Ainsworth to Mr. Walker.*) What system of signalling do you recommend?—I think we should be in favour of a uniform system of signal right throughout—the ordinary hammer.

6657. And the same rules of signalling throughout the district?—Yes.

6658. You stick to the hammer?—Yes.

6659. (*Mr. Leamey to Mr. Dixon.*) In regard to the down signals, is it customary to have the down signals so far as 25 fathoms from the place where they are required, that is to say, if the levels are 25 fathoms apart do you think one down signal is sufficient?—We have the down signal to the bottom, but we have signals to the eyes as well. It can usually be heard for more than one. Sometimes where we are within speaking distance of each eye one signal is used.

6660. (*Mr. Ainsworth.*) You would be in favour of a telephone or speaking-tube in the case of an accident of any kind?—There is no objection to that.

6661. So that information could be given to the top at once?—Yes.

Mr. William Walter Casson called and examined.

6662. (*Chairman.*) You are a mining engineer, and you have the management of the Townhead Iron Ore Mines at Egremont, the Jacktrees Mines at Cleator Moor, the Salter Mines and Limestone Quarry at Rowrah, and the Boonwood Mining Co., Ltd., the last of which is only exploring at the present time?—Yes.

6663. You appear on behalf of the iron ore proprietors of this district to give evidence?—Yes.

6664. With regard to the points of your evidence, you have heard the evidence of Mr. Scoular upon them?—Yes.

6665. Do you agree generally with that evidence?—Yes, generally I do.

6666. Do you agree as to what he said about the two shafts question, for instance?—Yes, generally. Of course I think the whole of the owners of the mining industry are against the compulsory two shafts at the commencement.

6667. Is there any danger in the one-shaft mine which renders it unreasonable to ask a man to work there?—None that I am aware of.

6668. I suppose a certain number of the owners' and managers' sons go down and work, as well as the workmen?—Usually.

6669. Owners send their sons down?—I have done so myself.

6670. You are not afraid for yourself or for your son, provided the shaft is a proper and good one?—Certainly not.

6671. I suppose these shafts in the deep mines do not drag like the shafts in shallower mines in soft earth?—No, because they are through a deeper deposit of rock.

6672. Are the deep mines more perfectly vertical than some of the mines in the small places?—Naturally. You have not the same drag.

6673. In the Furness district I am told that a good many of the shafts are out of the vertical. Do you know the Furness district?—I do not.

6674. You agree generally with what Mr. Scoular said about ventilation. He said he would not be against a standard if it was a reasonable one?—The question of the 19 per cent. of oxygen and carbonic acid gas we have no experience of, and we are a little averse to accepting anything definite.

6675. At all events till you know more about it?—Certainly.

6676. If you knew about it, and it was a reasonable standard, you would not object whether it was laid down that a candle should burn properly or that there should be a certain amount of oxygen and carbonic acid in the air?—I do not see any objection in a case like that.

6677. You agree with what Mr. Scoular said about explosives?—Yes. Our own special rules provide for this, as a matter of fact, the special rules we have at the present time.

6678. You only generally confirm the other witnesses?—I am not quite clear on the question of the changing-house capacity. Is it intended that the capacity of 150 cubic feet shall apply to the whole of the men, and that sufficient accommodation shall be supplied for the whole of the men employed at that mine.

6679. We suggested that they should be supplied on that scale in all cases where the men desired to use it, or where there was any reasonable prospect of their using it if provided?—If there were 100 men employed in the mine you would not provide 100 times 150 cubic feet of space if only 50 men changed.

6680. If there was a reasonable prospect that if there was a good changing-house the remaining 50 would change, I would make the provision for the 100 men?—May I put it in another way? Supposing there are 50 men in one shift and 50 men in another shift, is it recommended that the provision be made for 100, or for 50?

6681. If you had two shifts of 50 men each you would practically find about 40 in the shift at one time, because they take time to come up, and some get away before the others come in. If you had two shifts of 50 men you would find you would want 100 times 150 cubic feet in order to afford dressing room for the men and room for their clothes?—Do I understand that you only require 150 cubic feet space for the number of men presumably changing on one single shift?

6682. If you count two shifts of 50 each you would double the 50 and multiply by 150. We have measured up some sheds and found that about right?—My contention is that the two shifts cannot be changing at the same time, and that 150 feet would be sufficient.

6683. We will work that out. You have 50 men in the place changing. How much cubic space do you want to give 50 men changing in one room 150 feet each. Is that it?—That is your reckoning, I understand.

6684. That is a space of 10 feet?—By 5 by 3.

6685. Ten feet high. You cannot have it less than that. That gives 3 by 5. That is not enough. It means very little space. You could not have them as thick as that. They would be as thick as bees?—Probably not.

6686. I think you will find our figures better than yours?—My experience is in the large mines, where there are numbers coming up that some are changed and out of the building before the others arrive in.

6687. We have taken all that into account carefully. You think of it and write afterwards to the Secretary. Make your calculations carefully, and consider whether what we have stated is not reasonable The truth is we got it by carefully measuring some of the best ourselves, and seeing the men in there, and seeing whether they looked comfortable. I believe it to be the very minimum. Otherwise you agree generally with what has been said about changing-houses?—Yes.

6688. Is there any other point you would like to mention?—I would like to mention, as I represent the small owners, something in connection with the remarks made by one of the witnesses on Thursday last, to the effect that the small mines were a nuisance and a danger, and also that they used cheap material and ought to be closed, because they were the greatest sinners in every way. First, in reply to the word "danger," I presume he means danger to life and limb. During the time we have been working the Townhead Mines about eleven years we have had no fatal accident, and only one limb I can remember

broken through accident. At the present time we are employing about 100 men. I am told by the representative of another small mine working about 23 years, that they have had no fatal accident, so that I do not think we come really so badly out of it. I wish emphatically to state that we do not use cheap materials. We use practically the same material in the way of timber and other stores as are used in the other mines of the district. In reference to the small mines being closed, at the three I represent we have a total of about 300 men, and incidentally pay about 25,000*l.* a year in wages.

6689. What is the proportion of men in the district that work in a big mine as compared with those that work in a small mine? Have you an idea of the number of men working in hematite mines in the Cumberland district?—Is it about 4,000 in all? I am not sure.

6690. It is 4,800. What number of those would you say are working in big mines, and what number in small mines, roughly speaking?—It is rather a difficult matter to draw the line between the big and the small.

6691. What would you call a small mine?—A mine employing anything less than 70 men underground.

6692. Mr. Leck will give the proportion of men working in the big mines as compared with those working in the small mines out of the 4,800?—I should say, roughly, perhaps one-third.

(*Mr. Leck.*) About 370 underground and 120 above ground.

(*Chairman.*) That is to say, about one-tenth of the men work in small mines.

(*Mr. Leck.*) That is taking small mines as meaning mines with less than 70 working underground.

6693. (*Chairman.*) If you closed the small mines it would throw 1 in 10 of the men out of employment in the county?—Yes.

6694. You maintain that if we examined the accidents in small mines we should not find them sufficient to justify that being done?—I am certain you would not.

6695. Is there any other point?—I should like to say in connection with the small mines, that we also take an interest in the same matters as the large mine-owners; for instance, in the ambulance business the small mines are quite as enthusiastic as the general district, which on the whole is very enthusiastic. I might also mention, with regard to one of the companies I represent, that the ambulance men from that company have won the challenge shield two years in succession.

6696. How many men are employed in that mine?——

6697. (*Mr. Ainsworth.*) Is that Salter?—Yes.

6698. (*Chairman.*) Mr. Leck knows the mine. There are 82 underground?—That is an incident to show that we take an interest in it.

6699. What is the smallest hematite mine you call a mine, that you can remember?—I think Mr. Leck will answer better than I can.

6700. (*Mr. Leck.*) Fourteen underground, Jacktrees?—It was in an exploration state then.

6701. (*Chairman.*) There is one as small as 17?—That is Crossfield.

6702. (*Mr. Leck.*) It is a separate mine?—It is one of a group.

6703. (*Chairman.*) At least at every mine you would have a proper stretcher?—Yes.

6704. You ought to have a proper stretcher and accommodation?—I think it is so, or with very few exceptions.

6705. If it is not it ought to be?—Yes.

6706–7. There ought to be arrangements made in the case of an accident for some conveyance to take the injured man to the hospital?—Yes. They have a horsed ambulance at Whitehaven.

6708. All the small mines ought to be provided with proper ambulance stretchers, and provision ought to be made for some kind of horse or motor ambulance?—I think they have one at Whitehaven Infirmary at the present time.

6709. It is not enough to get the men out of the mine. What are you going to do when you have got them above ground?—At the majority of the mines there are stretchers and ambulance appliances, and in the majority of the engine-houses in the district there is a little cabinet.

6710. What arrangements are there for taking him to the hospital when he has been taken out of the mine and put into the engine-house?—They would take him away in the first instance on the stretcher to some point.

6711. They put him in the engine-house?—Yes.

6712. Is there any mine that has not proper arrangements for taking him away from the engine-house to the hospital?—I do not see what there could be to prevent the infirmary sending the carter anywhere. They can carry the man from the engine-house to the road. The horse ambulance could not always get to the mouth of the pit.

6713. If you have a man with a bad fracture and you have taken him up to the engine-house, what is the mine that is the worst situated in regard to getting him to the hospital?—Mr. Leck, I think, will be able to help us in that matter.

(*Mr. Leck.*) They are all within a reasonable distance. Beckermet is the furthest away from a point where a hospital van could get to.

6714. (*Mr. Lovett.*) I notice you are interested in quarries?—Yes. I have one quarry.

6715. Only one?—Yes.

6716. How many men are there employed in that one?—32 or 33 in the quarry.

6717–9. Does it come under the Quarries Act, the special code of rules?—We have the model code.

6720. Have you any variations to that?—No.

6721. What is your idea about unburdening in quarries?—Do you mean the overburden?

6722. Yes?—In what respect?

6723. You take it off?—Naturally.

6724. To what depth?—The depth varies from about 10 feet on one side to about 28 to 30 feet in the middle of the quarry. The overburden stands like *that*, deepest in the centre of the quarry.

6725. Supposing you felt inclined to advise that the overburden should be taken off a certain distance, what would be a fair thing to recommend?—That would depend upon circumstances to a great extent.

6726. What circumstances?—The dip of the top of the workable bed.

6727. I suggest it would be fair to say that it should be taken back a distance equal to the depth of the overburden in different places?—I think it would be too much.

6728. I submit from a lengthy experience that there would be an element of danger in not taking it back a distance equal to its own height?—You mean that at the centre of the quarry the overburden should be moved 28 or 30 feet back from the top of the face?

6729. If it is that depth I strongly suggest that?—I say that no hard and fast rule should be made to that extent for this reason the top of the workable bed of rock might dip towards the face or away. If it dipped away towards the overburden there would not be the same necessity for removing the burden in connection with safety as there would be if it was dipping towards the face of the quarry.

6730. If 28 feet high in a certain place from the face of the rock, it does not matter whether it dips *that* way or *that* way. If the piece that comes from the overburden, which is 28 feet high, falls, it does not matter which way the top dips?—I must differ from you in that way, if you will allow me. *This* is the edge of the quarry, *this* is the top of the workable bed of stone. When that is cleaned off, if the beds are dipping in *that* way and a piece slips out of the overburden, it cannot run up-hill as far as down-hill.

6731. I do not suggest it would?—That is my contention.

6732. The face of the overburden faces the same way as that of the rock?—I do not follow you—the face of the overburden?

6733. *This* is the same way as the face of the rock. If the rock is situated in *this*, the overburden is *here* and the face of the rock will be in *that* direction. The face of the overburden, if taken off, will be in the same direction. The danger is that some loose stone shall come out of the face of the overburden. It will

not come out *that* side where it has been touched, it will fall in that direction?—Naturally. I have not made myself clear. The top of the workable rock is clear. If the dip of the beds of the workable rock on the top are dipping away from the top, then are dipping in *that* direction, and the overburden is standing like *that*, and the dip of the top of the workable bed is like *that*. If a piece comes out of *here* it will not run so far up-hill as if the top of the workable bed was towards the face.

6734. We were talking about the overburden and you were thinking of the dip of the rock?—I said there were reasons why it should not be so far back in one case as in another. There should be no hard and fast rule on that account, I said.

(*Mr. Greaves.*) You are assuming that the top floor is level.

6735. (*Mr. Lovett.*) We were talking about the overburden?—I did not make myself clear.

6736. If the top of the rock dips away from the face, directly you get a top hole in, the whole thing occurs. It reverts to a serious element of danger, because if you have got that dip in the top of the rock, directly you get the top hole in you have not so much top, probably none at all?—Your suggestion is that it should be kept 30 feet back.

6737. Twenty-eight?—We dare not fire a hole so that it would bring the face of the top of the quarry nearer than 28 feet.

6738. You would fire the hole, but you would have to take the overburden back again?—We should have to take it back before if there was a hard and fast rule.

6739. No?—Supposing that 28 feet bared, and we took a 6-foot hole off, we have only 22 feet bare.

6740. It was 28 before you fired the hole?—It is not 28 as soon as you have fired it.

6741. You would have to take it back?—I should take it back before.

6742. No, you take it back after you fire the hole?—I should have to take it back before. I could not be within 28 feet if I had taken 6 feet off. I should have to do it before, and not after.

6743. There would be no necessity for such a recommendation as I suggest if you took it back before you fired. You would be back?—How long would we have to be allowed to take that overburden back, the next day or the next year?

6744. If you were attempting to remove it that would be good enough?—I quite see great difficulties.

6745. (*Chairman.*) The point that has been made so much is this. If you have ultimately to take the overburden off, the better thing is to do it as early as you can. It is a source of safety. That is one point?—Yes; but on the other hand, I do not know of any accidents through it.

6746. Would you agree if the thing has to come off eventually that the earlier you take it off the better?—Yes. The workings in the limestone quarries in the district are not continuous. I know one that stopped a year or two ago. Supposing they had 30 feet of overburden, they would have to keep it back, and there would be 30 feet of rock bare they do not require.

6747. You mean you do not know what you are going to do?—Yes.

6748. If you did, it would be reasonable?—In the case I am citing about two years ago, there was a quarry which came to a stand, and if this rule had been in force they would have had 30 feet of rock they did not require.

6749. You mean that there is a difference between *that* and *that (holding up a paper drawing in blue and red)*. They would have to be differently treated?—Yes.

6750. *Here* is a dangerous place. If the overburden is loose you might have to take a great deal off to be safe, and the whole thing might come down?—There ought not to be a hard and fast rule.

6751. Do not come to a conclusion. Please follow the point, first of all. We must do something with regard to overburdens, and we want to see what is right and reasonable. If you had an overburden which was loose and dangerous, it might be requisite to take a very large portion off to render it safe, might it not?—More so than in the other case.

6752. It might be necessary to take the whole lot off ever so far back. In another case, on the other hand, I can imagine a very little piece of overburden taken off would make you safe?—Yes.

6753. Supposing you had an overburden where there was a huge mass of solid granite mountain that would not move for anything, it would not be necessary to cut the solid mountain away?——

(*Mr. Lovett.*) No.

6754. (*Chairman.*) We want to make clear what is wanted. It comes to this: you are in favour of the necessity of removing an overburden where it is dangerous?—Yes.

(*Chairman.*) We have to find out some rule that will be fair and reasonable, and remove it properly when it is dangerous. That is what it comes to Mr. Lovett?

(*Mr. Lovett.*) Yes.

6755. (*Chairman.*) What Mr. Lovett wants is a reasonable removal of the overburden?—I have no objection to the word "reasonable."

(*Mr. Lovett.*) The reason I press this point is because I have had difficulty with some of the employers in the North of England. Neither I nor the inspector nor anyone can do anything satisfactory to safeguard the lives and limbs of the men, because the model code will not help us.

(*Chairman.*) It is too vague.

(*Mr. Thomas.*) Would it not meet the point if the overburden were sloped back to the proper angle of repose?

(*Chairman.*) If you have the angle of repose of the ground it would be safe.

(*Mr. Lovett.*) I do not agree. I think the danger would be greater. I think you had better have the straight face than the angle of repose.

(*Witness.*) Do the quarry owners know how long the demand will last? It is a difficult question. The demand lasts as long as the furnaces require the stone.

(*Mr. Lovett.*) Speaking of the overburden, a place is either safe or not safe. If it is unsafe, then we ought not to expect men to work. Never mind other considerations. If it is absolutely unsafe and dangerous to the life and limb of the men, then it ought not to be worked.

6756. (*Chairman.*) You accord with that proposition?—Certainly. My first object is safety.

6757. It has been suggested that 28 feet should be a rough and ready rule. Do you think that would be too oppressive?—I do.

6758. In all cases?—I do.

6759. In many cases it would be right and fair?—Probably I am speaking as having one of the deepest overburdens in the district.

6760. (*Mr. Lewney.*) Which quarry?—Salter.

(*Mr. Lovett.*) If this gentleman is going to continue that quarry he has to remove the overburden.

6761. (*Chairman.*) Will you answer that question?—Yes, if we continue the work. It is a sales quarry. We are dependent upon the demand for the sale of the stone.

6762. (*Mr. Lewney.*) Does this quarry work continuously?—Yes.

6763. (*Chairman.*) It is not in a dangerous condition at the present time?—Not as far as I know.

6764. (*Mr. Lovett.*) What is the depth of your overburden?—28 feet at the centre and 10 feet at each side. It runs from 10 to 28, and 10 on the other side, roughly.

6765. The suggestion is that you shall have 10 where it is 10, and 28 where it is 28. I do not think it is a hardship. You would not get the 28 feet running a considerable distance?—The average throughout will be perhaps 20, 18 to 20 throughout, over the top of the quarry.

6766. You agree that the overburden ought to be removed?—Yes; we have to remove it before we can work the stone.

6767. You do not have to remove it. A quarry manager does not have to remove the overburden?—I am only speaking for my own district.

6768. They sometimes let it go down. They work from hand to mouth and let it go down and remove it at the bottom?—I am only speaking for my own district.

6769–72. There is an absolute necessity of having some regulation, because I can assure you some of them send the overburden to the bottom, and it always constitutes an element of danger to the men working at the face of the rock?—It is cheaper for us to take it off and deposit it in another part than let it down into the quarry and take it out. Naturally we do it that way.

6773. Would it not constitute an element of danger to have it less than 28 feet high? What is the safest distance where the overburden is over 28 feet?—There have not been any accidents in the district that I know of through the overburden coming into the face of the quarry.

6774. Speaking generally, what distance would you suggest? Would you suggest where the overburden is 28 feet high what distance would be safe in your quarry?—Taking the angle of the beds, I should say 14 or 15 feet.

6775. That is about 10 feet more than some of them remove now, so that you will understand our pressing this point.

(*Chairman.*) That is very instructive, and we will consider this question. At all events, the witness' view is that it varies a great deal according to circumstances, and while he is prepared to condemn the principle of working with an unsafe overburden, he is not prepared to approve an exact rule. That is practically what he says.

6776. (*Mr. Greaves.*) In regard to this overburden, we appear to be assuming that the overburden is looser than the rock underneath. It often happens that the overburden is the harder and tighter rock of the two?—Yes.

6777. In that case would it be unnecessary to move so far back?—I was only citing cases in connection with our own district, where the overburden is sand and gravel.

6778. (*Chairman.*) The overburden is loose?—Or loosish.

6779. (*Mr. Ainsworth.*) Taking the Salter Quarries, how far do you keep the overburden back?—I could not tell you. We generally have a set of men redding, and when they get to the centre they start at the end and come back again.

6780. Is it nearer the crown at one end than the other, and *vice versâ*, according as you work?—Yes.

6781. How far back do you think would be safe?—14 or 15 feet from the centre.

6782. Would you say that the stores, candles, dynamite, and so on, provided at what is called the smaller mines, are, as a rule, of good quality?—Emphatically.

6783. In fact the quality of the stuff supplied to the men is the same as supplied at the bigger mines?—Exactly.

6784. If the men are at all doubtful they can inquire about it from the inspector?—Yes.

6785. If there is anything they think wrong they have only to notify the inspector and he will make inquiry?—Yes.

6786. Do the smaller mines subscribe to the ambulance societies the same as the bigger mines?—Yes, in the ratio to the output.

6787. If you have an accident at any of the mines you have charge of, you would send to Whitehaven for the horse ambulance?—Yes, if the man had to be removed to the infirmary.

6788. Roughly speaking, taking the furthest of your mines, how long would it take before the horse ambulance could be there?—The furthest mine we have from Whitehaven is probably about 6 miles—they come Frizington way, so it might be 7 miles.

6789. You would not have any difficulty in getting the horse ambulance?—I think not; it is ready in the infirmary yard to be sent out as soon as you telephone or telegraph for it.

6790. All that is wanted is a horse to take it out?—So far as I know.

6791. Are you in favour of the old-fashioned hammer signal?—Yes.

6792. If you have a speaking tube or telephone it may be useful for other purposes?—Yes, supplemental.

6793. Do you think you can work with perfect safety using the hammer signal for raising metal or lifting or lowering men?—Yes, and it is usual in the district.

6794. Of course you are in favour of having the code the same?—Yes, a universal code. I believe they are nearly all the same now.

6795. (*Mr. Greaves.*) In these quarries you have an ambulance near always ready?—Yes.

6796. (*Mr. Ainsworth.*) Do you keep the bearer ambulance at the quarry?—We keep the ambulance appliances in the engine-house; we have a cabinet at the quarry and one at every engine-house.

6797. What do you say with reference to a shelter at the quarry for the men to have their meals in?—They have a room to get their meals, and there are also shelters in the quarry for the small shots. In the case of large shots they usually go out of the quarry altogether if it is a big shot. There are three or four shelters altogether.

6798. You would be in favour of an Act providing that everything should be supplied which might be reasonably required in the way of shelters, both for the men when the shots are being fired, and also when they are having their meals?—Yes, and I think it is usual in the district to have them, so far as I am aware.

Mr. David Wilson called and examined.

6799. (*Chairman.*) Are you a quarry manager?—Yes.

6800. At which quarry?—The Workington Iron & Steel Co.

6801. There is one point on which we might ask you with advantage some questions if you will concentrate your attention upon it. Do you think that overburdens in a quarry, as a rule, ought to be removed, or do you think they ought simply to be allowed to tumble down?—There is no question they should be removed.

6802. We start with this proposition, where the overburden is loose by nature it ought to be removed artificially?—Yes.

6803. What rule do you think should be applied to the removal of it? In the first place, do you think a uniform rule should be made?—No, I think it would be wrong to make a hard and fast rule in the matter.

6804. Do you think a rule should be made that the over-burden should be systematically and properly removed?—I admit it should be removed.

6805. And removed from time to time?—Yes

6806. Can you suggest any means of arriving as a rule which would tell a person looking at it whether enough had been removed or not?—I have heard what Mr. Casson has said on the matter, and I quite agree with what he has said. For instance, I think it would be a hardship to make it a hard and fast rule, 28 feet on the top of the quarry. Before he could shoot any of that 28 feet away he would have to have another 10 feet, and that would be 38 feet.

6807. Still, if it was absolutely necessary for safety, you admit you would have to do it?—I have been engaged in this sort of work for 30 years, and I have never known of an accident from a falling of the over-burden in the quarry.

(*Mr. Greaves.*) The question is what is the over-burden.

(*Chairman.*) That is another point.

6808. (*Mr. Lovett.*) You would not lay down any hard and fast rule then?—No. For instance, working a quarry with a long face you have to turn the stuff out at either end—you meet in the middle and sometimes before you get to the middle you might be short of your

distance. We have three quarries belonging to our Company, and that is the way in which we work them: begin at either end, and before we meet in the middle sometimes we are close up to the edge of the over-burden of the quarry.

6809. I see no difficulty whatever in the way of applying the suggestion that I have already mentioned, or even making it a regulation. We know perfectly well you cannot remove 28 feet of over-burden in a day—no one suggests that—but if you are removing the over-burden, and you have a regulation stipulating it shall be at a certain distance back, if you are doing it, that is satisfactory, and that would meet all the requirements of any practical man, at any rate?—I object to a hard and fast rule—I mean a hard and fast number of feet back.

6810. I contend we cannot get that degree of safety without having something compulsory?—In one of our quarries it is a very uneven top, it dips away down in the middle, scoops down, and at both ends we have to shoot it away. It is difficult sometimes to work forward to get at it at the place in the middle; it is over-hanging, I admit, before you get to it. You have to shoot the rock away and put it over the edge to get to it.

6811. You could get round to that portion?—It would be very difficult, we should have to rise up about 30 feet at either end.

6812. I suggest you should simply remove it to the bottom?—We do that. I think our past record will bear us out that we have worked our quarry carefully—we have never had an accident owing to overburden falling into the quarry, and I have had 36 years' experience.

6813. Here is the difficulty; if there is no regulation and no specified distance mentioned as to the removal of the over-burden, then you must leave it to the inspector. I am quite prepared to admit that the inspector in this district is absolutely fair in that respect, but not always so get-at-able as we should like. Still you might have something satisfactory here, and you might go into another district where the inspector would have entirely different ideas and notions as to the distance the over-burden ought to be removed. You will get something quite different throughout the country. I venture to say you would not have the over-burden removed the same distance in any two districts because of the different ideas of the men as to the degree of safety or otherwise?—The overburdens in our quarry are from 1 foot to 18 feet. Now supposing you had half that distance—an over-burden of 9 feet deep—how would that be? It is quite strong stuff, not likely to fall.

6814. That raises another point, even half 6 feet would not be so safe—it would not be so safe as half 28 feet?—It depends upon the slope.

6815. As a rule there should not be any slope?—You want it so that the thing will stand. I think myself half of 18 feet, that is 9 feet, would be perfectly safe for the men working underneath.

6816. You suggest then that half the distance would meet the point?—Yes.

6817. Suppose you had an over-burden 10 feet high?—Leave 5 feet of clear space.

6818. Suppose a piece of stone fell from the 10 feet high, it is quite sufficient to say it would stand a good chance of going down on the men below?—Well, I am supposing the quarry will be under supervision every day; if so, nothing loose will tumble down. We are in the habit of looking our quarries down every morning top and bottom before the men start working, and anything likely to be a danger we endeavour to remedy.

6819. In the case of over-burden, even a strong shower makes a remarkable difference?—The greatest danger is to the men working in the quarry when the overburden is being removed above them.

6820. It depends upon how you take it out—if you work at the end?—We must work at the end.

6821. (*Mr. Ainsworth.*) The over-burden of your quarries consists mostly of soil and stone?—Yes, soil and stone.

6822. You have no rock over-burden?—At Clintz it is partly mixed, but at Kelton and Rowrah Hall quarries it is mostly clay and soil and rough stone.

6823. Have you the management of Clintz, Kelton and Rowrah Hall?—Yes.

6824. (*Mr. Greaves.*) By over-burden you mean something loose in the working?—Yes.

6825. You do not mean everything that is not marketable?—I mean refuse you have to remove from the top, something loose.

Mr. James Flynn recalled and further examined.

6826. (*Chairman.*) You have one or two points you wish to add to your evidence of yesterday?—Yes, with reference to fires in mines. I do not think it has been dealt with. We had a very disastrous fire at one of our mines about 12 years ago, and it was owing to an engine in one of the travelling ways, or close to the travelling way, and the timber taking fire. I wanted to see if we could get something whereby haulage engines would not be so placed where the men were travelling, or where they would be a danger to the lives of the men. For instance, we have an engine used for haulage out of dibs; if it is placed where there is a lot of dry timber and oil used it is dangerous. It was the same at the Southam fire which occurred 12 years ago; four men's lives were lost, and the lives of 50 men imperilled at the time, and some died afterwards through the effects of the fire. I thought possibly something could be done to place haulage engines or friction gear away from the main roads where they would not be a danger to the men going through that way in case of a fire taking place. In that case the engine was there—it was a little steam engine.

6827. (*Mr. Greaves.*) Was there a boiler?—No, the steam would be supplied from the surface, but there was a lot of oil and waste and stuff allowed to accumulate about it. As I have said, four men lost their lives there.

6828. (*Chairman.*) Would it be possible in all cases to put it off a road like that?—I do not see why they should be down the pit at all; I think they could be erected on the surface for the same purpose. The same thing applies to a sinking shaft, where, for instance, they put in a Tangye engine—it is a danger to the sinkers, and accidents have occurred through it. Then you can take the distressing fire at Whitehaven. It was through the friction gear being close to the main travelling road.

6829. You mean the one some years ago?—No, the present one. I think it would be possible, in cases where they were working a dib engine, to work it from the top or to see that it did not interfere with the travelling road of the men. A case of that kind might occur.

6830. Supposing it was near the road, and the support was made up of bricks?—I think the uprights and everything should be made of finished steel or cast iron, and the place visited every day to see it was in order and no danger of fire.

6831. You think the parts all round it should be made safe against the danger of fire?—Yes, the danger of fire taking place.

6832. (*Mr. Greaves.*) I suppose as a matter of fact it is not very likely that a steam engine would ever be put in again?—It is possible.

6833. They would put in an electric motor?—I do not know but what we may have some yet. It might be possible to put another in—they are not all electrical haulage now at the present time—but if you prevented anything of that sort taking place, it would be far better.

6834. (*Chairman.*) It does not seem difficult instead of putting in timbers to put in iron bars?—Quite so.

6835. That would remove the source of danger?—Yes.

6836. (*Mr. Thomas.*) I think you made some reference to a Tangye engine put in a sinking shaft?—What we call a Tangye here—that is the usual phrase. They are sometimes used for pumping purposes when the men are working in the sinking shaft.

6837. That is to say a sinking pump?—Yes, a sinking pump—it is erected half down the shaft in the shaft itself. I have known them to be so erected.

6838. (*Mr. Greaves.*) A kind of pulsometer pump?—Yes, pulsometer.

6839. (*Mr. Thomas.*) "Tangye" is only the manufacturer's name for the class of pump?—Yes.

6840. You object to a pump being fixed in the shaft; it should be fixed in a lodge room cut out of the shaft?—Yes.

6841. That is a secondary pump?—Yes.

6842. The sinking pump would have to go down with the sinkers?—Yes.

6843. You would make it conditional that when these pumps are employed they should be put in a lodge room from the shaft and not be suspended in the shaft?—Yes. There is another point in reference to the boring in old workings coming upon water.

6844. That has been dealt with. It is said that it is not necessary to have a bore hole more than 5 feet in advance in the hard ore in this district?—I think it is necessary, because where do you find the hard ore in our district? You do not find it.

6845. You can contravert that view, but that is what they say?—How could you judge the 5 feet? Here is a disused working filled with water, and possibly the plan may show 5 feet as the difference between the new working and the old working. If those plans are not accurate, and the working has been dealt with after the plans have been made, how are you going to get the 5 feet?

6846. (*Chairman.*) You have not quite understood the point. Supposing you were driving a heading, and you thought there might be water ahead, you would not know whether there was or not. They say that having regard to the strength of hematite ores as a rule 5 feet ahead is sufficient to protect you, even if there was water ahead?—I agree with that, providing they are sure of the substance of the ground between them—I mean the class of ground.

6847. Hematite is stoutish stuff?—All hematite is not. There is a great difference between hematite and copper, lead, and tin. 5 feet of limestone, I agree, would be sufficient, but 5 feet of a mixture of limestone and different things would not be sufficient.

6848. What would you say would be sufficient?—10 feet I should say. There is just one other thing I should like to mention, and that is in reference to the Truck Act. I think a misapprehension has taken place with reference to the Truck Act. They say that if the men are overcharged you have to complain to the mining inspector. The mining inspector has not sufficient power to deal with this matter. I have complained to the mining inspector, and I have been told by the late Mr. Hedley, the mining inspector, that it was a case for the county court.

6849. How long ago was that?—Only a few years ago, just before Mr. Hedley died.

6850. He has been dead eight years, I am told?—It was just before he died. Has it been amended since?

6851. There was an amendment of the Truck Act in 1896, and the enforcement of the Truck Act is very different now from what it was about eight or ten years ago. Have you tried complaining to the inspector lately?—I want to know has the Government inspector power to give instructions under the Truck Act? What is his power now?

6852. I will answer your question; not only has he power, but by the Truck Act he is expressly directed to do it. The words of the Act are: "It shall be his duty"?—I read it before in that way. I think there is a misapprehension about it, but I am satisfied with that.

6853. You send a letter to the Home Office if you get an overcharge and we shall refer it to the inspector?—If I have a complaint from anyone I want to know who has authority to deal with it.

6854. It is the duty of the inspector?—The reply I got from the late Mr. Hedley was that I was to take it to the county court.

6855. You may sue or else the inspector can prosecute?—Very well.

(*Mr. Ainsworth.*) I think the witness has said that in the case of boreholes it is necessary to go more than 5 feet ahead. Mr. Scoular said he should think 5 feet was sufficient if you were in limestone. I do not know how far he would say if it was in ore.

(*Mr. Scoular.*) I quite agree with Mr. Flynn that, of course, in limestone, 5 feet is very ample indeed, but if the stratum is very soft and mixed, it would have to be greater.

(*Mr. Ainsworth.*) You are in accord with Mr. Flynn about that?

(*Mr. Scoular.*) Yes.

Mr. Myles Richardson called and examined.

6856. (*Chairman.*) You are the manager of the Ullcoats Mine, Egremont?—Yes.

6857. You have heard the evidence given as to the health of the miners, as to changing-rooms, as to signalling, and a good many other points?—Yes.

6858. Do you agree generally with the evidence given by Mr. Scoular?—Yes, generally, I agree.

6859. There was one point he did not go into, viz., the sanitation of the mines. It has been complained that some of them down below smell?—I have not experienced much smell.

6860. What is the best mode of removing faecal matter?—The method that we adopt is that it is put into the water and conveyed to the bottom of the shaft in that way.

6861. Does not that make the sump very foul?—The only time we smell any thing of that is when it is being cleaned out—and that is not a long operation.

6862. How often is that done?—Sometimes two years will elapse.

6863. And the drainage of how many men would go into that sump?—We have 250 men employed; the sump is 16 feet long, 8 feet wide, 12 feet deep.

6864. How many times would the pumps change that water daily?—There are from about 18,000 to 20,000 gallons an hour getting into and out of it.

6865. It is perhaps surprising that it ever needs cleaning?—It is only the heavier sediment that goes to the bottom, of course. As I say, two years elapse, and sometimes more, before it is necessary to clean it out. The snoreholes of the pumps are not exactly on the bottom which leaves room for accumulation. As soon as the sediment gets up to the pumps it is necessary to clean it out.

6866. You would not dare to put any lime into the sump for fear of fouling the pumps?—Well, I do not know; anything that will go through an inch and a quarter hole the pumps will pick out.

6867. Are there other mines which bring the matter up to the surface in a dry condition?—I do not know of any. We make it a hard and fast rule for our men to go to where there is water; we do not allow it to be put into dry workings at all.

6868. At first that idea of putting it into the sump rather horrified me, but I had not realised the quantity of water that comes out of the sump?—I do not think it makes much difference to the men who have to clean it out. I have performed that duty myself. Any smell that there is is only for two or three minutes when you first get into it.

6869. At some of the mines in the South of England you are perhaps aware there is a rule, and a strict one, that it may not go into the sump. You are speaking of your own mine?—Yes.

6870. Is there any other point you would like to add to Mr. Scoular's evidence?—I do not think there

is anything particular. One other point I might mention is the size of working places; I do not think you could possibly fix the size of the working places owing to the nature of the ground.

6871. You agree with some of the men who have said that?—Yes.

6872. I suppose in some mines you could regulate it?—Yes, but in our district I do not think you could even in one mine. I have an instance in mind now where it takes a man nearly his whole shift to bore two feet in the ground, it is so hard; and another 100 yards away the men can get the ore with a pick. The difference in the nature of the ground is so great that you could not possibly fix it. Then when you come to remove the pillars, how are you going to keep the face within a certain distance? You must remove the ore, and you must wait until the roof comes down. It is not like a safe roof. I was down the Hodbarrow mine, and at that mine the sand is continually coming down behind them, and the difficulty is not great at all. But when you have a hard roof you must expose a very great area of it before you can get it to break down at all. I have seen a place myself, for instance, 30 feet high, and you could not see the other side of it with the light you had in your mine.

6873. You mean if you limited the width you would never get the roof down at all—you must cut it bigger to get the roof down?—Yes. Our size generally is 12 feet wide and 10 feet high.

6874. (*Mr. Lewney.*) Do you think the best possible method of disposing of the sewage is by taking it into the sump?—It is the best I have seen adopted.

6875. Have you ever known any people suffer from blood poisioning brought about by that method?—Not to my knowledge.

6876. I understand there have been cases, and you possibly would admit that there is a danger of that occurring?—You know there is a danger of that sometimes in water independent of that being put into it.

6877. It certainly must increase the liability when there is so much sewage in the sump?—It may, but I certainly have known men suffer from blood poisoning who were never near anything of that kind, and we certainly thought owing to the water they were working in.

6878. It is certainly not a pleasant operation to remove it from the sump?—No; but there are many more unpleasant operations than that. In a mine where there is plenty of water I think that is quite sufficient.

6879. I quite agree with you, it is better to go into the sump than to take it into dry workings?—Quite so.

6880. (*Mr. Thomas.*) You have a big volume of water in your place?—Yes, 18,000 to 20,000 gallons an hour.

6881. How many men?—270 underground.

6882. Have you any sanitary conveniences at the surface for them attached to the changing-houses?—Not exactly attached to the changing-houses—it is set over a drain which carries the water away from the shaft.

6883. Do you use any disinfectant at all for your cisterns?—No.

6884. You do not put anything in them occasionally?—No.

6885. That seems to be a sensible plan adopted in many mines: they get a cheap disinfectant and pour into the cisterns and let it distribute itself?—It would not last long here; it would be through the pumps before you get your back turned.

6886. (*Mr. Ainsworth.*) What are your views about requiring an underground manager to have a certificate?—I do not think it would do any harm, but at the same time it is scarcely necessary. I do not think it would improve me, for instance, from a practical point of view.

6887. That is impossible?—So far as theory is concerned, that is a thing I do not profess at all.

6888. (*Mr. Lovett.*) Supposing you had as much experience and a little bit of theory, would that make it worse?—I do not suppose it would.

6889. (*Mr. Ainsworth.*) We may take it that all the managers you know depend upon practical experience?—Yes.

6890. Practical experience is the qualification which causes a man to be appointed manager?—Yes.

6891. At the same time, do you not think perhaps that if something in the way of a certificate was required, it would stimulate the young men to get on and qualify themselves as managers?—There is no doubt in some cases it would have a good effect.

(*Mr. Ainsworth.*) It would be understood that in the case of a rule coming into force existing managers who had served to the present time with satisfaction would get an equivalent certificate for their services.

6892. (*Chairman.*) Yes, but it appears to me it would be hard to come down on men for an examination who are at present not managers but are 40 or 50 years of age, and who might be appointed managers in the next year or two. Have you any other point you wish to make?—I certainly would not adopt patent cages unless I was forced to.

6893. You mean with the arresting arrangement?—Yes. I think the less patents you have about a cage the better.

6894. Less patents?—Yes.

6895. It does not matter whether they are patents or not if they are good—you mean less arrangements?—Yes. I think the best thing in connection with winding is to have everything good and strong and a steady man at the handles. We have never had an overwinding at the place where I am.

6896. (*Mr. Lewney.*) Have you detaching hooks?—No, we have not, and personally I should be against them.

6897. (*Mr. Ainsworth.*) What is your objection to a detaching hook?—The particular reason is that it teaches the engineman to be careless.

6898. If he does make a mistake the detaching hook acts, and so on?—Yes, but then you do not know where the end of the rope goes after that.

6899. (*Chairman.*) You would say you would be against a half-cock trigger for sportsmen lest it should render them careless?—That is another thing altogether.

6900. Is it, when you come to think of it?—He had far better put his trigger down altogether, especially when he is getting over a fence. I do not see much objection to the patent hook itself.

6901. (*Mr. Ainsworth.*) I suppose you are in favour of the hammer system of signalling?—Most decidedly.

Mr. Robert Wilkinson called and examined.

6902. (*Chairman.*) Are you the manager of the Bigrigg Mining Company, Ltd.?—Yes.

6903. You come to tell us something about rock drills?—Yes.

6904. Have you had any phthisis produced by the use of rock drills in your mines?—Not any.

6905. Is that due to the character of the rock? Have you any siliceous rock?—Yes, we have siliceous rock.

6906. I thought it was limestone?—Well, it is most limestone we are working—we have sandstone as well.

6907. Do you have any spraying arrangement fixed on to your rock drills?—Not any.

6908. Are the men covered with dust when they use the rock drills?—Not particularly; just at the commencement when they are pitching the holes, that is all—not after they once get started.

6909. You are speaking of iron-ore mines?—Yes.

6910. Does not the drilling into the sandstone produce siliceous dust?—Yes, a little, but not so much as the lime.

6911. You have never seen a water spray apparatus?—No.

6912. You have heard Mr. Scoular's evidence?—Yes.

6913. Do you agree with it?—Generally.

6914. Is there any particular point you would like to mention in addition?—I do not know that there is any point upon which I can add anything.

6915. (*Mr. Thomas.*) How many, and what type of drills do you use?—We use the Flottman, and we have been using the Hardy.

6916. That is the small hammer drill?—Yes, about 25 lbs. to 26 lbs. weight.

6917. For what purpose?—Just drifting ahead—horizontal drifting.

6918. You have never tried any spray attachment?—No; I do not think it is at all necessary. I do not think it would do much good.

6919. You get a little dust produced?—At the commencement, but you do not get anything worthy of mention at all after.

6920. I suppose the exhaust air from these rock drills passes down through the drill itself?—Yes, it passes below generally,—the exhaust, you mean?

6921. Yes?—It does pass down.

6922. Does any air go down through the centre of the drill at all?—The drills are hollow for sinking purposes but not for drifting

6923. In drifting you do not bore many dry holes?—Mostly. We use a different class of drill for the dry holes to what we do for the wet holes.

6924. You get a little dust?—Yes, and that only at the commencement.

6925. Do your men do anything at all to lay that dust?—No; they would rather not be bothered with it. There is plenty of water, and I have asked them to do it on several occasions, but they would rather do without it. There is nothing injurious about the lime.

6926 (*Chairman.*) Do they wear respirators?—No.

6927. (*Mr. Thomas.*) Have you any apparatus at all for laying the dust after a blast?—We blow the dust out after the blast; we put on the air compressor; they get outside and it blows it out.

6928. You have never seen any apparatus to throw any water into the end?—No.

6929. You use a 2-inch pipe probably to convey your air?—Yes.

6930. Sometimes a 6-inch pipe would be inserted in your main for about 10 feet in length?—Yes.

6931. You would not object to the use of a simple appliance being fitted to the air mains whereby water could with the air be directed into the end after a blast which would completely damp any dust produced from blasting and wash out any deleterious gases from the explosion?—I would not object to it.

6932. In fact you might consider it an advantage?—I do not know that it would be much advantage in our present way of working. I would not object to it, but I do not think it would be any advantage at all.

6933. Perhaps your men do not return very quickly after the blast?—They do not.

6934. (*Mr. Greaves.*) You say you have holes down the drills for the exhaust when sinking, but not when driving ahead?—Yes; in the small drills the air goes down and blows the water and keeps the drill clear at the bottom.

6935. That is the "Flottman"?—That is the "Flottman."

6936. (*Mr. Thomas.*) You do not use any of the ordinary percussion rock drills?—No, we just use the small hammer drill.

6937. They are not used in the Cumberland district at all, at any rate only a few?—I do not think any.

6938. (*Mr. Ainsworth.*) You use the hammer drills?—Yes.

6939. They are a small kind of drill on the whole?—Yes, you can handle them about in any way.

6940. You do not perceive any dust in sinking?—There is not any at all in sinking.

6941. There is some dust when you are working in a dry fore-head?—Just at the commencement.

6942. Have you heard any complaint about it?—Not any.

6943. Have you ever known a man wear a sponge over his mouth?—No, we have never had any reason for it in any shape or form.

6944. On the whole it does not trouble you at all?—On the whole it does not trouble me in the slightest. The only trouble is when sometimes they have to bore by hand after using the machines.

6945. You find the men would rather use the drill, whenever possible, than hand boring?—Certainly.

6946. (*Chairman.*) I suppose your drills here are very small things?—Very small, about the length of *that* bag.

6947. What is the diameter of the piston?—About 2 inches.

6948. (*Mr. Lovett.*) You say you have asked the men to use water?—Yes.

6949. Why did you ask them if the dust is not injurious?—That is just at the commencement. I thought it might perhaps be an advantage to do so. I did not know that the dust was injurious, but I thought it would help to keep it down just at the commencement.

6950. (*Mr. Lewney.*) You are a practical miner?—I am.

6951. Did you ever work at a rock drill yourself?—No.

6952. I do not ask you that offensively?—Not outside our own.

6953. So that really you have had no opportunity of testing these in practice?—No more than just at our own place.

6954. Just in a casual sort of way as you go down to examine the working?—Just so.

6955. So that when you say they are not injurious you really speak as one who simply goes there occasionally—you have not been there all the shift?—Not all the shift.

6956. I suggest to you that whatever the size of the machine may be there is a considerable amount of dust in boring dry holes?—Yes.

6957. And that any provision that would allay it would certainly be useful?—Yes, but there is no dust after the hole has got commenced properly—after you get in four or five inches.

6958. Have you stayed there and watched the hole from the beginning to the end?—Yes, I have stayed there and used the machine on several occasions. I am not supposed to work with them, but I have taken them and shown the men how to work with them.

6959. I understood you to say you had not worked a machine?—I have not worked with them in a general way.

6960. You do not agree that a spray to allay this dust would be useful?—It would be useful, but I do not think it is necessary—not so far as I have seen, at any rate.

6961. (*Mr. Thomas.*) That is not in such rock as you have to bore through?—Not in the present rock.

6962. (*Mr. Lewney.*) I am speaking of limestone?—Quite so.

6963. You say the men have never complained to you about the dust?—Not at all.

6964. All I can say is you must have a very contented lot of men there?—There is nothing to discontent them at all in that.

6965. I happen to have some little experience in the use of rock drills?—Was it the same class of rock drill?

6966. Rather larger than yours?—We had the larger rock drill, and I daresay if we had been using it at this date we might have suffered considerably from it. It is considerably different to the present rock drills. We have two others, but never use them.

6967. In the case of the larger rock drills, would you not suggest that provision for allaying the dust would be useful?—Oh yes, in the case of larger rock drills I think so.

6968. (*Mr. Ainsworth.*) How long have you had these rock drills in use?—A little over three years.

6969. You were in charge at the mine when they were first introduced?—Yes.

6970. Practically you saw them started and showed the men how to work them?—Yes.

6971. So that you would be as capable of working them as anyone else?—I have taught lots of men to work them.

6972. You have had them going three years, and you have not had any complaints?—Not at all. The larger

drill causes far more dust altogether; you get a 6-inch stroke on the larger drill, and you do not get any stroke on the other—it is simply on the face the whole time.

6973. In reference to the larger drill, you would be in favour of a spray, but in the case of the small drill you use it is not necessary?—No, not for the smaller drills.

6974. (*Chairman.*) You have told us there is only dust at the beginning?—Yes, only just at the beginning.

6975. When you drill into siliceous dust it is only at the beginning, and that is quite enough to give the man phthisis if it is a siliceous dust. You are aware of that, are you not? The dust at the beginning is what affects the man when it is siliceous?—But it is very small.

6976. Do you say it would be safe to use a small rock drill in the rich siliceous rock without any water?—The water could be used just as well if the miners would do it.

6977. This is from a paper on this dust in reference to the use of drills: "Wherever the position of the "hole may be there is always more dust produced at "the start and for the first inches than when the hole "has been drilled deeper"?—Quite so.

(*Mr. Thomas.*) It does not depend so much upon the size of the drill as to the rate at which you bore the ground, and it is the nature of the material which you are boring which causes a certain dust which does so much damage. The complete nature of that dust is not specificially determined although supposed to be of a siliceous nature.

6978. (*Chairman.*) You know that men come back from the Transvaal very much damaged by bad dust?—Yes.

6979. Are there any men suffering in a like way in your mines?—Not any—not in the slightest degree.

(*Mr. Ainsworth.*) Do you call limestone a siliceous rock?

(*Chairman.*) No.

(*Mr. Ainsworth.*) Our drills are practically working in limestone.

(*Chairman.*) You might get a certain amount of bronchitis from limestone, but it is nothing like the stone in the Transvaal.

(*Mr. Lewney.*) Anything you could do to minimise the quantity of dust would render it more comfortable for the workmen; there is no doubt about that.

6980. (*Mr. Thomas.*) If it was necessary and if you had these drills fitted with a spray arrangement, would you anticipate that the men would loyally carry out an instruction to use the spray perpetually?—I do not think so.

6981. You really do not think so?—I am frightened that they would not.

6982. Supposing there was a regulation in force?—They would have to be very closely watched to do so.

Mr. Isaac Walker called and examined.

6982*a*. *The witness handed in the following statement*:—

Experience.—I have been employed in and about metalliferous mines and quarries for upwards of 20 years: 16 years as shiftman, deputy and pumpsman, overman, and mines manager; and two years as manager at Kelton Quarries, one of the largest limestone quarries in West Cumberland.

Inspection by Mine Officials.—I am in favour of all workings, roadways, and aircourses being inspected on each working day by an official. The workmen at the same time ought to be compelled to examine their own workings previous to commencing work.

Timbering.—Each workman ought to be made responsible for the proper timbering of his own "working."

Compulsory Storing of Timber Underground.—This would not be desirous, as the timber used in different "workings" varies in size and quality.

Shot-firing.—The present system of charging and firing holes is preferable to one man in each "working" being in charge of the explosives and shot-firing.

In case of a "mis-fire" each man on going back into his "working" is able to locate his own "holes," thereby detecting which (if any) hole has missed, thus enabling them to get the hole re-fired much more quickly, and with much less danger.

Mis-fire.—In the case of a "mis-fire" the men should be compelled to stay out of the "working" at least 30 minutes, while in "stemming" they should not be allowed to put more than 3 or 4 inches of stemming on the charge, so that it could be re-fired in the shortest possible time.

Signals.—It is desirable that an uniform system of "signalling" be adopted for "shaft work" and for "winding men and minerals."

Boring for Old Workings.—This should be made compulsory.

Sanitation.—Some special method is necessary and might be met by each company of men dealing with their own refuse, which could be brought to the surface in airtight cases.

Explosives' Fumes.—All new explosives should undergo a Government test both for strength and noxious fumes before being allowed to be taken underground.

Machinery and Boilers.—Winding-engines and boilers should be examined every morning by the engineman in charge.

Ropes, Cages and Connecting Links.—These should be examined every morning by the banksman previous to the men "riding" and should undergo an exhaustive examination by a mechanic at least once each week, at a convenient time.

Ventilation.—I think that paragraph 44 of the Metalliferous Mines Act, 1872 and 1875, adequately covers the question of ventilation.

Managers' Certificates.—I have no objection to these, providing a man has to have a practical training.

Government Inspection.—I think this should be solely under the charge of an inspector accustomed to metalliferous mines.

6983. (*Chairman.*) You are the manager of the Park House Mines, Bigrigg, Cumberland?—Yes.

6984. You have heard the opinions of the various witnesses—is there any point you would like to observe upon in reference to their evidence?—I do not know that there is anything particular.

6985. Your view very much confirms what Mr. Scoular has said?—Yes.

6986. (*Mr. Lewney.*) In relation to ventilation you say you think that paragraph 44 of the Metalliferous Mines Act, 1872, adequately covers the question of ventilation. Am I to understand that that is your opinion in regard to the mine with which you are more immediately concerned, or do you think that has a general application?—A general application.

6987. What experience have you had to justify you in expressing an opinion of that sort?—I have had experience in the Frizington Parks Mines, the Goose Green Mines, the Mowbray Mines, and also mines at Ennerdale.

6988. Have you ever worked at any soft hematite mines?—Yes, for instance, our present mine.

6989. Have you always kept your airways well up?—Yes, when they get down we heighten them, and we are doing this at present.

6990. Do you suggest that a regulation should be passed compelling everyone to keep their airways a certain size, or that a standard of ventilation should be insisted upon?—I should suggest a standard of ventilation.

6991. So that you agree after all that section 23 of the rules of the Metalliferous Mines Act is not altogether perfect?—I expect it is fairly well under the control of the Government inspector.

6992. Am I right in assuming it may be perfect in some mines and not in others?—Yes.

6993. There is nothing in Rule 23, paragraph 1, that fixes a definite standard as to what the ventilation should be. It seems to me to be a rule indefinitely formed, and everyone can please themselves what they do so long as they consider the ventilation adequate?—I agree there should be a standard of ventilation.

6994. (*Mr. Ainsworth.*) Have you anything to say about certificated managers? What do you say about that?—I do not know that it would make a great deal of difference.

6995. The great thing, of course, is the practical knowledge?—Yes.

6996. I was told by one of the witnesses, and my own opinion is, that having to go up for a certificate would be an encouragement to a young man to attend to things and educate himself as well as he could?—Quite so.

6997. Is it not the case that the bulk of the mine managers in this district are comparatively young men?—I think they are mostly.

6997*a*. (*Mr. Lewney.*) What do you do with old ones?—If we have to appoint we prefer to take a young man, that is, if he had a certain amount of experience.

6998. (*Mr. Ainsworth.*) How long have you been a manager?—Two years.

6999. How old were you when you were appointed?—Thirty-four. With reference to a few remarks made by one of the witnesses on Thursday in reference to sickness and the certificates, I think he said the doctors did not put the complaints on the certificates.

7000. He said they did not always do so?—Yes. These are the certificates for the last 12 months, all showing the complaints. (*Handed in.*)

7001. Are these all from one doctor?—Yes, and his assistants.

(*Mr. Lewney.*) I know, as a matter of fact, some doctors do not state it on the certificate; they merely put "Unable to follow his employment," and in several cases I have had to ask them to specify particularly in cases of injury the nature of the injury.

(*Mr. Greaves.*) I think that is quite right; they ought to.

(*Chairman.*) The point is that these figures relate to death certificates.

7002. (*Mr. Ainsworth.*) How many years had you worked before you were made manager?—About 14 years.

7003. How old were you when you first went underground?—About 17 or 18.

Mr. Henry Mellon called and examined.

7004. (*Chairman.*) You are a Mining Engineer at Askam-in-Furness?—Yes.

7005. You are an Engineer in general practice?—Yes.

7006. Is your chief experience with quarries?—Quarries and hematite mines.

7007. Have you any remarks to make upon the evidence given by Mr. Scoular and other gentlemen we have heard to-day in reference to hematite mines?—I did not hear it.

7008. Were you here this morning?—Only this afternoon.

7009. This afternoon you have heard a good deal of evidence. Is there any point upon which you would like to make any remarks?—I think not.

7010. We will not again go over the whole of the evidence of the managers, but as we have a quarry engineer before us, we should like to ask something about the over-burden. You heard that question discussed here?—Yes.

7011. Is it your view, in the first place, that there ought to be some systematic removal of over-burden, and that it ought not be left to tumble down haphazard?—I think there should be some general rule for it.

7012. Starting from that, can you suggest any rule that may be of universal application?—I do not think I can, because the over-burden being so different in different quarries, it would be very difficult to have a rule that would be applicable to all cases. The over-burden varies so much—it might be a good strong boulder clay or it may be sand and gravel—what would apply to one would not apply to another.

7013. Do you think that removing it back to a distance equal to its height would be insufficient in some cases and too onerous in others?—Yes. In the case of a boulder drift which would stand vertically I think it would be too much to take it back its own height from the face of the quarry.

7014. In the quarry is a systematic inspection made of the over-burden?—Yes.

7015. Daily or how?—I think it is daily; the men are working there and the foreman is there and always has it in view. The danger is in wet and frosty weather sometimes.

7016. (*Mr. Lovett.*) Have you any suggestion to offer us as to what distance it should be removed back?—It might be kept back 4 or 5 feet from the face of the rock, that is, to the foot of the over-burden. Sometimes the over-burden stands plumb, at other times it goes back to its natural slope; but I should keep the foot of the over-burden back to 4 or 5 feet.

7017. Supposing it was 20 feet high, do you think that would be sufficient?—Yes.

7018. What would happen if anything occurred?—I do not think it would go over.

7019. I submit it would be absolutely impossible to do otherwise if it fell 20 feet and has a 4-ft. ledge underneath?—It would be a rare case for it to go over. If you had a large round boulder which fell 20 feet it might roll on the bench of the rock and get over.

7020. Supposing you had an over-burden 20 feet high and the whole lot of it fell, do you think that 4 feet would retain the lot?—No, it would come down certainly into the quarry.

7021. I suggest we must guard against a danger of that description?—If you have an over-burden 20 feet in height and it is a strong boulder clay, it will stand vertically.

7022. And then that sometimes falls?—Only frittering off the face with simple weathering.

7023. In exceptionally dry weather, wet weather, and in almost any weather?—Yes; and the boulders would be falling out of it; but I do not think it would slip back, as you say, in a big mass and then come over the edge—material of that nature would not do so.

7024. It would be no hardship to remove a 6-ft. burden back, would it?—Not at all.

7025. I submit it would not be a hardship to remove it to 8 or 9 feet back?—No, but I do not think you can make a hard and fast rule, because usually you can do this class of work cheaper in the summer months to what you can in the winter.

7026. You would not think it would be any hardship to ask that 6 feet of burden should be removed 8 feet back?—It would not be.

7027. Why say that 4 or 5 feet might be sufficient? Why make the maximum 4 or 5 feet when you say most emphatically that it would not be any hardship to remove it back 6 or 8 feet?—You want to make a hard and fast rule. If it is 6 feet in height I would not object to taking it back 6 feet. I might say removing it the 6 to 8 feet you speak of is not necessary, but I should not object to do it, and it would not be any great hardship to do it.

7028. Would something like this solve the whole question, that where an over-burden was up to 8 feet deep it should be removed back a distance equivalent to its depth and higher than that 8 feet or one-third of its depth, whichever is more?—Yes, I think that would do. I do not see any objection to that—taking it one-third of the height after 6 feet.

7029. (*Chairman.*) Go back to 6 feet, or in any case one-third of the height?—Yes.

7030. (*Mr. Greaves.*) I want to be quite clear what you mean by over-burden?—Any over-burden of rock which you wish to remove.

7031. Any?—Yes, any material that has to be removed from the rock you are going to take away, that is covering the rock which you wish to work.

7032. In the case of such over-burden being of a hard and homogeneous nature, do you consider that the space mentioned, a width of 6 feet, or one-third of the height, is necessary?—So far as it applies to our district it is.

7033. (*Mr. Ainsworth.*) What is the over-burden you have in your district?—Not more than 8 or 9 feet.

7034. (*Mr. Greaves.*) Have you such conditions as I have mentioned in your district?—No.

7035. So that your answer would not apply to this district?—No.

7036. (*Mr. Ainsworth.*) What is the kind of over-burden you have?—Chiefly boulder drift.

7037. All moveable more or less?—Yes.

7038. It would be bound to be kept a good deal further back than a perfectly rigid over-burden such as Mr. Greaves speaks about?—Yes.

7039. You would allow that a rigid over-burden would not require to be dealt with in the same way as a moveable over-burden?—That is so.

Professor W. Galloway called and examined.

7040. (*Chairman.*) I need not ask you your qualifications as they are, I am sure, well known to all the members of the Commission. I daresay you have heard that we have had at considerable length now raised almost all the points that can be raised connected with the mines in this district, but we should like to have your evidence upon three points. In the first place, it is suggested that it would be wise in putting new shafts, in addition to the cage-way, to have a ladder-way at proper stages. Would there be any difficulty in doing that?—None, in my opinion.

7041. And it would be desirable?—Very.

7042. Then with regard to the mode of exit, are you in accord with the evidence given by all the witnesses, Mr. Scoular and others, that it is desirable to have these second outlets wherever practicable, but in cases where only one is considered practicable the matter should be settled in accordance with Section 18?—I do not quite follow that.

7043. Where an inspector considered that there was a possibility of doing more than was being done, he should have power to require it, and in case of difference it should go to arbitration—would that be a reasonable way of settling the whole matter?—I understood it was intended that if a ladder-way was provided in one compartment of the shaft, that would be sufficient without having two outlets.

7044. Hardly that, because supposing there was a single outlet with a ladder-way, and supposing the mine was in close proximity to another shaft where you could easily get a way through, would you leave it open to an inspector to say, "I think you ought to "drive a gallery into the second place"—and go to arbitration if they did not agree?—Yes, providing the distance was not very great.

7045. That would all be considered by the arbitrators?—Yes.

7046. It would leave it in this position, that all new shafts are to have the ladder-way?—Yes.

7047. It is not to be absolutely compulsory in every case to have two shafts, but the question of safe egress is to be left to arbitration if the inspector is not satisfied with the existing arrangements. It is the law as it is, in fact, pretty well?—Not in regard to metalliferous mines, is it?

7048. Yes. Section 18 is: "If in any respect "(which is not provided against by any express pro-"vision of this Act, or by any special rule) any "inspector finds any mine to which this Act applies, "or any part thereof, or any matter, thing or practice "in or connected with any such mine, to be dangerous "or defective, so as in his opinion to threaten or tend "to the bodily injury of any person, such inspector "may give notice in writing thereof to the owner or "agent of the mine, and shall state in such notice the "particulars in which he considers such mine, or any "part thereof, or any matter, thing, or practice, to be "dangerous or defective, and require the same to be "remedied," and if they do not do it they go to arbitration. There would not, therefore, be very much difference except that in new shafts there would be a necessity in any case to have this extra ladder-way?—Yes.

7049. If the inspector considered two shafts necessary the question would go to arbitration?—Yes.

7050. We have put this before a great many witnesses now, including a large number called on behalf of the miners, and certainly the vast majority of opinion seems in favour of that solution. Do you agree with that?—Certainly.

7051. The one difference would be that in new mines the ladder in addition to the cage would be compulsory?—I think that is quite right.

7052. Have you paid any attention to the size of changing-houses?—Yes.

7053. What size do you think would be reasonable?—I think the size I have heard suggested by yourself here.

7054–5. That would be 150 cubic feet?—150 feet per suit of clothes.

7056. Have you measured up a house and checked the figure?—Not in exact figures, but I have looked into the houses with that in my mind, and I have made mental calculations, and I think 150 cubic feet per suit of clothes would answer the purpose very well, and is not too much.

7057. You think there would be no objection to carrying those views out in the district?—None.

7058. We have heard in the most authoritative way on behalf of the owners there would be none?—Quite so.

7059. Then there is a point upon which your opinion would be very valuable; it is suggested that instead of leaving the quantity of ventilation vague, there should be a scientific standard. It is proposed there should not be less than 19 per cent. of oxygen in the air, nor more than 1·25 of carbonic acid. Are you prepared to give an opinion upon that?—I think it desirable that such a standard should be established.

7060. You have great experience on these very questions?—I have.

7061. You do not think those standards would hurt the mining industry?—By no means—they would help.

7062. They are very moderate standards?—Yes.

7063. You speak from expert knowledge?—Yes.

7064. I suppose, for instance, if you had not that standard of ventilation, the candle would burn very dimly?—That is the point; the candle would burn dimly and the workmen would not be able to do their work so well. That is quite apart from health questions.

7065. Would you be surprised to learn that Dr. Haldane went down and took a bottle with him, and that about ·3 of carbonic acid is what he found?—I should have expected more.

7066. That standard would be well within the proposed limits?—Yes.

7067. Those limits would be quite reasonable and would not do harm to anyone?—Quite so.

7068. (*Mr. Thomas.*) In case the inspector should require a second means of egress from the mine, and might suggest a means of getting at that by holing into another mine, might there not be many instances when it would be objectionable so to do by reason of the possible difference in levels of the two mines whereby the one holing into the other might have the other mine's water—and many circumstances of that kind. A power of that description would be rather dangerous to put into the inspector's hands?—That is what I felt when the Chairman put the point to me; that there may be many cases in which it would be most difficult to carry it out.

(*Chairman.*) I have not proposed it; I have only proposed to give the arbitrator power which is quite a different thing.

(*Mr. Thomas.*) I am only referring to one mine holing into another.

(*Chairman.*) The other one would have to be heard. The burden would be on the inspector to show it was practicable and right before the arbitrator could listen to it at all.

7069. (*Mr. Thomas.*) I think you will agree with me that circumstances are likely to arise in many mining districts where a proposition of that kind would be extremely difficult?—Yes, it would be so. What I have felt is this: I have attended very many arbitrations, and they run into great cost very often; and then if you put a matter of that kind into an inspector's hands, he does not have to pay the cost, and consequently he has not the same hesitation in entering into the arbitration as the parties themselves who have not the Government at their back.

(*Chairman.*) The only thing is that it is the law now. You do not propose to go back from the law as it is. That is the point.

7070. (*Mr. Thomas.*) But you quite agree with the suggestion made by Sir Henry that there should in every instance be two exits?—Yes, where reasonably possible.

7071. (*Chairman.*) Where you can get it. My own view is that every new mine should have an emergency exit, and as to the rest, you should do the best you can?—I quite agree.

7072. (*Mr. Thomas.*) I raise this point: the contingency may be very remote, but still it is a contingency appreciated by mining men?—Yes.

7073. (*Mr. Lewney.*) And one which would be taken into account either by the Home Secretary or anyone authorised under the Act?—Yes. I always find the inspectors very reasonable.

7074. (*Chairman.*) It is the only possible solution, apparently. Can you tell us from your general knowledge anything about the dangerous character of dust? You are a great authority on mining. My own impression is that quartz, for instance, is much more dangerous than limestone?—I do not think there has been any investigation made—nothing that I know of—in that direction.

7075. At all events, the dust in some kinds of mines seems more dangerous than in others?—So far as one can judge; but I should think it arose principally from the fact that in the mines where diseases due to dust have been most prevalent they have used drilling machines for a longer time, and therefore have got that reputation.

7076. You are in favour of some spraying arrangement?—Yes, I am, and I intended to speak on that point. What I wish to say is this: at Harrison Ainslie's mines, we have 18 of the Flottman drills in constant use, which produce a good deal of dust. Mr. Ray, the General Manager, is rather distressed about the amount of dust, and has tried to induce the men to use some means of allaying it. He finds the men very obdurate in refusing the use of any means, either spraying or anything else. I thought, therefore, if the Commission would perhaps propose some means of compelling the men to use sprays it would be a very good thing for the men. So far as we are concerned, we shall be only too glad to adopt compulsory means.

7077. Have you used the reciprocatory drills?—Not in this mine, but in other mines. They produce dust in the same way, and I generally use water spray with them.

7078. (*Mr. Thomas.*) The Flottman drills at any time produce a great deal of dust, and really the quantity of dust depends upon the area of the hole and the speed bored?—Yes.

7079. Would you be prepared to accept rules of this kind to provide against the inhalation of stone dust where produced by rock drills: I may say these are in force in some metalliferous mines in this country, and have been adopted, I believe, in their entirety in South Africa, and do not appear so far to have been any cause of trouble in the mines which have adopted them. "(1) No person shall use or cause or allow to "be used in the mine any percussion rock drill unless "a water jet or spray, or other means equally efficient, "is provided and used so as entirely to prevent the "escape of dust into the air. (2) After blasting in "any end, rise, or other place, no person shall return "to that place until after the lapse of at least half an "hour, unless the air in such place has been cleared of "the dust and smoke arising from such blasting by "efficient ventilation or other special means, or unless "an effective respirator or other apparatus is used to "prevent his inhaling such dust or smoke. Blasting "shall be so arranged that men working in other "places shall be exposed as little as practicable to dust "and smoke. (3) In ends, or rises, and as far as "practicable in other places, no person shall remove "or cause or allow to be removed the rock broken if "dry and dusty, unless it has been effectively damped "so as to prevent the escape of dust into the air "during removal." I know you will be able to give an opinion as to this district much better than anyone on this Commission could do whether such a rule would be rather too much for you?—I think only the first rule you read would be applicable here; I do not think the other two would be applicable; they are too complicated and to my mind unnecessary.

7080. It is necessary to appreciate the nature of the dust produced from your rock?—Yes, and the condition of the place after a shot has been fired. I have very often gone into them within a few minutes after shots have been fired.

7081. The subsidence of the dust here after blasting is pretty rapid?—Yes. I think the first of the rules might be applied with great benefit, but not the other two.

7082. With your personal experience and your study of the apparatus used on rock drills now to prevent the scattering of the dust, you think that the application and use of those to the mines, in the first place, would be no great expense, and that that could be very simply carried out by the men?—Yes.

7083. I say "could be"—perhaps you might anticipate that the men would want considerable pressure brought to bear upon them to use the very appliances provided by the owners for their own safety?—That is the very reason why they should be made compulsory because the men will not use them unless compelled to do so.

7084. You have never seen such a respirator that you would either use yourself or recommend the men to use?—I am afraid you cannot get the men to use them.

7085. And you agree that it is better to cure the evil at its start?—Yes.

7086. By such simple and cheap means as are now available?—Yes.

7087. (*Mr. Ainsworth.*) Have you known how this rule works in South Africa?—I have not heard, in fact I did not know of its existence.

7088. So far as the mines here go, you would naturally recommend the adoption of the spray?—Yes.

7089. Do you think it could be easily done?—Quite; I have used it a great deal in connection with the large boring machines.

7090. (*Chairman.*) It ought to be clearly understood that the limestone dust is not so dangerous as the siliceous dust?—Quite so.

7091. (*Mr. Ainsworth.*) Should you say there is any danger from limestone dust?—I have not sufficient experience to say.

7092. It is not a siliceous dust?—It is not siliceous at all.

7093. (*Mr. Thomas.*) In this neighbourhood there does not appear to be much cause for anxiety, as the nature of the rock, so far as we can gather from the evidence and the doctors' certificates, is not of a nature to give cause for alarm?—Not so far as we have ascertained up to the present.

Mr. Charles Edmund Ray called and examined.

7094. (*Chairman.*) You are the general manager of Messrs. Harrison, Ainslie & Co.?—I am.

7095. You have heard the evidence given by a number of witnesses?—Yes, I have been here since noon.

7096. I should think you have probably a competent knowledge of the different proposals that have been made?—I think so.

7097. Will you kindly offer us any general observations you like on any particular points that strike you. You heard what was said by Professor Galloway on the question of two shafts?—I foresee a great deal of difficulty about two shafts so far as metalliferous mines are concerned, particularly in our district, the Furness district.

7098. One witness suggests it should be compulsory? The other proposals you heard, I suppose?—I quite agree with the ladder-way.

7099. Then as to the changing-houses, what do you say?—There is one point upon that in the case of three shifts. I think you spoke of 150 cubic feet for men or per suit of clothes in the case of three shifts; do you not think 150 multiplied by 2 would be ample?

7100. Supposing there were three shifts of 100 men, I suggest you would take two shifts and multiply by 150?—That is quite right.

7101. We cannot bind ourselves to that, but we put that forward purposely to see how far the owners and the men thought it would meet their views?—Roughly speaking we think it is about right. As at present advised I quite agree with that.

7102. Are you in favour of safety catches on the bottom of cages in case the rope breaks? You heard there was a divided opinion upon that?—That is so. I cannot say I am very fond of safety catches. In our district we have springs; they are old-fashioned, but they have frequently held in the case of an overwind—they have always held, I might say—but I believe in a good rope and a thorough equipment throughout in that respect.

7103. How about detaching hooks?—I cannot say that I am particularly fond of them. I prefer the springs myself with a good rope.

7104. (*Mr. Lescaey.*) I presume you mean the springs on the side of the cage which operate when the rope goes back and hold the cage when the rope becomes detached?—Yes.

7105. In your experience have you ever known these to act and to save the lives of the men on the cage?—Only once, and not long ago they did act then and save a man.

7106. And there is a possibility if you had not had those appliances, the cage would have gone down the shaft and probably the men would have been dashed to pieces?—That is quite true.

7107. So that in that case they were a very effective means of safety?—Quite so.

7108. Have you the detaching hook?—We have not.

7109. Have you ever considered whether it would not be desirable to adopt it?—No, not seriously, because we have been very successful with our present equipment.

7110. Have you had any cases where the cage has been drawn up into the sheave wheel?—Yes, we have had cases where a man has pulled the rope out of the shackle and the cage simply held on the slide ropes with the springs.

7111. Supposing there had been a cage of men on?—I suppose the same thing would have happened, the cage would have remained there.

7112. Have you never heard of men being crushed to death, and in one case a man dropped off the cage through that very thing happening?—I cannot say I have.

7113. You probably would not recollect that some 24 or 25 years ago the manager at the Yarlside mine was killed by that very thing happening?—By the overwinding?

7114. Yes; drawn up to the sheaves and the cage canted and he dropped out of it?—I do not remember it.

7115. Another case occurred at the Elliscales mines 17 or 18 years ago where a man was drawn up into the sheaves and crushed to death. I suggest to you in both those cases if there had been a detaching hook, of course accompanied by the clutches for holding the cage, it is just possible the lives of those men might have been saved?—I do not doubt that at all—I think that might have happened.

7116. (*Mr. Ainsworth.*) How did it happen—had the rope broken?—The engine-driver lost his head a little bit to tell you the truth—he was quarrelling with a man at the time and he lost his head.

7117. (*Mr. Greaves.*) And over-wound?—Yes; he drove the rope out of the shackle and the catches held.

7118. (*Mr. Ainsworth.*) You mean the spring catches?—Yes, the spring catches.

7119. So that really it was altogether the conduct of the engineman which caused the accident?—Yes.

7120. I suppose on the whole you would be in favour of having everything first class, the ropes and machinery, and everything of that kind?—Yes, absolutely of the best.

7121. And if you had that you might say that the danger in winding, supposing the engineman was up to his work, was almost nil?—Reduced to a minimum.

7122. In reference to the system of signals, are you in favour of the hammer signal?—I am strongly.

7123. The old-fashioned signal?—Yes.

7124. And if you have anything further it would be simply used in the case of an accident to a man down the pit and you wanted to telephone up?—Yes, a telephone is useful, but not always reliable.

7125. But so far as the winding goes the hammer system ought to be amply sufficient?—Yes.

7126. We have had it brought before us here that there ought to be some sanitary arrangements at the bottom of the pit. Can you make a suggestion in reference to that in any way?—The system we have adopted at Lindal Moor is this, that we have one or two screens and a box with the ordinary closet top on. It opens behind and the box just fits in.

7127. Practically an earth closet?—It is an earth closet, and they put the screen behind if they happen to be in the heading and do not want to go too far away from the shaft. On the other hand, if the heading is a short one, you put it up at the end and it only necessitates one screen. The repairers empty them. They have sawdust or earth and Sanitas or some form of disinfectant.

7128. How do you find it work?—Very well indeed.

7129. Of course you prefer that to the sewage going into the sump?—We never allow a man to use the pit as a closet, we have always told them to go out.

7130. You mean to go up?—Yes; we have pit closets at the top and we always try to keep them up to the use of those.

7131. If there is a deal of water that is all very well, but if the pit is dry?—It is very much better to know where all this stuff goes; it is safer and I think it is better altogether for the men in the mine.

7132. To go back to the question of signalling for a moment, assuming the hammer signalling is the best, would you be in favour of the same code throughout the whole district?—Yes, because the men get mixed up and there might be a misunderstanding.

7133. What is the deepest shaft you have in the Furness district?—I think the Low Field shaft is 220 yards with a slope working below that which brings it up to 260 yards.

7134. (*Mr. Thomas.*) Apparently, Mr. Ray, you do not attach much importance to furnishing cages with safety catches?—I do not. Of course a man can only speak from his own experience. We have always had

these safety springs. Some people say they catch on the side rods sometimes when the cage is going down the shaft. I have never known them fail to act when they ought to have acted. We test the springs frequently to keep them right.

7135. Would you suggest that their use should be compulsory?—No, I should not like to make it compulsory because I think a man is much more satisfied by his own personal experience.

7136. You would rather leave it to the discretion of the engineer?—I certainly should.

7137. Is there any regulation as to fixing the factor of safety at which the wire ropes might be working?—Yes, all through.

7138. There is a factor of safety fixed?—Certainly, there is always a factor of safety adopted.

7139. There is a factor of safety adopted, but that is not fixed?—You are quite right, not in that way.

7140. When you are winding the men you could not speak as to what factor of safety you generally obtain?—I could not.

7141. It is no doubt ample?—Yes, it is no doubt ample; there is no general defined rule about it.

7142. In the absence of any provisions making it compulsory to fix the safety catches, in the case of a rope breakage you would have no objection to fixing a factor of safety for the winding rope especially when winding men?—None whatever; I should be strongly in favour of it.

Mr. Thomas Gavan-Duffy recalled and further examined.

7143. (*Chairman.*) First as regards boys under 16; you say now that there are 50 of them employed at the mines?—Yes. The figures I gave the other day were transposed, they should have been 50 boys under 16 and 400 between 16 and 18.

7144. How do you make out 50? The returns show only 17?—Are those returns backed up by birth certificates produced in every case?

7145. No, they are only returns furnished by the owners. How do you make out 50?—From my own observation. I give every mine week by week.

7146. Tell me the name of the mine where there are the largest number of boys under 16?—I should say Park House.

7147. How many have they under 16?—I could not say. I do not go there often, but I daresay they will have some.

7148. I want to know how you get at the number of 50?—I could not pledge myself definitely to 50, but I should say about 50 from my own observation.

7149. Can you give me a mine with as many as 15?—I should think there were about 10 at Park House under 16.

7150. What makes you think that?—By seeing the boys themselves.

7151. Have you questioned them?—I have not questioned them, but I certainly believe a great number of those I have seen are not 16.

7152. Is that perhaps due to the fact that the Cumberland boys are rather small?—No, some of them are very well developed, in fact you might find a Cumberland boy of 16 would be bigger than a Lancashire boy of 18.

7153. You made that allowance in judging the size?—No—I know one or two of the boys.

7154. This is really only a supposition?—When we were discussing this matter at our Council meeting last week we had members of our Council there who objected to the standard of 16 on the ground that they had boys of their own who went to work at 14, and had not got to be 16 yet.

7155. Did your Council definitely say that there were as many as 50 of these boys working. It is easy to find out, although I do not know that it is very important?—It is not very important.

7156. I do not know that we can make much of it; the returns are 17 at present?—As I say, those returns are not backed up by birth certificates produced.

7157. And yours are not here?—No, they are not here.

(*Mr. Isaac Walker.*) I think I can settle that matter; we have four boys at Park House underground under 16, and the certificates are in the office. Mr. Leck has seen some of them.

7158. (*Chairman.*) I do not think we need carry that point very much further?—If there are four at one mine and there are 32 mines in the district, that is a fair proportion.

7159. Of course, imagination may multiply numbers?—I suggest a boy ought not to go down the pit until he is 16.

7160. We have heard all that. I think you wish to say something with regard to ambulances?—Yes, we make a very strong complaint that there is not a single horse ambulance in any of the iron-ore mining districts.

7161. There is a horse ambulance at the hospital?—At Whitehaven, which is a coal mining district.

7162. Supposing a man is injured and carried up out of the mine into some convenient place, the office or somewhere, will not a horse ambulance come and fetch him?—In some cases, not always.

7163. Mention any case where a horse ambulance would not or could not come for him?—There is one horse ambulance at Whitehaven, and the Whitehaven district itself has the first claim upon that ambulance. We had a case at Egremont a few weeks ago where a man was brought up out of the mine and had to remain an hour or an hour and a half at the pit-head for the ambulance to come from Whitehaven.

7164. What mine was that?—At Ullcoats; it was the case of a man named Atkinson.

7165. How far is Ullcoats mine from Egremont?—About three-quarters of a mile.

7166. Have they a horse ambulance at Egremont?—They have not.

7167. The nearest is Whitehaven?—Yes, the nearest is Whitehaven, 5½ miles away.

7168. How long did it take to get the horse ambulance up?—It was very considerably delayed owing, I understand, to the fact that the people at Whitehaven could not get a horse for the ambulance.

7169. What became of that case—the man I suppose was taken ultimately to the hospital?—Yes, ultimately; and I would like to say that the Ullcoats people certainly devoted every care and attention they could to the man. We say they had not the appliances to do what should be done under such circumstances.

7170. Do you propose that a horse ambulance should be kept at each mine?—No. We have the iron-ore district divided by the low and high side; we say a horse ambulance should be kept for the low side and one for the high side.

7171. Where would you have your two horse ambulances?—One in Egremont and one in Frizington.

7172. Where are the hospitals at present?—At Whitehaven.

7173. Every man in the district would go to Whitehaven?—Yes.

7174. Even if injured close to where we are sitting now?—Yes, he would go to Whitehaven.

7175. It might be as far perhaps as 8 miles?—Yes, quite.

7176. It is better in most cases, is it not, that the horse ambulance should go out from the hospital which is going to treat the man, because then they could be sure it is sent out with proper appliances?—I agree it would be better to wait for the proper horse ambulance to come, than to take an injured person in a cab or a jolting cart; but we say that the horse ambulance should be at a convenient place.

7177. The question is, if you had a horse ambulance at the two places you mention, who would

keep them there?—I should say the Urban District Council ought to keep them.

7178. There would have to be someone there always day and night, waiting, and not only that, but a competent attendant of some kind?—We do not suggest that; we suggest that if the Urban District Councils were to provide the ambulance carriage, an arrangement might be made with the posting people who always have horses and men on duty.

7179. Who is going with that ambulance carriage as an attendant?—There is hardly a mine in the district at which there are not at least two or three very competent ambulance men.

7180. They would have to be found, and delay would occur while they are being found?—They are nearly always in the pit. I was present when a man was brought up from the Wyndham mine a few weeks ago, and when the doctor came and saw what the ambulance men had done he said there was nothing for him to do.

7181. That is very creditable, but that is not the point. The point is whether it is better to wait until the regular ambulance of the hospital can be sent out from Whitehaven, or to have another and intermediate place rather closer but possibly without the advantage of the attendant and the ambulance being sent out properly?—I am not quite sure that an attendant is sent out in every case from Whitehaven—probably Mr. Leck will know.

7182. It is so in the south; they send a man out with it?—I have only seen the horse ambulance come from Whitehaven once, and I saw no attendant with it.

7183. At all events, this much is clear, that where possible it is far better, is it not, that the ambulance should be sent out from the hospital that is going to treat the man, so that they know that that ambulance is in a proper condition with all the bandages and appliances necessary?—I think before a man should be taken from the Egremont district to Whitehaven he should be first seen by a doctor.

7184. Is not the hospital the best place for the storage of the ambulance?—If it is convenient.

7185. That is all I ask about that. You desire to say something about covering up accidents?—Yes. Mr. Scoular in his evidence this morning said there was never such a thing happened.

7186. He certainly said it ought not to happen?—I would not have raised the point but Mr. Scoular was very definite about it. I feel quite sure that Mr. Scoular would not be a party to anything of the kind, but I have two cases plainly in my own mind in which I know the facts from the men concerned, and what I propose to do (I may say they are two of the small mines) is to get sworn affidavits containing the facts.

7187. Let us know the facts, what are they?—I do not propose to and I cannot reveal the names of the men concerned, otherwise they would lose their jobs. I mean to say plainly if I was to reveal their names at the present moment, I would have no opportunity whatever of getting sworn testimony from them. In order to prove that these two cases did happen, what I will do is I will get the affidavits sworn and sent up to the Home Office.

7188. You wish to say something about the charges for the changing-houses?—Yes. We have been told that none of these charges are ever exacted.

7189. Before we proceed to refute a thing let us see what the statement is. I understand it to be that there is a charge made in some places for the man to clean out the room, and sometimes they say it is paid directly by the men to the man in charge, and sometimes it is deducted from the men's pay-sheets —that is what is said—but it is usual, they say, for the miners to pay this man who cleans the room out. Now that being what is said, what do you say about it?—I have a case here showing where a changing-house has been charged at 3*s.*—that would be for the whole company.

7190. How many?—I should say it would be over six.

7191. In a week?—For the fortnight.

7192. Threepence a week each?—Yes.

7193. How was that money spent?—The man in charge of this change-house is at the present time receiving 17*s.* a week.

7194. And the total charge made was 3*s.* for the fortnight?—No, this is from one company—there are quite a number of companies at the mine.

7195. How many?—Fourteen or fifteen.

7196. That is to say the mine was getting more from the miners than the man received. What is the objection?—I desire to hand in that due bill (*handed*).

7197. We will look into that.* You have heard what the owners said about it. Now as to phthisis, you are still a little sceptical as to the health of the community?—I am. I do not propose to detain you at the present moment because I intended, had the Commission remained here over to-morrow, to have asked a local doctor of vast experience in the district to give you his opinions. I asked him yesterday: "In "your 14 years' practice thousands of miners must "have gone through your hands, and you must have "an immense amount of data?" He said, "Unfor- "tunately, I have not. They come upon me so thick "and so often I never get time to write them down."

7198. What does he say that is relevant to phthisis? Does he say there is a lot of it?—He was not so strong on phthisis as pneumonia and bronchitis. He said there was a good deal of that, he thought, caused through bad ventilation or dust.

7199. Does he deny that the bronchitis and pneumonia is less here than in most districts in England?—That is according to the report of Dr. Morison, which is very remarkable. I have an opinion that I can produce a report of Dr. Morison's that will refute Dr. Morison.

7200. Does not that report of Dr. Morison which will refute Dr. Morison refer only to infants and not adults?—I think not.

7201. Will you send us that report?—I will.

7202. We will have that doctor here to-morrow morning if he will come?—I would have to make arrangements.

7203. Can you telephone him to-night or send a telegram?—I can send a telegram.

7204. What is his name?—Dr. Byers, Cleator.

7205. Is he on the telephone?—I do not know.

7206. Our Secretary will telegraph him to-night and also write a letter, and will you do your best to have him here to-morrow?—I will try.

(*Mr. Scoular.*) May I say that after hearing the statement made the other day by Mr. Gavan-Duffy about covering up an accident and the place being turned inside out I asked all the managers that I could find with reference to it and they indignantly denied such a thing. I am anxious to make that statement.

7207. (*Mr. Lewney.*) I should like to ask in what way they covered up the report of the accident—was it by refraining from reporting it to the inspector?—No. I mean to say this, that in this particular mine—one of the small mines again, I want to emphasise, not a large mine—they deliberately went out on the street and got men on the street to go back to that place to transform it before Mr. Leck saw it.

7208. Was it a fatal accident?—Yes, it was a fatal accident in one case, and a non-fatal accident in the second case.

* *See* evidence of Mr. David Gill, Questions 7236–7248.

At Seascale, Cumberland.

TWELFTH DAY.

Tuesday, 25th October 1910.

PRESENT:

SIR HENRY HARDINGE SAMUEL CUNYNGHAME, K.C.B. (*Chairman*).

JOHN STIRLING AINSWORTH, Esq., M.P. | URIAH LOVETT, Esq.
WILLIAM LEWNEY, Esq.

T. E. BETTANY, Esq., *Secretary*.

Dr. HENRY STAGG BYERS called and examined.

7209. (*Chairman.*) Will you kindly give us your qualifications?—M.B. (Durham), M.R.C.S. (England), L.R.C.P. (London).

7210. You have come to speak to the general health of the locality, especially as regards phthisis and other pulmonary complaints?—Yes.

7211. What is your view upon that?—Well, so far as the district is concerned, I consider it very healthy. You wish me to speak more particularly in connection with mines.

7212. First of all, with regard to the whole district?—I consider it compares very favourably with any other district with which I have been acquainted. You wish me to speak in regard to the iron ore mines?

7213. Certainly?—Well, I consider we are singularly free from what you might call respiratory diseases due to the mines themselves. With regard to miners' phthisis, about which I believe a great deal has been said, I cannot say I have ever come across a case of fibroid phthisis which I could distinctly put down to iron ore mining. There have been undoubtedly a very large number of these cases in the district, but they have been imported from South Africa, due, no doubt, to the use of the diamond boring drill. With regard to bronchitis, of course we have a fair number of cases, but in my opinion these cases are due rather to the men sitting down in draughts when they are perspiring than due to any actual cause owing to their work. I must admit, of course, that there have been cases which one has put down to inhalation of deleterious gases, such as explosive gases, and so forth—at least I have considered them so. Men have come up and they have, perhaps, had a good many shots fired in a small compass where, possibly, the ventilation has not been good, and they have suffered a sort of catarrh in the bronchial tubes which passes off after a few days. With regard to deaths, I have looked through a large number of my death certificates, and I have discovered that in practically all the cases in which bronchitis has been cited as the cause of death the cases have been old men, say over 60, and in those cases the bronchitis has been of a chronic form. Whether that has originated from one of these causes, such as I have mentioned before, where a man has caught a slight attack of bronchitis and then got a cold later on and so developed a chronic form, it is difficult to say; but no young man practically dies from bronchitis in our district.

7214. I suppose bronchitis is rather a disease with more aged men?—Yes.

7215. As you get on in life you are more subject to bronchitis from natural causes?—Yes, chronic bronchitis.

7216. You mean with older men who sit in draughts perhaps or get wet through—is that the sort of way they would catch it?—Yes, that is possible. When I made those remarks about sitting in draughts I was referring more to the younger men.

7217. I was asking why a man over 60 is more likely to catch bronchitis than, say, a man of 40?—Well, chronic bronchitis seems to be a complaint of old age—and of course you get it amongst the old women as well.

7218. And by taking care of ourselves as we get older we may possibly avoid it?—Possibly. With regard to pneumonia, I look upon pneumonia as an infective disease, and I cannot consider that it is caused by a man's work. Of course a predisposing cause might be getting a chill.

7219. And again, of course, when you come to the question of phthisis, certain classes of dust from the Transvaal might be a predisposing cause and a very active one, in certain districts, at all events?—Yes.

7220. We are very much alive to that aspect of it. On the whole your evidence seems to me, if I have rightly interpreted it, a good deal to confirm the evidence of Dr. Morison?—I have not seen his evidence.

7221. Here is his annual report; it is too long to read it through, but I might refer to a few paragraphs from it, and you can see it afterwards. He says, "It "is satisfactory to note the reduction in mortality "from phthisis in both urban and rural districts this "year compared with the previous years." Then he goes on to say that there is a good deal of pneumonia about, and he thinks it is a good deal due among poor persons to housing and causes of that kind. Then he gives what is the most valuable part, because it is an actual fact, "Arranged in the order of their "phthisis mortality rate the urban districts stand "thus." Penrith, for instance, is big, but when you come to the districts round here they bear out a good deal, I think, the views you have been giving?—They do undoubtedly. Of course one gets a certain amount of phthisis, but perhaps not so much as one might expect. In looking through my death certificates again I discover the cases of deaths from phthisis might be divided into two lots, first of all, the young folk who die under 30 and those undoubted cases where there was hereditary tendency, if we can accept such a term—and secondly, the older folk, which in nine cases out of ten would be cases of fibroid phthisis, as we call it.

7222. I do not know whether you have any views upon the question of good changing-houses at the mines. Would that be a good thing for the men?—I think so. They very often come up out of the pit soaked through, and then a good wash and a change, and putting on dry clothes, would be beneficial to their comfort and health.

7223. And after a time there might be a tendency to pulmonary disease?—Yes, I have known the men in the winter time to come home with their clothes practically frozen on them, where they have not changed at the changing-house.

7224. Then you are very much in favour of changing at the mine or quarry?—Yes.

7225. Would you make it compulsory?—No, I do not believe in the compulsory business.

7226. A good many of the men said they would make it compulsory?—I think a man should have a certain amount of say in what he does and does not do.

7227. But about the sanitary character of the practice you have no doubt whatever?—No doubt whatever; it would be to the benefit of the men undoubtedly, and I think if the changing-houses were made satisfactory the men would take to it themselves.

7228. (*Mr. Ainsworth.*) I suppose you have among your patients a number of labouring men?—Yes.

7229. You would say, as a rule, that a Cumberland miner lives as long or has as good a chance of attaining to old age as anyone else?—I think so. We have a good many men working in the district 60 years of age and upwards.

7230. (*Mr. Lewney.*) Is pneumonia, which you say is fairly prevalent in the district, due to men contracting colds in coming from work?—I think in my evidence I said a cold contracted no doubt would be a predisposing cause.

7231. So that a man perspiring freely while at work and coming home in the frosty air would be very liable to that sort of thing?—It would be predisposing. In point of fact, if you look through the statistics for pneumonia, one discovers that the bulk of the cases occur in the months of May and June—we generally call those pneumonia months, and we do not get so much pneumonia in the winter months, in fact very little.

7232. (*Mr. Lovett.*) I understood you to say it is generally admitted by the medical profession that pneumonia is an infectious disease?—Infective, I said. It is due to a microbe organism, the same as phthisis is due to a microbe organism.

7233. Have you had any experience in the working of rock drills where men have suffered?—I have had a very large number which have been imported from South Africa.

7234. You have not found any in this country?—No, I cannot think of one case that I can put down to the iron ore mines. Rock drills, so far as I know, have not been extensively used—if they have, they have only just started, so that we have had no opportunity as yet of testing whether the working of such ore as we have with them would be deleterious or not.

7235. Of course you are aware that they work the limestone here?—Yes, but I believe only recently. You see these cases of dust, as they call them, sometimes do not develop thoroughly for months or even years. I have known men come home from South Africa apparently perfectly well, and perhaps two or three years afterwards they begin to develop the symptom.

Mr. David Gill called and examined.

7236. Do you represent the Bigrigg Mining Co.?—Yes.

7237. From the evidence we have had* it is thought by some that charges are made for the changing-houses which total up to more than it costs the Mining Co. You understand the point?—Yes.

7238. A pay sheet for 1908 has been put in showing a charge of 3*s.* Attention was called to it by Mr. Gavan-Duffy, and it was said if you add the 3*d.*'s together the amount got by the company would be bigger than the amount they expended. We desire light thrown upon that?—I will put in the books which show the number of men paying in that fortnight in that year.

7239. Give us exactly in that fortnight ending September 19th, 1908, what you got and what you paid?—No. 1 company is the company which you have before you; we have six men paying in the changing houses—six men paid 3*s.* for the lot.

7240. Give the total number of men and the total amounts paid?—

No.	1	company—number of men,		6	—paid	3*s.*
,,	2	,,	,,	3	,,	1*s.* 6*d.*
,,	3	,,	,,	3	,,	1*s.* 6*d.*
,,	4	,,	,,	3	,,	1*s.* 6*d.*
,,	5	,,	,,	2	,,	1*s.*
,,	6	,,	,,	5	,,	2*s.* 6*d.*
,,	7	,,	,,	5	,,	2*s.* 6*d.*
,,	8	,,	,,	2	,,	1*s.*
,,	9	,,	,,	4	,,	2*s.*
,,	10	,,	,,	2	,,	1*s.*
,,	11	,,	,,	3	,,	1*s.* 6*d.*
,,	12	,,	,,	5	,,	2*s.* 6*d.*
,,	13	,,	,,	5	,,	2*s.* 6*d.*
,,	14	,,	,,	2	,,	1*s.*
,,	15	,,	,,	2	,,	1*s.*
,,	16	,,	,,	5	,,	2*s.* 6*d.*
,,	17	,,	,,	2	,,	1*s.*

7241. To what sum does that total up?—1*l.* 9*s.* 6*d.* for the 59 men.

7242. What did you pay the caretaker?—We paid 1*l.* 10*s.* to the caretaker.

7243. That is to say you paid him 15*s.* a week?—That is it.

7244. I gather you have something else you wish to say?—There is one man to add to that number, a shiftman, who is not in the book; we had 6*d.* from him for the fortnight.

7245. So that it comes to 1*l.* 10*s.* and you expended 1*l.* 10*s.*?—Yes.

7246. You have the books to show that?—Yes.

(*Chairman.*) I think that disposes of that case.

(*Mr. Gavan-Duffy.*) I do not think you have all the companies.

(*Chairman.*) Yes, he has given them all; that seems to satisfy the point.

(*Mr. Gavan-Duffy.*) No, not quite—the man who is at the present moment in charge of the changing-house is receiving 17*s.* a week.

(*Chairman.*) In this particular change house?

(*Mr. Gavan-Duffy.*) Yes.

(*Chairman.*) You brought forward a specific case and here is the end of it; there is nothing in it; that case is gone. Are you satisfied about this case of 1908 now?

(*Mr. Gavan-Duffy.*) Yes, in regard to that case. I took that bill at random.

(*Chairman.*) Can you give us anything else?

(*Mr. Gavan-Duffy.*) The man who is in at the present moment is getting 17*s.* a week. It is a case where a man met with an accident and then got the change house job, and he got 17*s.* a week, and we say the men paid that in.

(*Chairman.*) That is admitted; but the question is whether they pay more.

(*Mr. Gavan-Duffy.*) I will not say that they pay more.

(*Chairman.*) If the owners pay out what they receive there is an end of it.

(*Mr. Gavan-Duffy.*) It does not satisfy us.

(*Chairman.*) Very likely that does not satisfy you. You say the men should not pay anything at all; but there is a total end to the allegation that the company are making a profit on this business. I have taken the case submitted by yourself and I have challenged it and at once brought it to their notice and desired to see the books, and here is the end of it.

(*Witness.*) So far as concerns Mr. Gavan-Duffy's remarks now, I may say at present we are paying the caretaker 17*s.* 6*d.* a week to look after our changing house and there are 57 only changing, so we are losing 3*s.* 3*d.* a week every week, and we are prepared to show our books to anyone you care to nominate to see them.

7247. (*Mr. Lewney.*) Is it the same man who was there in 1908?—No, a different man.

7248. He is paid 2*s.* 6*d.* more?—Yes; he is a little bit stronger.

(*Mr. Gavan-Duffy.*) This man is an invalid receiving compensation.

(*Witness.*) Well, we are paying him 17*s.* 6*d.*; that is all I can tell you.

(*Chairman.*) There is an end of that question about making a profit. I think that case falls to the ground. The only question is what is to be done with regard to changing-houses, which is a much wider question. That ends the evidence for the present.

(*Mr. Gavan-Duffy.*) I have been asked by all our witnesses who have attended this Commission to convey to you their very sincere thanks for the full opportunity

* *See* Questions 7188–7197.

you gave them and the uniform courtesy with which you treated every one of them. They have asked me to say that.

(Chairman.) I am sure every member of the Commission has only been too anxious to try and bring out every possible point, and give all the witnesses every opportunity of expressing their views. I am glad you have said that, and you may tell them we appreciate their thanks very much, as we wished to give them every possible chance of saying what they had in mind.

That ends our local inquiry, but before closing the proceedings the Commissioners wish me to thank Mr. Leck for the valuable assistance he has given them during our visit to Cumberland.

THIRTEENTH DAY.

Wednesday, 7th December 1910.

PRESENT:

SIR HENRY HARDINGE SAMUEL CUNYNGHAME, K.C.B. *(Chairman).*

RICHARD AUGUSTINE STUDDERT REDMAYNE, Esq.
JOHN SCOTT HALDANE, Esq., M.D., F.R.S.
RICHARD METHUEN GREAVES, Esq.
ROBERT THOMAS JONES, Esq.
WILLIAM LEWNEY, Esq.

G. W. CHRYSTAL, Esq., *Secretary.*

Mr. ARTHUR WILLIAM KAY-MENZIES called and examined.

7249. *(Chairman.)* Mr. Menzies, you reside at Highfield, Carnarvon, North Wales?—Yes.

7250. Will you kindly give us your experience?—The Carnarvon Quarry Owners' Association appointed me in conjunction with Mr. Milton of the Glynrhonwy Slate Quarry Company, Limited, and Mr. W. J. Griffith, of the Dorothea Slate Quarry Limited, to give evidence on their behalf before you. I served an apprenticeship of over three years as a mechanical engineer, partly at Messrs. de Winton's Foundry, Carnarvon, and partly at the Sandycroft Foundry Company, Limited, near Chester. I was afterwards trained for 12 months at the office of the county surveyor of Carnarvonshire, in surveying, levelling, and architecture; I completed my apprenticeship with my late father who was himself a qualified surveyor. I have been actively associated in the management of several slate quarries for 15 years; for 12 years as an assistant to my late father, and since his death as manager and director. At present I am managing director of the Alexandra Slate Company, Limited, managing director of the Llanberis Slate Company, Limited, managing director of the New Braich Slate Quarries, Limited, chief manager and director of the Talysarn Slate Quarries, Limited, and managing director of the South Dorothea Slate Quarry, Limited. I am also consulting engineer to other quarry companies. I have visited slate quarries in Newfoundland, Pennsylvania (U.S.A.), Angers (France), and the Pyrenees, for the purpose of studying the different methods employed in those countries in the manufacture of slates.

7251. I think we may conclude you have considerable experience on the subject about which you are going to give us evidence?—Quite so.

7252. First, there are several suggestions that have been made for amendment of the law, which I should like to bring to your notice one after the other with the view of hearing what you have to say upon them. I do not know that we can take them in any very logical order, but we will deal with them as best we can. For instance, take the question of overburden in quarries. I may say it has been suggested to us that in many cases the overburden is dangerous; and it has been suggested that there is not a sufficiently scientific systematic method of removing the overburden in quarries generally. I do not allude to particular quarries but quarries generally. It has been suggested that more steps should be taken to get the overburden more regularly removed. What do you say upon that question generally?—I do not think it is possible to remove the overburden in a better way than we are doing at present.

7253. That is as regards the quarries you have mentioned?—Yes.

7254. Would you have any objection to some proposal of this kind; that the owners should remove the overburden in a proper and workmanlike manner, having regard to the circumstances of the quarry and the character of the quarry?—I would not object to that.

7255. Secondly, if an inspector thought the overburden was not being properly treated, he could make proposals for a different treatment of it; and then, in the event of not agreeing with the owner, go to arbitration for a special rule. Do you think that might have the effect of unduly prejudicing the owner, or would you think it fair?—If all the circumstances were taken into consideration I should not object to it.

7256. That is to say, for instance, the question of how far the quarry was almost worked out?—Quite so.

7257. The lay of the strata?—Yes.

7258. And the whole conditions?—Yes, including financial circumstances in particular.

7259. I suppose the financial circumstances do make some difference in a quarry?—A great deal of difference.

7260. I will ask you about that presently when we come to another head of the evidence?—I should like to make it quite clear that we always remove all the overburden we possibly can because it is in our own interest to do so.

7261. And at as early a period as you can?—Yes.

7262. I mean not working with great quantities of overburden?—Quite so.

7263. Sometimes there must be overburden that you never want to remove at all?—Yes.

7264. You might have enormous masses of overburden, for instance?—Quite so.

7265. I will give you another instance; you might have an enormous mass of overburden due to the deposit of rubbish in bygone generations—people working the quarry in a very unscientific way had thrown stuff out, and thousands, possibly millions of tons would be required to be removed?—Yes.

7266. What would you do in those cases, because it raises an awkward point?—Of course we should not work that portion of the quarry, where the débris had been left, unless it would pay us to do so.

7267. Is it your view that overburden must be dealt with specially with regard to the quarrying you are doing, and not in a sort of general way?—I do not quite follow your question.

7268. I mean would you favour an explicit general rule, applying to every quarry in the kingdom, without

regard to its particular circumstances, or would you favour the question of overburden being considered with regard to the circumstances of the particular quarry?—With regard to the circumstances of the particular quarry.

7269. Now as regards the gallery system of working, I suppose when you are working a quarry where the strata lie in a direction sloping away from the point you are working to you would work that, as a general rule, in galleries?—Yes, we always work in galleries where it is possible.

7270–1. If the strata were inclined towards you, then the gallery system is not applicable?—The gallery system is applicable both ways.

7272. It has been suggested it might be a good thing to have a rule all over the kingdom, that a gallery should have a maximum height. Do you say that, again, is a question of quarry and quarry?—I think that a gallery ought to have a maximum height of 60 feet.

7273. You would never allow a gallery higher than 60 feet?—That, again, depends upon circumstances.

7274. Is there any general rule to apply to galleries, comparing, for instance, the width to the height?—I do not think so. I think it would be quite impracticable.

7275. At the same time you would be prepared, I suppose, to say that galleries ought to be reasonably sufficient and properly made?—That is so.

7276. There has been a suggestion made that walls should be built on galleries. Will you explain that?—Was it not in order to prevent stones rolling from one gallery to another?

7277. It is put in Rule No. 4, model code quarry rules: "There shall be a clear space between the out-"side rails of tramways and the edges of galleries, "sufficient to prevent both the falling of stones from "the waggons and the falling of the men themselves to "galleries below. Where such a space is impracticable "the edges shall be securely fenced." Would that be a reasonable provision—that where the rails had to go close to the gallery edge, for want of room, there should be a fence there?—I should imagine there would be no room for a fence. If the rails had to go close to the gallery edge, it indicates that the gallery is very narrow. It is quite an impracticable suggestion, in my opinion. There are places on galleries where walls might be built with advantage.

7278. But, as a general rule, of universal application, do you consider it would be inapplicable in certain cases?—Yes, at certain points on the gallery.

7279. That is a recommendation of the Departmental Committee of 1894. I suppose you would say that ought to be taken with the provision "where reasonably possible" read in. That is apparently your view?—That is so.

7280. Then as regards accidents. I think we shall have some evidence given before us as to the accidents that have occurred in quarries for the last 14 years?—Yes, by Mr. Milton.

7281. Generally speaking, has there been an increase in the number of accidents as they are reported?—There has been a considerable increase.

7282. Is that increase in the serious and fatal ones the same as in the lesser ones, or different?—Practically entirely in the minor accidents.

7283. That, I suppose, would be due to the fact that a number of accidents are now reported that were not reported before?—Yes.

7284. Due partly, also, I suppose, to the Compensation Act?—Yes; in particular to the amendment of the Compensation Act in 1906. We find that the number of days which the men are now out of work since the Act has been amended is very much greater than it was before; and I think we can show it is entirely due to the amendment of the Act.

7285. Does that represent an increased danger or an increased carelessness of working, or is it really rather due to the difference of returns than anything else? Would you say the working is more unsafe now than it used to be?—Oh, no.

7286. There is no difference?—None whatever.

7287. It is a paper difference?—Entirely.

7288. I will not ask the details of it; I will wait until Mr. Milton comes. Then as to the question of preventing these accidents. I suppose a good many of them consist of cut hands?—That is so.

7289. Would it be possible to wear gloves for those?—I do not think so. For the splitting and dressing of slate it is very necessary that the hands should be as free as possible, and I believe myself that the wearing of gloves would not allow the workman to use his hands in the way he should do.

7290. You have, I suppose, first-aid appliances at the quarry?—We have.

7291. I suppose there is a difference between what one would call first-aid appliances and the splints and things that the doctor provides. The first-aid appliances are kept there, I suppose, and are considered a thing not so much under the doctor as a mode of just helping the man until the doctor arrives?—That is so.

7292. In most cases the provision of splints and things by the doctor is paid for in his general retaining fee?—Yes. We have a set of splints there as well.

7293. But those are in addition to what the doctor would have for his particular use?—Yes.

7294. Although he might use yours, of course, if he could get hold of them, in an emergency?—Yes.

7295. Therefore by first-aid appliances, I suppose, we mean things provided of a more elementary character by the owner, apart from those which the doctor has?—That is so.

7296. Have you heard any objection on the part of owners to supplying a reasonable quantity of lint or boric fabric, or anything of that sort, for the use of the men's hands?—Not at all; we should be glad to supply them. We do keep lint and plaster and splints at the quarry as it is.

7297. From what I saw when I was round these quarries I must say I am of opinion that the men do not sufficiently take care to bind up and treat antiseptically small cuts which frequently grow and get poisoned, and cause some interruption in their employment quite unnecessarily?—That is so.

7298. What do you say about that?—I should say it would be a good thing to have anything to prevent that.

7299. Do you think they are not sufficiently careful?—I think they are not.

7300. You agree with the opinion I have formed upon that point?—Entirely.

7301. There is another point: I have been myself struck with the sight in many places of vertical lifts that are used—I call them lifts—for the purpose of taking up rubbish and slates from the bottom of the quarry to the surface. In most places, all over the kingdom, those lifts are only made for raising material, and not men. Of course it would be difficult to alter the number of those that exist now, but would it be onerous if it were suggested that those made in future should also be capable of lifting men?—I should say not. We have no vertical lifts in the quarries in Nantlle Vale.

7302. But you are aware there are vertical lifts in many other quarries?—Yes, there are vertical lifts in many other quarries.

7303. If something of that kind was done, the relief that it would afford to the men and the officials of the quarry is out of all proportion to the cost it would be—I mean far greater advantage than any cost involved in it, would it not, as a rule?—Yes, I should say so.

7304. In some cases it is a severe task, is it not, going from a deep quarry to the surface?—Yes.

7305. I may mention the Dorothea Slate Quarry—that appeared a great depth?—That is so.

7306. There they have a vertical lift. Perhaps I had better ask the gentleman from the Dorothea Quarry?—Yes, he will answer that better.

7307. Now about changing-rooms for the men. At present it is the law that at metalliferous mines they shall have a changing-room?—Yes.

7308. Do the men have such accommodation in the quarries with which you are acquainted?—We do not supply them with changing-rooms—we permit them to change in the engine-houses.

7309. Would it not be desirable, though, that there should be places set apart for them to change—regular changing rooms with some convenience for washing—or is that unnecessary in the case of slate quarries?—I think in the case of slate quarries it is unnecessary; but if the majority of the men in any particular quarry wished to do it we should be very glad to erect them.

7310. Provided you would be reasonably satisfied that they would use them?—Yes.

7311. How about the mess-rooms, for eating in the middle of the day—what do they do? Many of the men are far from their houses?—Yes, and where they are, we provide mess-rooms for them.

7312. You think it would not be unreasonable to require a sufficient amount of mess-room accommodation to be provided for such men as would use them?—I think not.

7313. It would not be a very onerous thing?—Oh, dear, no.

7314. Have they a fire, in cold weather, in those mess-rooms?—Yes.

7315. Where they can take refuge from the rain, if it comes on heavily?—That is so.

7316. When do the men come to their work, roughly speaking?—In the summer at 7 o'clock in the morning.

7317. Supposing torrents of rain unexpectedly came on about the middle of the day, what would the men do for the rest of the day—would they go on working through the rain?—The men outside wait for an hour or so, to see whether the rain will stop, and if not they usually clear home. What they should do in the case of slate-making bargaining is to go up to the saw sheds to help their partners.

7318. I see what you mean; but I suppose in the case of a mess-room it would be an advantage for them to be able to go in there in cold wet weather and wait there?—Yes, but we should prefer not to let them go there during working hours.

7319. (*Mr. Jones.*) Are they allowed to go before a certain time in the afternoon?—In what way do you mean?

7320. Supposing it is raining in the morning, are the men allowed to go at 12 o'clock, or are they compelled to stay there until after 2 or 3 o'clock?—They usually stay there until 2 or 3 o'clock in the afternoon, and then go home. If it starts raining at 11 o'clock in the morning it is very difficult to say whether it will be clear at 12 or 1 or 2 o'clock, and it is just as well for them to stop there.

7321. The custom, at any rate, is to stop there until a certain time in the afternoon?—Yes.

7322. Whether they get wet through or not in the morning?—I think so.

7323. (*Chairman.*) You think the necessity for changing-rooms would not be so great in quarries as it would be in mines?—That is so.

7324. With regard to the débris and rubbish brought out from a quarry—I suppose there are really two ways of getting slates, either you get it by means of a quarry sunk on what you might call the pit system, or else you must go and mine?—That is so.

7325. The difference, I suppose, would be this—and I ask you this purposely—that if you choose to work your vein by means of a quarry you get the advantage of light, and it is in the open air; but you have to remove a most enormous quantity of overburden, in many cases, probably, millions of tons?—Yes.

7326. In a mine, you get rid of the necessity of removing the overburden?—Yes.

7327. But on the other hand, you get the disadvantage of having to work in the darkness?—Yes.

7328. Does that represent it roughly?—Yes, but if we could possibly work our quarries as mines we should prefer to do so.

7329. It is the cheaper of the two?—It is the cheaper of the two.

7330. I suppose in some respects the accidents would be less?—That I cannot say.

7331. (*Mr. Jones.*) Do you mean it is cheaper to work a slate vein as a mine than as a quarry?—Most decidedly, I should say so.

7332. (*Chairman.*) Of course it would depend a good deal upon circumstances, and there might be circumstances where there was practically no overburden at all?—You understand, in the vale of Nantlle, I do not think we could work our quarries as mines because of the way in which the slate lies.

7333. That is just what I want you to explain?—If we could it would be a very great advantage. The average working hours of the men who work outside in Nantlle Vale is 41 hours a week. I presume they are more in Festiniog, because they are not to the same extent subject, of course, to the weather—so that that in itself is an immense advantage. In addition to that the removal of débris is a very serious matter in the open quarries.

7334. (*Mr. Jones.*) Is the dinner hour included in the 41 hours?—No, actual working hours.

7335. (*Chairman.*) In the case of a mine you leave the débris behind you?—Yes.

7336. At all events, you leave a very large proportion behind?—Well, I do not know that they do in Festiniog—I am not sufficiently acquainted with the system of working there; but as they tunnel right into the heart of the slate they naturally do not remove as much débris as we do.

7337. There is another point which strikes me may be of importance in considering the two systems; where you have quarries worked on the pit system, in veins of slate, every now and then, you have to leave a portion quite unworked to serve as a sort of bridge or buttress between the two sides of the non-slate strata by which the slate is surrounded?—I do not quite follow that.

7338. You have a vein of slate existing between two other masses of earth and stuff; you cannot go on in that pit and make it into a long furrow because if you did, the two sides would collapse?—We always make them circular.

7339. I mean you are obliged to waste a large quantity of good slate so as to leave walls to keep the earth up?—Not always.

7340. If you worked two pits near one another, one *here* and one *here*—with a great piece across between the two pits, how do you remove that without letting the walls fall in?—If the wall happens to be bad rock we do not remove it.

7341. That is so much slate wasted?—Not necessarily.

7342. How do you get it out?—I am afraid I do not quite follow you.

7343. (*Mr. Greaves.*) I think you are referring to the position between the Alexandra and the neighbouring quarry, where you have to leave a mass of slate rock?—There are special circumstances associated with that particular matter. It is a question of boundary.

7344. (*Chairman.*) Now some questions about the profits of quarries in North Wales at present and for the past years. It has been suggested to us that any very large accession of expense with regard to quarries might be very damaging to the industry. Of course we want to know something of the condition that the industry is in. I suppose a good many years ago there was a brisker demand, and higher prices paid, for slate than there is at present. I was told so: is that correct?—That is so. The prices of slates are now low, but they have been higher; on the other hand, the cost of working is very much higher than it has been in previous times of depression.

7345. So that the profits have declined?—Yes.

7346. Has the price of slates actually gone down during the last 10 years, say. When would you have said during the last 10 years was a good time?—The year 1903 was an excellent year, abnormally good I should say, and due in part to the Penrhyn strike, which cut off a supply from the market, therefore there was a greater demand and prices went up. That was an abnormal period.

7347. (*Mr. Jones.*) I think the strike was from 1900 to 1903?—Yes, those years.

7348. (*Chairman.*) What was the best year for prices in slates—when were slates at their highest?—I think in 1903.

7349. Higher than in 1900, for instance? Was it the maximum point?—Yes.

7350. The causes that have been suggested for the fall in the price of slates have been partly that architects use more tiles than they used to, for one thing?—Considerably more.

7351. Also there has been a severe competition with Portuguese and French slates?—That is so.

7352. And that has been accompanied by a rise in the expense of getting the slates?—Yes.

7353. So that the profits have declined?—Yes.

7354. Could you give us some instances of cases in which profits of quarries have been small. I want you to give us some average cases. Firstly, give us an idea, roughly speaking, of the average of profits on capital in the slate trade. Of course we quite understand that mining and slate quarrying is a lottery to an extent—you put in for it, and you may draw a prize or you may draw a blank; but can you give us a notion of the sort of average that the good quarries have been paying in North Wales? I do not ask for names or details?—Without mentioning any names, I may say I have before me the profits for a quarry, which I will call No. 1, from 1901 to 1910, which includes what I may term the boom years.

7355. So that you go before the boom years, through them, and then to the period afterwards?—Yes Taking all those years, from 1901 to 1910 inclusive, together the nett profits have amounted to 8,275*l.*

7356. And that upon an outlay of how much capital?—20,000*l.*

7357. What does that amount to on an average per annum?—I think about 4 per cent.

7358. (*Mr. Jones.*) Are you including 1910?—Yes, because the financial year of the company happens to end on April 30th, 1910. I am taking the financial years of this particular company.

7359. (*Chairman.*) You give it to us as a sort of representative quarry?—That is a good quarry. I should like to point out this is a quarry which during the same period cleared out an average of 16·6 tons of débris for every ton of slate manufactured. That is rather an important point.

7360. (*Mr. Redmayne.*) Nett or gross profits?—Nett profits.

7361. (*Chairman.*) That is what the shareholders got?—Yes, what the shareholders got.

7362. Now, give the case of a bad quarry—a quarry that has not paid well?—I have four quarries before me, which are in Nantlle Vale, and I will take them in their order. The next quarry, No. 2, for the period from 1900 to 1910 inclusive, made a nett profit of 7,000*l.* in the 10 years on a capital of 45,000*l.*—that would be about 1½ per cent.

7363. Of what did the capital consist?—20,000 preference shares, 20,000 ordinary shares and 5,000 debentures—all subscribed.

7364. (*Mr. Greaves.*) Accumulative preference?—Not accumulative preference.

7365. The ordinary shareholders never got anything, then?—You understand in some years they got something, in other years they lost—they made 12,000*l.* and lost 5,000*l.*, and the nett is 7,000*l.* in that period.

7366. (*Chairman.*) Representing 1½ per cent. on the capital?—Yes. In that particular company I ought to point out to you that they cleared out 32 tons of débris, on an average in that period for every ton of slates they manufactured. They have been as high as 38 tons and as low as 28 tons, and the average for the 10 years is 32 tons. Perhaps I ought also to add that there are employed at this quarry 250 men, and that it is regarded locally as being a very good quarry. With regard to No. 3 quarry, I cannot give you a longer period than from 1905 to 1909, because I was not associated with it before that date. They made 4,548*l.* in 1905 and 1906; but in 1907, 1908, and 1909 they lost 7,371*l.*

7367. So that they are worse than nothing?—Yes; that is a quarry which employs 450 men.

7368. What is the capital of that, roughly speaking?—20,000*l.*—all ordinary shares.

7369. (*Mr. Jones.*) Paid up?—Yes.

7370. I do not ask you the name, but I may say I can tell by the number of men employed to which quarry you refer. I doubt whether the capital is paid up?—In what way? This is a private limited company with a capital of 20,000*l.*

7371. (*Chairman.*) That amount was spent?—That amount was actually won and lost in those years.

7372. That amount was expended?—The 20,000*l.* you mean?

7373. Yes?—A good deal more than 20,000*l.*

7374. When I use the word "capital," what is important for our purpose is not nominal capital, but how much expenditure that amount of profit or loss represented?—I cannot say in this concern.

7375. Would you put it that more than 20,000*l.* had been expended?—I should put it at three times that figure.

7376. At all events, it has been a loss hitherto?—Yes. My late father used to say that it required at least 20,000*l.* and took seven years to open out a slate quarry.

7377. Will you give us another specimen?—I really do not know what you will think of this concern, No. 4—you will probably think the people associated with it have been very foolish to work it. Between 1900 and 1909, both inclusive, they lost 18,255*l.* and they made 1,250*l.*

7378. Why did they go on working, then?—The gentleman who owned this quarry was rather a faddist; he was greatly interested in the concern; he believed that ultimately it would turn out all right. He did not like to be beaten, and he continued supplying the capital until he died about three years ago.

7379. (*Mr. Lewney.*) Was that an open quarry?—Yes, an open quarry.

7380. (*Mr. Jones.*) Is the quarry working now?—Yes, and employs 100 men—and the débris cleared between 1900 and 1909 has averaged 38·8 tons for every ton of slate manufactured.

7381. (*Chairman.*) Do they hope to turn the corner?—I think we are turning the corner this year.

7382. (*Mr. Lewney.*) Has its life lasted the seven years?—Rather more. There are circumstances connected with this quarry as to why it has lasted so long. In an ordinary sort of way it would have closed down long ago.

7383. (*Chairman.*) Those instances, I suppose, are given by you in support of your general view that the profits of quarries in North Wales are not very large at present?—Very poor.

7384. Some of them are in a very poor state, and some might be more successful?—Yes. Of course I refer, you understand, to Nantlle Vale.

7385. Some of them have been paying, I suppose, very well indeed—very good profits—in North Wales? I do not know that they have done over a period of years.

7386. (*Mr. Jones.*) Is it not true that 20,000*l.* nett profit was made in one year at one of the quarries you refer to?—The property was then privately owned, and I cannot ascertain the figures. It was formed into a limited company in 1905.

7387. Was not that 20,000*l.* profit made during the 12 months?—That could not be regarded as profit, because the owner pulled down, as you know, the side of the quarry and made an enormous number of slates one year and left all the débris in the bottom. In the succeeding years we have had to clear out that débris, so that before you can consider they have made a profit you must take into consideration the clearing out of the débris.

7388. The people coming after him fail to make a profit because this man had been allowed to dig the heart of the quarry out and make 20,000*l.* in 12 months?—That is not so; they did not make the profit. You must take a period of years, and I say if you take that particular year and the succeeding years the concern has lost money.

7389. But many of these quarries change hands very often, do they not?—I do not know that they do.

7390. Two or three of them have done so?—Two or three small ones in the Nantlle Vale district have, possibly, but the principal quarries have not changed hands.

7391. Two of them perhaps not, but the others have?—What principal quarry?

7392. You know it is only two or three years ago you went into one quarry after another company?—If you refer to the Talysarn Company, that has not changed hands, it is still owned by the Talysarn Company. I was merely made a director of the concern.

7393. (*Chairman.*) Mr. Jones, as I understand, means this: you have given us some figures, but may it not be that in previous years very large profits have been made out of some of the quarries you have mentioned which if reckoned in would, on an average, modify the figures you have given to us. That is the point?—In that particular quarry which he refers to I have not got the results for the years previous to 1905; but what I say is that if you take that particular year into consideration you must also, of course, take the previous years; and I say that in all the concern has lost money.

7394. It would not modify the opinion you have given?—Not at all.

7395. (*Mr. Jones.*) But if you had taken that into consideration it would make a lot of difference in the statement you have given us?—As regards quarry No. 3?

7396. (*Chairman.*) It is quite a fair observation by Mr. Jones for what it is worth?—I should like to point out, since you make a point of this particular matter, I will assume this concern made a profit of 20,000*l.* in one year in the way I told you—they worked down the slate, left all the débris in the bottom of the quarry, and since then that débris has had to be cleared out. The company lost money, and I brought 15,000*l.* into it, so that that 15,000*l.*, with the débris still left, balances practically the 20,000*l.* That is additional capital altogether.

7397. (*Mr. Jones.*) It stands like this: if that quarry had been properly worked, and if rules had been properly drawn out, that would not have happened—the gentleman in possession would have had to work it out according to certain rules?—Rules?

7398. (*Chairman.*) You mean they would not have made the 20,000*l.* on the one hand, nor had to expend the 15,000*l.* on the other?—There was no other way of working that quarry.

7399. However, there is the point that 20,000*l.* was made on the one hand, but it cost an expense of 15,000*l.* on the other?—Yes—and will cost more.

(*Mr. Jones.*) No. 3 instance would look very different if Mr. Menzies had taken a few years before into consideration in making his statement.

7400. (*Chairman.*) Not much—it would have made 5,000*l.* more profit?—Yes.

7401. What difference in the interest would that give you?—There was a loss of 3,000*l.* If you take the 3,000*l.* from the 5,000*l.* there was a nett gain of 2,000*l.* on 20,000*l.* over five years.

7402. It makes it into a 2 per cent. quarry?—Yes, that is if you regard the capital as being 20,000*l.* That is really a nominal capital; it ought to be nearer 60,000*l.*—in fact, I may say the owner was offered 60,000*l.* for it many years ago.

7403. (*Mr. Jones.*) That was the amalgamation scheme?—No, it was not.

7404. (*Mr. Redmayne.*) They evidently considered it worth more than the 2 per cent.?—They evidently thought so. That was the time when they made the 20,000*l.*, and I suppose they thought it would be continued.

7405. (*Chairman.*) I was informed also (I do not know by whom) that the fall in prices of slates had adversely, or somewhat adversely, affected wages and caused emigration. What is the truth of that?—Of course it naturally has affected wages.

7406. I think I will ask you generally; has the change in the value of the slates which you have mentioned to us as having taken place had any, and if so what, effect on the general conditions of labour in the district?—Yes. The average wages of the quarrymen, the labourers and sundry men, have naturally come down. May I read you the average of these wages.

7407. Certainly. Give us any facts that support that view?—I had better not take them in the same order that I did before.

7408. If your views are contested we should take them with greater detail, but Mr. Jones thinks perhaps they are generally right?—In Quarry No. 1 for the year 1905 the average wages of the quarrymen were 6*s.* 1*d.* per day; in 1906, 4*s.* 8*d.*; in 1907, 4*s.* 11*d.*; in 1908, 5*s.*; in 1909, 4*s.* 10*d.*; in 1910 for 11 months, 5*s.* 5*d.*

7409. That is the highest point reached?—No, the year 1905, 6*s.* 1*d.*, is the highest point reached. This is the quarry to which Mr. Jones referred, and where I altered the system of contract. You will observe the average wages went up from 4*s.* 10*d.* in 1909 to 5*s.* 5*d* in 1910. It was due to the fact that I altered the system of working. I am able to do better out of the slate rock, and able to pay the men better.

7410. Without going into further details as to particular quarries, could you give us a general impression of what the fall in wages has been since 1905, which seems to have been the best year. Apparently 1903 seems to have been the boom year for slates, and the best year for wages seems to have been 1905?—I should say for quarrymen it has dropped down from 5*s.* to 4*s.* 6*d.* per day.

7411. About a fall of 6*d.*, speaking very generally and roughly?—Yes, very generally.

7412. Have a number of men left the district in consequence?—Not in consequence of the fall in wages.

7413. What has been the reason?—Because a number of quarries in the Vale of Nantlle have been closed down.

7414. Is it true that fewer quarrymen are employed now than there were employed some years ago?—Certainly.

7415. (*Mr. Jones.*) With regard to that average: is that an average of the quarrymen alone or does it include the labourers?—It does not include the labourers. That is the average of the quarrymen.

7416. (*Mr. Lewney.*) May I ask how many labourers you employ in proportion to the number of quarrymen, is it one in two or one in three, or have you any principle to go on?—We have no principle whatever to go on, but I think the best answer to your question is if I read out the tonnage of débris we clear out for every ton of slate we manufacture.

7417. That would hardly give it. Could you give us the number of labourers employed and the number of skilled quarrymen?—No, I have not got them.

7418. (*Mr. Greaves.*) What would it be about, roughly, do you think?—I should say there would be half and half.

7419. (*Mr. Lewney.*) That is near enough?—That is quite an approximate figure.

7420. (*Mr. Greaves.*) What would be the wages of the labourers, about?—The wages of the labourers are from 3*s.* 6*d.* to 4*s.* a day. I give you the average wages per day. In 1888 the average wages of the labourers at the Alexandra Quarry were 2*s.* 9¼*d.* a day; in 1898, 4*s.* 3¼*d.*; in 1908, 3*s.* 9¼*d.*—that is practically 3*s.* 10*d.*

7421. (*Chairman.*) Mr. Jones admits your general proposition as stated by you although he is doubtful as to some of the figures?—When I said those wages were higher than the average wages of the other quarries I think I was correct. The average wages of the South Dorothea Quarry in 1910 were 3*s.* 6*d.* per day, that is the average for the labourers. For the Talysarn Quarries it was 3*s.* 5½*d.* per day and for the Llanberis Quarry it was 3*s.* 7*d.* per day.

7422. (*Mr. Jones.*) Those figures would bring down the average of the quarrymen very much?—I have not included the average of the quarrymen at all. The quarrymen are separate altogether. Those are the labourers. When I gave you the average of the quarrymen it did not include the labourers.

7423. (*Mr. Greaves.*) These latter figures are labourers only?—Labourers only. I should like to say that our quarries are getting deeper every year and therefore it costs more to lift out our débris and to lift out our water.

7424. (*Mr. Jones.*) I suppose I need not ask about the royalties?—I shall be very glad to give you the royalties. Quarry No. 1, Crown lease, term, 51 years, rent, 250*l.* per annum, merging into a royalty of $\frac{1}{5}$th of all slate and stone gotten. I will give you another Crown quarry; dead rent, 400*l.* per annum. This is No. 2.

7425. (*Mr. Greaves.*) These are not the same numbers as we had on another subject?—No. I am purposely mixing them up. No. 2 merging into a royalty of $\frac{1}{4}$th up to the dead rent and $\frac{1}{3}$th beyond the dead rent. No. 3 quarry; in this instance the tenants are private owners.

7426. Freehold?—No, it is not freehold. It is partly freehold and partly leasehold, and I am giving you now the rent and royalty of the leasehold portion. 10*l.* per annum dead rent merging into a royalty of 2*s.* 6*d.* per ton upon best slates, 2*s.* 3*d.* per ton upon second bests, and 2*s.* per ton on seconds. No. 4 quarry, dead rent, 200*l.* per annum.

7427. Is this Crown property?—A private owner; merging into a royalty of 2*s.* 6*d.* per ton on all slates of the size of 16 by 8 and upwards and 1*s.* per ton on all slates from 14 by 12 down. I do not think myself that the question of rent or royalty is of the importance which some people attach to it.

7428. (*Mr. Jones.*) There was one statement made by you which I should like to get clear. You said the men worked on an average 41 hours a week?—I said the men outside, did I not?

(*Chairman.*) You were saying why a mine was more profitable than a quarry, and I understood the rain interfered with the quarry frequently and it did not interfere with the mine. Then you gave us the number of hours worked outside, not being so big as worked in the mine.

7429. (*Mr. Jones.*) 41 hours per week?—I was giving you then a particular quarry. I should like to give you, if I may, the actual quarries. I have no objection to name the quarries. That particular quarry which I gave was the Alexandra Quarry, situated at the top of Moel Tryfan, where we have a lot of rain and wind and fog, and of course the average was rather low. I will take a quarry down in the Vale of Nantlle; the average of the men outside is 45 hours per week and for the men working inside the saw sheds 49 hours per week.

7430. (*Mr. Lewney.*) So that the case you gave us formerly was really the worst case you have in the district?—There are other quarries that are as bad as that, because they are situated on top of hills. I picked that out at random.

7431. (*Mr. Jones.*) The ordinary time is from 7 o'clock to half-past 5?—Yes, but my point in giving you that was that the number of hours worked in the open quarries in the Nantlle Vale are less than in the quarries at Festiniog; and on the other hand I happen to know that in Festiniog they are less than what they are in France.

7432. (*Mr. Lewney.*) They are all underground quarries; they are all mines in Festiniog?—That is so.

7433. We quite understand that?—Sir Henry was asking me whether it was not an advantage to work outside. I consider it is a disadvantage.

7434. You have stated that the financial consideration in your judgment is the most important?—I did not say it was the most important.

7435. I do not want to misconstrue you?—Did I use that expression—more important than the consideration of the men—I do not think so. I put the men first and finances afterwards.

7436. You said under any conditions the quarries should be worked with due regard to the safety of the workmen?—Most decidedly. It is in our own interest to do so of course.

7437. There are very few places working but what can be worked with a reasonable regard to the safety of the workmen?—I do not quite understand your question.

7438. There are very few places to-day working but what can be worked properly with due regard to the safety of the workmen. Do you know of any particular place at the present moment but what can be worked safely?—More safely than at present?

7439. Some places may be worked very safely at present and others may not; but is there any reason why they all should not be put on the same line?—I think there is every reason why they should not be put on the same lines. The circumstances of quarries differ. I have in my mind now a certain slate quarry where I should say it was most essential that the faces should be examined very carefully periodically, but on the other hand I know plenty of quarries where it is not necessary to examine the faces.

7440. I am not speaking so much about the faces, but with regard to the overburden for instance?—That depends entirely upon the circumstances.

7441. Upon the nature of the overburden?—The nature of the overburden and the circumstances under which the quarry is working.

7442. Would you consider it a hardship if it was suggested to compel all quarry owners to work their quarries in galleries if they were allowed a reasonable time, say a matter of four or five years. You would not expect that every quarry should be worked on that system in a month or two or a year, but if they had reasonable time given to them is there any reason why it could not be done?—I think it is quite impracticable. I think if you were to force the quarry owners to make galleries with a view to the future working, especially at the present time, they would not be able to carry on their works.

7443. I did not suggest that it should be done immediately, but given a reasonable time?—I mean to say even to start now: it is very difficult to speak in general terms about this sort of thing, but I should like to instance the case of the Alexandra Quarry. I should very much like myself to make our No. 1 pit into a galleried quarry. I have started on the work many times and I have had to give it up.

7444. Why?—Because of the expense. But our No. 3 quarry is worked entirely upon the gallery system. We are able to continue it on the gallery system and we hope to improve it as we continue.

7445. Do you consider that the blondin is the best possible method of getting the slate up out of these quarry holes?—The blondin is very convenient but more expensive to work than the ordinary hoist.

7446. And more dangerous?—I do not think so. That is my opinion.

7447. We were given to understand that there had been numerous accidents through stones falling off the the skip. What is your experience with regard to that?—Our experience as regards stones falling from waggons in mid air has not been very much. We have not had many accidents from that sort of thing. We had an accident on the Alexandra Quarry about six months ago and that was from a stone which fell from a waggon hoisted on the old system. I remember one about six years ago that was from a blondin. Then there was an accident at Talysarn Quarry about nine months ago; that was a blondin accident, but it was of an extraordinary nature. It was where one blondin crossed another. The waggon happened to catch the lower blondin and turned it over.

7448. Some of these waggons have doors on them and some have not. Do you think it would be advisable that the waggons they lift up with the blondin should all have doors on them?—Any stones which fall from waggons do not fall from them in consequence of there being no doors: they roll from the top of the load. It is because they are badly loaded.

7449. Overloaded?—Overloaded or badly loaded.

7450. Have you any restriction or do you give any instructions to the men?—Yes, we have a maximum load.

7451. Are they supposed to load the waggons above the sides?—Yes.

7452. You allow that?—We allow that, but they make it a conical shape.

7453. (*Mr. Jones.*) I think the number of accidents at Alexandra are double what they are at Dorothea. Can you explain the reason why? Dorothea is the steeper pit?—Without knowing the nature of the accidents I cannot express an opinion upon it. I

should say myself there is no reason why there should be more accidents at the Alexandra than at the Dorothea, and I do not think there are.

7454. During 1909 at Alexandra the accidents totalled 16 and at the Dorothea 10?—Could you give me the particulars of those accidents?

7455. I have only the total?—Only 16 accidents in 1909?

7456. Yes, and the persons employed at Alexandra numbered 227 and at Dorothea 287.

(*Chairman.*) With more people at Dorothea there are 10 accidents and with less people at Alexandra there are 16 accidents.

7457. (*Mr. Jones.*) It does not depend on the nature of the accident, does it?—Yes, the point is this: the majority of these Alexandra accidents might be of a very minor character.

7458. They might be at Dorothea?—Possibly, and therefore I cannot express any opinion upon it.

7459. The slate in both quarries is of the same nature, is it not?—Yes.

7460. So the slate at Alexandra has not got a tendency to cut a man's hand more than the other one?—The thing is this: at the Dorothea Quarry it is quite possible that the men who had accidents did not leave work. In the case of the Alexandra Quarry on the other hand there might be men who had minor accidents and went home when they should not have gone home.

7461. The men at Dorothea have compensation just the same?—I know they have.

7462. There is a statement here that the Workmen's Compensation Act is responsible for the number of accidents reported?—I think so, certainly.

7463. But your accidents are double what they are at Dorothea and the Workmen's Compensation Act applies to both. Do you get more falls at Alexandra than at Dorothea?

7464. (*Mr. Lewney.*) May I ask are both these quarries worked on the same principle?—Not quite: the Dorothea Quarry as it so happens is a quarry which has very steep sides to it, and practically no galleries. At the Alexandra Quarry, on the other hand, the large proportion of men are working in the galleries.

7465. It was stated that they are working at Dorothea in galleries?—It has one gallery at the bottom, if you can call that working on the gallery system.

7466. (*Mr. Jones.*) It is the same thing exactly as you have got at Talysarn. You start one gallery at the bottom of the pit?—That is so.

7467. In a general way they are worked on the same principle, are they not?—Yes.

7468. Do you allow the men, when you get a fall at the quarry, to pick up the slate blocks even when a fall is going on?—No.

7469. Have you had a fall there lately?—Yes.

7470. Is not it a fact that the slate blocks are slung and two men watch to shout that danger is coming along?—I cannot tell you that.

7471. May I suggest that things like that would explain the fact that you get more accidents than they do at Dorothea. I am not saying it is true. Another thing is, at your quarries I fancy you allow the blondins and loads to go on when the men are firing and they have to go underneath them after firing their shots. Do you not think it would be much safer if it could be stopped just for the time the firing is on? They have to watch the shots with the thing overhanging them?—Are you aware of the fact that the men at the bottom of all these quarries never look at these things when they are going up?

7472. They watch them and if they do not watch them there would be more accidents than ever?—I say they do not and it is well known in the slate quarries that they become reckless under those conditions. It becomes part of the nature of the man. I do not blame the men at all. I think it is very difficult to be always looking up at your load and seeing whether a stone is coming out or not. You have to go on with your work.

7473. While they are shot-firing do not you think they have sufficient to do to clear off from the firing without watching?—I should be glad to make a rule as you suggest.

7474. You would not object to anything of that sort?—No.

7475. You cannot suggest any better scheme than this blondin because many accidents do happen from the loads. That is not the fault of the men?—I am not aware that there are more accidents due to the blondin system of hoisting than to the old system. Have you any figures showing that?

7476. I have not, but I fancy we have had evidence to that effect.

7477. (*Mr. Lewney.*) When the Commission visited North Wales I think it was so stated. I do not think it was given in evidence?—In my own opinion a blondin is not as dangerous as the old system of hoisting.

7478. Is it any more costly?—Yes, the blondin is the more costly.

7479. (*Mr. Jones.*) Would you favour one shot-firer in a quarry, instead of allowing the men to fire their own shots?—No.

7480. You think the present system is the best?—I think the present system is all right, because it is only experienced men who do the shot-firing.

7481. (*Mr. Lewney.*) You do not as a rule allow anyone to go and use explosives?—We only employ experienced men as rockmen.

7482. In the case of a gallery, would you be willing to submit the matter to arbitration if there was a dispute about it?—I do not know that I should have any objection to it, but you quite understand (and this is what I wish to impress upon you) we always work our quarries upon the gallery system when we can, because it pays us to do so.

7483. It might pay you because you stated before that in a certain quarry all the débris was left behind. It could not be left behind if you had a gallery?—I cannot help what has been done in the past.

7484. It might be done in the future?—I am only speaking now for myself.

7485. I am not suggesting you would do it?—When I say "for myself," I mean that is my personal opinion. I think that is what quarry-owners generally do. I think they like to work on the gallery system because it pays them to do so. Obviously on a face 400 feet deep, having eight galleries each 50 feet deep, you could put more men to work than on one depth of 400 feet.

7486. You would agree to a rule limiting them to 60 feet or thereabouts?—Yes.

7487. And you would be favourable to a rule at the same time having a mimimum width for the floor?—I do not think so. That is quite another matter altogether. Take a galleried quarry where you have galleries each 30 feet wide all round and suddenly, owing to a slide of rock, the galleries are taken away in part: it is a very difficult matter to have to make up those galleries again.

7488. You will agree that falls are due to undermining, as a rule?—I do not know that they are always due to undermining.

7489. (*Mr. Greaves.*) I noticed that you said you would be agreeable to a maximum of 60 feet in height for a gallery. I presume, in saying that, you mean so far as your own style of working is concerned?—Quite so.

7490. Not as a universal rule?—Not as a universal rule. Of course where one gallery works into another, if circumstances will not allow them to carry on the 60 feet, it is quite another matter, but speaking generally, in our own quarries, I should not object.

7491. Your remarks apply to your own particular style of working?—Quite so. It does not apply to slate mines.

7492. And must not be taken as an expression of opinion for all other quarries?—No.

7493. There was another suggestion, that it might be of advantage to lift the men up and down. Of course, if that was done, the lifts would of necessity be very much more expensive, and more precautions would have to be taken than where it is only a case of lifting minerals?—Yes.

7494. It would add considerably to the expense of the lift?—Yes.

7495. You would not like the mess-rooms to be used as shelters during the working hours, I suppose, because of the difficulty of keeping the time?—Yes.

7496. If the men were allowed to go there at any time there would be practically no means of time-keeping?—Quite so.

7497. With regard to the question of managers: are you in favour of having certificated managers in future? You will understand the suggestion would not be that the present men should be in any way interfered with; it would be only in the future. Of course there would have to be an interregnum between this time and such men being manufactured. What is your view about such certificated managers?—I suppose their theoretical knowledge would be of advantage, but it will confine the companies in the selection of their managers probably.

7498. You think it would in future? You do not think that all the brighter and better youths would go in for certificates on the chance of promotion?—I think perhaps on the whole it would be a good thing.

7499. You mentioned that you had attempted to make galleries at Alexandra and you found the cost prohibitive?—Quite.

7500. But your view is that you would, wherever possible, from economic grounds work a quarry in galleries?—Yes.

7501. Do you think, or do you not think, that all the slate workings, whether underground or not, should be under one Act and one set of inspectors?—That is a question I can hardly answer, because I do not know very much about the condition of those that are underground.

7502. You were asked as to the firing of shots. Practically inexperienced men do not fire shots?—No. It would rather hamper the quarry operations if the number of men were limited.

7503. (*Mr. Redmayne.*) You said it would pay you to work your quarries as mines if it were possible?—Yes.

7504. Why would it not be possible?—Owing to the nature of the rock. The rock in Nantlle Vale lies at a different angle to what it does in Festiniog.

7505. I suppose it is much less at Festiniog?—That is so.

7506. The dip gradient in your case is much steeper?—Yes. The difficulty in our rock would be to make a chamber of sufficient size for working so that the roof would not fall in.

7507. It is purely a technical difficulty of that sort?—That is so.

7508. But it would pay you if you were able to do so?—Undoubtedly.

7509. What is the width of your vein?—It varies considerably; on an average it is about 200 feet wide.

7510. That would necessitate you having your galleries always running at right-angles to the main axis so to speak, if you worked on the gallery system?—Not necessarily. We have galleries across the bed as well as along the bed.

7511. Have you width enough for that? Supposing that is your vein and it is 200 feet in that direction (*illustrating*) you would have to have your galleries here and here, would you not?—We have the galleries all round. I say 200 feet; the bed is rather wider than that: I was talking then of the purple vein.

7512. Why do you not go in for the gallery system seeing that you say you could and that it would be more profitable?—It is entirely a question of the circumstances of the quarry which you are working. You have beds of bad rock which intersect the slate bed and perhaps it does not pay to clear away that bad rock.

7513. But in places like Dinorwic and Penrhyn and so on, they have the same difficulties?—No; the working at Dinorwic is quite different to that in the Vale of Nantlle. The Dinorwic quarries are worked on the side of the hill.

7514. Keeping you to the point of the intermixture of bad rock, they have the intermixture of bad rock the same as you have?—Yes.

7515. Your answer would be, would it not, because they are on the side of the hill and you are not?—That is so.

7516. But still you could work your pits by means of galleries, could you not?—They could be worked, of course.

7517. It is simply a question of cost?—Entirely a question of cost.

7518. There is no technical objection?—No.

7519. With regard to overburden; there is a rule I would like to call your attention to in the Model Code of Special Rules of Quarries. It is the second one. I wonder whether you would have any objection to a rule of that nature. It says: "The overburden or tops of "the quarry and all loose ground or material shall be "cleared far enough back from the edge of the quarry "to prevent danger to persons employed." It is a general kind of rule?—We do keep them back sufficiently far.

7520. Then you would not have any objection to a rule of that nature being made of compulsory observance?—No.

7521. In answer to the Chairman, did you allude to the difficulties that you think obtain from your point of view in regard to the use of gloves?—Yes.

7522. Do you apply that to gloves or would the objection be removed if the fingers were free and the palm of the hand protected?—I do not think there would be any objection to that from the workmen's point of view, but I do not think there is any real advantage in it.

7523. There is the advantage inasmuch as one sees a certain class of workmen (I have seen them) with a pad of leather tied round with rope—a very rough and ready sort of mitten—for lifting stones which certainly protects the palm of the hand?—Yes.

7524. I cannot see where your objection comes in. I understand it if you have a glove entirely, but if the fingers are free and the lifting portion of the hand, the palm, protected, what do you say?—I do not know that there would be any great objection to that, but I doubt very much myself, if there was a rule to that effect, that the men would carry it out.

7525. It would be your duty to make them carry it out if it was a rule. It would be a question of inspection. Still, you think it might result in some good if carried out religiously?—If the fingers were free?

7526. Yes, and the palm of the hand protected. I mean, to meet your objection that the men would not be able to handle the material they were dealing with?—It might be some good.

7527. With regard to the question of goggles: have you considered the question of the use of goggles in the case of persons working in the dressing sheds?—Yes. I do not think they are necessary.

7528. I noticed, at one quarry which I visited, their use was made compulsory after a man had lost one eye, and I thought the compulsory use might have come at a slightly earlier stage, before he lost his eye. That would point, would it not, to the manager regarding them as a preservative to the second eye?—Yes, but I cannot recall to mind now any accidents that have happened to eyes due to bits of stone during the splitting operation or the slate-dressing.

7529. The work that is carried out in the dressing shed, the splitting and sizeing?—Do you refer to the old style of dressing?

7530. No, I refer to the style of dressing in operation at the quarry as we saw it when we visited Wales the other day.

(*Mr. Greaves.*) That was hand-dressing, but Mr. Redmayne did not see the machine-dressing.

7531. (*Mr. Redmayne.*) Not the machine-dressing that you have in operation?—In the case of cross-cutting it might do some good.

7532. At one quarry they have made some experiments and most of the objections advanced against it have been met?—I see.

7533. Then as to the inspection of the work in the quarry: can you give me any idea as to the number of inspectors that you have or the number of men per inspector?—Inspectors for what?

7534. Of the work in the quarry?—In the quarries which I control we have only the quarry manager who has charge of the quarry. We have no inspectors.

7535. Under them?—Under them.

7536. They have at some of the large quarries?—Yes, at some of the large quarries I believe they have. At the Talysarn quarry we have a head manager and a manager for each pit.

7537. No inspection other than that?—No inspection other than that.

7538. Do you not think it is very desirable that there should be some inspection?—I do not think so.

7539. How are you going to get your rules carried out unless you have someone to enforce them?—They are already enforced by the manager.

7540. The manager cannot enforce them sufficiently over say 500 men?—I have no quarries where there are 500 men under one manager.

7541. 250?—200 men.

7542. Even that is rather a tall order, is it not—one man inspecting 200 men? Would you have any objection to a rule saying there shall be an inspector for so many men?—It depends on the number.

7543. It depends entirely upon the number?—Yes.

7544. Say 200 men?—I should have no objection to that.

7545. I am coming down a bit, say 100 men?—It is all a question of cost. As it is, our quarries do not pay. We find it a very difficult matter to make them pay, and if we are going to have more charges of this character then of course it would be still more difficult for us to pay our way.

7546. Supposing it saved you a dozen compensation cases in the year, would that not help to pay? The fewer accidents you have, so much saved?—Yes, but I doubt myself if there were more inspectors it would reduce the number of accidents.

7547. Then you think the accidents cannot be reduced?—I do not say the accidents cannot be reduced, but I think the number of days the men are out of work can be reduced very materially and are being reduced.

7548. But do you not think the number of accidents can be reduced?—I do not think so.

7549. Would you take it from me that at a certain quarry since more rigorous Government inspection has been brought to bear at the quarry, the accidents have been reduced enormously?—During the last few years?

7550. During the last few months?—Of course I have nothing to say to that.

7551. It is rather hard to get over that fact, is it not? In regard to these blondins, I was very interested in observing the blondins when we were up in your part of the world. Do many accidents arise from materials falling off the tub—I do not know what you call it?—The waggon—no, not many.

7552. I was very surprised, because I noticed after they were caught up they swerved about a good deal, and sometimes at a considerable angle?—Do you refer to the blondins or the other system of hoisting?

7553. I am referring to the overhead rope which clutches up a waggon. I think you call that the blondin?—Yes.

7554. I noticed as soon as it was caught up it was swung like *that*, and very often in mid air it hung at a considerable angle, and I was astonished to find there were not stones falling off in every case?—They do not. Our experience is that they do not fall out.

7555. It would be only in accordance with nature that they should fall off?—I do not know that it is in accordance with nature quite. You can get hold of a glass of water and put it in a stand and twist it upside down.

7556. That is a different thing altogether?—It is the same sort of thing.

7557. That is centrifugal force?—I know, but it is the horizontal motion in this case which keeps the load in the waggon.

7558. It was hanging at a very considerable inclination?—If the waggon was running *this* way the inclination was *that* way, was it not?

7559. I will take it that it was so?—It was not the other way. Does not that motion help to keep a load in the waggon when it is inclined *that* way?

7560. Only to a very small extent; but I should think they must very often have stones falling off these waggons?—We do not as a rule. I do not say stones have not fallen off.

7561. Would it not be a simple remedy to make it so that it could not fall off?—No, it would not be a simple remedy.

7562. To put it into the waggons in such a way that it cannot fall off?—I should like to see the waggon designed out of which a stone cannot fall which would carry anything like a decent load and which would be convenient for tipping.

7563. You could not design such a waggon?—I do not think so.

7564. I do not think it is past human ingenuity?—I do not suggest it is, but I have not been able to think of one myself so far.

7565. I only thought it was a fruitful source of accidents?—No, it is not.

7566. Do you not think a more general use of cranes in the handling of the material at the quarry would be conducive to diminution of accidents?—We do not use any cranes at all in the quarries I control.

7567. Not in loading up the trams?—No; we use no cranes at all.

7568. All hand loaded?—We use the blondin sometimes as a crane.

7569. Would there be no advantage in using cranes from the point of view of safety?—I do not think so.

7570. At some quarries they use it very largely?—Yes, I believe they do at the Dinorwic.

7571. And at some others to a greater extent than at Dinorwic?—Yes.

7572. The effect appears to be to the reduction of accidents. You have no suggestions to offer?—None whatever. If they were of any value to us we should use them.

7573. It depends what meaning you put upon the word "value." Do you mean economic value?—Economic value; that is to say, if it was any convenience to the men to load their débris or their slate blocks we should use them, because we believe in giving every facility to the men to work.

7574. Then why should they be to advantage in some quarries and not in yours?—I cannot say.

7575. (*Mr. Greaves.*) In our quarries, for instance, the blocks are very much more than the men can lift. In Mr. Menzies' quarries the blocks are very seldom more than the men can lift, and if they are, they are usually broken. We lift pieces with a crane perhaps two tons in weight. Mr. Menzies has never seen a piece as big as two tons, I daresay.

7576. (*Mr. Redmayne.*) There are large lumps at Dinorwic?—I presume so. I have not been to Dinorwic for very many years. There is a great difference between the Dinorwic quarries and our quarries, because we use our hoists as cranes. We have not got any hand crane.

7577. You do use the blondin as a crane?—It fulfils the duty of a crane.

7578. Then there is an advantage in using cranes at quarries where there are not blondins. You have experience of quarries worked without blondins?—I have experience of quarries without blondins, but not without hoisting machinery. We have one quarry, the Llanberis quarry, where we have no hoisting machinery.

7579. It is all hand loaded?—It is all hand loaded.

7580. Take that quarry: would it be advantageous?—I do not think so, because we dress the blocks at the bottom of the quarry into a convenient size for loading.

(*Mr. Greaves.*) If I may interrupt to make things clear, that Carnarvon rock will cross-cut. We have to saw ours, and to do that we have to take it up to the surface.

7581. (*Mr. Redmayne.*) Here we have the Dinorwic, where they have stated that with advantage they could use more cranes?—I say definitely that, so far as this particular quarry is concerned, the Llanberis slate quarry, cranes would be of no use whatever to us, no advantage to us, as compared with our present system.

7582. Would they be advantageous from the point of view of prevention of accidents?—None whatever.

7583. Why not?—Because we split up and dress our blocks at the bottom of the quarry into sizes convenient for slate making.

7584. When you get a great mass of stone—I think very often they do this—they go rummaging about among the stone to get the big lumps out in order to dress them, and that is where the accident happens. I have watched them pull out these large masses of stone, and that is where the accident happens?—I think, on the whole, the Dinorwic rock is larger.

7585. If they conveyed the stuff to the dressing shed, loading it up by means of cranes, and dressed it there instead of *in situ*, after taking it to the dressing shed, I feel sure there would be very much fewer accidents?—I do not think it would be so.

7586. (*Mr. Greaves.*) Regarding the number of inspectors to the men. In an ordinary pit at Nantlle one inspector can see every man working at one moment. There is a position in most of the places where he can watch the whole of the men from that one position?—Yes.

(*Mr. Redmayne.*) I quite agree with that, but can he inspect the places at which the men are going to work, to see whether the rock is firm or liable to give way, and so on.

7587. (*Mr. Greaves.*) The men themselves (I suppose you have a rule) have to satisfy themselves as to the safety of the place?—Yes, every day.

(*Mr. Redmayne.*) That is a rule which applies throughout all mines.

7588. (*Chairman.*) Do you have in those slate quarries consulting engineers in connection with the quarries?—We have not in our quarries. There are quarries where they have consulting engineers.

7589. I will put to you the reason of my question. It was suggested by one gentleman that where you had a consulting engineer it was not so necessary to have a certificated manager, because really all the difficult questions were submitted to the consulting engineer. That is not so with all quarries, is it?—No.

7590. It is the sandstone I was speaking of in Scotland?—Yes.

7591. (*Mr. Jones.*) I understand that in some of the quarries in Nantlle they have three or four men in the quarry following their ordinary occupation, and then they are responsible for making periodically an inspection of certain parts of the quarry. Have you that in your quarry?—I do not think we have men who are specially appointed for the work, but we have men who do go round in that sort of way.

7592. Do they keep a record?—They do.

7593. You have gone in lately for more machinery?—Yes.

7594. Have you had much experience with the drilling machines?—I have had about two years' experience.

7595. Do you think the dust question applies to them at all—boring dry or wet?—I must confess I should prefer to see wet drilling rather than dry drilling, but I do not know of a hammer drill yet that can do wet drilling. If one can be found which would do its work as efficiently as the present drills I should be very glad to go in for it.

7596. So you would prefer wet drilling to a dry one?—Yes, if we could get the drill, and it was an efficient machine.

7597. You take every opportunity of lessening the cost of production through machinery?—That is so.

Before closing my evidence, Mr. Chairman, I should like to place on record my earnest wish to do everything reasonably possible to reduce the number of accidents in the slate quarries I control. I fully realise that such a matter should be the first consideration of management, but I believe much can be done by the workmen themselves in this direction.

Having regard to the difficult circumstances under which the slate quarries in the Vale of Nantlle are operated—difficulties which are periodically increasing, owing to the greater depths of the workings, congested state of tipping ground, rising local rates and Government taxes, also competition with foreign slates, tiles, and other roofing materials—I hope that, if the members of this Commission decide to advise the amendment of the existing Acts of Parliament relating to the working of slate quarries, they will bear these important facts in mind, otherwise serious injury may be unintentionally inflicted on an industry upon which such a large community is dependent.

Mr. J. G. Ashmore called and examined.

7598. (*Chairman.*) You are the secretary and general manager of the Oakeley Slate Quarries at Blaenau-Festiniog?—Yes.

7599. You have a considerable experience of slate quarrying in the district of North Wales?—Yes, 35 years altogether.

7600. The Oakeley Slate Quarry, which you manage, is one of the most famous and well-known quarries in North Wales, I think?—Yes.

7601. What was the number of men employed in the year 1899 as compared with the year 1909, 10 years afterwards?—Shall I give you the number for the whole of the associated quarries; perhaps I had better?

7602. Yes, the whole?—I will put in a list of the associated quarries at Portmadoc which I may say represents all but, perhaps, two smaller concerns.*

7603. In this list of quarries, what is the number employed now as compared with what it was?—The total number of men employed in November 1909 was 2,394 men, and if we include the slate quarries in Merionethshire outside that association, it would be 2,657 men in 1909. Of these 1,384 were employed below ground and 1,573 above ground. No females were employed.

7604. (*Dr. Haldane.*) Does "above ground" include open quarries?—No, these are referring to the Merionethshire mines entirely—the Merionethshire district pure and simple. I have no knowledge practically of the open quarries in the Carnarvon district. These figures compare with 4,971 in 1899, 2,401 of whom were employed below ground and 2,570 above ground. This shows a total fall in employment in the slate mines of Merionethshire in the 10 years of 46 per cent.

7604a. (*Chairman.*) Have the numbers of men fallen off in the quarries also? Those are mines you have given us?—I do not know whether they have fallen off in the quarries to the same extent. I am not quite certain of the percentage, but I believe there has been a general reduction in the employment in the slate industry throughout the whole of North Wales.

7605. Has there been the falling-off in the Oakeley Slate Quarries?—There has been a falling-off in the Oakeley Slate Quarries to a very serious extent.

7606. Would you say 50 per cent.?—Quite.

7607. What has become of the men?—A very large number have emigrated to Canada and America, and a good many have gone into the coal districts of Durham and North Wales and a few to South Wales.

7608. Have the wages increased or decreased?—The wages have gone down. So far as our own individual quarry is concerned, some few years back we adopted a principle that in the event of an advance in price we should immediately advance the wage, and *vice versâ*; in the event of the prices being reduced the wages should be reduced. We put that system into operation, and so far it has worked, I think, satisfactorily on both sides.

* The list put in by Mr. Ashmore was as follows:—

The Oakeley Slate Quarries Co., Ltd.
J. W. Greaves & Sons, Ltd.
The Votty and Bowydd Slate Quarries Co., Ltd.
The Maenofferen Slate Quarry Co., Ltd.
The Craig Ddu Quarries Co.
The New Rhosydd Slate Quarry Co., Ltd.
The Diphwys Casson Slate Quarries Co.
The Park and Croesor Quarries Co., Ltd.
The Wrysgan Slate Quarry Co., Ltd.
The Bwlch-y-Slater Co., Ltd.

7609. (*Mr. Lewney.*) A sliding scale?—It is a kind of sliding scale.

7610. (*Chairman.*) According to that the price has diminished?—According to that the price has diminished.

7611. And consequently the wages have gone down?—The wages have gone down *pro rata* with the prices now ruling.

7612. I do not want to go into details too much, but you heard what Mr. Menzies said generally about the question of the profits made by slate mines. Do you agree, or do you disagree?—I agree with Mr. Menzies. We have had good times, and I think unless we had none of us would have been here to-day. As a matter of fact we have had for the last five or six years falling years, and I think last year was the worst we have experienced as a company since our formation.

7613. There are a certain number of companies which are not paying?—The greater number in the Merionethshire district are non-paying concerns to last year, up to which their accounts are mostly made.

7614. As regards the general health of the district, what do you say about that? I suppose you are appearing here for miners and quarrymen—taking them both together?—Yes.

7615. What remarks have you to make upon the health of miners and quarriers?—As a matter of fact I think the only really reliable figures to go upon for the whole district are those prepared by the Medical Officer of Health, Dr. Richard Jones, in his report in 1909. I have dealt with that year right through because it is the only recent year we have complete, and I have a copy of his report.

7616. To sum up, what Dr. Jones says is: "The "death rate from phthisis was 1·5 per 1,000 of the "population in the Festiniog Urban District"?—Yes. Table 4 gives the particulars as to the causes of and ages at death during the year 1909.

7617. What does he say about slate quarries?—There are 18 deaths from consumption in that district. I have not been able to obtain the exact numbers of deaths due to tubercular diseases in the quarries separately.

7618. Then this does not throw much light on the thing, does it? The total death rate from phthisis is 1·5—not a very high death rate, is it?—That includes the population of the district.

7619. That 1·5 of the whole district includes all the quarries?—Yes.

7620. That is rather light on the whole?—It is fairly light, and as a matter of fact the greater portion of the male population are quarriers connected with the slate quarries.

7621. Have you heard any opinion at all in the district that the slate workers are more subject to phthisis or less than the rest of the population?—I cannot gather that they are more subject. The impression is that phthisis is not really a disease properly attributable to the slate industry. The experience and the statistics which have been got out by the medical officers of the district from time to time have proved as a matter of fact, that there is less phthisis disease among the quarriers pure and simple than there is in the whole population.

7622. I should like to have those figures if you have got them?—I will get them for you.*

7623. (*Mr. Greaves.*) I think I have them. That is not lately. It is the evidence given before the Departmental Committee?—I have heard of nothing to alter their experience in the meantime since the date of that.

7624. (*Chairman.*) Evidence also was given on fibroid phthisis and industrial diseases in 1907 before the Departmental Committee. I was a member of that Committee. The evidence there was that they were not suffering in this particular way?—That is so, and your report was drawn up on that basis. There has been no case of a post mortem examination on a Festiniog quarrier from that date to this, and therefore there has been nothing further proved on that particular point.

7625. How do the accidents stand in the Oakeley Quarries? Are they on the increase or diminution?—They are on the increase.

7626. The severe or the slight ones?—The minor accidents.

7627. Will you give us a figure to show that?—In 1899 we had 26 minor accidents, that is such as cut fingers, &c., with 1,650 men employed. For the year ending April 13th, 1910, we had 20 minor accidents with 750 men employed. That showed an increase on the face of it of 40 per cent.

7628. To what do you attribute that increase?—To the Compensation Act, and more particularly that of 1906. Of the total accidents that we had during the year 1909, which were 43, 41 were disabled for seven days and over, one under seven days, and one fatal. Those were the total accidents. 41 of them were disabled for over seven days. I think that rather points to the fact that the Compensation Act may have accounted perhaps for the length of some of their disablement.

7629. (*Mr. Lewney.*) Have you any idea how many men were off work over seven days and under 14 days?—I have not got that figure, I am sorry to say.

7630. (*Chairman.*) Do you not think that possibly the fact that there was a falling off of employment had reacted to a certain extent in producing going off work, and that where his employment was failing a man took life rather easier?—There is only one point: I do not wish to suggest anything in any way, but one cannot get over the fact that under the conditions at the present time under this Compensation Act, if a man is injured he can very often get more money by sitting at home, with a hand done up in a bandage or what not, than he can get when he is at work—with a half-rate of wages and with the various sick funds and very often insurance fund; and then again, if he is a bargain taker, he is also entitled to a proportion of his contract which is running while he is laid up.

7631. Is your meaning that without necessarily being a malingerer, he may take life easier?—I do not say a man should necessarily rush back to work if he is getting higher pay for doing nothing than when at work.

7632. So long as the doctor is there?—That is so. I should say here, in reference to our doctors, we are in a very different position on our side from that on the Penrhyn and Dinorwic side. They have their own official doctors and we have gentlemen who are resident local doctors of the place.

7633. (*Mr. Redmayne.*) Perhaps they went back to work too soon in the old days?—They seem to have faced the difficulties pretty well. It is so difficult to trace these things. We have no detailed record of the accidents at all to make any comparison.

7634. (*Mr. Lewney.*) You had no records under the old conditions?—We had no records under the old conditions. All these things that are reported now they would never have thought anything of: the men would go home over the mountain and come back next morning and take no notice of small accidents.

7635. (*Chairman.*) You have given us the number of minor accidents. What were the number of graver accidents?—The total number in our quarry was 41.

7636. You have given us in 1909 and 1910, 26 and 20. What were the number of deaths and more serious accidents?—I have not extracted that, except for 1909. I can give you the whole of the accidents, which were 43 in all, 41 of which were for seven days, one beyond seven days, and one fatal.

7637. What was the total for 1910?—I have not got that for 1910.

7638. You pointed out that the serious accidents have not increased, and that the minor ones have increased?—Yes.

7639. I want the numbers. You have given us the two numbers for the minor accidents. Now I want the two numbers for the major accidents?—I have not got them.

7640. You can get them, I presume?—I can get them easily.

* *See* Appendix F.

7641. Perhaps you will get it. Your opinion is that they will be found not to have increased?—Yes.

7642. (*Mr. Jones.*) Does the 43 in 1909 include all the serious ones?—All accidents reported.

7643. (*Chairman.*) The next point is the Workmen's Compensation Act. That does not come within our scope except in a very incidental way. With regard to blood poisoning: are there a certain amount of minor accidents due to blood poisoning from cuts?—The blood poisoning, of course, does follow in cases, but we have no particular registering of those cases.

7644. Would you agree with me that the men are not careful enough in dressing cuts when they get them, letting them remain until they become bad?—That is so in many cases. I may say we have every appliance for them to avail themselves of in various places in the quarries.

7645. I suppose you have some lint and wool and things?—Yes.

7646. Whose care is that put in?—That is in the manager's care in the head office.

7647. But every man who got a cut merely in the finger would hardly disturb the manager's office to get a little bit of wool?—They are in telephonic communication with them, and if there is any serious accident to any man, he can be attended to.

7648. I am speaking of merely cuts. Would it not be better that there should be a little more supply of some antiseptic solution and then for the man to tie his finger up?—I cannot absolutely say that there is no distribution of it in other portions of the quarries, but I know there is a store in the central office.

7649. Do you not think it is one of those things that remain in the central office, and does not get distributed?—I should think it is quite possible.

7650. At all events, I may take it the owners have not the least objection to providing a sufficiency of first aid of that description?—None whatever. The difficulty would be to get the men to use it. I do not know whether you can enforce any rule by which you can make them have their fingers attended to, but that is our difficulty as a rule.

7651. (*Mr. Jones.*) Is it not owing to the fact that the men have not got easy access to it?—I believe it is fairly well distributed over the quarry, but I cannot make the statement because I am not certain.

7652. (*Chairman.*) I take it generally that you and the owners would welcome any means of having something handy for these men to tie their cuts up?—By all means.

7653. You wish to call attention to precautions taken outside the Workmen's Compensation Act to ensure the safety of the men?—Yes, I wish to point out that outside the various Acts of Parliament governing our operations we have a very specially trained staff with ladders and acetylene lamps for making the roof safe and testing any loose pieces on the sides of the wall. That is a very costly process: I mean to say it works out in most of the cases where we have had to make the roof safe at about 5*s.* a square yard to put a roof safe in one chamber, and, of course, that process is going on from chamber to chamber from one year's end to the other. That is, in my opinion, a form of insurance. In addition to that, we have an expert consulting engineer who goes through the quarries every quarter and makes a full and exhaustive report upon the conditions of the working which is duly circulated among our Directors, and at our meetings the recommendation for stopping work here, or what not there, is invariably carried out. In addition to that, we have the surveys taken also every quarter by a fully qualified surveyor showing the exact position of the workings through the quarry from the top to bottom; and over and above that, we also have a consulting expert electrical engineer who is also paid to give us a full quarterly report upon the condition of our plant from the top to the bottom, and his recommendations, needless to say, from time to time are invariably acted upon. It represents, putting it together, a very, very considerable expenditure, but it is all done with the one object, the upkeep of the property and the general protection of the men.

7654. You take the view that the workman, quite apart from the general rightness of protecting him, is also of value to the mine?—Very great value.

7655. It is not to your interest to see them injured?—Certainly not.

7656. Quite apart from the question of humanity or justice?—That is so.

7657. What other provisions are there made for the men?—As regards their general comfort we have made some very excellent roads to the various working places, both above and below ground. We have efficient ventilation throughout the whole of the workings. We have 17 dining-rooms with accommodation for 1,268 men in different convenient parts of the quarry on the various floors. We have four drying rooms. We have a sufficient number of shelters on each floor during the time of blasting operations. We have a hospital and they have ambulance appliances. We have pure drinking water on every floor where practicable, and we have 25 privies.

7658. (*Mr. Jones.*) Is that general throughout the quarries?—It has been lately. In one or two quarries they have not perhaps quite the same proportion of conveniences as we have *pro rata* with the number of men, but nearly every quarry in our district throughout is generally adopting the same principle.

7659. But they have not come up to it yet?—They have not come up to it yet quite in every instance, but they are all doing it.

7660. (*Chairman.*) You heard what Mr. Menzies said about the general profits. Have you anything special to add to that? I see something in your remarks?—I can only say our own personal experience is that Mr. Menzies is quite right. During the period of the Penrhyn strike we had a boom year owing to the fact that the supply fell very considerably short of the demand, but of course a big trade disturbance of that character is bound to have its aftermath, and I think we are all more or less suffering to-day from the effects of that strike. That is my firm belief.

7661. What effect would a strike leave after it is over?—What has led up to it has been this; during that period the whole of North Wales, putting out every slate they possibly could at that time, were quite unable to meet the demand. The consequence was that merchants and other buyers on this side had to look elsewhere for their covering material and it gave a great spurt to the importation of foreign slate, which has continued right up to the present date. It also gave a great impetus to the putting down of tile and other manufacturing plant, and it has also introduced several other imitation roofing materials, composition roofing materials, which we still find are very strong competitors. That all had the effect upon our general sale prices, and indirectly again upon the wages of the men throughout the whole of the slate districts.

7662. I think at present you say there are no less than ten different Acts apparently affecting the industry?—There are.

7663. You mean the Workmen's Compensation Act and all?—Yes, covering everything.

7664. Acts like the Workmen's Compensation Act could not possibly be consolidated with the quarry ones?—Quite so.

7665. But you would like as much concentration as you could get so that people would know what to look to, both masters and men?—Of the Metalliferous Mines and the Factory Act, or if it were possible I should much prefer to see a separate Act embodying the clauses which are applicable to the slate industry, whether they are open quarries or whether they are mines.

7666. (*Mr. Lewsey.*) Separate from the metalliferous mines?—Yes, separate, because they are utterly different in so many respects.

7667. (*Chairman.*) What have you to say about certificated managers. Some people say it will cut out men who although they might not be good in examinations are very good in practice. What is your opinion on the whole?—It is a very difficult thing to express an opinion upon. There is no doubt that many of the ordinary rock men we have working in the quarries to-day know every inch of rock and every turn and twist

of the geological formation they are passing through, and therefore for absolutely practical men they are the finest you could get. Whether they could rise to the position of inspector or manager of a quarry if they had to pass through a technical examination it is very difficult to say. If they could be obtained with full theoretical knowledge and practical knowledge of course it would be naturally to our advantage.

7668. You would be rather in favour of bringing in any legislation of that kind cautiously by successive instalments instead of passing it in an Act straight away?—That is so.

7669. I think that covers all your paper?—There is only one point I should like to refer to in the evidence given by Mr. Menzies, that is in reference to the question of using gloves and pads. One of the great objections to gloves and pads in the slate industry is owing to the slippery nature, the clayey slippery nature, of the material that they deal with. When you get that slate dust in a moist state on a pad a block of slate is more likely to slip out of your hand and cause an accident than if you have your hand free.

7670. Not if you have your fingers free?—I would not even say that, because you have only your fingers free on your pad, after all is said and done, and if you have the moisture on the pad and you are using a heavy weight it would be more liable to slip out of your hand. I have heard from some of the quarrymen themselves whom I have asked—one asks casually going through—and they point that out as being one of the objections to using it. I thought I would just refer to that.

7671. (*Mr. Redmayne.*) And yet in playing golf or driving a motor-car you use a pair of gloves?—Yes, but you do not handle the same commodities. Anything of a stony or granite nature would be a different thing; but here you have a very slippery greasy material in your hand, and that reminds me that is one of the points I should like to refer to in reference to the question of spraying the mills. A suggestion has been made that the mills should be sprayed to keep down the dust.

7672. (*Chairman.*) The slate mills?—Yes. If you spray these slate mills with water you would get that dust in a very slippery condition, which is most dangerous, and very likely there would be more accidents.

7673. What are these slate mills?—Where the slates are dressed by machinery and the blocks are prepared for the sawing tables. The mills at the Festiniog mines I am now talking of.

7674. You prefer to work dry?—Yes. The cubic space per man is so extensive. It comes out to over 7,000 cubic feet per man employed in those mills throughout, so that the fear of any danger from dust is pretty well relieved.

7675. (*Mr. Redmayne.*) What have you to say with regard to the possibility of increased inspection of working places under the Act?—It is our practice for each working place to be visited twice a day by our existing inspectors. We have a chief manager and six under managers, and our total number of men at present would be roughly 800.

7676. That is seven men inspecting?—It is a little over 100 men to each inspector at the present time, but we are not employing our full quota of men at the present time. We should not increase our inspectors if we had double the number of men—we might by one or two, but not *pro rata*. Our practice is for our inspectors or under managers to visit the working places twice a day.

7677. Is that just a casual visit?—They walk through and they know exactly where to look for anything. Very often the bargain takers themselves have a word with the inspector or, as a matter of fact, he knows where any little defect is likely to be, and he goes and looks to see how things go on.

7678. Does he write a report?—Yes, it is entered in a book on the premises—not every day inspection—they have a special inspection.

7679. That is not done every day?—That is not done every day.

7680. Inspection is made every day but it is not reported?—Not unless there is anything special. If there is anything special he sees when walking round or any defect in the face out of the ordinary working process he makes a special note of it and that is reported to the chief manager, and if necessary they have a conference as to what shall be done in that case.

7681. Do you see any objection to that report being made a regular thing and written every day by each inspector, whether there is anything wrong or whether there is not?—It would entail a very big job where you get a very large area as in our quarries. It is about as much as a man can do to go through now twice a day. He goes through it twice a day, and if he had to stop and take down the condition of every chamber whether there was anything right or anything wrong it would be a very big job.

7682. He does state the things which are wrong: for instance, he has inspected his area, whatever it is, and he will know whether anything is wrong?—He does that now.

7683. All that I am putting to you is that that should be recorded?—He does that now. He takes a note now of anything which is wrong in his daily inspection.

7684. There would be no harm in recording it?—No, he does take a note of it and records it in his own book.

7685. You do not see any objection to recording it?—No.

7686. (*Mr. Jones.*) I suppose you would not say anything against making it a rule that quarries should provide mess-rooms and shelters?—I think they add very considerably to the comfort and convenience of the men.

7687. And you think it would be beneficial?—I think so. In nine cases out of ten it is a very small expense.

7688. I know for a fact that your quarry and possibly one other are well provided in this respect?—Yes.

7689. And I know as well that at other quarries they are very poorly provided?—I think it adds very considerably to the comfort of the men, and I cannot understand why they do not do it of their own free will because it is to their advantage to have healthy comfortable men working for them.

7690. As to ventilation inside: supposing you have sunk an extra floor do you widen out chambers without roofing up to the floor above?—We get through to the floor above at the earliest possible moment before we widen out.

7691. Unless you get through the ventilation in that floor is tight?—It is a bit tight but you cannot help these cases for a short period. It lasts 6 to 12 months as a rule.

7692. You have mentioned with regard to the fall in employment 46 per cent. What was the fall in output at the same period?—I can give you, taking the same dates, 1899 to 1909, the fall in the sales but not in the outputs. I may remind you that the sales will very nearly tell you the output. They are very similar. Taking one year with the other it comes very nearly equal.

7693. (*Mr. Lewney.*) Take the comparative price per ton?—I will give you the drop in price. The total sales from the whole of the associated quarries in 1899 was 112,000 tons and in 1909 it was 88,500 tons, a drop of 23,500 tons or say 21½ per cent. That is the drop in the output and you can take that as a guide. The sale price per ton from 1899 to 1909 dropped 25 per cent. exactly.

7694. (*Mr. Jones.*) So your output was greater in 1899 than in 1909?—Most decidedly. That is accounted for to a large extent by a lot of development work having been stopped. During bad times you cannot afford to spend so much on it.

7695. I should like to ask you this: Is the royalty a big handicap to your quarry?—The royalty in our case is a very high royalty under present conditions. It was not a high royalty when we went into the concern when the conditions were absolutely different both as to the character and nature of the rock, and also as regards prices; but, at the present time, of course, the royalty is somewhat of an incubus. I can

tell you this: if we had paid no royalty at all last year we should have made no profit, so had we had our quarry free from royalty altogether we should still have had no profit.

7696. (*Mr. Leveney.*) But yours would be one among many industries which suffered last year?—I quite agree, but we did not pay a dividend the year before.

7697. (*Mr. Jones.*) You were a bit better off at the end of 1899 than you were in 1898?—No.

7698. You had less stock?—We had less stock simply because we gave it away. Because you have less stock it does not mean that you make more profit—quite the contrary—and, as a matter of fact, it was by putting that stock on the market at an absolute loss that has to a very large extent had the effect of reducing the import of French slates. That is one of the main objects why I did it, to try to fight them in the market if we possibly could.

7699. Have you evidence of malingering among the workmen?—I would not say I have a single direct case of malingering, but of course one hears a good many things, and I have had one or two cases pointed out to me, but I have not taken very minute particulars of them because I do not care about taking the question up. I do not think Welshmen are different from any other people in the United Kingdom, and we know there are cases of malingering in other districts which are very clearly and prominently brought to light in the transactions of the Medico-Legal Society—I do not know whether you have seen the book. They bring some very excellent cases to notice, and I think that has something to do with it.

7700. I would not deny for a moment that you get it in every class of business?—Quite so. I think I should do the same myself under the same conditions. I will go so far as to say that.

7701. Can you give us some idea, supposing a man has met with an injury and is at home, how much money would he get from his compensation and his clubs—an ordinary working man?—I have put in here a list of all the different payments made by all the different clubs which are working over our districts generally, and you will see the claims which they provide for the men, the number of weeks, and what they pay in each case. In some cases they pay as much as 18*s.* a week.

7702. They receive that from the club alone?—Yes, and then there is the half wages which, say, in the ordinary way is 15*s.*: then there is the sick fund from which they get another 5*s.* or 6*s.*, and then they may get a proportion of their contract, which is 15*s.*

7703. Which club pays 18*s.*. That is the Hearts of Oak, is it not?—I think it is.

7704. Quarrymen working underground are not allowed to join the Hearts of Oak, I think?—No.

7705. Not very many quarrymen belong to the Hearts of Oak?—The Foresters pay 12*s.*, the Rechabites 15*s.* and 10*s.* per week according to age, and all the local lodges pay on an average 6*s.*, 7*s.*, and 8*s.*—6*s.* some of them.

7706. Five shillings some of them?—6*s.*, 7*s.*, and 8*s.* If you put down those few items together and add them up it is quite possible for a man to get 47*s.* at home when he is lying up under an injury, whereas he may only get 30*s.* or 32*s.* a week when he is working.

7707. As a rule, it is very seldom you come across a man with more than two clubs that would amount to 15*s.* or 17*s.*?—Yes.

7708. At the most there are very few now who get 15*s.* a week compensation?—In our quarry they do. It is a very fair average.

7709. That is 30*s.*?—Yes, and then, as I say, if he is connected with the contract, if he has a bargain running in the contract, he puts in a substitute and gets his share of that contract and that may work out at 10*s.* a week.

7710. Sometimes you get a man injured and he stops at home and has a contract, and the contract does not pay sufficient to clear the man in his place?—There are very few of those cases in our quarries. You may get them in some quarries, but as a matter of fact there are very few cases. The percentage has been right the other way. This is an extreme case, but that is the sort of thing which may have some sort of influence. I am trying to find what is the reason of these accidents, and I say that is one of the things that may account for it. The whole responsibility is on the employers and if we can get that a little relieved, the man taking a third, the State taking a third, and the employer taking a third then we shall get it *right*.

7711. I have known men to be on compensation and yet they have had to pay a man to take their place at the quarry?—That is an extreme case I am sure.

7712. You get them both ways?—Yes, but that is a very extreme case, I am sure.

7713. The case as a fact rests with the doctor?—To a very large extent.

7714. You made one remark that the doctors are different. The men at Festiniog pay the doctors themselves?—That is so.

7715. By that you mean at Festiniog the tendency is for the doctor to keep the man at home longer than he should. I do not say that he does so?—I do not like to say that but it is the tendency. You cannot get away from it.

7716. Then at the other two places the tendency would be to send them back to work before they should?—Not if the cases are properly looked after: but my contention is there is only one doctor employed there and with the larger number of men they cannot watch the cases properly.

7717. They have also to go through the hospital?—I know, and I believe they have been much stricter since the questions have been asked in the House, and I believe there has been a very considerable reduction in one of the quarries already.

7718. I should say it is due to other causes?—It may be due to more than one cause.

7719. (*Mr. Redmayne.*) As soon as the man is injured he now reports?—Yes.

7720. Since May?—Yes, that is very important.

7721. (*Mr. Jones.*) A part of your quarry is open quarry?—Yes.

7722. Take the shelters the men have got?—Yes.

7723. I have heard complaints made that they have nowhere to dry their clothes. They work there with a sack or something on?—Yes.

7724. Would it be a great hardship to put up something where they could leave these clothes to dry, &c., instead of keeping them in the places where they get their meals?—As a matter of fact we have been shifting in our quarries in recent years, recent months one might say, and we are trimming off a lot of the outcrop up at the top of floor eight and other floors, and as that work is going on and we get sufficient working space to put 15 or 20 men on we are putting up a shelter. A shelter is now being built on floor 8 and will be completed. We follow the men. As the men go on, we follow them with the convenience as soon as we find there are sufficient men to justify it. It is no use putting up a shelter for two or three men who will only be there for a given period.

7725. Have you heard any complaint about the motors in one of the mills; that the noise affects the hearing of the men?—No, I have not heard that. We have tried every kind of silencer, and they have all failed, and we have gone back to this. I have heard no complaint.

7726. In a general way they are complaining; whether it is so or not I cannot say; and they are stating that the terrific noise that there is there does affect their hearing?—I should not have thought it was half as bad as underground channelling. It is not to be put in the same category at all. They do not complain of that. They go on with that from day to day and never complain.

7727. Would you favour having the right to draw up the men on the inclines?—I think there are some disadvantages attached to that which you know of. I think if we started doing that, it would lead to more accidents than we have to-day, never mind what care you take with your lifts. We have had one or two very nasty accidents recently which fortunately did no injury to human life—accidents which apparently nobody could foresee or have any control over—and if we had been bringing up men at the time, there is no

question about it that every man would have been killed. I do not like the idea myself.

7728. (*Mr. Greaves.*) There is at present a rule, we have a special rule, which precludes the men being lifted in the inclines?—That is so.

7729. That was a rule made by the Departmental Committee?—That is so. I may say we have had an application from the men to be allowed to go down in some portion of our works, and we had no alternative but to refer them to that rule. We are absolutely prohibited from doing so.

7730. It is not so much a matter of choice; it is a matter of necessity?—It is in this case.

7731. As a matter of fact you are precluded?—Under present conditions we are precluded absolutely. Mr. Jones wanted to know whether there would be any objection to any alteration.

7732. (*Mr. Jones.*) Of course it is a great hardship to walk down?—It is in some cases, I admit. Of course we put down the best step ladders we can, and make the roadways as convenient and comfortable as we can apart from putting it down on the incline.

7733. (*Mr. Lecwey.*) In reference to the accidents: is it not due rather to the more efficient system of reporting than anything else that so many accidents are now reported?—There is no doubt that when the alteration of the reporting of accidents came into operation, it did apparently have the effect of increasing them. There is no doubt about that.

7734. I take it a good many of these accidents that you refer to would be minor accidents where the men may be off three or four days, or may be seven days?—All over seven days.

7735. The great proportion of them would be seven days or over?—Seven days or over. It is a strange thing—only one in 43 (you see the proportion) entire accidents we had in the quarry, was laid up under seven days; all the others seem to get over the seven days. I do not know why.

7736. Are they all over 14 days?—I cannot say that. Unfortunately I did not go further. Seven days or over was the return to me from the quarry.

7737. It would have been rather interesting if you had?—It would.

7738. I suppose you are aware that the Compensation Act does not apply for the first seven days?—No, it must be over seven days.

7739. And if a man is off work for eleven days, he only gets paid from the end of the first week?—That is so.

7740. So there would be no object——?—Not in the seven days alone.

7741. ——in a man malingering, so to speak, for 10 or 11 days?—No, he has to go for the 14 days. I will get those particulars for you.* These are the figures returned to me from the quarry, and, of course, they did not look at it in the light of that question. But I will get that for you.

7742. You also agree that a good many of the accidents were attributable to blood poisoning. Would you not also agree that men are getting to know the dangers of blood poisoning, and that they are more careful now than they were in the olden times?—I should hardly put it in that way. I did not suggest they were attributable to blood poisoning, but I said there were cases, of course, where blood poisoning supervened, and suppuration of the wound, according to the general state of the man's health in many cases, and the conditions under which they live. All the medical men (I have heard them speak of it many many times) have said that if the men would only be a little more cleanly in their habits, and their home conditions were better, they would not have nearly so many cases of blood poisoning.

* Mr. Ashmore sent the following particulars of the duration of disablement due to accidents to workmen at the Oakley Quarries for the year 1909:—

Cases of disablement for 14 days and over	32
" " " 7 days and under 14 days	9
Case " " less than 7 days	1
Case, fatal	1
Total number of accidents	43

7743. Do you not think it is really because the men have a better knowledge of the dangers of blood poisoning now than they had formerly, that they take more care after a slight accident?—They may, but we do not find it the general practice. They are most casual; as I tell you, one man will get a nasty cut, and will spit on it, and perhaps he is chewing a bit of tobacco, and then put his bit of a handkerchief round it, and take no notice of it whatever. It is a common thing to do, with all their experience, and we have tried to put these things before them. It is a very difficult thing to force these men to come in and have their finger tied up like a good boy. We will do all we can by having the appliances right throughout the quarry from top to bottom, and it is the men's own fault if they do not use it. We cannot do more.

7744. I think you suggested it would be more dangerous to have the dust in some of these mills sprayed than to leave it dry, did you not?—Yes. I do not know whether you have experienced it in going down any of these underground stairs, more particularly the slate stairs, where the slate accumulates in a slate dust and has got on the steps. It works into a beautiful greasy slippery clay, and if you get on this you will find what it is. Even with nails in your boots you will slip on that. The same condition will be brought about inside those mills if you spray those mills with water. Where the men are working with crowbars on their blocks with the weight on their feet, the probability is that they will slip on many occasions.

7745. Surely there would be more dust floating about when it is dry than when it is sprayed?—I have been in these mills and I have absolutely failed to find dust. You can stand over the saw tables and you cannot find dust. I was up there only last month and I took every opportunity of noticing what was going on, and I could find nothing; but in one little shanty at the side, where we have two little saws dressing some cubes for sewage purposes, we have had bowls put up over the saws with holes at the bottom so that the water can drop on it. When we were there the holes were stopped up. The men stopped them themselves. They absolutely would not let the water drip on to them. That is a case in which provision had been made; they will not give the thing a chance. They will have to be forced to do it, but you do not always want to come into cross-purposes with your men and you do not want to have everlasting rows and be looking them up. It is very difficult.

7746. After all, it is not a question of preventing the dust, but the men will not use it?—They will not use it in that case. I am only giving you a case where we have a special contrivance so that they shall have water and the dust shall be kept down, and they will not use it. That is the only case where we have such a contrivance of that sort.

7747. Have you any drilling machines in your mine?—We have, of every description.

7748. Have you those with the spray?—Most of our drilling is done in water by hand feeding, and all the slate at the present time is drilled with the ordinary slate jumper, and of course it is only in the hard rocks outside in the open that we break those up very often with the hammer drill. There is another drill on the market at the present time which is a hydraulic drill and which has a very powerful head of water in the bit, which we hope to adopt in the very near future. It is known as the Kellow drill. The first trial of that drill is coming off at our quarry next week, and if that drill is found satisfactory for these purposes, it will be very generally adopted throughout the quarry, and that will obviate all difficulties.

7749. So that you agree if it were possible to get an efficient drill, it would be better to have one of that description than the old type?—For overhead work in the dry; it is just at the level heading where that is done.

7750. (*Chairman.*) You do disapprove of the dust, then?—I disapprove of the dust in headings and underground working if it can be avoided, but, as I say, in our case nearly all the drilling is done in water at

the present time; the jumping is done in water fed artificially by hand.

7751. You say the men did not use the water for this particular saw. Did you see them working without the water?—Yes.

7752. Was it dusty?—With that particular saw it was.

7753. You mean it was a peculiar saw?—They were two special saws which had been made for a particular purpose.

7754. They were dusty?—They were dusty. They were outside the ordinary mill, in a separate building, and there was complete insulation with every convenience and contrivance made to keep the dust down.

7755. Do you consider slate dust dangerous?—I can trace no case of it.

7756. But you mean it is generally objectionable?—We know the desire of the Government is to keep dust down generally.

7757–8. (*Mr. Greaves.*) These two saws were not turning in water troughs as all other slate saws are?—Quite so.

(*Mr. Redmayne.*) What is that Rule that you said prohibited the men from using the inclines?

(*Mr. Greaves.*) It applies to Merionethshire mines.

(*Mr. Redmayne.*) That is not the Code recommended by the Departmental Committee?—This is under the Special Rules, No. 40:—"No person except the agent, "assistant agent, foreman or person in charge shall "walk upon any incline while traffic is going on or "shall ride upon any waggon, sled, truck or tank on "any incline or water balance."

(*Mr. Redmayne.*) I was following the Model Code which was recommended by the Departmental Committee, and your mentioning the Departmental Committee made me look at it.

(*Mr. Greaves.*) This is the Code adopted by the Departmental Committee (*producing it*).

Mr. F. Milton called and examined.

7759. (*Chairman.*) I believe you are a Member of the Royal College of Surgeons, England, also General Manager of the Glynrhonwy Slate Quarries, and you were appointed, I think, by the Quarry Owners' Association in conjunction with Mr. Menzies and Mr. Griffith to give evidence before us?—Yes.

7760. Your evidence is specially with reference to the surgical side of the question of accidents in connection with the work of the men employed in quarries under the association?—Yes.

7761. It is those quarries you wish to speak about—Yes.

7762. The work you have endeavoured to do for us is in these analysed returns (put in by you) of accidents as they have happened to employees at six of the larger quarries under the association during the ten years from 1900 to 1909?—Yes.

7763. How many quarries are there altogether under the association?—The association, I believe, is rather an indefinite body; it is hardly a hard and fast body; there are a number of small quarries.

7764. You have taken six?—Yes.

7765. How many do those six represent?—I may say a circular was sent round to the owners to ask if they were willing to send in their returns, and six quarries have sent in their returns, which have been analysed. With respect to the other quarries no returns have been received.

7766. It may be said that what you have put before us with respect to those six quarries is fairly representative of the others, I suppose, but it is not typical of them?—Quite so.

7767. It might be necessary to inquire into some others, which it could be quite easy to do?—Possibly.

7768. However, only six quarries sent in their returns?—That is so.

7769. And the remarks you make are made in reference to those six?—Yes.

7770. Are they large quarries?—The total number of men employed is just short of 2,000 on an average in the year.

7771. How many would that represent of the whole of the quarries under the association?—We invited altogether 10.

7772. Are those 10 of the biggest?—Yes.

7773. You invited the whole of the 10?—Yes—there are only about a dozen quarries altogether in Nantlle Vale.

7774. It could not be said that those had been selected in any way?—Not at all.

7775. They were not illustrating a theory?—Quite so.

7776. But simply chosen from returns you could get?—Yes; consequently we got ten-twelfths of the whole lot. There were 17,300 in the 10 years.

7777. It is at least two-thirds?—Yes.

7778. The number of men you include in these remarks is about two-thirds of those employed altogether?—Yes, two-thirds.

7779. It is for that reason you consider, so far as you know, that they might be treated as representative of the whole. That is your view?—Exactly.

7780. Now you have analysed in a series of tables, with considerable detail, the question from two points of view—first the nature of the accident, whether it is a wound or contusion or not—secondly, you have analysed them with a classification dependent upon the length of time during which the disability occurred?—Yes.

7781. Then you have also sent us a report which deals with the accidents occurring at these quarries during the 10 years 1900–9. Your general conclusions, I understand, are that up to the year 1907 the number of accidents in quarries was not excessive, that is, regard being had to quarry work, which is rather a dangerous occupation, I presume?—Owing chiefly to the nature of the material handled, and the nature of the work.

7782. It is an occupation in which you expect accidents?—Certainly.

7783. When we examine the returns we see there is a striking increase in the number of accidents from 1900 to 1909?—Yes.

7784. The totals rise from 1900, when 1,982 men were employed, from 1·56 per cent. up to 6·07 per cent. in 1909, when 1,464 men were employed?—Yes.

7785. So that, although the number of men had diminished, the total number of accidents had increased by 2½, or a little more than 2½ times?—Yes.

7786. Although the number of men has diminished, the number of accidents has increased to very nearly three times?—Yes.

7787. Those figures you have given include both fatal accidents, serious accidents, and minor accidents, and all?—All of them.

7788. When you pick out the fatal cases from those you find an increase, but not so large an increase. In 1900 the percentage of deaths was ·1, whereas in 1909 it had risen to ·136?—Yes.

7789. Not so large an increase as the total number of accidents had increased by?—No.

7790. Tell us in your own words to what you attribute this increase in the total number of accidents?—I think, probably, it is more an increase of the number of accidents reported, rather than an increase of the accidents themselves. The remarkable point is that the increase occurred in the year 1907. If you take the number for 1906 it is more than 1900, but it is no more than 1901—it is rather less than 1901 in percentage. The figure for 1906 was 2·04; in 1907 it jumped to 4·69; in 1908 it increased to 6·4; and in 1909 it was 6·07.

7791. They appear to slightly increase from 1900 up to 1902?—Yes.

7792. From 1902 to 1907 you have a fall?—Yes.

7793. Then in the year 1907 you have a very sudden jump up?—Yes.

7794. In 1909 you have a slight fall again?—Yes, a fall, but a very small fall.

7795. In addition to your report, you have also exhibited the results of that report in a tabulated form?—Yes.

7796. Chart No. 1 shows the total accidents, and the way they have gone?—Yes.

7797. When we come to examine the details of them we find that Chart No. 2 separates Chart No. 1 into two parts?—Yes.

7798. Namely, the severe accidents, and the less severe accidents?—Yes.

7799. While the severe accidents follow the general trend, that is to say, first rise, then fall, and then rise again, the subsequent rise is not greater than the previous one of 1902?—That is so.

7800. Whereas with the minor accidents the rise is very large indeed?—Yes.

7801. So that the rise has mainly occurred in the minor accidents?—Practically wholly, I think.

7802. If you notice, with respect to the fatal cases, there is rather a larger percentage of fatal cases in 1909 than in 1900, but it is not very large?—That is so.

7803. Analysing again the minor accidents, we find that contusions have increased?—Yes.

7804. Not quite so much in ratio as the others, but they have increased?—That is so.

7805. Then wounds seem to show a very large increase indeed?—Very large.

7806. They account for a great deal of the increase? Yes.

7807. Other minor injuries do not seem to account for much of it?—A slight rise—very small.

7808. What do you mean by minor injuries?—Lesser injuries to the eye and other injuries of small importance for the most part.

7809. Those are some of the things?—Almost all of them. There are two cases of burns—scorching, rather—and a case of dislocation of a cartilage, and I think that accounts for the whole of them.

7810. Fractures and dislocations?—Those would be under the severe cases; that is all the cases of fractures and dislocation with the exception of fractured fingers, which are classed as minor accidents.

7811. That shows very much the line of change?—Yes.

7812. Other severe injuries the same thing?—Yes, those are the severe injuries to eyes, where sight has been impaired and multiple injuries.

7813. Deaths also follow the same lower rule?—Yes; but deaths are also included in the other charts under each separate heading.

7814. Wounds to fingers and hands show a large jump towards the end?—Yes, very much corresponding with the wounds in reference to the whole number of accidents.

7815. Those results you have exhibited apparently in one page?—Yes, for the purposes of comparison.

7816. You would call the upper lot the less severe, and the others the more severe?—Yes; with the exception of No. 5 on the bottom left-hand corner, those would be other minor accidents.

7817. With regard to the time of disablement, for less than a week it continues very much as it was, except that in 1904 there seems to have been a well marked rise of small disablements?—Yes. The figure is so small there that of course a very small difference in the figure makes a large rise in the percentage.

7818. How did you get the figures at all?—There is no compensation paid, but the cases are reported to us if a man is away absent.

7819. There may have been a large number of small ones in respect of which the men were away for less than a week?—Those are accidents of which we have cognisance.

7820. It might be that *this* curve might be altered if every one was reported?—With this exception, I do not think there are any cases on account of which a man has left his work which are not reported there. If a man leaves his work the accident is reported, and that would come in.

7821. We may take it as regards accidents disabling men for less than a week it is open to the remark that if we had minute returns *this* curve might possibly be different?—Quite possibly.

7822. The next is not open to that observation?—No.

7823. Your curves show, then, that when they are disabled for less than a week the rate of increase during the years from 1900 to 1909 is not very marked?—No.

7824. One week and less than two weeks also not very marked?—No.

7825. Two weeks and less than three weeks it is very marked?—Yes.

7826. Three weeks and less than four weeks a rise, but not so strongly marked as the last?—Yes.

7827. Four weeks and less than five weeks a rise, but not so strongly marked as the one before?—Yes.

7828. Five weeks and less than six weeks and over this it is more normal?—Yes.

7829. All the rest, that is to say, all disablements from 6 to 7, 7 to 8, 8 to 9, 9 to 10, 10 to 11, and 11 to 12 exhibit no very marked rises during the last years? That is so.

7830. Now what is the conclusion that you draw from that?—That again there is the fact that for the first two periods (viz., under one week, and one week and less than two), if anything, there has been a decline in the cases since 1907, including 1908 and 1909, and that the rise has been very strongly marked in accidents away for more than two weeks and less than three, which is a period where the great benefit under the Act comes into operation—and rather strengthens my view that the increase in the number of cases is due to the action of the Act and not to any increase in the number of accidents themselves.

7831. You would not call staying home for one week malingering, for instance?—No. I think it is a perfectly fair thing in a great number of cases. Take a concrete incident: a man has an injured finger, he could at a pinch work with the finger; but seeing that he gets benefit and does not make an absolute loss through laying up as he would have done before, he continues to stay at home and looks after his finger for a longer period than he would have done before the Act came into force.

7832. If that staying at home and looking after his finger prevents blood-poisoning setting in, there ought rather to be in the case of other accidents which take a longer time a slight falling off in the figures?—Certainly.

7833. But there is not?—There is not.

7834. If it produces a bigger crop in one class of case you would expect it ought to improve the general health and decrease the general crop in the other class of case?—It ought.

7835. But it is not so?—It is not.

7836. That is the general conclusion you draw from looking at those figures?—Yes.

7837. You have had some 15 years' experience in the district?—Only four years in the slate quarries.

7838. You cannot compare the general state of the men's health and the accidents before and after?—No, I have had to go into a general deduction to be drawn from the figures.

7839. Is there an impression prevalent that slate quarrying is more dangerous than it was?—I do not think so.

7840. The theory you have formed in presenting us with these statistics is that the increase of accidents is apparent and not real?—Yes, apparent and not real.

7841. Can you suggest—because you have had a good deal of experience—any steps that could be taken to make it still less? You admit after discounting all these it is heavy?—Yes.

7842. Can you suggest anything which would diminish it still more?—I cannot suggest anything. I have thought carefully over the subject, but I cannot see any way. A very large number of cases, as proved by the figures, are cases of injuries to fingers and hands.

7843. Is not the mode of treating those at the present very careless?—I think so. It is very hard to speak of those from the point of view of the surgeon, and the point of view of the ordinary man. I mean

after all, take my own particular case: forgetting I was a surgeon, if I hurt my finger to some extent, which I have done many times since I have been down there, I do not think I would take much more care of it than the ordinary man. I think, for one thing, the material which they work is not on the whole bad for wounds; that is to say, the slate itself is not bad for wounds. Within limits I think it is really a very good sort of dressing to put upon them. Slate dust itself dries up wounds in an extraordinary way—it has very astringent properties. I have tried slate dust on my own hands when I have cut them—I may say I always put on slate dust as a curative agent, and it is absolutely marvellous the way in which it heals the wounds. I believe a great deal of the dirt which gets into the wounds is attributable to the dirty rags the men put round them. I do not think at all it is the material they work that injures wounds. In my own mind I do not think there are a large number of wounds which fester badly.

7844. Then careless treatment of this kind must account for a large number of these cases which cause the people to remain at home?—Yes.

7845. That is due to a certain extent to suppuration, is it not?—Yes, it probably is.

7846. And that, you say, probably results from putting dirty rags on a wound instead of leaving it alone? Yes; of course in quarries where first-aid appliances are used that would not be so likely to occur. In our case they are kept in the weighing machines where the men can get at them.

7847. In the majority of cases is it not a very inadequate and poor supply? I have been round and asked for it here and there, and I never saw such an exhibition of first-aid appliances as was present—cases open with bottles empty?—I do not know that you can control it.

7848. The inspector could look and see that the box did not consist of bottles and things with nothing in them?—Suppose you put the curative agent in the hands of a man on the spot—our particular man is the weighing-machine man, and you could give him a bottle with a solution of carbolic acid carefully stoppered up—when he comes to use it he will pour it into a broken tin or cup, which contaminates the thing more than if you left the stopper out of it. Of course, from a surgical point of view what they do is appalling, but I do not see a way of stopping it.

7849. You agree it is appalling, and it is done in defiance of all reasonable principles?—Yes, of course it is.

7850. I suppose we may assume that if men would use these antiseptics and little dressings for cuts, the employers would be willing enough to do all that they could to provide them?—More than willing, I am sure.

7851. What is your view upon the subject of slate dust and getting fibroid phthisis from inhalation?—It is only an opinion, but so far as I can judge I do not think there is any more frequency of phthisis in any form among the quarrying population than there is amongst the outside population. I have a cutting before me, I may say, in which Dr. E. Ll. Parry Edwards, Superintendent Medical Officer of Health for the county of Carnarvon, speaking at a meeting in connection with the King Edward Memorial, of November the 25th this year, says: "As to the general belief that quarry-"men suffered more from consumption than any other "class, he was in a position to say that it was not so." That is a statement from the Superintendent Medical Officer of Health.

7852. He says he is in a position to say that?—Yes, he said that at a public meeting.

7853. On the other hand, you would say that it was distinctly desirable that wet drilling, and wet working of slates, should be adopted where possible?—Yes, all the dust should be stopped so far as possible, no doubt.

7854. On general principles?—On general principles.

7855. (*Mr. Lewsey.*) Are you in practice?—Not at the present moment, but I have been.

7856. What facilities have you for getting out these comparative tables?—The returns of accidents handed in by the different quarries.

7857. Do they in every case state the nature of the accident?—Yes; of course it is in popular language: I have had to use a certain amount of knowledge, and that sort of thing.

7858. You will agree, I think, that before 1907 no proper record was kept of the accidents—I mean no systematic method was adopted?—I do not think there was any alteration in 1907: they must have been all kept; there is no alteration that I have seen between 1907 and the years afterwards.

7859. Do you know of any quarries in your district where the men are supposed to report minor accidents of all descriptions, whether they prevent them working or not?—No, I know of no hard and fast rule made at any quarry.

7860. I take it your opinion is that the increase is almost entirely due to the operation of the Workmen's Compensation Act?—I think it must be so.

7861. Does that also account for an increase in the fatal accidents?—There is hardly any increase.

7862. Slight increase?—There are only two or three, after all. I think you cannot get over that.

7863. Would that also account for the increase in the number of men off work more than seven days and less than 14 days?—No. There was a diminution in these cases in 1908 and 1909.

7864. If it would account for the increase in one case, would it not also account for the increase in the other?—No; it is a question of the size of the numbers. For instance, take 1900 and 1909, there was only one, and one more fatal case would double the number; whereas, if you start with a number of men injured, say, those away for two to three weeks, amounting to 28, you would have to have 28 cases more before it was doubled.

7865. There was an increase in the number of men off work for more than seven days and less than 14?—There is a decrease for the last two years.

7866. Does the last two years bear out the proportion of the other two years in regard to the whole of the accidents?—Yes.

7867. Are these figures applicable to any particular quarry, or do they apply to all the quarries?—To six different quarries.

7868. Are the accidents in all these quarries proportionate?—The general trend in all of them is the same. When I first made out the lists I made separate lists for each quarry, but I found they corresponded so closely that in order to get a general result I threw them all together. There is no quarry in the six whose figures departs largely from the combined figures.

7869. (*Dr. Haldane.*) Are you aware whether anyone has analysed the figures given in the last decennial report of the Registrar-General on occupation and mortality?—No.

7870. The figures, for instance, with regard to slate quarries?—No. To tell you the truth I have not gone into the mortality question. I am only giving a general impression of what has happened with regard to the slate quarries.

7871. Do you know if anyone has analysed the figures further than they are analysed in that report?—I do not know that they have.

7872. They are very authoritative?—They are.

7873. (*Mr. Greaves.*) I find in that report that amongst those not employed in quarries the number of deaths from phthisis was 173 per thousand as compared with 154 per thousand in the case of quarrymen. Do you think about the same proportion would exist now? Have you any reason to suppose there is anything different?—No; it is only a general impression on my part: I have no authority for saying anything but that would certainly correspond with my impression—they are so near, there is practically nothing in it.

7874. It would tend to show your general impression is correct, as to the occupation of quarrymen, that they are not subject to phthisis more than the rest of the population?—No.

7875. (*Dr. Haldane.*) There may be something in the direction of chronic bronchitis?—I do not think so.

I have talked it over a good deal with Dr. Mills Roberts, the doctor to the Dinorwic Slate Quarries, and he says when first he began he was struck with the number of cases of phthisis, and put it down rather to the effect of slate dust among the quarrymen: but as he came to be more used to the diseases prevailing among the general population he changed his idea entirely, and he gave up the idea that it was more frequent among the quarrymen than amongst the general population. I think that is a very fair all-round sort of statement.

7876. (*Mr. Jones.*) Pneumonia is very prevalent among them?—It is very often diagnosed; whether it occurs so often I am not quite sure. I had a certain number of men who were said to have had pneumonia, but at the end of the week they were pretty bobbish—they had had a pain in their side. Again, if you come to think of it, you will find pneumonia is very often diagnosed among children—children have pneumonia with extraordinary frequency—but there again I think it is due to the same cause; it is a diagnostic disease rather than an actual disease. The slate dust is peculiar in this way, that the slate dust adheres to a moist surface very readily, and it is a question whether it ever gets into the lungs at all—I think it is all arrested in the nose and throat and spat out again; they spit a good deal, and I think a greater quantity of it is rejected through the mouth and never gets out of the air passages at all. I have brought a specimen of slate dust if you care to have anything at all to do with it.

7877. We have a collection of slate dusts already, but where is this from?—That is out of the mill at the Glynrhonwy quarry. (*Handing sample.*)

7878. This is from the mill?—From the mill.

7879. (*Mr. Greaves.*) Just taken off the saw?—Taken out of the saw-dust, washed and deposited, and that is what was suspended in the water and taken off and dried, so as to get it as fine as possible.

FOURTEENTH DAY.

Thursday, 8th December 1910.

Present:

Sir HENRY HARDINGE SAMUEL CUNYNGHAME, K.C.B. (*Chairman*).

Richard Augustine Studdert Redmayne, Esq.
Richard Methuen Greaves, Esq.
Robert Thomas Jones, Esq.
William Lewney, Esq.
Uriah Lovett, Esq.

G. W. Chrystal, Esq., *Secretary*.

Mr. James Leonard Overton called and examined.

7880. (*Chairman.*) Are you the manager of one of Messrs. Boots the chemists' establishments, at 9, Bridge Street, Westminster?—Yes.

7881. I believe, in pursuance of my request, you have got a little first aid box which you are prepared to show us?—Yes.

7882. Kindly show its contents and explain how it is to be used. First of all, perhaps you will kindly enumerate the contents?—First of all it contains a packet of antiseptic wool to be used for washing the wound so as to ensure its being clean before the dressing is put on.

7883. Wash with ordinary water?—No, with an antiseptic solution used with the antiseptic wool. Then we have some tablets of perchloride of mercury, or in the alternative permanganate of potash.

7884. I think for men like miners you are of opinion that perchloride of mercury is the better of the two?—Certainly.

7885. You get a good deal more for your money in the mercury?—Yes.

7886. Permanganate of potash would do for children in the nursery; but where you have miners to deal with the wounds are more apt to be infected?—Perchloride is very dangerous, of course, but I think it is absurd to suppose that much trouble is going to happen with it.

7887. It is not dangerous to the wound although it would be dangerous in case you swallowed it?—It is used universally in hospital practice for the treatment of wounds. Then for use with that we have a one ounce bottle which should be filled with water and one of the tablets placed in it and dissolved; this would be used with the antiseptic wool mentioned before, to swab it out thoroughly so as to ensure cleanliness.

7888. And dried with another clean piece of wool?—Yes. It is recommended then that a pad of this boric lint should be cut to the size of the wound and placed over it. That is held in position either with a bandage—and for this purpose we put in an exceedingly strong tape as being more useful for miners than the ordinary open wove bandage—or else with adhesive plaster. The bandage is perhaps the best thing for ordinary small wounds, but in the case of a wound with gaping edges, as in the case of a deep wound in a fleshy part, the plaster is recommended to be cut into pieces of suitable length and placed across so as to bring the edges into proximity. Then after that, the ordinary treatment is pursued of putting on the boric lint and a bandage over the top. That is the whole of the contents.

7889. Except some safety pins?—The safety pins, of course, are used to hold the bandage in place.

7890. Roughly, what is the size of the box in which those are contained?—5 by 3½ by 1¾ or 2 inches.

7891. How many small cuts would that treat as it is now?—As it is now about 15, I should think.

7892. And, of course, by having a larger box you could have sufficient to treat any number of cases?—Yes.

7893. What is the number of tablets it is proposed to put in?—15 would be a useful number, but at the present time I think there are 20 in this bottle.

7894. About what could that be produced at?—It could be produced to supply any quantity, but I do not think it could go lower than 1s. 4d.

7895. And that includes a pair of scissors?—Yes.

7896. (*Mr. Greaves.*) And printed directions?—Yes, which would be on a card, of course, placed inside the lid.

7897. (*Chairman.*) And the box would be enamelled?—Yes, I should suggest enamelled red quite plainly. Adhering to that price, it could not be produced in a box enamelled as this one is, but a box enamelled in one

colour would be cheaper than this—one of this class costs 2*d*., but it would probably be quite easy to get a box enamelled with a red cross and the firm's name on it for 1*d*. or 1½*d*.

7898. (*Mr. Redmayne.*) How many times would that box, full of different things, suffice?—About 15 times.

7899. (*Chairman.*) I suppose it would be easy by putting some fresh wool, and some of the other things, in to keep it up for another 15?—At very small cost it could be kept up to its present condition.

7900. I suppose you are of opinion that it is better to wash such a wound as a miner or quarryman would have than to attempt to treat it simply dry?—It is absolutely essential—it is necessary to wash it first and dry it afterwards.

7901. (*Mr. Greaves.*) I presume you could not produce these things unless you had a certain number of orders?—It would not be produced except to order.

7902. Some arrangements would probably have to be made to secure a certain number of orders?—Yes.

7903. Messrs. Boots are not prepared to put it on the market, I mean?—No, it will not be produced, of course, unless there is a demand for it.

7904. What number of orders would you require for that, do you think?—I should think 500.

7905. (*Chairman.*) Still, if you found there was likely to be a demand you would probably put it on the market?—If we thought there was likely to be a demand of course we should put ourselves in a position to be able to produce them quickly.

7906. And you would do it at a reasonable rate?—Yes.

7907. (*Mr. Redmayne.*) I think it would go further than the slate mines—everybody would want it—factories and even households?—Undoubtedly they would be useful for those purposes as well.

Mr. John McKenzie called and examined.

7908. (*Chairman.*) Do you appear on behalf of the Ballachulish Slate Quarry workers?—Yes.

7909. What is your position with regard to them; are you agent?—I am agent.

7910. How many men are there in the Ballachulish slate quarries for whom you appear?—120 quarriers at present.

7911. Altogether that is, working down in the quarry and on the surface?—Yes, splitting and cutting slates.

7912. That includes the dressing as well as extracting the slate?—We call them 20 crews; they are in squads of six; there may be two or three for bank purposes splitting and cutting, and the remainder in the quarry blasting and cutting.

7913. Have you been a long time in this trade?—A matter of 11 years.

7914. We had evidence given before us yesterday to the effect that there had been some decline in the profits, and even, we were sorry to learn, in the rate of wages in some parts of the country such as North Wales. Has there been a similar state of things with you?—Yes, a considerable decline in the rate of wages.

7915. That is not due to anything but the difficulty of disposing of the slates?—Quite so; want of trade, I suppose; and another point is that the quarries are handicapped owing to previous mismanagement.

7916. You mean rubbish has been shot in the wrong place, for instance?—Yes—parts of the quarry covered up with rubbish.

7917. And in other cases the eye of the quarry, as it has been termed, has been taken out?—Yes. Parts of the quarry, as you saw when you visited it, have been undermined and the galleries have been broken up; whereas if the galleries had been cut up properly the quarry would have been in a very much better condition.

7918. All those circumstances, I suppose, have combined to produce the adverse prospects of the trade at the present time?—Yes, they have.

7919. I believe you want to call our attention to the open state of the quarry?—I do.

7920. Will you explain that?—There is no part of the quarry properly fenced at present. The entire circumference of the quarry, that is the general opening, is without any protection, which renders it very dangerous for persons who have occasion to cross the hill in the night time. One man missed his path there lately and was found in one of the galleries the following morning seriously injured and quite unconscious. It is dangerous for cattle and sheep also. In fact, it is a common thing for sheep to come tumbling down the rock face. At all times the sheep are a constant source of annoyance to the quarrymen. They habitually graze overhead, and in moving about loosen small stones and send them streaming down upon the men beneath. If the quarry was fenced it would put an end to this annoyance. There are particular portions within the quarry which should also be fenced; especially No. 1 sink and No. 3 sink. Also the broken-down fence which had been placed behind No. 39 house should be replaced by a new protection. That old protection had been erected when a child had been fatally injured; since then it has decayed and no protection has replaced it.

7921. Is the overburden sufficiently removed?—The Company take particular care to keep it as far back as they possibly can.

7922. It is not the overburden you are complaining of but the fencing?—The fencing. Although the overburden has been kept back the sheep loosen the small stones which would not be moved if it were not for the sheep being there.

7923. Then it is the fencing which is really defective?—Yes.

7924. Was the man injured one of the quarrymen?—No, he was not a quarryman; he was simply taking a short path.

7925. Where had he been that evening? You will quite understand the nature of my question, because in a matter with which I was concerned we had evidence that a number of sailors had tumbled into a dock, but the evidence was that they would have tumbled in even if a fence had been there because they were so jolly?—I quite understand; still at the same time the injury might be fatal.

7926. In considering whether it is due to want of care in fencing, you want to know somewhat the state of the man who fell over. You are not able to enlighten us on that point?—I am not able to enlighten you on the fact of where he had been, but I know he was taking a short cut.

7927. Apart from that you think it is not safe—that it is likely a man perfectly sober would tumble over?—Yes, certainly at night time. You must remember they go up the hill side for the cattle if they do not come home at night, and they frequently have occasion to search for them.

7928. And you think that the sheep may cause the stones to come down?—Certainly.

7929. Would it be a very expensive thing to fence the quarry?—I do not think it would be.

7930. Have you any idea what it would cost?—I could not give any estimate. I simply bring the grievance forward. I am sure you must have noticed when you were there how some part of the fence had been carried away by blasting operations, and it has not been replaced.

7931. You are putting it forward as a reasonable and proper thing to be done?—Yes, that is our point.

7932. We will ask the owners about that when they come?—We do not want to put any compulsion upon them, but we consider it reasonable that it should be done.

7933. (*Mr. Greaves.*) You mean that it should be a sheep-proof fence?—Yes.

7934. (*Chairman.*) The next point is that you think there is not enough shelter against blasting?—Yes.

7935. Kindly give us your views upon that subject?—We are rather badly provided for shelters. There are only four sheds for 120 quarriers, and not one of them is as large as it should be. Literally speaking, the men are packed in them like herrings in a box. Also they are not suitable from a health point of view. They are damp, open, and draughty. Further, the existing sheds are so placed that not one half the men can find shelter. One is up on No. 1 level where only 12 men are employed. Two are close together in No. 2 sink, but they are too far away for most of the men to go to, therefore the men are compelled to seek shelter under large rocks and other totally inadequate places. The last has been newly erected in No. 1 sink, and in it 18 men have to take shelter. One more point about our shelters is that besides being small they are not high enough. It is not possible to stand erect in one of them. It is a daily occurrence for some or other of the men to knock his head severely against the beams in entering, a fact which in itself proves indirectly serious.

7936. Did you say there were only four shelters for a great number of quarries?—Yes, at present.

7937. In which quarries?—"Quarriers" was the word I used.

7938. Has any accident occurred through the insufficient shelter?—No, but still we consider that better shelter should be provided.

7939. Part of your point is, that men lose time in having to go a long distance to obtain shelter?—Yes, and again an accident might occur at any time.

7940. Would it be possible to have moveable shelters which could be moved about from place to place?—I do not think so.

7941. There may be cases where only four or five men would want to get into shelter—would you have a place put for them?—Yes; you want a shelter which would not require them to go too far from the place of employment.

7942. The difficulty really is that they have to go too great a distance from their employment in order to find a safe shelter?—Yes.

7943. And the tendency is not to go so far?—Yes; to find shelter under rocks, and so on.

7944. Simply to take the risk of it?—Quite so.

7945. You next wish to call attention to the danger of ascending and descending quarries in the present condition. What have you to say about that?—There is not one properly safe path for ascending or descending the quarries. In summer the danger is not so great, but in winter it is very dangerous owing to the frozen state of the ground. To one of the sinks there is no path but by the haulage inclines, and a slip on it on a frosty morning might result in a serious accident, and although great care is taken by the men falls are common. Small ladders are also used, and stone steps, but they also are unsafe. As the paths are at present it would be exceedingly difficult and awkward to bring persons up from the sinks in case of accident.

7946. Have you had any accidents from that cause?—You would not call them accidents, but falls are quite common, which might result in serious accidents, although they do not—it is simply that the men take particular care in descending.

7947. What is the lowest level below the natural surface of the ground?—About 150 feet, I should think.

7948. How long does that take a man to go down from the top to the bottom by ladders?—It would take a matter of three minutes to get down. It might not be, perhaps, more than 120 feet.

7949. It is not a case in which mechanical descent would be necessary, it is a small quarry?—Yes.

7950. You say you want the ladders made more secure?—Quite so, more secure.

7951. You are aware that at present it is a requirement of the law that the ladders should be sufficient?—Yes.

7952. You think the methods of bringing the slate to the shipping places are not as safe as they might be?—Yes. The present method of bringing wagons loaded with slate to the shipping quay is very dangerous, especially in winter time. Then the ground is hard frozen, and there is no safe foothold. I will explain the method, but first I must state that the wagons have to be brought downhill a distance of 100 yards with a gradient of 1 in 20. In bringing them down the men have to go in front with their backs to the wagon (one or two to each wagon) keeping it back by partly checking it with their feet in front of them. Now, there is always a danger in this method if the wagon is allowed to gain speed at the start; but in winter time it is more dangerous still, because the hollows for placing the feet are frozen up; the feet slide, and then the wagon rushes along with the men helpless in front of it, because of the impetus and velocity it has gained. At any moment the men's feet might catch and throw them under the wagon, or there is a possibility that the men may be jammed with the wagon in front of them before they can clear themselves.

7953. (*Mr. Redmayne.*) You say more dangerous in winter than in summer?—Yes, owing to the frozen state of the ground.

7954. (*Chairman.*) What is your remedy for that?—There should be a man, at any rate, keeping the hollows properly opened, and picking the ground when the men are bringing the slates down to allow them to keep their feet in the hollows.

7955. (*Mr. Lewney.*) Have you no brakes?—No brakes.

7956. (*Mr. Greaves.*) Do they not put a sprag in, or anything?—No. You have seen the wagons, and must have noticed they could not put a sprag in. Owing to the shape of the wagons it would be dangerous to attempt to put a sprag in.

7957. I do not remember that?—The wagons are very low on the wheels.

7958. I do not see how that would interfere with a sprag?—It might hinder them, again, completely going down the incline.

(*Mr. Lovett.*) They could not sprag those wagons.

(*Mr. Greaves.*) But could they not put a piece of wood in the wheel?

7959. (*Mr. Lovett.*) It would be very dangerous?—Even with a sprag they may miss the rails.

7960. (*Mr. Greaves.*) How?—Jump off the rails. They do go off the road.

7961. Sometimes?—Yes; it is quite a usual occurrence.

7962. That is because of the inferior state of the permanent way?—Yes.

7963. That is another question?—Quite so.

7964. But as to the difficulty of lowering the wagons, you say it is impossible to use a sprag or any form of brake?—Yes; if a sprag was used it would hinder the wagon coming down.

7965. The gradient is 1 in 20?—Yes, approximately.

7966. Are the wheels loose or tight on the axle?—They are tight on the axle; a few are loose.

7967. Then it would not go down 1 in 20 with a sprag?—No.

7968. (*Mr. Jones.*) Could you not put a bell-brake on those wagons?—I should think they ought to work with a kind of bell-brake.

7969. (*Mr. Greaves.*) Have you never tried bending a piece of iron to act as a brake?—No, we have not tried that.

7970. We often use crowbars for that purpose?—You understand the wheels are under the wagons. An iron could not be used.

7971. Why not?—The wheels are underneath the body. I have never seen such a thing used.

7972. (*Mr. Redmayne.*) What is your suggestion about the hollows?—There are hollows about 2 feet apart down the incline, and those hollows are apt to fill up so that when the ground is frozen the feet will not catch. My point is that those hollows could be kept open.

7973. (*Mr. Lewney.*) That will still necessitate the men going in front of the wagon?—Yes, and we consider it a danger that the men should go in front of the wagon.

7974. (*Mr. Lovett.*) I should think a bell-brake would do it?—I should think that would do it.

7975. (*Mr. Lewney.*) Do you let more than one wagon down at a time?—One at a time.

7976. (*Mr. Greaves.*) What would be the weight?—With slate?

7977. Yes?—Say 27 cwt.

7978. Wagon and all?—And slate; 27 or 30 cwt.

7979. About 30 cwt., say?—Quite so. But my friend Mr. Clark, who is with me, thinks it is more like 40 cwt. with the slate in the wagon. They carry 1,000 slates in every case going down to the pier.

7980. (*Mr. Redmayne.*) Do you not think it is a very dangerous thing for a man to be in advance of a wagon?—We consider it so.

7981. (*Mr. Lewney.*) What is the length of road you have to do this?—About 100 yards.

7982. It must be a tremendous waste of labour besides the danger to the workman?—Just so.

7983. It would be better to let it down by rope or something of that sort?—By haulage.

7984. (*Chairman.*) Apparently the safest thing would be to prohibit the man walking at all in front of the wagon, and then to provide some means of braking the wagon?—Yes, that would be the safest.

7985. We will pay attention to that. What are the arrangements for attending to accidents in the mine?—I do not think there are any arrangements laid down. The Company supply stretchers, bandages and lint, and I suppose any man who has a knowledge of first-aid attends to the accidents.

7986. What else do you propose should be done?—We propose that a team, or a certain body of men, should be recognised as first-aid men to go to assist in case of accidents.

7987. Are there not one or two first-aid men there now?—There are one or two, but they are not recognised.

7988. How do you mean "recognised"?—I mean being recognised in the works as the works ambulance team.

7989. Are they not so known?—They have no connection with the works—I mean the ambulance men.

7990. They are quarrymen?—Yes, quarriers—there are one or two, not more, and they may be out on the banks or in the quarries.

7991. You think there ought to be more?—Yes, and they ought to be recognised.

7992. What form would the recognition take?—As the ambulance team in the quarry they should have access to the ambulance outfit at once in cases of accidents.

7993. You think there should be more organisation?—Yes.

7994. You mean at present if a man is injured they do not know who to go to?—No, and at the moment of excitement they might lose their heads and would not know where to find a man to attend to it in the absence of a doctor.

7995. (*Mr. Greaves.*) Would you have the men stationed in certain parts of the quarry doing nothing else?—No; they would be working in the quarry, but there would be those men who would attend to a case at once if a doctor could not be provided. They might forget who were the ambulance men unless they are recognised ambulance men.

7996. You mean wearing a uniform?—No, simply the name of the ambulance team.

7997. (*Mr. Redmayne.*) If the names of the ambulance team were posted up in the quarry everybody would get to know their names, and that is what you want?—That is my point—and to have a proper ambulance outfit.

7998. (*Mr. Greaves.*) Are there any number of men in your quarry who do not know who the ambulance men are?—Yes. Again, most of our ambulance men have had to leave for want of employment because we keep on the old men and young ones have to go, and those are the men who have ambulance knowledge.

7999. The effect of recognizing them would not prevent their going if there was no work?—No, we could not remedy that if they had to go.

8000. (*Mr. Redmayne.*) You mean it should be a rule that at every quarry having so many men there should be a certain percentage who were expert in ambulance work?—Yes, so as to facilitate instant attention in case of accidents.

8001. (*Mr. Greaves.*) Suppose that here is a man John Smith, or anyone, always known to be an ambulance man—I do not understand how the recognition by the management will make any difference to the men in the moment of excitement unless he wears a uniform?—My point is this, that they may have forgotten who were the ambulance men.

8002. Do you mean that they ought to send a crier round or stick up a notice showing who were the ambulance men, or what?—Have a notice posted up always.

8003. (*Mr. Jones.*) You want the management to take the responsibility of informing the workmen that a certain number of men in the quarry will attend to any case of accident?—Yes.

8004. (*Mr. Lovett.*) Do you mean that they should have pay for the time they were attending to those duties?—That would be a question to be considered.

8005. You mean that the company should provide sufficient ambulance requisites?—Quite so.

8006. And that the men should have facilities placed at their disposal for going there when they liked?—Yes.

8007. That they should have access to them?—Yes, in case of any accident at any time.

8008. (*Mr. Jones.*) And I suppose you think that the ambulance men should have the power in case the outfit gets out of order to ask the management to have it properly completed?—Quite so—to see that the outfit is always complete.

8009. (*Mr. Greaves.*) You were speaking about the shelters, and you said they were not healthy?—Damp and draughty; and men go in there warm and are very likely to catch severe colds.

8010. How long have they to remain in the shelters?—It depends. If the blasts do not go off at once they have to remain longer—and again they have to go there if the weather is wet or inclement.

8011. Part of your complaint is that the paths going down to the quarry become slippery in frost?—Quite so.

8012. Paths are apt to do so in frost—it is rather difficult to prevent it?—Quite so, but there are no steps.

8013. You think steps in frost would be safer than a path?—Yes, they would be much safer than what it is now, in comparison with the present arrangement.

8014. The present arrangement is a sloping path?—Yes.

8015. What would be about the gradient?—I could not say. I have not considered the matter.

8016. Of course, if you had steps, you would have steps and then a bit of level, and then more steps—I mean it is too shallow to make steps all the way?—Yes.

8017. And then you think the place would not be more dangerous than a path in frosty weather?—Quite so.

8018. Anyhow you think the change from a sloping path to steps would be safer, especially in frosty weather?—Quite so.

8019. (*Mr. Jones.*) With reference to shelters I suppose you know there is a rule now in existence which says: "A sufficient number of proper shelters "shall be provided (which must be used by the persons "employed) except where all leave the quarry during "blasting." In your quarry you have not a sufficient number of shelters?—No.

8020. What you want is that the rule already in force should be carried out?—Yes, quite so.

8021. I think the same thing applies to the fencing—there is a rule that every quarry shall be properly fenced?—That is so.

8022. Your complaint, again, is that the rules are not carried out?—Yes.

8023. There is not a carrying out of the old rules?—Quite so.

8024. How are you situate as regards mess-rooms?—We do not require mess-rooms because we are quite near the workmen's places.

8025. What have you to say about the sheds for working, where you dress and split the slates?—They are not as convenient as they might be. They certainly might be more convenient.

8026. Do you think it would be better to build stone ones instead of the ones you have now. We have seen the ones you have now?—I consider those we have now, if made close in winter time, would be better than the stone ones—we have to remove them so often.

8027. Why?—Owing to the sloping out of the banks and owing to the wind—we have to change.

8028. Have you to provide the shelters yourselves?—We have to provide them ourselves.

8029. Do you think that a just and satisfactory thing?—I do not think so, I think the sheds should be provided by the employers.

8030. I think you agree that moveable shelters would be considered satisfactory?—Yes.

8031. Any shelter composed of wood would be moveable?—Do you mean shelters from blasting?

8032. Yes?—They would have to be stone shelters—you could not remove those.

8033. As I understand it, a moveable shelter against blasting would not be considered satisfactory?—Not in this case—they have to be slate shelters.

8034. In case they had to work the quarry a distance from the shelters they would have to build new shelters again?—Yes.

8035. (*Mr. Lovett.*) Are the sheds you work in moveable?—Yes.

8036. Are they satisfactory so far as size is concerned?—They are quite satisfactory as to size, but they might be made warm in the winter time. It is severely cold in the winter time.

8037. Are there many accidents happen in the dressing sheds or splitting sheds?—No—no accidents happen although cuts might occur, but they are at times unavoidable owing to the sharp edges of the slate.

8038. I was wondering whether the pieces would fly from one man to another?—Well, we sit so that the pieces fly away from us. The pieces do fly, still that cannot be hindered.

8039. (*Chairman.*) One other question. Are you working practically in the quarry yourself now?—I work both in the quarry and on the bank.

8040. What do you do if you cut your finger, not badly enough to call the ambulance or doctor in; what would you do?—Well, sometimes we do not look at it at all; if it is slight we pay no attention to it.

8041. If you thought you had to do something, what is your idea of the way of treating it?—In fact we cannot treat it down in those quarries. We get a piece of rag of some description and wrap it round till we go home.

8042. Do you see that the rags are clean?—The rags are sometimes clean and sometimes not.

8043. We had evidence that slate was a very good antiseptic, and that a bit of rag was the worst possible thing to put on because there was so much liability of poisoning it?—Well, it is an old habit amongst the slate quarrymen to cover a cut up with the slate dust.

8044. Are you aware that a piece of rag is a poisonous thing to put on a cut?—Yes, I am; because I am an ambulance man myself.

8045. (*Mr. Jones.*) But you put a bit of rag on because that is the only thing available?—Yes, because it is the only thing available.

8046. (*Mr. Redmayne.*) You complain of the shelters and want of fencing already provided?—Yes.

8047. Have you lodged any complaint with the Inspector of Mines for the district?—We have not, because he could have seen it himself.

8048. As he has not seen it himself, would it not be as well to do so?—There is another point; I do not know the gentleman, and he may be there and I would not know it.

8049. Any letter, anonymous or otherwise, which you might address to him would receive attention?—Quite so; still we consider it ought to be done.

Mr. John Clark called and examined.

8050. (*Chairman.*) You have heard the evidence that has been given to us by Mr. McKenzie. I will simply ask you do you agree with it, or have you anything to add?—I agree with what Mr. McKenzie has said, and I have nothing to add.

Mr. Ernest Albert Neele called and examined.

8051. (*Chairman.*) You are the General Manager of the Dinorwic Slate Quarry, North Wales?—Yes.

8052. The Dinorwic Slate Quarries, I think, are some of the largest in the United Kingdom?—They are the largest, I think.

8053. They lie on that side of the mountain which is opposite Llanberis?—Yes.

8054. They are open quarries, entirely worked in the gallery style?—Yes.

8055. Except there are three sinks or shafts, but these shafts are open to the sky?—Yes.

8056. There is no part of the premises which could be called a mine?—No.

8057. What is the average height of the galleries?—24 yards.

8058. And the width?—12 yards.

8059. Do you consider that a proper and safe arrangement?—I do.

8060. I mean that width and height?—Yes.

8061. The hauling up of material and sending down of slates is done upon inclines?—Yes.

8062. What is the usual slope of those inclines?—They vary.

8063. Thirty degrees, or something of that sort?—About that is the average.

8064. The quarries are divided into inside and outside workings, are they not?—Yes.

8065. Will you give us a general description of the quarry?—The quarries are divided into inside and outside workings; the inside workings consist of all operations connected with delving of rocks and dressing of rocks to suitable sizes for the dressing sheds. The rocks consist of slate material and a useless rock which is locally called "bastard granite." The slate-producing rock is worked by a class of men called "quarrymen," and the rock is divided into lengths of about 7 yards and generally called a "bargain," which is worked, as a rule, by two men, assisted by a journeyman. No lad can become a journeyman before he has been in the quarry for two years. The bargain is let monthly, and the same parties continue to work the same bargain in many cases for years; as a rule they continue the working of the bargain until the slate becomes too inferior or from some other cause they separate their partnership of the bargain. It is the custom for both partners to work inside the quarry for a few days at the beginning of each month, drilling and blasting to procure blocks for the dressing shed, as it is found that one man could not very well keep his partner and a journeyman supplied with sufficient blocks for dressing, unless he is assisted at the beginning of the quarry month, for the purpose of clearing down tops and bottoms and drilling holes. After the first week, generally, one partner will keep the other partner and journeyman going for the rest of the month. The non-slate-producing rock or bastard rock is worked by another class of men called "rockmen"; these men work in couples as partners, and their duty is to clear away the worthless rock, so as to keep the quarry open for the

slate producing rocks to be worked. There is another class of men that work inside the quarry called "wagoners," these load up into iron wagons the debris that has been brought down by the quarrymen; in some cases these men push the wagons to a tip, but in other cases they merely load the wagons and push them to an engine tram-line, where they are taken away by a locomotive and put over the tip by another class of men called "tipmen," who are outside the quarry. All these are contract men. The other quarrymen—partners and journeymen—work outside the quarry, as do also a class of slate loaders, roadmen and weighers. The fuse generally used is a tape fuse, manufactured either by Bickford or Nobels. All the explosives and fuses are stored in the magazine belonging to the quarry and under Government inspection; they are sold as required in suitable quantities to the men, who keep what they require in properly made boxes under lock and key in their dressing shed. Detonators are kept in a separate box and locked up; they are stored in a separate building from the magazine which contains the explosives. The men are provided inside the quarry with sheltering sheds for use when blasting, which occurs six times a day in summer and five times a day in winter. The signal for blasting time is given by whistles; the first whistle means that all men are to proceed at once to the sheltering sheds. At the expiration of three minutes a second whistle is sounded, when fuses are lighted, and the third whistle will sound five minutes afterwards, when all blasting is over. Outside the quarry the men are supplied with slate dressing sheds and eating houses, in which large stoves, tables and benches are supplied free. There are also barracks which men utilise who live too far away from their work to get home daily, in which bedsteads and cupboards are provided; each man pays 2*s.* per annum for same. The men are supplied with a staff of doctors and nurses and a hospital (free of all charges), where the serious cases of accident are taken and kept until the injured man or men are convalescent; other cases are taken home, and the doctor or his assistant visits them, provided they are within a radius of 4½ miles from the quarry hospital. All the employed are not only medically attended to in case of accident, but are also medically attended for all ailments they may suffer from free of charge. There is also a foundry with a staff consisting of joiners, blacksmiths, moulders, &c., and storekeeper. This foundry supplies the quarry with materials and does the work of repairs, &c. necessary. Materials that the men require can also be supplied from this yard. Inside the quarry there is a staff of 16, and the galleries and workings are examined daily by this staff, and everything possible is done to avoid accidents. The incline drums and ropes outside the quarry are examined daily by the brakesmen, and monthly by a practical engineer. The ropes inside the quarry for winding purposes are also examined five times daily, once after each blast. Dealing now with accidents, I will take them as follows:—Number and nature of accidents. Fatal accidents. In analysing the above statements, I feel convinced that the small number of serious accidents compare as favourably at this quarry as at any other similar works in the country, but the number of accidents reported, I admit, is in excess of other slate quarries in Wales, and this I attribute to two or three reasons:—(1) My having given instructions for all cases to be reported to the insurance company, and the encouragement on the part of the quarry doctor for injured patients not to return to their work until the small cuts were perfectly healed, and the wounded parts quite safe to come in contact with foreign matter, and the very natural anxiety of the medical staff, such as those employed at the Dinorwic quarry, who, jealous of their professional status, are reluctant to allow any person to return to work until properly cured. (2) The benefit club system which the Dinorwic quarrymen have makes their remuneration (including compensation) in some cases better than their wages, and it is quite natural that a man who has met with an accident, and is in receipt of a weekly payment from a benefit club and his compensation, should be in no hurry to return to his work. Then there is a small percentage of Dinorwic quarrymen, who, because they live outside the quarry doctor's radius, visit other practitioners. I say, without casting any reflection upon the medical profession, that it is quite natural for such a doctor (possibly a struggling practitioner) to take a generous view of the injured man's case and prolong his convalescence, in order to bring the man within the limit of the Act, and so entitle him to compensation, seeing that the man will be paid by a wealthy insurance company, and that the doctor will be sure of his remuneration for his professional duties from the same rich insurance company per the workman. These are the chief causes for the number of reportable minor accidents in the Dinowic quarry being so large.

8066. There have been a good many accidents at Dinorwic quarry, have there not?—There have.

8067. What are the numbers of serious and small accidents, and the percentages?—For what period do you want that?

8068. You can give us what periods you can?—From 1905. There have been 12 serious accidents in 1905, 25 in 1906, 36 in 1907, 27 in 1908 and 22 in 1909.

8069. Those are serious?—Those are serious.

8070. Now the non-serious?—Inclusive of those, the total number of accidents—recorded accidents, that is—is 377 for 1905, 338 for 1906, 468 for 1907, 462 for 1908, and 501 for 1909.

8071. What would be the number of men employed in those years, if the number is not much altered, one number would do for the lot?—They vary a little; 2,899 in 1905, 2,872 in 1906, 2,825 in 1907, 2,708 in 1908, 2,694 in 1909.

8072. So that the numbers of men have slightly diminished during the five years, and the number of serious accidents has first gone up and then down?—They have gone down considerably in the last year.

8073. The minor accidents have increased from 377 to 501?—That is so.

8074. What do you attribute that increase to?—May I first of all say that the majority of the accidents are what I should call small. I do not say they are trifling or trivial, but they are small, and the majority of accidents are to the hand—cuts and bruises.

8075. Have you any figures that would show what proportion of those minor accidents is due to very small things, such as cut hands and so on?—I can only give it to you that they are hand injuries which are very light as a rule.

8076. Has the increase occurred among the minor accidents, more among the hands cut, the disablement for a week or so, than it has occurred among the other minor accidents which perhaps disable for two, three or four weeks? Have you any figures to show that?—Yes; the hand is the heavier all the time.

8077. You have figures to show that?—Yes.

8078. Could you let us see those?—I can give them to you or read them to you.

8079. If they are not very long, give us anything you can. Otherwise, put it in the form of a table. What we want to see is this: among those minor accidents, which have increased at the fastest rate, the slight ones or the heavier ones, that is the point?—The slight ones.

8080. Will you give us some figures if you can, in support of that view?—I will give you the hands for those five years.

8081. By "hands" do you mean slight injuries to hands or severe injuries?—Slight injuries. In 1905, 226; 1906, 191.

8082. That goes down?—That goes down. In 1907, 255; 1908, 275; 1909, 298.

8083. Then the increase from 226 to 298 is not as proportionately great as 377 to 501, so that those figures would show rather that the great increase had taken place in the more severe minor accidents instead of the less severe accidents?—Yes, it does work out in that way.

8084. Those figures do not seem to bear out the theory that the chief ones are among the hands only?—It works out to 54 per cent. on an average.

8085. The total of minor accidents?—The hand accidents over the others.

8086. But still, the hand accidents proportionately have increased only from 226 to 298?—Yes.

8087. Whereas the accidents other than hands have been increased from about 130 up to something like 200—a great rate of increase?—They have increased on the total number altogether from 13 per cent., 11 per cent., 16 per cent., 18 per cent. to 20 per cent.

8088. But if we analyse out the minor accidents, it seems the increase has taken place, not in the hand cuts, but something else?—I think very largely in the hand.

8089. It is small, because it is 226 to 298: that leaves a total increase of 377 to 501?—That is so, but of course there are other accidents which are slight.

8090. That is just what I want to call attention to. What we want is to put our finger on the class of accident which has been the real cause of that large rise from 377 to 501. The hands alone do not account for it. That is clear?—Of course, because everything is in it.

8091. The increase of injuries to hands has not been so very large. There must be something else which has been the real increase?—They have all increased.

8092. But which has increased the fastest: one will have a bigger ratio than the others?—I have not worked that out.

8093. There must have been something which has increased at a faster rate than cuts in the hand?—Injuries to the foot have increased a little.

8094. Perhaps you could put those returns in?—*Yes.

8095. Would you mind letting me look at the figures for a minute. (*Table of figures handed.*) It would take some little time to make an analysis of this to show?—Yes. The hand is the chief part of the man injured.

8096. It is the chief part of the man injured, but the rate of increase on the hand is not so big as the rate of increase on something else, and it is that something else we want to get at?—All the other things are against the hand: the head, eye, arm, leg and body.

8097. But the rate of increase of that would prove bigger than the hand?—Yes, it must be so.

8098. To put it in another way: we had evidence yesterday of a very detailed character of six quarries, showing that in that case it was the very small and minor accidents that had increased, and not the others. This hardly bears out the same view?—Of course those are not all serious accidents.

8099. I am speaking of minor accidents. The serious ones are not in here?—Yes, all the serious are included. Those are the total.

8100. (*Mr. Redmayne.*) Have you separated the serious from the minor?—I gave you the serious first of all, but the serious are in those.

8101. (*Chairman.*) We get to this fact, that the serious accidents have increased by 12, 25, 36, 27, 22?—Yes.

8102. You cannot say there is much of an increase in that?—No.

8103. (*Mr. Redmayne.*) The hands that you gave us include the serious?—Yes.

8104. (*Chairman.*) Do you say these are not serious, or is that 377 the total?—That is the total with the serious included.

8105. The total has increased from 377 to 501?—That is so.

8106. That is a very great rate of increase?—Yes.

8107. And that high rate of increase is not accounted for by the hands alone?—Not entirely.

8108. Because the rate of increase on the hands alone is at a less rapid rate than the total rate of increase. Therefore, there must be something else which has been increasing faster still than the hands, and we want to put our fingers on what that is?—I can tell you what that is without hesitation; that is claims for the accidents.

8109–10. Have you anything to show the periods of disablement?—Yes, I can give you the number of weeks off from 1905. 35 men were off for one week. This is a long table; I do not know whether you will take it down.

* *See* Appendix G.

8111. Is there a markedly larger proportion of increase in the short disablement cases than there is in the long disablement cases?—Yes. I will give you two weeks alone.

8112. That is to say, there are a greater number of short disablement cases relatively?—Yes, may I give you 1905?

8113. Yes, give us some figures?—In 1905, 105 men were absent for two weeks; in 1906 there were 100 men; in 1907 there were 189; in 1908 there were 200, and in 1909 there were 233.

8114. That is about twice as many?—Yes.

8115. That is two weeks?—Yes.

8116. Now, if you took a period of four weeks, what would the numbers be?—This is four weeks for the same years, 59, 63, 63, 50, 56.

8117. So that among the four weeks there has been no increase?—That is so.

8118. And therefore the increase has taken place among the accidents for the two weeks—short period accidents?—That is so.

8119. I think we had better have the returns?—I should like to make a point here. You said there were a larger number of accidents in 1909. There are a larger number of recorded accidents.

8120. (*Mr. Lewney.*) We want to know the reason why the number of these accidents has increased?—I wanted to say that there are less real accidents—less accidents reported at the quarry.

8121. You mean to say you pay more attention now to the reporting of accidents?—No.

8122. (*Mr. Redmayne.*) I have some figures which I took out at your quarry the other day, comparing January 1909 up to August, with January 1910 up to August of this year. The total accidents reported for inside and outside were 370 for the months January to August inclusive, 1909, and 262 for this year for the same months; very much less, you see; 108 less?—That is so.

8123. (*Chairman.*) Why is it that the short period accidents have increased more rapidly than the longer period? Why have the two-week accidents increased faster than the four-week accidents? How do you account for that?—The alteration in the Compensation Acts.

8124. How would that do it?—A man if he is away for a fortnight can claim for the whole period.

8125. You would not put that down as malingering, but rather that if a man had a right to stop away, he did so?—Most distinctly, if he had a right, he would stay away. But a man is very naturally inclined to say, "If "I am off for five days I am going to get nothing: if "I am off for seven days I shall get a day, and if I am "off for a fortnight I shall get the lot."

8126. That is without attributing any cheating or bad motives to the man?—Certainly, but I think the Act encourages him to do it. I am not saying this about the Dinorwic men any more than any other men, because I believe it is general.

8127. (*Mr. Lovett.*) Who certifies the man is unfit to work?—He sees the doctor.

8128. And he certifies he is fit to work?—Yes, when he is ready.

8129. How can the man evade that?—I do not say he does evade it.

8130. (*Chairman.*) Looking at these figures, is there any reason to think that the real question is that the mode of working the quarries is not so careful either on behalf of the masters or the men as it was, and that more injuries are taking place now than used to take place?—There are less.

8131. You say there are less than used to take place. Can you give us any figures or reasons for saying that?—I shall have to qualify that. I find last year, 1909, they went up a little, but these are the accidents reported to the doctor in the hospital for the five years.

8132. Apart from those reported for the statistics?—Independent of them entirely, but they include them: 1905, 719; 1906, 688; 1907, 684; 1908, 615: if you look at 1905 again, you will see there is a drop of 100: in 1909 there were 655.

8133. So that it is that grouping of accidents which you have just given us that you would look upon as really indicating the care with which the quarry is worked?—I say there is no less care on the part of the master or the men, but as against that you see the reported accidents go up with a leap.

8134. Can you account for that rise from 615 to 655?—I cannot. I have been into it very carefully with the quarry doctor, Dr. Mills Roberts, and he says it is extraordinary how things will run sometimes: he gets a run of eyes, hands or heads, and they seem to go in fluctuation.

8135. Was there any increase of output between the years 1908 and 1909?—No, there was a small drop.

8136. Were there a number of men taken on that year and employed who were not so experienced?—The numbers have dropped. Boys are taken in twice a year.

8137. (*Mr. Jones.*) Can you give us the figures for the last 20 years?—I cannot.

8138. I am under the impression that you would not find any change for the last 20 years before the Compensation Act came into force at all, and the figures in the hospital would prove they had the same number of accidents?—I cannot prove it because I have not got the figures with me, but I think you are very likely right.

8139. (*Chairman.*) Your figures only go to 1909. Up to what date in the year 1909 do they go?—The end of the year.

8140. Can you give us any figures for the year 1910?—No, I have not got any with me. I have waited for the end of the year.

8141. At the present time are the accidents that are reported still on the increase?—No, they are decreasing.

8142. Why is that?—The reason I put it down to is that I have been very stringent with the men in reporting their injuries and looking after them sharper.

8143. Since what date?—Since May.

8144. What change did you make in May?—The insurance people called out very loudly and there was a good deal of attention drawn to accidents at the Dinorwic quarry, as you know. I had taken a very generous and lenient view of accidents; I had not troubled at all: if a man said he was injured, I believed him and I instructed the quarry officials more or less to do so, and he showed himself to the doctor or brought a doctor's certificate. But now I have made a stringent rule that every man injured shall immediately go to the doctor and prove his injury.

8145. Since when?—Since May. I think you have the notice.

8146. This is known to the inspector, I think?—It is public for anybody to see.

8147. Can you give us the monthly figures of accidents for 1909 and 1910, January, February and March, up to August of each year?—I have not got them with me.

8148. Could you not give us the monthly figures?—I have them here.

8149. (*Mr. Redmayne.*) I took them off your book?—That did not deal with this present year beyond the fact that it has been reduced.

8150. (*Chairman.*) What seems to have happened is a rather sharp fall off at about April?—Yes.

8151. As sharp a one in May, and then a slight increase again up to August of this year. I do not know what September, October and November would show?—September is down a little, I think, and I think October is down a little. I can supply you with those figures.

8152. You had better provide us with those figures, and we shall be able to judge for ourselves?*—I will. I know that it is correct that they are down again.

8153. Could you give us a notion of how much they are down?—I would rather send the figures and make quite sure.

8154. Can you give us an estimate, if you went on at your present rate, of what you would be this year as compared with 1909? In 1909 you had 501?—Yes.

8155. You will give us the accurate figures afterwards, but what do you think this year would work out at?—250 to 300.

8156. You do not mean that they would go down from 501 to 300?—Yes.

8157. We should like to have those figures?*—I will send them to you.

8158. At all events really the rise in accidents is an apparent rise due to methods of reporting and due to the Workmen's Compensation Act and due in your view to the easy way in which that Act is worked?—That is quite right. I would not like to say the "easy" way, but the generous way.

8159. I think I have seen it alleged somewhere that the fall that has taken place is due to increased inspection and increased care on your part since May?—I cannot admit that. I have not taken any more care. I have been more careful to see that the man was really injured and that he reports himself.

8160. I mean more care in preventing the accident itself?—No. I am sorry to say I do not think the accidents themselves will show any reduction. The recorded accidents will.

8161. (*Mr. Lewney.*) You had your doctor's figures worked out?—I have not brought them for this year.

8162. (*Chairman.*) You will give us them for this year, too?—I will.

8163. (*Mr. Redmayne.*) I thought that the effect of that notice would be to prevent men with small wounds going away from the works and not having them attended to. By that notice you could tell the men they must report themselves to the doctor or some recognised official?—Yes.

8164. I should have thought that would have had a most wholesome effect in preventing accidents becoming seven-day accidents?—It has had that effect.

8165. In one way it is a reduction of seven-day accidents?—For recorded accidents it is a reduction, but because a man has cut his hand and not reported it, the accident is there just the same.

8166. The actual accident?—Yes.

8167. Do you not think if a sort of note like that was stuck up at all quarries compelling them to report all accidents, it would be useful?—I think at most quarries it is done.

8168. It is not done at Penrhyn?—Is it not? It has had a good effect there is no doubt.

8169. (*Mr. Greaves.*) The difficulty, of course, is that in many quarries there is no medical man to report to. At most quarries they have to report at once to the office every accident as soon as it occurs, but there is no medical man on the spot?—Is that so?

8170. (*Mr. Jones.*) I take it that your new rule is that the man must go to the hospital?—Yes.

8171. It is rather odd, if you will allow me to say so, "... he should also, if able, call at the quarry "hospital to see the doctor before leaving the quarry, "bringing the overlooker's notification of accident "with him." If a man goes to the hospital without the overlooker's notification of accident, he is not admitted as a man who has met with an injury in that particular quarry?—Yes, he is.

8172. But your rule does not allow it?—I do not think it can be read that way.

8173. (*Chairman.*) Was it meant in that sense?—Certainly not. I say, "He must report his injury at "once to the overlooker (or other official) in his depart-"ment; he should also, if able, call at the quarry "hospital to see the doctor before leaving the quarry, "bringing the overlooker's notification of accident "with him"—if he has got it.

8174. Your point is, it was not intended at all events?—I think the doctor knows every employee and he knows *this* man works at *that* part of the quarry.

* Mr. Neele subsequently supplied the following figures to the Secretary:—1909, September, 47 cases; October, 39 cases. 1910, September, 19 cases; October, 23 cases.

* Mr. Neele subsequently informed the Secretary that the total number of cases in 1910 was 353, as compared with 501 in 1909.

8175. Supposing a man arrived at the quarry hospital to see the doctor, and he had not got the overlooker's notification, and he explained it by saying he could not see him, or he was not there, would it be the doctor's duty to treat him notwithstanding?—Most distinctly.

8176. (*Mr. Jones.*) Have you had cases where the doctor has refused to treat any of them because they did not happen to have the notice?—No, and I will undertake to say it would not happen.

8177. (*Chairman.*) If there was any misunderstanding on that score, you would be prepared to alter this notice to make it clear that the man who could not get the notice should be treated just the same?—Certainly.

8178. With regard to accidents from chips and the use of goggles; have you anything to say upon that?—I am in favour of it when a man is gouging or is using a chisel or sledge-hammer, but I should say this too; I carried out Mr. Mottram's request—Mr. Mottram is the Inspector of the quarries—he asked me to try a number of men with goggles, and I did, and sent the reports to him, but they are by no means in favour of it as a whole.

8179. What are the faults that the men find with the goggles?—They say they do not see so well through them; use might help them there. Against that I have one old quarryman in the quarry who regularly uses them, and he says he finds absolutely no inconvenience.

8180. Are his goggles the same pattern as the others?—Yes. In addition to that, I have made a rule that all one-eyed men should wear them. That is a rule and it is carried out.

8181. (*Mr. Greaves.*) Do they complain much?—They do not complain much.

8182. (*Chairman.*) I cannot understand why the goggles provided have got side pieces of gauze. Would not a plain pair of spectacles letting the air come freely between be a great deal better?—I do not think so because the chip sometimes flies not to the man working, but at the man by his side.

8183. That is rather rare, is it not?—It is rare.

8184. You might take the risk of that?—I have seen men wearing large spectacles, not goggles at all, apparently with perfect comfort?—I might try that, but I am doubtful of it. The chip flies at all sorts of angles and it might get under the spectacles.

8185. Could you not get them not so close to the skin so as to allow the air to blow freely through?—Do you mean glasses?

8186. Yes?—I had it out with the doctor and he was against them.

8187. Shooting spectacles are open to exactly the same remark and yet they are very generally used?—I think the shot is spent.

8188. But your sideways point would apply in the case of shots, and yet practically all sportsmen do use spectacles with plain glasses in them and not goggles?—That is so.

8189. (*Mr. Jones.*) Do the one-eyed men like them?—I think they have got not to dislike them. They did not like them at first.

8190. I am under the impression they would rather be without them?—I daresay they would, but I do not think I should be doing my duty to the man or his employer to allow him to run the risk of losing his last eye.

8191. But they insist that the wearing of the goggles interferes with their free working?—They have not notified me to that effect.

8192. You told us you picked a certain number of men in the quarry to try the goggles on?—I did.

8193. Your experiment then, was to the disadvantage of goggles?—Yes, they would not take to them altogether.

8194. (*Mr. Redmayne.*) They thought they were too heavy?—Yes, I do not think you will find quarry workmen will speak well at first of any innovation. They want to get accustomed to it.

8195. (*Mr. Lovett.*) Do they not injure the sight permanently? That is my experience?—I do not think so.

8196. I have closely investigated the matter, and I have asked scores and scores of men who would like to wear them, but they say they permanently injure the sight and they left them off for that reason.

8197. (*Chairman.*) If I get a pair of spectacles, will you try them?—I will. I agree with Mr. Lovett that thousands of quarrymen would be delighted to wear them if they could get something suitable, and as your suggestion seems to be a good one, I will try it with pleasure.

(*Mr. Jones.*) This is an important point to your quarryman. If he is gouging the pillar or block he wants to see which way the pillar goes. He can only see it by pouring water on the block, and then he can just see a hair line. He could not see it through glasses. He wants to see that and watch it, because if he goes too much *this* way, or *that* way it will spoil his block.

8198. (*Chairman.*) I suppose there would be no objection, if it was found that a good glass could be made which the men would use and were desirous of using, to providing them?—Do you mean as a gift?

8199. I mean you provide them and you pay for them—or ought the men to provide them?—I sell them now (I make absolutely nothing out of it) with the gauze, at 4*d.* per pair. I will go so far as to say this: I would provide the first, but I think the men ought to repair.

8200. Do the men provide their own tools?—Yes.

8201. You would regard the spectacles as a portion of his outfit of tools?—I would and I think a man who values his sight would be only too glad to pay for it.

8202. (*Mr. Greaves.*) I should imagine it is wiser the men should pay, because it makes them a little more careful?—Yes, of their own pocket.

8203. (*Chairman.*) The spectacles would not be a very onerous thing?—I should think not.

8204. (*Mr. Redmayne.*) That is why you would provide the first but not the second?—Yes.

8205. (*Chairman.*) It would not be a very onerous provision if good and proper spectacles could be got, that some steps should be taken that the men should wear them?—That is so.

8206. The next point in your statement is about the payment of wages. Is that a matter which is in any way connected with safety?—I do not think it is. I gave you a general description of the working of the quarry.

8207. The general health of quarrymen you consider good?—I do. I would like to say I have 800 men working in the quarry who are over 60 years of age. I think that speaks pretty well.

8208. What do men do at your quarry when it is wet? What is the practice when the weather is wet? Do they work through the wet, or how is that done?—They shelter.

8209. If it is a day that is going to be a wet day for certain, after a certain time they go home?—Yes. I should say they very often work till they are wet and then they will go home.

8210. Do the men provide themselves with Dreadnought cloaks of any kind?—No.

8211. Is that not rather a pity?—I do not think they could work in them.

8212. I mean in case they got wet through?—No: I think the large percentage of them have umbrellas.

8213. (*Mr. Lewney.*) And old sacks?—A great many have sacks.

8214. (*Chairman.*) I suppose men working in open air like men in all classes out in the fields, whether ploughing or shooting, do not suffer from a wetting so much as townsmen may do?—I do not think they do; besides they go home and then they have a chance to change.

8215. (*Mr. Jones.*) Have they a place where they can dry the sacks and jackets they use in the quarry?—They dry them in the eating-houses.

8216. That is hardly healthy, is it?—Well, they do it. There is not much drying to be got there.

8217. It is a general complaint, I take it, and how to get over it I cannot see. It would be a big item to have two places with two fires?—It would. There is no question about it that the men can go home if they are wet.

8218. But most men do not want to go home if they can work the day out? If they go home they lose half a day or whatever it is?—That is quite true.

8219. They have an old coat to throw over their shoulders and they generally work. It is very inconvenient when they come the following day to have that coat wet?—Yes, I quite see that.

8220. By having somewhere to put it in, a drying room or something like that, they could have it again?—Yes.

8221. (*Chairman.*) How many mess-rooms have you got?—Practically one in every gallery.

8222. How many would that be altogether?—23.*

8223. That is one to about every 110 men or so employed?—It is about that.

8224. Are they big enough, each of them, to take in about 100 men at the time, or would they take a smaller number?—Some of them would take a smaller number and some of them are big enough to take 200 men.

8225. Do some of the men go home in the middle of the day?—A very small percentage—a few living in Llanberis.

8226. Have those mess-rooms got fires in winter?—Yes, summer and winter if they choose, and a big cauldron for hot water.

8227. I gather in most places the owners have no objection to providing a reasonable and comfortable mess-room for the men where it will be used?—They are provided so far as we can.

8228. With regard to fibroid phthisis, is there any abnormal amount of that among the quarrymen?—No.

8229. I may say frankly our reports do not show it, and there is no reason for thinking so?—I do not think so for a minute.

8230. With regard to drilling, do you do much machine drilling?—Very little.

8231. It is nearly all hand?—All hand, practically. I have only three rock drills.

8232. Are those for drilling into slate?—Yes, and bastard rock. By that I mean I have only three machines.

8233. Are they dry or wet?—Wet.

8234. You would have no objection to using wet drills entirely instead of dry?—I am no believer in the machine drill at all at present. It does not pay me at all.

8235. It would pay people with harder kind of rock?—I think so, better.

8236. With regard to ambulance—I mean by ambulance, first-aid appliances as apart from those that the doctor has. You have some of those in the quarry?—Yes.

8237. I suppose you have not got first-aid for mere cuts on fingers sufficiently, have you? I am bound to say I think that everywhere there is a deficiency in that respect?—It is a thing I am going to remedy in the quarries. I will put that right.

8238. We had a gentleman who came here this morning with some suggestions?—Yes, I was in the room. If you would kindly let him send me a box, I would show it to the doctor, and if it is satisfactory I will undertake to provide one practically in every gallery.

8239. So that they are available for the men?—Yes.

8240. Would you undertake by a notice to point out the danger of tying up a cut with a dirty rag. It is much better to put slate dust on. A rag got from anywhere is the most pernicious thing you can possibly tie up a finger with?—I will go into that with the quarry doctor.

8241. Perhaps you will let us know whether your doctor would be of opinion that to pull out of your pocket a piece of rag or even your handkerchief and tie up a wound with it is the worst thing you could possibly do?—I have no doubt I can speak for him now. He would agree that it is.

8242. And it would be better to have a piece of lint of some sort?—Yes. I have had a preliminary talk with him. I am not a sufficiently medical expert to say why, but he does not seem to fancy having any dressing for a cut.

8243. I mean washing the place with an antiseptic solution first before putting the lint on?—I do not think he is quite in favour of the men having that solution to use.

8244. Why should they come for a mere little cut and trouble the doctor?—I quite agree with you.

8245. Does it not seem unnecessary to go and trouble a doctor and walk all the way to a hospital for a cut an inch long—it might be rather a deepish one—when you could just wash it out and put a bit of stuff on it and tie it up yourself?—His idea is this: is there not a fear of the man doing that and trusting so to cure the thing whereas he might come down to the hospital. It might be a tendon that is cut.

8246. It is not very probable on the other hand that the man with a small cut will not attend to it at all, but go home?

8247. (*Mr. Lewney.*) Or put something on it which is dangerous, such as tobacco leaf which is commonly used? I have seen it done many times?—If you will leave that with me I will go into it with the doctor.

*8248. (*Chairman.*) Perhaps you will communicate the doctor's views to us?—Yes.

8249. At all events I may take it generally you are quite willing to do anything reasonable which can be done in that direction?—Distinctly so.

(*Mr. Jones.*) I might suggest on that point there is a complaint at Mr. Neele's quarry that the men have not got easy access to bandages and that sort of thing. I thought of suggesting to Mr. Neele that a supply should be kept in the machine at each gallery.

8250. (*Chairman.*) I should think it is not improbable that Mr. Neele would admit, without taking any blame to himself, that there should be improved access to those things?—I will not only admit it; I will promise it shall be done.

8251. (*Mr. Jones.*) There are some very good ambulance men at your quarry, are there not?—Yes, there are 300 men.

8252. (*Chairman.*) It is no worse than all the other quarries because we have all been struck with the desirability of getting some small aid of that kind more easily and rapidly for the men with small cuts which are important to us, because they form such a very large number of these small cases which are raising the accident rate?—Yes.

8253. I think I have gone through most of the points in your proof. There are a few other questions I should like to ask. It has been suggested it would be better that explosives for use in quarries should be tested by the Home Department and certified generally with a report on their quality and character. I suppose you would have no objection to that?—No.

8254. It has also been suggested that in certain places the fuse which is used is of very poor quality?—I do not think any fault can be found with mine.

8255. You would have no objection to fuses being certified as sufficiently good for use?—Not at all.

8256. With regard to the fencing of quarries. Speaking generally, in your district is there sufficient fencing? You have heard what one of the witnesses said to-day about one quarry?—Yes. I was not struck by what he said. It seemed to me very weak that they

* *See* Q. 8294.

* A specimen of the first aid box referred to in Mr. Overton's evidence above (*see* Q. 7880) was sent to Mr. Neele, who subsequently wrote, "before and after receiving Boot's "box I had two or three meetings with the quarry doctor on "this matter, with the result that I am pleased to inform the "Commission that the necessary appliances for dealing with "cuts and small wounds are now provided in all the galleries "in the quarry, and properly prepared dressings are available "to any man who meets with an accident, and if anything "further is required, it is in the doctor's strong opinion that "the injured party should (when able) come to the hospital "for treatment, and this is being done."

had not had the rule carried out. The Dinorwic quarry is properly fenced.

8257. The law is at present sufficient you consider, if it is carried out, with regard to fencing?—Yes.

8258. Then with regard to the overburden at quarries. I should like to suggest the following proposal to see whether you think it would be oppressive: that is that overburden should be removed in a proper and workmanlike way to such an extent as was right having regard to the nature of the quarry, and secondly, that if an inspector considered in any quarry that the overburden was not being sufficiently dealt with, he should have power to propose a special rule to the owners indicating the method in which that particular quarry ought to be treated, and in case they disagreed, go to arbitration in the ordinary way. Would you consider that in any way oppressive?—I do not like it at all. I think it is taking the management out of the hands of the manager.

8259. But if a dangerous practice is in vogue he has power with regard to anything which is a source of danger under Section 18 to propose a rule of that kind. It does not carry it very much further except that it specifies it?—A dangerous practice?

8260. Would you not admit that under Section 18 of the Act you could deal with the question of overburden supposing there were overburden dangers in a quarry?—I would not allow it.

8261. Supposing someone who was not so careful as you was allowing it, the inspector would have power to deal with it under this: "If in any respect which is "not provided against by any express provision of this "Act or by any special rule, any inspector find in any "mine to which this Act applies or any part thereof, or "any matter, thing, or practice, in or connected with "any such mine to be dangerous or defective"—then in case they do not agree, arbitration?—That is not the Quarry Act, is it?

8262. That is the Metalliferous Mines Act?—I do not like it at all. I think it is putting a great deal of power into the hands of the inspector.

8263. That provision is with regard to metalliferous mines and does not apply to quarries?—I think not.

8264. Why should it not?—Because, in my opinion an inspector who was not (I say this without prejudice) at all a fair-minded man might make the thing very unpleasant and very tyrannous.

8265. There is always an arbitration in the background. He does not come there as a dictator under this because "If the owner or agent fail to comply "either with the requisition of the notice, where no "objection is sent within the time aforesaid or with "the award made on arbitration"—he can only propose a remedy?—He has that power now.

8266. That is the law at present?—Yes.

8267. The only difference this would make would be to give the inspector power to suggest a mode of removing the overburden—that it should be 6 feet away or something applicable to that, and in case the two did not agree to go to arbitration?—I do not like it.

8268. (*Mr. Redmayne.*) When I visited Dinorwic the other day with Mr. Mottram we had occasion to stop at a place where the Act was not being carried out?—I am aware of that, and you will be surprised to hear that the place was absolutely firm when I sent up to it. That was all tipped rubbish.

8269. It was tipped rubbish held together?—Yes, it was held in a certain direction.

8270. Supposing one slab became loose?—It would not have gone that way. It was firm. I went up and looked at it myself. I am not saying this in an unpleasant way at all, but Mr. Mottram drew attention to some rock which he said was standing out in an unsafe manner. It took 6 pounds of gunpowder to move it. Unless the inspector is a very fair-minded man it is putting a very heavy tax on the quarry people.

8271. (*Chairman.*) On the other hand you have got the protection behind you of arbitration in the matter?—Which is expensive. The industry is already heavily burdened, and I think any gentleman who knows anything about the slate trade will tell you it is in a parlous condition and has been for the last four or five years.

8272. We will consider that point carefully, but certainly some of us are rather inclined to think that an application of the Quarries Act like the Metalliferous Mines Act would not be interfering with you and would not damage you, but you maintain strongly a different view?—I do.

8273. (*Mr. Redmayne.*) In taking out the figures I find that the non-fatal accident rate per cent. in slate mines as compared with slate quarries in 1909 showed a very considerable difference. In the slate mines it was 6·77 and in the quarries it was 12·42 per cent.—nearly double you see. I wondered if you could give me any explanation of the extraordinary difference?—I could not give any reason for it now.

8274. I would suggest as a possible explanation of it the fact that the slate mines are mining slate at a much less inclination—about 30 degrees as compared with yours which is practically vertical. That might be one possible explanation?—That might be one and there is another that comes to my mind now. That includes all the slight accidents, does it not?

8275. Yes.—I do not know how the slate mines are, but I believe the slate mines move for every ton of slate that they get much less rubbish than I have to move and the open quarries have to move generally.

8276. Because they can leave it underground?—Yes.

(*Mr. Greaves.*) We do not leave rubbish underground. We only take out the slate rock.

8277. (*Mr. Redmayne.*) Whereas in the slate mines they cut through the intrusions, you have to remove the intrusions?—That is it.

(*Mr. Lewney.*) Do those figures of yours include the dressing of slate?

8278. (*Mr. Redmayne.*) I was coming to the third explanation, and that is that you have a great deal more handling of slate than they have in the mines?—I know nothing of the slate mines, so perhaps it is not right for me to make any explanation of it.

8279. I was thinking that possibly the last was the most prolific source of accidents, namely, the handling. I was going to ask you whether in your opinion you could not use cranes in the handling to a greater extent than you do?—I know that question has been raised, but I do not see any object in putting more cranes than I have got or I would do so directly.

8280. I think at Nantlle where they use cranes the rate is very much less. That would almost point to the strength of the argument, would it not?—Cranes are only used so far as the Dinorwic quarries are concerned in shifting the rubbish, that is the bastard rock. In the slate quarries you do not use cranes at all for slate blocks. You make it to a reasonable size on the spot. I provide as many cranes as are needed and I would not know where to put them if I had more.

8281. There were 12 places more where you could use them in dealing with waste rock?—I daresay there would be.

8282. You do not think you could use them in the non-waste rock?—Not any more than I do.

8283. Not without altering your whole system and carrying out your pillaring in the dressing sheds?—I am sure that would not be a wise move at all.

8284. For what reason?—I do not see what is going to be gained by it at all. You simply bring any heavy lump of slate into the dressing shed where it hampers the man and causes him a lot of unnecessary work in the shed which he can do in his bargain.

8285. Are not the accidents largely due to the handling of great masses of rock with the hand?—Not of the slate but a large proportion are with rubbish.

8286. A very minor point occurred to myself and Mr. Mottram when we were making our inspection. These masses of slate have extraordinarily sharp and knife-like edges sometimes, and there was one man who took a hammer and just ran it along the edge like *that* before he did anything. Systematically he used to run the hammer along the sharp edge?—Yes.

8287. It seemed a simple thing but it seemed very suggestive in preventing cuts?—I have never seen it done. I cannot imagine what he was doing it for.

8288. (*Mr. Jones.*) It is generally done, I think?—To knock off the edges.

8289. (*Mr. Redmayne.*) Just run the hammer along the edges?—Are you speaking of slate rock?

8290. Yes, but you get it with the rubbish just the same?—Yes.

8291. It seemed a little thing?—I will give that word of caution to the men.

8292. One of your men suggested it, not by word of mouth, but by his actions?—Yes.

8293. Then with regard to the inspection. I took out the figures when we were there. You had 1,017 persons inside the quarry and 1,677 outside or a total of 2,694 men, and for that number of men you have got about 40 galleries all told?—49 galleries I think it is.

8294. (*Chairman.*) You told me 23 before*?—I made a mistake, it is 49.

8295. (*Mr. Jones.*) That is what we had in the evidence of the inspector?—He asked for the number of galleries from some point.

8296. (*Mr. Redmayne.*) That is so, but then you have a number *there*?—Yes, away to the right. It is 49 galleries.

8297. I am looking it up purely from the point of view of inspection. For that number of persons and galleries you had eight inspectors and five assistant inspectors?—Yes.

8298. That rather struck me as being a very small number of inspectors seeing that the work of the assistant inspectors is practically relegated to the sheds, is it not?—Certainly not.

8299. They do not do much actual inspection, do they?—Actually equal inspection with the overlooker. They are assistants to the overlooker.

8300. I take the time they are in the quarry and the time they are in the sheds?—Who?

8301. The assistant inspectors and the inspectors?—Yes.

8302. The assistants were doing mostly clerical work?—No, you may take it from me with regard to the overlookers and the assistants, their work is first of all to go through the galleries; every gallery is inspected morning and afternoon, perhaps three or four times. They certainly have to do that, and they do do that.

8303. Take the ordinary 13; a very considerable amount of their time is in the sheds?—I cannot agree to that at all. The examiner is in the sheds and he examines the slates which come from the sheds and are worked in the sheds with the picker to see if the slate is good; but the overlooker and the assistant overlooker ought not to be in the sheds. They ought to be in the galleries. That is their work.

8304. We found them in the sheds mostly?—It must have been a bad bit of luck.

8305. Your manager was with us and will tell you what we found?—Was Mr. Lloyd Williams with you.

8306. Yes. May I take it they are actually inspected?—Yes.

8307. Or should be?—I maintain they are.

8308. It would be part of their duty to examine the face rock?—Yes, that is their duty.

8309. That means a good deal of clambering?—There is no need for the men to clamber up. That is a very rare thing. If he sees anything wrong in the face of the rock that he cannot see from the top or the bottom of the gallery he goes over in a rope.

8310. He could not do that if he had only one arm?—No, he could not.

8311. One of your inspectors was a one-armed man?—There is one.

8312. He seemed a very good fellow?—He is a good fellow, too. He is a man with a very small department.

8313. To be perfectly straight and open with you, it rather struck me that the inspection was distinctly meagre?—I am sorry to hear you say that. I do not think so myself, and I do not think what you apparently imply (the want of inspection) is the cause of any accident.

8314. I do not say in comparison with other places because it was not so, but it was meagre for such an undertaking?—Of course, you ignore the fact that Mr. Lloyd Williams, the local manager there, is on the spot and is supposed to be all round every day, and is so, and the bargain letter is there, too.

8315. I am not including those?—But they ought to be included because that is their business.

8316. It was merely with a view to ascertaining your views as regards inspection, and whether or not you consider that sufficient?—I do. I do not think you can show me any place where there has been any accident through want of inspection.

8317. But it is an enormous area to superintend?—It is large.

8318. And 49 galleries odd?—15 people to look at them. It is only an average of three galleries apiece.

8319. Do you not think increased inspection would lead to a diminution of accidents?—I do not at all, and I should like to refer to what I say in my statement, that it is the workmen who should inspect. One of my first rules is that every man shall inspect his working place before he commences to work there, and after blasting or anything like that.

8320. The fact is applicable to all mining and quarry regulations, but over and above that official inspection is very necessary, men whose livelihood does not depend on the amount of mineral got?—Distinctly necessary, but if the man would do that himself there would be no need of official inspection.

8321. But a man whose wage is determined by the amount of mineral got is *primâ facie* less likely to make an inspection than the man whose livelihood is not dependent upon the amount of mineral got?—When his life is dependent on seeing that his working place is right and safe?

8322. There is an expression which you used which I will give back to you, "Familiarity breeds contempt"?—I quite agree with you. That is the reason of it. Make him lose that familiarity. Make him realise his responsibility.

8323. Would you carry that into effect by a greater amount of inspection by individuals whose livelihood does not depend on it?—No, I think you would make him think to himself "I need not bother; I know the "rope is all right because there is Thomas looking after "it," or whoever the man may be.

8324. You object to it on principle?—I do. I think the man is responsible.

8325. (*Mr. Jones.*) Is it not dark at this time before the men start work?—No.

8326. I quite agree with you that every workman should look at his own part of the bargain, but at the same time it is not that familiarity breeds contempt. The man cannot do it during the winter months. He is there before it is light enough, and he starts work perhaps at the bottom. I take it that he does so although I have no proof?—With all due respect to your opinion, the hours alter as you know. Eight o'clock is the present time and it is light unless it happens to be a very dark morning.

8327. But with many men they will be there at half-past seven or quarter to eight, and they have something to do on the floor of the bargain. They cannot do it without there being proper light?—Yes, but that man has left his bargain the night before, and he knows the state he has left it in, and nobody better than that man. He knows far better than the inspector.

8328. (*Mr. Lorett.*) With regard to what you said about inspection. To carry your argument to its logical conclusion, do you mean to say there is no necessity for regulations and no necessity for Government inspection at all? It simply amounts to that?—I do not think so. So far as Government inspection is concerned I will go with you. I do not think we need it. But I do say this; there should be a quarry inspection, because the workman says: "Now, I do not like the look of that," and he goes to his overlooker and says: "What do you think of it?" Then the responsibility comes on the right man. That is how I look at it.

* *See* Q. 8222.

8329. (*Mr. Jones.*) You want all the responsibility on your official and the Government official?—I am quite content it should be on my official.

8330. (*Mr. Lorett.*) I do not think it is quite a proper thing. Supposing the workman is satisfied the working place is not safe, and he says to the employer: "I do not think it is safe: I am working in a danger-"ous position," and the employer says: "It is quite safe"?—I put it to you, would the employer do that? Would a reasonable manager say that?

8331. But he might reasonably believe it was safe when as a matter of fact it was not?—Then who would have to settle that?

8332. The inspectors?—But you would not stop the quarry while the inspector was fetched from Liverpool or somewhere.

8333. But if the employer has the absolute power of saying whether a thing shall be done or not done for the safety of the men I do not quite see where you get to ultimately?—I do agree that he has the power. He has the temporary power and the over-looker says yes or no, it is right, but after all is said and done the industry or the employer has to bear all the responsibility.

8334. Not exactly: the life of the man has to be taken into consideration?—Yes, and if it is unfortunately lost he has to be compensated by the industry.

8335. Compensation does not cover the loss of life?—From a humane point of view I quite agree with you.

8336. As regards the overburden question I take it you quite agree that the question of overburden should have attention. It calls for serious attention?—Yes.

8337. In that case you believe that the natural deposit and the rubbish deposited on the top of the working face ought to be removed sufficiently far back to prevent, at any rate, the men running unnecessary risk?—I agree it should be removed sufficiently far back to prevent any risk.

8338. Unless we have some regulation saying how far it should be removed and what would be the reasonable distance, who is to decide?—If you make the over-looker responsible for it he decides.

8339. Then what you said about inspectors not being impartial and not quite so fair minded as they might be in some cases, would also apply to this?—I am not saying that of any inspector in particular.

8340. I quite understand, but one employer might pay all the necessary and desirable attention to that particular point, and another employer, even in the same district, might treat it with indifference and carelessness and risk the lives of the men unnecessarily. Is there not the necessity for something not quite so vague even as the present regulations—something more definite?—Of course he might do it, but I do not think any employer who takes any interest in his quarry or his men would do so.

8341. As a matter of fact I think there is carelessness on the part of the men and carelessness on the part of the employers. You have had a lengthy experience. Can you help us with some suggestion. You say the overburden should be attended to and removed sufficiently far back?—I say it is, so far as the Dinorwic Quarry is concerned.

8342. What would you think then?—Say 4 to 6 feet back.

8343. Even that, although it does not quite satisfy me, would improve matters very considerably in many slate quarries and many granite quarries?—I think that is a reasonable distance.

8344. (*Mr. Lewney.*) Have you any electric firing in your quarries?—No.

8345. In regard to these more severe minor accidents; what do they arise from principally. You classified the minor accidents the less severe and more severe, if I recollect right?—No, I classified them so far as concerns the serious accidents as being reported to His Majesty's Inspector.

8346. (*Mr. Redmayne.*) The others are all seven day accidents. Seven days is the minimum?—Yes.

8347. (*Mr. Lewney.*) These largely arose from cuts on the hand?—Yes, chiefly.

8348. What are the principal causes of the other accidents that were not classified under that head. What I want to find out is were any of them due to falls—pieces of rock coming down from the face?—Very very few. That is a thing I am very glad to say I have not suffered at all from.

8349. I noticed while at your quarries some of the tramways were running extremely near the edges, Have you ever known any accidents arise from that cause?—Toppling over?

8350. Yes?—Not one.

8351. (*Mr. Greaves.*) I see you say you consider the great thing would be if you could only get the men to take more care, and you suggest that part of the cost should be borne by the men, say 15 per cent. That is with a view of making them more careful?—My idea is to make the man realise his responsibility, as I was saying to Mr. Redmayne. He should realise his responsibility that the workings should be right, and that his own life is of some importance, and his freedom from accidents is of some importance to himself.

8352. You think the fact of his contributing would bring it home to him more?—I do.

8353. That is your idea?—That is the idea of the suggestion.

8354. You wish to contradict a statement made by one of the witnesses* that a quarryman when he gets wet through would not be allowed to leave his work. Supposing a man does get wet through and he leaves his work, what happens. When they get wet through they do walk off sometimes, do they not?—They do.

8355. Without seeing the over-looker if they cannot find him?—Yes.

8356. What happens then?—He reports it next morning. He may do two things; he would very likely tell his partner, "Tell the over-looker I have gone, I am wet through." It would be accepted. If he comes next morning and says, "I went off at two or "three o'clock in the afternoon: I was wet through" it would be accepted.

8357. So that really he would not suffer in any way?—No, the men have absolute freedom to go if they are wet through.

8358. There is one thing asked of a good many witnesses here, and that is as to the certification of a manager. Do you think that the managers in quarries should be or should not be holders of certificates?—Certificates for what?

8359. That there should be an examination held and that a man should have a certificate of sufficient knowledge to be a manager, the same as a coal mine manager has. What is your view on the subject?—I do not see anything against it, but I do not think it should be an examination, if you bring such a thing about, of his knowledge of percentages and figures, and that sort of thing. He should be a practical man.

8360. I think there is no doubt we all agree that the first and primary necessity is that he should be a thoroughly practical man. The question is, is it desirable that he should also have a certain amount of theoretical knowledge, and if it is desirable, is it so desirable as to make it advisable that it should be a condition of his employment that he has such a certificate?—I do not think so. If it is theoretical knowledge I would rather have the man who has worked his way up.

8361. I suppose you would rather have a man who had both?—Yes, if he is equally good.

8362. (*Mr. Redmayne.*) The fact that a man is a certificated manager does not necessitate your employing him. You would employ that certificated manager who had the practical knowledge?—That is so.

8363. (*Mr. Greaves.*) The idea in some of our minds is that in a short time all the more promising youths would, as part of their education, read a little bit and get a certificate, the same as most sailor boys now get a mate or master's certificate; they do not get made mates and masters; the same as an engineer at sea who gets a certificate as soon as his time is up as

* *See* Q. 3108.

second, and as soon as he is out of his second's time he gets a certificate as first. I know many men now at sea as third engineers holding first engineer's certificates?—Yes.

(*Mr. Lewney.*) What you would suggest is that the man should have a certificate that he was a practical quarryman?

8364. (*Mr. Greaves.*) Probably the effect might be that all the best young men would get certificates, and then when there came an opening they would be in a position to be employed as managers. You think to make it compulsory would not be wise?—If I can put my views: I quite agree that given a good man who has commenced in the quarry and worked his way up, and who is a thoroughly practical quarryman, if he is certificated, from your point of view, as well, I think that is all the better.

8365. Do you think it would be advisable that it should be made a law that a manager should hold a certificate. It is so in coal mines?—I think it will perhaps bar the way to many a good illiterate man.

8366. (*Mr. Redmayne.*) Supposing it is coupled with a proviso that certificates of service be given to those such as can show they have had the requisite service, which are now in existence, so as not to interfere with existing conditions?—I think it is bound to be an improvement under those circumstances.

8367. (*Chairman.*) Do you not think possibly if a system of that sort is brought in it should be brought in tentatively and with regard to different districts. I can imagine it to be a very proper thing to bring in in one district and not in another. Would not the best plan be if it is brought in to give power to the Secretary of State to extend the requirement of certificates to certain industries and districts rather than to bring it in suddenly over the whole of Great Britain?—I should think so. Do it by degrees.

8368. (*Mr. Greaves.*) The certificates would be an improvement in most cases shall we say?—I want to make it quite clear that I would not do away with the chances of the practical man. That is what I am very anxious about because he is the right man in my opinion—not the theoretical man, but the practical man.

8369. I presume no one would appoint a manager who was not a practical man. On the whole should I say you are in favour or not in favour of certificated managers; I mean compulsory certificated managers?—For the future?

8370. There would have to be an interregnum while these certificated men are being manufactured, so to speak, and educated?—I think he would be a better man for being certificated.

8371. (*Mr. Lewney.*) Your views on that matter are not very strong?—They are very strong that he should be a practical man.

8372. (*Chairman.*) I suppose if the examination was really of a very thoroughly practical nature, and not at all of the theoretical kind, your objection would be less strong to it?—I am quite in accord with you then.

8373. What you fear rather is that the examiners, the Civil Service examiners, who we will suppose are gentlemen from Oxford, will get hold of these candidates and begin to ask them a lot of theoretical questions which would not be much good if they were answered?—That is it in the rough.

8374. (*Mr. Greaves.*) Certificates would be an improvement so long as they did not interfere with the chances of practical men?—Yes.

(*Mr. Lovett.*) You might say a man should have at least 10 years in the quarry.

8375. (*Mr. Redmayne.*) The machinery which is adopted under the Coal Mines Regulation Act says that the man shall have had so much practical experience: that is a *sine qua non*: and the examination board consists of representatives of the owners, representatives of the managers, representatives of the men, and the inspector of the district. That is the present regulation. The examination is of an intensely practical nature, and the tendency over a period of years has been to improve managers greatly in point of practical knowledge?—Yes.

8376. Might it not have the same effect if the same sort of machinery were used?—I think it would.

8377. (*Chairman.*) It would depend then a good deal on how it was worked?—Yes.

8378. As to whether it was a blessing or a curse?—Yes.

8379. (*Mr. Lewney.*) What would be the advantage of a certificate in cases of this sort. Can you give us any idea?—If a man was certificated?

8380. Yes?—I think he would be generally a better man. So far as working the quarry is concerned I do not think it would be any improvement myself.

8381. Who is the person you would grant the certificate to?—For a manager or for an over-looker?

8382. I want to find out?

8383. (*Mr. Redmayne.*) In your case it would be Mr. Lloyd Williams?—Yes.

8384. (*Chairman.*) One man in each quarry?—You mean the local manager of the quarry.

(*Mr. Redmayne.*) Yes, the resident manager.

8385. (*Mr. Lewney.*) In selecting a foreman you would have regard to his practical qualifications, would you not?—Purely and simply to his practical qualifications. That is what I want to impress upon you. He must be a practical man to satisfy me. I do not care about his other qualifications. I am speaking now of an over-looker or foreman.

8386. (*Mr. Jones.*) With regard to the galleries you stated they were 22 to 24 yards in height. I suppose that is the average height?—Yes, that is the average height.

8387. What is the variation in height?—I think there are two or three of them much larger and there are a number smaller.

8388. Do you consider 24 yards a sufficient height for a gallery to be properly worked?—Yes.

8389. And you would have no objection to a rule limiting the height to 24 or 25 yards?—New galleries.

8390. Yes?—I would not object to new galleries.

8391. And bringing down the present galleries which are over 25 yards. You would want a certain period of time to do it?—Yes.

8392. You would have no objection to it, I take it?—Not to making new galleries 24 yards.

8393. I should like to get this question on the notes. You made a statement that you did not know where to put more cranes. Is that on account of the floor being so narrow in places that you could not put them up?—No. I do not see the practical use of putting them up.

8394. You would not object to the minimum width of the floor, I suppose?—How do you mean, object to it? I endeavour to get all my floors about half the height of the gallery, and any new gallery I make I will try and do that.

8395. We saw places in Dinorwic where the floor was of just enough space to put the tramway in?—Yes, there are such places.

8396. I take it you quite agree that places like that are dangerous for men working in the gallery?—I would not admit they are dangerous. They would be dangerous if anything fell, but if anything has to be pulled down, the men below are warned and clear away.

8397. As regards firing you fire six times a day?—Yes, in the summer.

8398. Do you not think it would be much better to have firing oftener?—No. I have reduced the firing and I find great advantage.

8399. What are the hours of firing?—9, 11 12, 1, 3 and in the summer 4.

8400. Then at 12 and 1 they are firing in the dinner hour?—They must complete during the dinner hour. If a man is not quite ready at 12 he will perhaps go on at 20 to 1 and finish it.

8401. Then he has to put in a certain amount of work during the time he is supposed to be having for his meals?—Yes.

8402. I do not know whether it is so under the new arrangement, but it would be much better for the men to have their work clear of any firing, because if a man is preparing a hole before dinner he rushes off to

dinner and perhaps does not take the same amount of care that he should do?—I do not agree with that. I quite see your point that it cuts the dinner hour short. I admit that, but he does it at his own desire. I admit your idea that he will have to do it in his dinner hour. If I made the firing more often and he goes off at 12 o'clock and does not come back till 1 o'clock, he cannot fire until 3 o'clock.

8403. But in some quarries they fire every hour?—They used to in Dinorwic. Every quarryman at the firing time knocks off work at the first whistle, three minutes, and the second whistle, five minutes and the third whistle; that is eight minutes altogether. Allowing two or three minutes for knocking off, which they do, and two or three minutes more for going out of the shed and back again, here is a quarter of an hour lost with 2,000 men in the quarry. It works out enormously, and I am quite certain I improved the output of the quarry by altering that.

8404. I have not given that much consideration, but in going to their dinner there is a tendency for them to rush their work during that time?—I do not ask them to do it. They need not do it.

8405. They must do it. If they fail to get the blasting all ready for 11 o'clock——?—At 12.

8406. And 12 as well—they have to get it ready by one. Supposing the workman takes from 12 till 1: I mean he has prepared that shot hole for one, and then he takes his dinner hour. The result is that the man cannot fire until 3 o'clock. He is working on contract, and he cannot get any slates up because he is two hours behind time in firing?—That might happen in one case out of 100. I have never heard a word of complaint about it.

8407. That does not follow?—It does not follow, but I think if you give 1,700 quarrymen 9 o'clock, 11 o'clock, 12 o'clock (exclude 1 o'clock if you like), and in the winter 3 o'clock, and in the summer 4 o'clock—six hours—there is ample time in the day to do all the blasting because you cannot drill a hole in five or ten minutes. It is a work of time.

8408. I consider the blasting, at any rate the preparing of the shot, during the dinner hour has a tendency to do that, but I admit there are very few accidents you get from explosives?—There are a very small quantity.

8409. As regards ropes: it was brought out in evidence by the men that the custom at your quarry is that the men should buy their own ropes?—Yes.

8410. I put it to you in this way; if a man pay 15*s.* or 20*s.* for a rope there is a temptation for him to use that rope when it should be thrown away. Do you not think it would tend to safety if the employers provided the ropes?—No, and I will tell you why. You say there is a temptation for him to use that rope after it is useless. I come back to my old argument that if a man has bought something of his own he will take more care of it than he will if it is his employer's, and not only that but he ought to for his own life's sake.

8411. Even if you suffered a certain amount of loss from it do you not think it is the safety of the life and limb of the man which is in question. It all depends on the rope he uses?—It does.

8412. If they are the same ropes as the ones I have seen there are only three strands. The man will splice the rope and splice it again if he is allowed to, even if there is only one strand holding it up, because he has to pay for it?—Against that there is the argument I have given you, and I maintain it teaches the man to be more careful of himself, and further I cannot call to mind, and I do not think there is any record of, an accident through the rope breaking.

8413. I am rather favourable at any rate to the view that the ropes should be supplied by employers. I quite see your objection that the men might not take the same care of them as they should, but after all it is a question of discipline?—It is.

8414. I take it you agree as to having proper messrooms where necessary?—I have them I think.

8415. Do you think the slate industry is important enough to have an Act to itself. As it is now the slate mines are under the Metalliferous Mines Act and the Quarries Act, and various other Acts applying to them. Do you think the slate mines and quarries should be under one Act containing everything relating to them?—So long as it did not bring the open quarry under the same restrictions put on the slate mines I think it would be an advantage to have it under one Act. You would know where you were better.

8416–90*. Instead of having three or four Acts applying to the same place?—Yes.

* The portion of evidence here omitted was given by a witness who attended under a misapprehension of the scope of the Inquiry. It was deleted at the request of the witness and with the consent of the Commission.

Mr. JOHN EVAN ROBERTS called and examined.

8491. Do you reside in Bangor, North Wales?—Yes.

8492. You are chairman and managing director of the Moeltryfan Slate and Slab Quarry Company, Limited?—I am.

8493. Which is situate on the south-west slope of the Moeltryfan Mountain, about 7 miles from Carnarvon?—Yes.

8494. The quarry is worked on the gallery system, with tunnels and levels leading out to the quarry banks?—Yes, down to the fourth gallery.

8495. There are four concentric galleries?—Yes.

8496. A quarry floor, and a newly opened pit?—Yes.

8497. I do not know that we need take the size of the galleries. You employed 246 workmen?—We did, up to October 1909. In that month we had a fall, and since then there have been only about 120 working.

8498. (*Mr. Redmayne.*) That was the fall we saw?—Yes.

8499. (*Chairman.*) You have been managing that quarry for some years?—Yes; we purchased the property 35 years ago, in the year 1875.

8500. Personally you have known that quarry for a great many years?—Yes.

8501. Is it your opinion that more accidents occur in quarries generally, or in yours if you like, nowadays, than used to occur some years ago?—No, I think they were very much the same.

8502. On paper since 1907 the numbers appear bigger, do they not, in the Government returns?—Yes. Since the Act came into force I have no doubt more care is taken in recording every accident; but so far as my knowledge goes, the number of accidents is very much the same.

8503. It is this: there are more now taken notice of and reported than there used to be in the old times?—Yes.

8504. Did you hear the evidence that Mr. Neele gave on a number of points connected with galleries?—Yes.

8505. Do you agree generally with what he said, or are there any points you would like to add?—Well, in a general way, I agree with him, but I think I might go one stage further on one point: I think it would be advisable in any future appointments that managers should have passed some examination enabling them to take the post. Our company is in the fortunate position of having a manager who has been in the quarry from his early days and is a very excellent man; but in any future appointment, I think it would be advisable that the manager should have some general knowledge.

8506. With regard to overburden, do you think it would be advisable in relation to quarries to have some more detailed rules about removing overburden?—I do not think so. So far as we are concerned I could not suggest anything.

8507. Speaking of the whole district do you think it would be advisable?—I do not.

8508. Do you think, then, that the overburden is sufficiently removed in the slate quarries of the district round that part of North Wales?—I can only speak of our own quarry, the Moeltryfan. So far as regards that quarry I feel it is not overburdened, but I cannot speak as to other quarries generally.

8509. You had a considerable fall at your quarry?—Yes.

8510. What was the cause of that?—It was on the north side of the quarry. As you may have noticed when you were there, it is all granite, and the bearing or the slipping of the rock is into the quarry, whereas on the other side the slipping is the other way. We never had any trouble or fall on the other side at all. The width of the galleries and the work was very much the same on both sides; but there being, in addition to that, some big "slouts" there, a large quantity of rock slid down.

8511. Was that slipping due to any bad working of the quarry in years gone by?—No, I feel confident of that. The galleries were the same width.

8512. The working of the quarry in olden days was effective and good?—Yes.

8513. So that that was an accident which might happen anywhere?—Yes. It is the opinion of some gentlemen of experience that it might be the result of an earthquake, or some convulsion in the ground. It came unexpectedly altogether; I mean until a few months before it came down.

8514. Would it be desirable that an Inspector should have power, as is the case in metalliferous mines, if a quarry was being worked in such a way as likely to become dangerous, to say the mode of working should be altered?—I do not think so, so far as it affects the Moeltryfan Quarry. I should have said earlier in my evidence that Moeltryfan is a Crown quarry, and the Inspector for the Crown visits the quarry very often; so that in the case of a Crown quarry I do not think it is necessary, because he looks after the interests of the Crown, and sees that the quarries are properly worked.

8515. Take the case of a quarry not looked after by the Crown?—I think it would be advisable.

8516. That means some power analogous to Section 18 of the Metalliferous Mines Act, which would give an Inspector power to go to arbitration in case he thought a practice was being carried on which was likely to be fraught with danger?—Yes, I think in a general way it would be advisable to have a gentleman who was wise and discreet to do so.

8517. You agree, providing the Inspector were wise and discreet?—Yes.

8518. Is there anything else you would like to comment upon?—I should like to say, with reference to the statement I sent you, there was one accident omitted, instead of 51 there were 52, and that alters the total amount paid on non-fatal accidents—instead of being 242*l.* it should be 294*l.* It was an exceptional case, a case of a workman who had what might be called a permanent disablement—he cut off his finger—but he is still in our service, and he is paid compensation at the rate of 2*s.* 6*d.* a week, 6*l.* 10*s.* a year. That item was omitted, both as regards the number of accidents and the amount paid.

8519. The highest number of accidents you have ever had in any one year was 10?—Yes, during the last 12 years.

8520. Serious and slight accidents put together?—Yes.

8521. Out of how many men?—246 men.

8522. That seems very much smaller than anything else we have come across?—It is not for me to praise the directors of the Moeltryfan Quarry, but I may say we are exceptionally careful with our workmen; and I think the quarry has a reputation of being in that respect, so far as the health of the men is concerned, very carefully managed. I might go further and say we are able to effect policies considerably lower than any other quarries have done.

8523. Now what is the one point, or the principal point, upon which you take most care, and in respect of which, if you did not take care, you would expect the accidents to occur?—As regards the machinery in the sawing shed for one thing: and also in the quarry—there are stringent rules and the manager is authorised and empowered to call men to account at once if they disobey the rules.

8524. What is the most important of those rules? What rule of all would you say, if it were taken away, would bring the accidents back more than anything else? What is the subject of it?—One thing would be running into shelter in good time before blasting. We are very careful there.

8525. You provide good shelters?—Yes, we have them near at hand.

8526. At the other quarries the number of blasting accidents are not so very large—do you see my point?—Yes.

8527. So that that does not quite account for the difference between you and the other quarries—it must be something different from that?—Well, I cannot think particularly of anything.

8528. Have you many cases of small cuts to hands?—I have some figures here which I should like to give you. The majority of non-fatal accidents are accidents to hands or fingers—the others vary.

8529. Taking last year, 1909, how many accidents had you, and what was the cause of them?—We had four.

8530. Do you mean only four fatal and non-fatal, together?—There was no fatal accident in that year.

8531. Had you only four cut hands in that year?—Yes, all accidents together—only four.

8532. (*Mr. Redmayne.*) Had you had a lot of seven days accidents?—All the accidents entered are accidents upon which compensation was paid, whether small or large.

8533. (*Mr. Jones.*) That means seven days and over?—Yes.

8534. (*Chairman.*) How many reported accidents were there?—That I cannot say; but these were the only accidents we paid compensation for.

8535. Were those the only accidents in respect of which men went off even for a week? If a man went off even for a week, would it appear there?—Only if he received compensation.

8536. I wanted particularly to know the number of reported accidents?—I cannot give it now, I will let you know later.* The basis we went upon was all accidents that were reported and paid for.

* The following statement was afterwards sent by Mr. Evan Roberts:—

List of Accidents at Moeltryfan Quarry, for the Year 1910 (*up to December* 15*th*).

Name.	Date of Accidents.	Age.	Classification.	Nature of Accident.	Date of return to work.
Robert Roberts	June 14th	34	Labourer	Caught between waggon and rock	Sept. 28th.
O. Thomas Owen	July 7th	20	Quarryman	Strained thigh	August 8th.
William Williams	August 6th	46	Labourer	Finger caught between waggon and chain.	August 23rd.
O. R. Williams	October 6th	45	Quarryman	A block fell on his finger	November 8th.

8537. Is there any other point you wish to call our attention to?—No, except to say that the alteration of the number of accidents and the amount paid alters the percentage in my former statement to some little extent.

8538. I take it from you the apparent accidents have increased since the Compensation Act?—I cannot say. We used not to keep a minute record, so that I cannot speak definitely on that subject. As regards the number of non-fatal accidents, the number was 52, and the amount of compensation paid was 294*l.*

8539. You cannot give us the number of accidents in respect of which no compensation was paid?—No.

8540. Then that would not carry us very far; our object is to know the total?—True; but this would refer to any serious accidents—I mean accidents that would last for a good time. The total amount paid in respect of fatal accidents was 270*l.*, and non-fatal accidents 294*l.*, making a total of 564*l.* The average compensation paid, including fatal accidents, was 47*l.*, or excluding fatal accidents, 24*l.* 10*s.* per annum. The average compensation per accident was 10*l.* 8*s.* 11*d.*; and excluding fatal accidents 5*l.* 10*s.* per accident. I may say that the accidents worked out, so far as I can tell, to 1·85 per cent. of the men employed—it is a trifle under 2 per cent.

8541. That is the Compensation Act?—Yes.

(*Mr. Jones.*) One question in a general way. I take it that you say nothing against providing proper mess-rooms, and so on?

8542. (*Chairman.*) Perhaps I had better ask that. We have been in communication with a good many employers in the course of our journeys round, and there seems to us to be a general disposition to be willing to provide messing rooms, with fires and so on in them, to such an extent as they would be properly used. Do you approve that system?—Yes. I might say that when the quarry was in full working order, and the 246 men were working, we had three places.

8543. How many of the 246 men stayed and used them, and how many went home?—I should say about a good two-thirds of them would stay, and the others would go home. A good many of the workmen live in the immediate neighbourhood.

8544. You would only propose to provide the messing-room for such men as did use it, or were likely to use it, if it was efficient?—True. I should like to say it is in the report that the total premium we paid was 1,194*l.*, and the total compensation there was 564*l.*

8545. The figures do not concern us very much?—I thought I ought to mention that.

(*Mr. Jones.*) I take it to stand thus: at Moeltryfan they pay compensation to all the men as they do at all the other quarries, therefore we must put it down to careful management?

(*Chairman.*) It will appear more clearly when we get the whole of the figures.

8546. (*Mr. Redmayne.*) To what extent do you use cranes for the handling of the stone?—We do not use any in the ordinary working of the quarry. We have started now the clearing of the rubbish in the fall, and there have been some boulders, and we have one temporary crane erected.

8547. The men do not use hand cranes?—No.

8548. (*Mr. Jones.*) Do you think it would be advantageous to the quarry if the men could recommend that some arrangement should be made to clear away that barrier between you and the Alexandra? Would it not be an advantage to work the quarry properly?—That is rather a delicate question to answer; I mean in this respect, that the property is held between two, and the Crown has to be consulted.

FIFTEENTH DAY.

Friday, 9th December 1910.

PRESENT:

SIR HENRY HARDINGE SAMUEL CUNYNGHAME, K.C.B. (*Chairman*).

RICHARD METHUEN GREAVES, Esq.
ROBERT THOMAS JONES, Esq.
WILLIAM LEWNEY, Esq.
URIAH LOVETT, Esq.
G. W. CHRYSTAL, Esq. (*Secretary*).

Mr. JAMES SLEVIN called and examined.

8549. (*Chairman.*) You are the general secretary of the Sett-makers Union of Great Britain and Ireland?—Yes.

8550. Where do you reside?—In Glasgow.

8551. Your union of sett-makers exists all over Great Britain and Ireland?—Yes.

8552. It is one great union?—Yes.

8553. In round numbers how many members have you?—Slightly over 2,000.

8554. Will you give us some idea where most of those members are at work?—Approximately about one-third are employed in North Wales; there are possibly 300 up in Aberdeenshire; 300 or 400 in the west of Scotland; possibly 200 or so in the east of Scotland, and I should say, roughly, about 200 in the south of Scotland. There are not many in Ireland; our members are few there in the meantime.

8555. Have you many in England and Wales?—We have not many members in England; I should say approximately about 100—in Leicestershire mainly.

8556. That makes up your couple of thousand?—Yes.

8557. I shall take you through a number of points, but there is one very important point I should like you to give us some information upon first. What sort of stone is sett-making done on?—Granite and whinstone.

8558. And what other kinds of stone?—I do not know of any except grit-setts, but those are not in our union.

8559. Where is the whinstone sett-making chiefly done?—Chiefly in the north of England and east and west of Scotland.

8560. The whinstone sett-makers then will be the minority?—There are a good many, but some of them are in the union Mr. Lovett represents.

8561. (*Mr. Greaves.*) Do you call Leicestershire stone granite?—Yes.

8562. (*Chairman.*) I daresay you are aware that in certain trades—I do not say necessarily in sett-making—granite dust and whinstone dust is dangerous to the lungs on account of consumption?—Yes.

8563. On the other hand, it is suggested by a certain number of people that where that trade of

chipping granite is done quite in the open air it is not so dangerous, and some people say not dangerous at all. What views have you upon that question?—My opinion is that it is dangerous, although it is not quite so dangerous in the open as it is in a shed. But I think it is dangerous in any case.

8564. There is another thing to be considered; is it dangerous if done by hand and without machinery?—It is dangerous if done by hand as well as by machinery, but not to such an extent.

8565. What are your grounds for that opinion?—I have brought some statistics here regarding the deaths in our trade, and the cause of them, as certified by the Registrar. I have been secretary of the Sett-makers Union since 1906, and have gone over the Registrar's certificates since that date—the certificates before that date I have not been able to lay my hands upon.

8566. That is exactly the kind of evidence we want?—If you take the year 1906 you will find the percentage of deaths due to consumption was 18·5.

8567. That was amongst sett-makers?—The members of our union who died. We pay funeral benefit for all members who die in good standing.

8568. From what number was that percentage taken?—There were 27 deaths in 1906.

8569. How many of them died from consumption?—Five.

8570. Out of the deaths that occurred the proportion of 18 per cent. died from phthisis?—Yes. The average age of all who died, taking the total of 27 deaths, was 57·25 years; and the average age of those who died from consumption was 40·8. Those are the figures for 1906.

8571. We shall have to compare the figures you give with the rest of the population. Have you the corresponding figures for the general population?—I have not.

8572. We shall have to compare those?—It would be as well if I said that at the end of 1906 the membership was 2,710.

8573. According to the report Mr. Greaves has just put before me, I see that taking the ordinary population, out of every 1,000 persons who died, 173 died from consumption—that is 17 per cent., and your rate being 18·5 per cent?—For that year.

8574. It is not strikingly larger?—No, but that is for 1906, remember.

(*Mr. Lovett.*) May I suggest we are taking the whole population of the kingdom in getting 17 per cent.; but these men work in the open air, many of them on the mountain side, other conditions being favourable they should be less liable to phthisis than the general population.

(*Chairman.*) Quite so.

(*Mr. Greaves.*) Those figures are for the Festiniog district, still it gives some sort of idea.

8575. (*Chairman.*) The average age of death of the population is 51½ years—your average is 57·25?—For all those who died.

8576. You are more long-lived than the ordinary population apparently?—Yes. Of course, as Mr. Lovett has pointed out, we have the advantage of fresh air.

8577. Will you kindly give us your next figures?—1907 is a little more favourable. In 1907 there were 17 deaths out of a membership of 2,153. Out of those 17 deaths there were three died from phthisis, giving a percentage of 17·64. The average age at death of the 17 was 60 years, and the average age of the three who died from consumption was 55·3. Then in 1908 the membership was 2,039 and the total deaths were 22. Of those, two were from phthisis. The average age at death of the total was 56, and the average age of those who died from consumption was 37·5. In 1909 there was a membership of 2,055; there were 22 total deaths; five of those died from phthisis; the average age of all who died was 51·27 and the average age of those who died from consumption 28·56.

8578. That is taking the whole of your union all over the country?—Yes, the whole of our union. Then I have the figures up to the end of November this year if you care to have them.

8579. We should like to have those. I may say your figures are valuable because we cannot get them elsewhere?—Up to the 30th November this year there were 24 deaths, and the membership was 2,021. Of those 24 deaths five were due to phthisis. They compare very badly this year, because the average age of all who died this year up to the end of November was 61·1. The average age of the five who died from consumption was 40·4. Those are all the figures I have taken out since I became secretary.

8580. I should like to ask you whether the deaths from consumption, so far as you know, are more prevalent in one part of the kingdom than in another?—Yes.

8581. Is there any place where you would say they are rather bad?—Judging from the number of claims we pay, my experience is that a bigger proportion comes from North Wales than elsewhere.

8582. That is where one-third, roughly 700, are employed?—Yes.

8583. (*Mr. Greaves.*) This is referring to phthisis?—Yes.

8584. (*Chairman.*) Have you taken the figures out separately for North Wales?—I have not got them out separately, but I have a list of where all the deaths took place.

8585. You can send that to us afterwards; let us have the same figures for North Wales only for the five years?—I will do so.*

8586. Why are you inclined to think the figures would show a greater proportion of phthisis. Why do you think it is likely there would be more phthisis in North Wales?—I cannot give a reason.

8587. If you cannot we cannot help it, but I was hoping you would be able to give a reason?—No. The custom is becoming more prevalent in North Wales than it was to use sheds, and sheds are being built for sett-makers to dress the stones in. These sheds which are being put up now are very much too small; in some cases the men cannot stand upright in them, therefore the men sitting in the little sheds and dressing the setts must be swallowing a great amount of dust, I should say.

8588. Where is it the sheds are low? Are they lower in North Wales than elsewhere?—I do not know that they are, but in some parts they do not have a

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* The Secretary afterwards received the following communication from Mr. Slevin:—

158, George Street, Glasgow,
December 22nd, 1910.

Dear Sir,

As requested I now beg to submit particulars of the various localities where the deaths from phthisis, mentioned in my evidence before the Commission on the 9th instant, took place. I am also indicating the nature of the stone in the various places, although I do not think any great importance can be attached to this, as sett-makers do not, as a rule, confine themselves exclusively to either granite or whinstone but work both with equal facility in most cases. Thus a man who, at the time of his death, happened to be in a whinstone district, may have worked the greater part of his life in granite quarries and vice versa.

Yours faithfully,
JAMES SLEVIN.

STATEMENT ENCLOSED:—

1906 (5 deaths).

(1) Trevor, Carnarvonshire (granite); (2) Corstorphine, near Edinburgh (whinstone); (3) Tillyfourie, Aberdeen (granite); (4) Carlingford, Ireland (whinstone); (5) Tillyfourie (same as 3).

1907 (3 deaths).

(1) Pwllheli, North Wales (granite); (2) Glassdrummond, near Newry, Ireland (granite); (3) Pwllheli (same as 1).

1908 (2 deaths).

(1) Llanaelhaiarn, Carnarvonshire (granite); (2) Creetown (granite).

1909 (5 deaths).

(1) Trevor, Carnarvonshire (granite); (2) Bonawe, Argyllshire (granite); (3) Trevor (same as number 1); (4) Creetown (granite); (5) Trevor (same as number 1).

1910 (5 deaths till November 30th).

(1) Trevor, Carnarvonshire (granite); (2) Conderrat, near Glasgow (whinstone); (3) Ballinacraig, Newry (granite); (4 and 5) Penmaenmawr, North Wales (granite).

row of sheds, but each man has his own little box, technically called a scathie.

8589. In your view the enclosed sheds are more dangerous than what I may call the mere wind screens?—I think they are.

8590. Have you any figures you can give us separating the districts—I mean could you separate out the persons who are employed in whinstone as compared with those employed in granite?—Oh, yes.

8591. Do you think they will show that granite is more dangerous than whinstone, or that they are pretty much on a level?—I could not say for the moment.

8592. (*Mr. Lovett.*) You would be able to get those figures and send them to us?—Of course the figures are really here before us, but I must work them out and send them on later.

8593. (*Chairman.*) Is there at present much sett-making done by machinery?—I do not know of any.

8594. Do they not use the pneumatic tool at all for sett-making?—No.

8595. Is it entirely hand work?—Yes.

8596. (*Mr. Greaves.*) They make the small German setts with a machine?—Yes, they chop them off, but they do not use any pneumatic tool for it.

8597. Do they not for the nidgers, as they call them?—All the nidgers I have seen have been done by hand. They may ultimately use pneumatic tools, but they do not so far as I know.

8598. (*Chairman.*) Have you seen pneumatic tools used?—Yes, but not in sett-making.

8599. Where have you seen them used?—In Aberdeen and Dalbeattie.

8600. For tombstone making, and such things as that?—Yes.

8601. That raises a good deal of dust?—Yes.

8602. I suppose that is considerably more dangerous from a phthisis point of view than the hand sett-making?—I should think it was.

8603. Have you any reason you can give in support of that view?—The men are very much nearer the dust, and there is a good deal more dust raised by pneumatic tools than by sett-makers' hammers.

8604. Your opinion is that it would probably be so?—Yes.

8605. You would expect it to be so?—Yes.

8606. Is there any other thing you would like to say about phthisis with reference to statistics?—I do not know that I have anything to say except give you the figures.

8607. The figures look to me at present as if they were possibly in advance of the general population, but they do not appear to be very seriously in advance. Are you able to say what the general figures are, Mr. Lovett?

(*Mr. Lovett.*) I am not, but I have the impression that they are slightly in advance because the sett-makers work in sheds.

8608. (*Chairman.*) We shall be able to see that. These figures will be available for comparison, and we shall be able to do that easily. You would like one Act applicable especially to quarries, and one for metalliferous mines, and a different one for coal mines?—I have no knowledge of mining.

8609. At all events, you would like the Quarry Acts to be put into as concise, separate, and convenient form as possible, and the rules too?—I should.

8610. (*Mr. Greaves.*) Do you mean all quarries, whatever the material is that they quarry?—Yes, all quarries.

8611. All open quarries?—All open quarries.

8612. (*Chairman.*) You say, "Special rules when "adopted for any quarry should continue in force "until formally repealed." That is the law at present, is it not?—There was a case last year, you will find it in Mr. McLaren's report for the east of Scotland for last year, where there was a quarry which was worked by a firm and they gave it up. It remained idle for some little time and then it was taken over by another firm. They were sued for some breach of those Special Rules, and Mr. McLaren took them to law and lost the case.

8613. I know what the case you allude to is. It is a blot on the Act. We have had that case brought before us. The third paragraph of your statement says, "In all cases the occupier of the "quarry for the time being shall be held responsible "for its safe and proper working." Would you be in favour of any certificate for the manager of a quarry?—Yes.

8614. What should that certificate be—only practical experience, or would you give him an examination as to his knowledge?—I should couple them. I have recommended further down that before anyone is appointed as manager of a quarry he should have had at least three years' practical experience. I should be in favour of some examination in addition to that.

8615. Do you think that that examination might not cut out a good many good men, men who were really good, but who could not pass an examination: for instance, if they were asked about the crust of the earth, or something of that sort, or whether a rock was igneous or not?—I am not assuming the examination would be conducted on such severe lines.

8616. The question is whether it would be of that class of knowledge that they would be likely to have. I mean this: may not an examiner puzzle a very good man by asking him whether granite is an igneous rock or not?—That is so, but still if an examination paper were drawn up to test the man's knowledge of working in a quarry he would not ask him a question to puzzle the man.

8617. According to your view, a good deal depends upon the good sense of the examiners?—Undoubtedly.

8618. You would have to have sensible examiners?—Undoubtedly.

8619. But if you got that, you think it would be a good thing to have some questions asked a man of a general character?—I think it would.

8620. As well as having his practical experience?—Yes.

8621. Then you think that all quarries ought to come into the Act, irrespective of height?—Yes.

8622. Supposing a man had a quarry at the bottom of his garden where the gardener went once a month to get a little gravel to put on the paths. Would you call that a quarry?—That is an extreme case.

8623. I put it purposely. At present it goes out by reason of the height rule?—Of course.

8624. But if you abolish the height rule every single quarry would come in. You do not mean that apparently?—I should not include that small gravel pit such as you describe. I am speaking of quarries employing a certain number of men.

8625. Will you tell us what you think is reasonable?—I would not ask a man who went into a garden to dig a little gravel to comply with all these rules and regulations, but in employing a certain number of men I think that would come under the Act.

8626. (*Mr. Lewney.*) A gravel pit 12 feet deep might be dangerous?—Yes, in that case it should.

8627. (*Mr. Jones.*) I take it you mean where it is worked for profit &c.?—Yes, I mean a place that is a commercial undertaking.

8628. We hear that the quarries are worked at a loss, as a rule?—Still it is a commercial undertaking.

(*Mr. Lovett.*) I think where it is worked as a commercial undertaking would be better.

8629. (*Chairman.*) That is the same sort of thing. We will consider that point. It has been put before us. Where quarries are worked in galleries the width of the floor should be at least half the height of the face?—Yes.

8630. I suppose you would have the width of the gallery about what—60 feet, or perhaps more—25 fathoms, or something of that sort. I think 25 fathoms is the common width?—The height of the galleries vary very considerably in Dinorwic.

(*Mr. Lewney.*) Twenty-five yards.

(*Chairman.*) Yes, it is 25 yards. That is the rule in a good many places, is it not, about having the width half the height.

(*Mr. Lewney.*) In some of the quarries we visited that was the rule.

8631. (*Chairman.*) I suppose in some places, owing to the way in which the slate lies, it would be impossible to make the width of the floor half the height?—Not in granite quarries, unless they quarry by means of mines. In that case galleries are unknown practically.

8632. I have seen one place at a quarry in which there was a tremendous height running up and practically no galleries?—That quarry was possibly worked by mines, was it not?

8633. Yes, by mining?—In that case, of course, galleries are never required because there is really no danger.

8634. Might it not be in other cases too, that it would be impossible to carry out that rule of making the width of the floor half the height of the face?—If there is a good height of face and the quarry is worked in the ordinary way by means of shot firing, I do not see the difficulty.

8635. In your view, that is the safe way to work it as a general rule?—I think so, unless the quarry is worked by means of mines.

8636. But here again, I suppose, in special cases it might be necessary to depart slightly from the rule possibly?—You mean regarding the width of the floor?

8637. I mean if you lay down a hard-and-fast rule, an absolute rule, is it not possible in some extreme cases you might prevent the quarry being worked?—I do not know of any quarry where the application of these rules would prevent its being worked.

8638. You think it could be done?—Yes.

8639. (*Mr. Greaves.*) You are talking of granite and stone quarries only?—I am talking of granite and whinstone only.

8640. (*Chairman.*) Then you say "In sunk quarries "where the material is lifted up to the surface by "means of blondins or cranes the wagons or skips "should have no part of their load projecting over the "sides"?—I think that is so.

8641. Is that not commonly done?—I believe it is, but I do not know that they are compelled legally to do it.

8642. It is not common to let the contents project over the side?—I do not know that it is, but I have known an accident happen through a piece falling from a skip.

8643. How deep is the deepest granite quarry that you know of?—The deepest quarries I know of are up in Aberdeenshire: they are over 300 feet deep.

8644. How deep is the deepest one?—I should say it is over 300 feet.

8645. How do the men go down into that?—The last time I was there they went down ladders.

8646. Do they raise the material by means of cages there?—It is raised by means of a crane or blondin.

8647. They have not a cage working in runners—a lift?—Not so far as I know.

8648. I suppose in some cases the exertion of going down into the quarries and coming out is considerable to the men?—It must be. Mr. Fordyce can tell you, but I believe they have a lift in one of the quarries there.

8649. For carrying the men?—Yes.

8650. I want to ascertain whether it is not a considerable relief in deep quarries, at all events, to have the men hauled up by mineral lifts instead of being obliged to climb the ladders?—Certainly it must be so.

8651. You say "In all cases of inspection of "quarries, especially after an accident, the repre-"sentative of the men should have the legal right to "accompany the Inspector and should be warned of "his visits." There is another alternative I suggest which they have not got in quarries and in metalliferous mines at present: that is that the men should have the same right of inspection that the coal miners have—that is to say, a right of inspecting every part of the quarry at periodic intervals?—Yes. This is a case that has special reference to that. On the 29th April, at Dalbeattie, two men were working in a place they considered dangerous, and a fall of rock came away and buried both the men up to about the waist. One of the men sustained a compound fracture of the leg and the other a simple fracture. The Inspector came round some little time after and he went and interviewed the quarry proprietor, but he never went to ascertain the men's views. The men had never seen him. I was in Dalbeattie on the 26th July, and at that time they had never seen the Inspector although he had been there. He had never gone to any of them. I think that was scarcely fair.

8652. In consequence of that was there any harm done by his not having seen the men?—The men maintain, of course, that the place was unsafe, and that they should not have been put into it. The likelihood is that the quarry proprietor (I am only assuming this) would have told them the place was quite safe so far as they could see, but the men maintained that the place was unsafe and it was known to be unsafe. The Inspector could not possibly have had that evidence because he did not call upon the men.

8653. Did they not call the attention of the Inspector to it, because anyone can write a letter to him?—They had not done so so far as I know.

8654. Your point is that it should be the duty of the Inspector to ask the men in the case of accidents also?—Yes, especially in cases of accident.

8655. They do in a great number of cases—they generally do. An Inspector would certainly at present consider it his duty to do it if he thought he was going to get any information in that way?—Yes, but here you have a case of a very serious accident, and the men might have both been killed. Had a little more of the top slipped away, they would have been killed undoubtedly. The Inspector comes shortly after the accident and calls upon the proprietor of the quarry, but he never takes any trouble to ascertain the men's opinion. I think that is unfair.

8656. You cannot say for certain that he did not tell the employer he thought it was excessively dangerous, and did not want any more evidence because it was so clear?—Of course I do not know.

8657. I see your point, that the Inspectors ought to consult the men also when the accident occurs?—Yes.

8658. (*Mr. Jones.*) You want some security that the interests of the men are looked after by the Inspectors?—Certainly. The statement the Inspector got in this case must have been one-sided. It could not have been anything else.

8659. We have got the name of the case and the date?—The accident occurred on the 29th April in Dalbeattie, and the names of the men who were injured were George Bott and Hugh Bott. They were father and son. On the 26th July I was at Dalbeattie, and I interviewed Hugh Bott, the man who sustained a compound fracture of the leg, and he told me he had never seen the Inspector and neither had his father.

8660. Now as to the handling of explosives: "No "one should be allowed to handle explosives without "some reasonable proof of competency." Some of the witnesses have said they thought all the men should be allowed to use explosives, and that they were quite competent to do so, and that with regard to the men who were using explosives there was no complaint. Another witness told us that he had no complaint to make of the competency of the men?—The men who are handling explosives in the meantime may be competent, but that is not any proof that men who will be appointed later on will be competent.

8661. What proof would you wish to have of competency?—It is difficult to say, but I think some little examination should be gone through regarding the nature of the explosives and the method of handling them.

8662. In a granite quarry, for instance, how many of the men use explosives out of, say, 100 men?—There are usually one or two men told off to handle explosives.

8663. Only one or two?—In most of the quarries.

8664. I thought a great many more did it?—In quarries where they are breaking stones for sending to the mills a great many more do it; the man who bores the hole blasts it.

8665. Would you like the Government to undertake to approve explosives used in quarries and also to approve the quality of the fuse used?—I think so.

8666. Have you seen a good deal of different fuses used in quarries in the course of your experience?—I have.

8667. Do they sometimes use bad stuff?—Yes.

8668. A good deal of it is good, I suppose?—Yes.

8669. But sometimes it is bad?—Yes.

8670. Do you know where the bad stuff is made. Is it foreign or English?—I may explain I was working at a granite quarry for over five years, and we obtained some fuses from a firm in Glasgow. Some of it was very inferior, and we complained, and the reason given was that the price of rubber had gone up so much that they were using inferior material instead of rubber.

8671. (*Mr. Greaves.*) Was that the explanation of the makers or the proprietors of the quarry?—That was the explanation given by the agent who supplied it.

8672. The agent of the makers?—Yes.

8673. (*Chairman.*) Then with regard to ambulance. You say, "The number of workmen that must be "employed before an ambulance chest is compulsory in "quarries should be reduced from 25 to 10"?—I think so.

8674. Do you not think it would be a good thing to have a little ambulance chest of a very small character even though only five or six men were there?—I think it would be, and it is very inexpensive.

8675. Something merely to cure the smaller cuts?—Yes.

8676. (*Mr. Greaves.*) Taking a quarry where there is no building, how would you arrange about the ambulance chest?—The cost is so very small I would have it there also.

8677. How would you arrange about the ambulance chest supposing it was a quarry which has no buildings and nowhere to keep it?—The ambulance chest is a very small affair, and the person responsible for the working of the quarry could take the chest home when the quarry was not working.

8678. (*Chairman.*) You think all accidents which keep a man off his work for at least three days should be reported?—I think so.

8679. I see some objections to that that I should like to put before you. Do you not think it would make an enormous accident list which would really conceal the true character of the accidents—I mean if you had every little thing reported you would lose really the sense of proportion between what were the serious and what were the small ones?—No.

8680. What good would it do to report your small accidents, such as those that only keep a man off for three days: even a cut hand would then be reported as if it was an accident?—We would get more reliable data regarding the number of accidents.

8681. Of course you would get more reliable data if you had people reporting and taking notes of everything on earth. The importance in reporting is to get the real thing you do want reported and clear away the rubbish that is not so important?—I think if a man meets with an accident and it keeps him off his work for three days it would not be very much trouble to report it and classify it.

8682. Would it be very much good when it was done?—Possibly it would. It would be there for reference.

8683. But there must be some limit to pen and paper I was going to say. You have no conception of what it would put upon us in the investigation and taking into account of all this. This matter was gone into on the Coal Mining Commission. The point is this: unless it would serve some really useful purpose in keeping down the accidents we are better off without it. What we want to get at is the accidents which are really preventable, and I should have thought if we took notice of all the three-day accidents it would be going into it in too much detail?—An accident, if it keeps a man off for three days only, may ultimately become very serious.

8684. It may have a serious cause; but I mean an accident which causes anybody to keep from their work at all may be very serious, such as a slip of the stone which might have killed somebody; it very often may be more important than the accident itself?—I think we should have a record of the accidents.

8685. You still wish for it?—Yes.

8686. I should like you to support your view if you can by some reasoning and by pointing out to me what real good it would do. Can you give me some instances and show me how it would really help in preventing accidents. Is not the present system after all, if thoroughly carried out, sufficient to indicate to the Inspectors and to the public and the Home Office whether a mine has been carried on well or not. Would it show anything much more if you went into greater detail?—Under these Special Rules an accident, if it does not keep a man off for half-an-hour, if it is caused by explosives, must be reported.

8687. I agree with regard to explosives that is the present law. That is why they have done it in that way?—Why should it not be applied to all accidents?

8688. For this precise reason. If you get an explosion it should be reported whether there is any man injured or not, but when you get other things, such as a cut hand, if you merely know that someone has cut his hand and been off for three days, it does not help you very much. What can you do?—Take the case of a man (and such a case has been known) who gets his finger burnt with the fuse. He does not lose five minutes, but it must be reported.

8689. I agree any accident due to explosives should be reported, and I agree it should be reported whether it keeps him off or not. But according to your view, if there was an accident which kept him off for a period of three days it should be reported, but if for two days it should not be reported?—I do not propose to alter the law with regard to explosives.

8690. I mean, if an accident occurred through a cage being faulty you would report it if it kept him off three days, but not if it kept him off for two?—Yes but then you must fix the limit somewhere. Very serious accidents must be reported. Now who is to be the judge of whether the accident is serious or otherwise.

8691. I admit there is a difficulty. I have had a good deal to do with that very state of things, namely, that the serious ones should be reported whether they give rise to an accident or not?—That is the reason I put in three days. Of course, I have no objection to making it a week.

8692. That is just the point?—It is just to keep a record in some way.

(*Mr. Greaves.*) Anything over a week is reported now.

(*Chairman.*) Yes.

8693. (*Mr. Jones.*) Does that meet your view: they are bound to report every accident over seven days now if it keeps a man at home over seven days or away from his work?—Yes, that would, but I really do not see any objection to the three days.

8694. (*Chairman.*) "All accidents to the eyes "should be entered in a book kept at the quarry for "this purpose." Why would you have the accidents to the eyes treated differently from the others?—Because I think sett-makers are especially liable to injuries to the eyes. A sett-maker may meet with an accident to the eye and its initial effect may be trifling, but ultimately he may lose his eyesight over it.

8695. Would you be in favour of them all being provided with goggles?—If the goggles could be of a sufficiently good nature, but I have not seen one yet. If I saw one that did not prevent a man doing his best at work, and if the goggle was sufficiently comfortable, I should use it, but I have not seen any yet.

8696. Would it not be possible to make a goggle that a man could wear perfectly and see perfectly with, and which would give him a very good measure of protection: for instance, if you had a rather large thing, each glass fully 2 inches in diameter, and slightly curved outwards, and with a space between the eye and the goggle like a pair of spectacles, and deliberately risked the chance of one coming in the side for the advantage you would get in letting the air go freely through it—make it like a pair of shooting spectacles, in fact?—I should not say it was impossible.

8697. Would you say it would be tolerably effective?—I do not know. You could not tell until you had some practical experience of the wearing of them. Some little time ago a sett-maker lost one of his eyes at Kirkmabreck in a quarry leased by the Mersey Board, and the Mersey Board issued orders that all sett-makers were to wear goggles. They did for a day or two, and then one by one they dropped it and in a short time nobody wore them.

8698. They were goggles about half an inch or three-quarters of an inch wide *this* way and perhaps an inch *that* way?—They were mostly of gauze.

8699. Entirely of gauze?—Except the rims. I did not see them, but I understand that the front was closed gauze. I do not think they were glass.

8700. They had glass in the front, had they not?—I do not think so.

8701. Everybody knows it injures a man's sight to attempt to do his work through gauze?—I think every man was at liberty to buy his own, and possibly there were various kinds of them, but I know they were not maintained.

8702. If we could get an effective pair of spectacles would you be in favour of everybody being obliged to wear them?—Yes, if you could get an effective pair, but that is a very large order.

8703. You would be in favour of it if you could?—Yes, I believe they would preserve the eyesight.

8704. Have you had any experience of the respirators being worn by men?—Yes, I have seen them in crushers.

8705. Did the men complain that they were oppressive?—Yes.

8706. Can you remember any particular case where the men wore the respirators where there was crushing and where the respirator was oppressive?—Yes, I have known men who were employed in wheeling away the crushed granite from the bottom of a crusher or riddle who wore the wool respirators, and they took them off in a very few minutes.

8707. What did they say they felt?—They said they felt a choking sensation.

8708. I agree with you: I am not asking you adversely: I have tried them myself and I have had a good deal of experience of it. It is true that they are very difficult to wear. I suppose in quarries a large number of accidents occur through small cuts?—Yes.

8709. And for that reason you would be in favour of some suitable lotion and ointment and clean stuff to put on them?—Yes.

8710. Do you think the quarrymen are aware if they have a cut that they cannot put a more poisonous thing on it than a piece of handkerchief or rag from their pocket?—I do not think they are. Every man takes the first thing that comes to his hand to wrap up the cut.

8711. Anything is put on?—Anything is put on to stop the bleeding.

8712. They are not aware that it is absolutely poisonous?—I do not suppose they are.

8713. You would like the lifting capacities of cranes in a quarry to be marked by metal plates?—Yes.

(*Chairman.*) In docks I think it is universal to mark a crane. It is only the right thing to mark a crane with the weight for which it is constructed. I thought they were all marked in that way.

(*Mr. Lewney.*) I thought so too.

8714. (*Chairman.*) You also say that in the cases of derrick jibs you would state the radius at which the load should be raised so as to be a guide to the men using it?—Yes.

8715. Do they anneal the chains?—Not so far as I know. I have never known it done in the quarries.

8716. (*Mr. Greaves.*) I suppose these big quarries chiefly use rope?—Yes, in most quarries now they use wire ropes. Of course they use the chains for slinging the loads.

8717. (*Chairman.*) Just the small thing?—Yes.

8718. (*Mr. Lewney.*) I think most cranes now have wire ropes?—Yes, most of them.

8719. (*Chairman.*) You would be against taking intoxicating liquors into a quarry?—I would.

8720. Except a little brandy for the case of accident?—Yes.

8721. What would the men say to that?—I do not know: possibly some would be in favour of it and some against it.

8722. I could imagine your desiring to do that on general principles for the good of the men's morals, and so on, but can you say it is really necessary because accidents occur through the men's use of liquor?—I have known accidents occur, and I believe they were caused by that. I have seen men handling explosives under the influence of drink.

8723. (*Mr. Lewney.*) Would that drink be obtained before they went to the quarry?—Yes, taken on with them.

8724. (*Mr. Jones.*) Does that not show more the lack of discipline at the quarry than the need of a new rule?—You can discharge the man if you think fit, but you do not always want to discharge the man.

8725. (*Chairman.*) I should think there might be a distinction between beer and spirits?—You might draw a distinction. In some cases they take beer for their dinner.

8726. If you prevented them taking intoxicating liquor you would not allow beer for dinner?—You might draw a distinction in that way, of course.

8727. All sett-makers in your view should be provided with suitable sheds to work in. Those sheds ought not to be much enclosed, ought they? It would be very dangerous?—Sett-makers' sheds are usually open in the front.

8728. Is it not better that they should work more in the open still, with only just a sort of screen behind them?—This, of course, refers to wet weather. They do not work as a rule in those sheds except in wet weather.

8729. You wish to confine that observation to working in wet weather?—Yes, or very windy weather.

8730. But still that would produce the danger of consumption?—But still men find it very much to their convenience to work under a shelter of some kind, even if they do have more dust.

8731. It strikes me that such sheds should only be to keep the rain off: they ought not to prevent the wind coming in or else you have consumption?—In those sheds the sett-maker cannot block his stone, but he can dress it. The dressing of the stone is almost all done by men who are seated. They must have some little shelter when they are sitting down to do that work.

8732. A shelter overhead perhaps?—And at the back.

8733. Would you not be afraid of consumption increasing. You told us at the beginning of your evidence, when I was asking you about sett-makers' consumption, that sheds had a good deal to do with it?—Yes, but I recommend that the sheds be at least 5 feet high. In most cases they are not.

8734. (*Mr. Greaves.*) Do you prefer these sheds to scathies?—No, I have worked in both, and personally I would prefer the scathies, but I do not say everyone would say that.

8735. (*Chairman.*) You do not seem to think there is danger of consumption from sett-making in a shed if the shed is a fairly high one?—Fairly high and fairly open.

8736. (*Mr. Greaves.*) You said the enclosed sheds are more dangerous than the scathies?—I think so.

(*Chairman.*) It is somewhat doubtful at present whether there is much more mortality from consumption in the sett-makers.

8737. (*Mr. Jones.*) I take it you agree that a shed of proper height is much more convenient for the workmen?—Yes, I think they should have some shelter in any case.

8738. (*Chairman.*) And much less likely to cause him to get consumption?—Yes.

8739. (*Mr. Greaves.*) I am only talking of North Wales where I have seen them; they appeared to me to be there more than 5 feet high in front. I am only speaking from impression?—Do you mean the sheds built in a row or the scathies?

8740. The sheds built for the sett-makers?—Some of them may be, but I know some that are not.

8741. (*Chairman.*) I should have thought one thing about it was obvious, namely, that in the windy weather or when it was blowing hard the high shed is likely to be more uncomfortable, is it not?—Yes, but they must have a back to them in any case.

8742. (*Mr. Jones.*) They turn their back to the wind?—They can in the scathies, but not in the shed, of course.

(*Chairman.*) In the case of the slate dressers they were sitting under some low sheds, and the question was whether that lowness did not keep the wind off.

(*Mr. Jones.*) They turn their backs to the wind.

8743. (*Chairman.*) With regard to the crushers, you have seen a good deal of granite crushing—Yes.

8744. That is a very dusty job, is it not?—Yes.

8745. Do you know if the men suffer from phthisis in granite crushing?—I think they do.

8746. Have you any figures to show that?—No, I have no figures, because none of those men are members of our union, so I have not got any figures for those men.

8747. Having seen the granite crushers, can you suggest any means that could be adopted to minimise the dust?—Yes. I think where the crushers are large there should be some form of a suction fan to take away the dust.

8748. It would be a difficult thing to do, would it not, to draw the dust from all round amongst the machinery?—Yes, but it might minimise the dust nuisance a good deal.

8749. You have never seen any steam employed for granite crushers, I suppose?—For motive power do you mean.

8750. No, for diminishing the dust?—I have not.

8751. "Mess-rooms should be provided at all quarries"?—Yes, I think that is very important.

8752. I suppose you would say that the places they ought to be provided are where the men do not go home. Where the men all go home it would be no use having mess-rooms, but you would only ask for them to be provided where the men would be likely to use them?—That is so.

8753. Is there a deficiency of them at present?—There is. I think I am safe in saying that in 90 per cent. of quarries nothing of the kind exists.

8754. The men just go into the engine-room?—They go into the engine-room or the blacksmith's shop. They go in, of course, with their hands all dirty, and they take their food with their dirty hands. Nothing is provided for them to wash them, although I believe in the majority of cases water is available.

8755. Of course in saying this you would qualify your views by saying that what was reasonable should be done. In places it might be impossible to get water, but you do not ask anything but what is reasonably fair?—That is so. I do not know of any quarries where they have not water.

8756. I suppose you would wish that in those mess-rooms there should be fires provided?—Yes, on a very cold day in the winter time.

8757. I am merely asking you what sort of a mess you mean. We have seen some good ones and we have seen some very bad ones.

8758. (*Mr. Greaves.*) From your experience and knowledge of the sett-makers generally do you think if washing accommodation was provided they would generally make use of it before dinner?—I think so, and the use would ultimately become more. At the outset it might not be so much used as it should be, but I believe ultimately it would be very general.

8759. (*Mr. Greaves.*) When you say that all quarries should be under one Act you mean granite quarries only?—I have no special knowledge of quarries beyond the granite and whinstone quarries.

8760. You are only speaking of those?—Yes.

8761. I gathered from you that you consider any man who used explosives ought to have a certificate and pass an examination?—There should be some rule of competency.

8762. You would have an examination?—Yes; it would not require to be too severe of course, but I think some examination should be necessary.

8763. For everyone who uses an explosive?—I think so.

8764. (*Mr. Lewney.*) You say in your opinion it would be an advantage to have certificated managers in quarries?—Yes.

8765. In what way would it be an advantage?—Let me give you a case to illustrate the point that came under my own personal observation. I know a case of a quarry where there was a practical man managing the quarry. It is not necessary, of course, to mention any names. A young gentleman who had no knowledge whatever of quarries put 1,000*l.* into the firm on condition that he got employment, and as they had no other method of employing him they sent him to take charge of the quarry, of which he knew absolutely nothing.

8766. In that case you would have a foreman who would be a practical quarryman?—Yes, but of course he need not take the foreman's advice unless he thought fit.

8767. Which of the two men would you insist should have the certificate of competency?—The man who is responsible should have the certificate, that is the manager.

8768. You mean the gentleman who put in the 1,000*l.* should be the one who should possess the certificate?—Yes, he was the manager: he was responsible.

8769. Supposing he read up some books on quarrying and passed his technical examination, would you still grant him that certificate?—No: you will see that I also stipulate that he shall have at least three years' practical experience.

8770. Supposing, on the other hand, you get a man who is thoroughly competent: he passes this examination and gets his certificate. In what way could you prevent a managing director, for instance, from coming in and interfering with the management of the quarry?—You could not prevent the managing director, of course, but naturally a managing director, assuming he was a person of common sense, would not do anything against the wishes of the man who, he knew, had been picked for the position he held.

8771. Take the case you have given as an instance: we will assume that the door was closed against them putting this man in as manager: there would be nothing to prevent the same people appointing him managing director?—Nothing.

8772. So you see the question of the certificate would not be quite so effective after all?—The difference is more important than you seem to imagine, because the managing director may not be at the quarry except perhaps once in three months, or perhaps not once a year: but the man I have called the manager I am supposing is there practically every day and taking personal charge.

8773. But that would be a matter of arrangement. The point I wish to suggest to you is this: that by making an examination of this description compulsory, in time you would exclude good practical quarrymen who would not have very high literary attainments in favour of men who had given more attention to technical training?—I do not think it would have that effect. I suppose that the examination paper to be drawn up would take all these things into account. I do not suppose the examination paper would be so framed as to exclude the man with the practical training in favour of the man with more literary attainments.

8774. I am afraid you would close one of the few doors which are now open to the ordinary working man by what you suggest?—I should be very sorry to do anything of that kind, but I do not think it would have that effect. I would think that the man's practical experience would go for a great deal in the examination.

8775. Do you think three years' experience in a quarry is sufficient to qualify a man as a manager?—No, I say at least three years.

8776. I should consider you would have to increase it considerably?—That is a minimum.

8777. With regard to the use of explosives, you are also in favour of men being compelled to pass an examination before being allowed to use explosives?—I think there should be some reasonable proof that the man understands the explosives.

8778. Would it meet your views if it were said a manager of a mine or quarry should ascertain whether a man had had experience in the use of explosives before allowing him to have charge of that sort of work?—Yes.

8779. You simply want to guard against an inexperienced person being allowed to use explosives?—That is so. That is the whole point.

8780. The certificate would require an examination?—I do not say a certificate regarding the use of explosives, but some reasonable proof of competency.

8781. You would be satisfied if reasonable precautions were taken to insure that the man was competent before being allowed to use explosives. That is your idea?—That is the idea.

8782. (*Mr. Greaves.*) I presume every man must use an explosive when he is inexperienced. He must use it for the first time? It is something like saying a man must not go into the water before he can swim?—A seaman must go to sea for the first time, but you would not put him in charge of an Atlantic liner on his first voyage.

8783. I thought you said experienced in the use of explosives?—I said some reasonable proof of competency.

8784. (*Mr. Lovett.*) There is just this one point with regard to the sheds, and that is the partition wall where sheds are built in a row; there are partition walls and separate divisions?—I think that is very important.

8785. You think it should be extended 3 feet beyond the front of the shed?—Yes.

8786. I take it that you suggest that to prevent accidents?—Yes.

8787. Men often suffer from pieces flying from another man's hammer in the next shed?—That is so. That is the idea.

8788. That would minimise the danger very very much I should think?—Yes. In fact the injuries to the eyes are very often caused by another man's hammer rather than the sufferer's hammer.

8789. I suggest to you the more serious accidents to the eye are caused from pieces flying from another man's hammer?—That is so.

8790. This would prevent it undoubtedly?—Yes.

8791. Have you noticed in any quarries that the men will put up a slab or a piece of board in a rough and ready fashion to try and prevent that?—Yes, frequently.

8792. That goes to prove that undoubtedly the danger does exist?—Yes, it is frequently done.

8793. With regard to the dust nuisance, I take it from what you have said that you are thoroughly convinced in your own mind that men really do suffer from phthisis?—I think they do.

8794. Neither you nor I have any reliable data, but you think it is a case for serious and careful investigation?—I think it is.

8795. (*Mr. Jones.*) Have you had personal experience of wearing goggles?—No.

8796. You have never worn them yourself?—No.

Mr. John Fordyce called and examined.

8797. (*Chairman.*) What position do you hold in the Sett-makers Union?—I am president of the Kemnay Branch of the Sett-makers Union.

8798. You have heard the evidence that has just been given by Mr. Slevin?—Yes.

8799. Do you generally agree with the whole of it?—Most of it. There may be some details.

8800. Would you kindly point out any details that you think might be added to or changed?—I wish to point out that I have not a great deal of knowledge regarding the position of the quarries under the Acts, or the rules which are in vogue at the present time. My knowledge is not so intimate as Mr. Slevin appears to have. I would approve of the idea in his third paragraph that the owner of the quarry should be responsible for the safe and proper working of the quarry. I am pointing out what I approve of.

8801. Do you not think you might give us what you differ from? That will be shorter, because if you go through what you approve of perhaps it will be a large amount?—With regard to the three years' practical experience of quarry work necessary for the appointment of a manager to a quarry, my view is practically his view. You cannot have too much experience. What one man will learn in three years another man may never learn at all, and still he might get into the position of a manager of a quarry. Some practical test of some kind ought to be set up.

8802. You are in favour of practical examination of some kind or another?—Yes. Of course it may be taken for granted that the owner of a quarry wants to get the best man he possibly can get in his own judgment, but at the same time I believe it would be within the experience and observation both of Mr. Slevin and myself that very often the round man gets into the square hole, as you say, and the consequence is everybody suffers all round.

8803. You think that danger would be prevented if there was a practical examination of some kind?—Yes. It would be a difficult thing to fix the standard. You might fix a certain definite thing and it would not be effective after all. So much depends upon the circumstances attending the case, but three years' practical experience would be a good and reasonable thing in the circumstances.

8804. If nothing more occurs to you, supposing I ask you some questions?—I would rather answer questions.

8805. I will ask you some questions upon a point which, from Mr. Slevin's evidence, you might know about. With regard to wearing goggles: what do you think about goggles for work?—With regard to the question of goggles, as I say in my statement, sett-makers have never taken kindly to the wearing of goggles or spectacles. I have tried goggles myself of the wire netting kind and wire netting with glass in the centre, and I found them very disagreeable in the respect that in the warm weather they cause a sweating sensation about the eyes: then the glasses have become more common among stone-cutters—not so much among sett-makers—the ordinary open glasses (plain glasses I understand they are), and when you wear them for some time the eye loses the faculty of defending itself. You must wear them once you begin.

8806. That is a very important point. We had not thought of that. It is extremely important?—I had occasion to go to one of the inspectors of stone-cutters with an eye that had a stone in it or something, and we got talking about the wearing of spectacles: he told me that if I did wear spectacles—I said I did not like them—I should have to wear them always, because the eye loses the faculty of defending itself when once you begin to wear them. I believe that is a law of nature all round.

8807. Would you be in favour of compelling everybody to wear spectacles?—It is a very difficult thing to compel people: that is the difficulty about it. Even supposing that the men were really willing to wear spectacles, there is a natural freedom without them, and I think it would not be well taken at all. At the same time there are a good few stone-cutters who are wearing them steadily.

8808. Are glasses better than spectacles—glasses like *these* things?—Decidedly, but they are much bigger.

8809. A very big spectacle, you mean?—Yes, they are bigger than that. They are very big round glasses with just plain glass.

8810. And they have no protection at the side of them?—No

8811. Is there a great risk of things coming sideways?—Sometimes there is.

8812. But that disadvantage is more than compensated, I suppose, by the freedom of the air going through?—Yes. That is what makes them so unpopular with the sett-maker, I think—they see so much better, naturally, so long as their sight remains good, that they do not care to have artificial things. The very same thing prevails with regard to wearing a protective cloth or gloves.

8813. Why do they not wear gloves with the fingers cut off?—Some of them wear them regularly and steadily; others simply would not have anything to do with them at all if they could possibly avoid it.

8814. (*Mr. Lovett.*) Are you speaking of sett-makers now?—Yes, I am speaking of sett-makers.

8815. (*Mr. Lewney.*) The trouble with the sett-maker in having the middle of the hand covered up is that he would lose the sense of touch: he could not use his tools so well?—Quite so.

8816. It is an easy matter to get hold of a lump of stone but he would not have the same control over his tool?—That is so.

8817. (*Chairman.*) What is the cause of most of the small cuts or injuries to the sett-makers. How do they come about?—Sometimes you get the edge of the stone as sharp as a piece of glass, and when you come across it with your hand in any way it just makes a clean cut like a razor. On the other hand, there are bruises. I got one *there* the other day. The blood gathers and a black blister comes. That is got by bruises.

8818. Would you be in favour of having some simple bandages and lotion available for use for those who wanted it?—Yes.

8819. I suppose you would approve of not having to go to the foreman to get it, but to put it in some position where any man could get it easily?—I will tell you the arrangement we have where I work. That gentleman I was telling you of is an inspector of the stone-cutters' work, and he has a place where he keeps plans and other things of that kind, and he has a drawer where he keeps necessary lint and cotton and whatever is wanted in that way: and anyone getting a cut or any slight ailment of that kind can go and get it dressed there without any trouble.

8820. How many times does a man get one of the slighter cuts in the course of a week or a month?—He might go for months and months and never get anything.

8821. Small cuts are not quite so common with you as they are among slate workers perhaps?—I do not know anything about slate workers, but they come along sometimes. You would get a good few probably every day, once you begin. Perhaps you make a bad stroke with your tool and come down on your knuckle like *that*, and if your tools are pretty well worn down, then the liability to get snaps of that sort becomes very much greater, and if you do it once or twice it seems to have a tendency to recur.

8822. With regard to shelters: what do you think ought to be done about shelters?—In my statement I gave some of the dimensions of the shelters that we have, and I fancy the members of the Commission have seen them.

8823. How high are they? You have given the length, width, and length of roof?—I have missed out the height. They are about the height of standing. You could not quite stand at the back, but generally speaking the stones would be put in at the back.

8824. Are those suitable?—I have never heard any complaints all these years about them.

8825. With regard to the liability to accidents, do you think the serious accidents are increasing or diminishing?—I think they are diminishing rather than increasing. That is without any statistics whatever. The precautions taken are very much greater than they were at one time.

8826. You attribute it a good deal to the fact that the sett-makers now do not work in the quarry where they would be likely to have stones fall on them, but the stuff is taken away to a safe place?—Yes. I spoke of that at a meeting of our branch, and I gave them an indication of what I have put before the Commission.

8827. What did they say?—They were quite agreed with what I said. Of course that is a fact that tells all round.

8828. The granite is not of a poisonous nature apparently?—That is my view of it.

8829. The piece of rag that you put on a wound is a great deal more dangerous than the granite I should think?—Yes, but workmen very often take considerable risks in respect of that, and other people are very particular, again.

8830. What do you think about the dust produced in the sett-making?—As I said in my evidence, it is not so great as in some of the branches of the granite trade.

8831. You mean your sett-making is not so dusty as the machine and automatic tool work done in the sheds?—No. One reason for that is, I believe, that you are always chipping off in dressing stones. It is in dressing that you come nearest to the source of the dust as it were; you are always chipping off and the dust falls down among the chips.

8832. I suppose that the hand work takes off larger pieces and coarser-grained pieces than the fine chipping of a tool?—Yes.

8833. Altogether it does not seem, then, that there is much danger of consumption among the sett-makers working in these open sheds by hand?—There would not be much above the normal, I think. The way I am looking at it is that I have not been impressed by any cases during the time I have been observing that would lead me to believe that it was caused by that specially. There might be cases, although it was not manifest enough to influence my mind in coming to that conclusion. It would not do to infer from my statement that dust is harmless, seeing that they are working in the open and are not exposed to a cloud of dust all the time.

8834. Have you seen any granite crushers at work?—Yes.

8835. That is very dusty, is it not?—Yes.

8836. You would expect men to get some phthisis or consumption there, would you not?—Yes, they are terribly exposed to the dust. There is no doubt about that.

8837. Do you know whether they do get consumption or not?—I have no statistics of figures that could bear that out.

8838. These men are not in your union, are they?—No.

8839. So you have not got the figures?—No, it would be about 14 or 15 years, I suppose, since there were crushers where I am, but I will tell you what I have seen round the places when it is windy weather; you would see the very finest of the dust blown quite a distance away, and you would see it settling upon the grass and other things growing round, which shows that in windy weather the finest of the dust goes—the dust which would be most likely to be inhaled into the lungs.

8840. Is there any other point you can think of?—With regard to the handling of explosives spoken to by Mr. Slevin: the way I have seen that done is, an experienced man has gone to this place about the time I went to the quarry—that would be about 30 years ago—and he has had a good name for being a good blaster: the practice followed was that when they wanted to add to the number of their blasters (the firm had several quarries round) the man was put on with this man to give him experience. He was put under him and directed as to how to do the whole thing. I would consider that no man ought to handle explosives without some such system as that, because it is a very dangerous thing. I have been in places where everybody handles explosives, and it is not a thing to do at all. Every man ought to be thoroughly qualified and experienced before he undertakes anything of that kind. I do not think it would require a great deal of arrangement. Of course it would have to be done probably in a formal way, and a certificate given him at the end of a certain time, pretty much as the sett-makers do.

When a sett-maker has served an apprenticeship he gets a certificate that he is a qualified man. A quarry blaster could be put in the same position.

8841. (*Mr. Greaves.*) May I ask who gives the certificate to the sett-maker?—He gets his certificate from the union.

8842. Is there a committee of the union which gives it to him, or does the secretary give it on his own initiative, or who has the power to give the certificate?—The system of putting apprentices on as sett-makers is this: it is an individual member of the union who takes on the apprentice, and he arranges with the union that the apprentices to be taken on, if there are not too many to the number of journeymen——

8843. I am speaking about the certificate. Can any member of the union give the certificate?—No, it would be given under the hand of the general secretary, I think. Mr. Slevin would be able to give you that information.

8844. (*Mr. Jones.*) What is the period of apprenticeship?—Four years.

8845. Then I take it your union must be satisfied that the young lad has spent four years with a practical sett-maker learning the trade?—Yes.

8846. Then this practical sett-maker, who has been teaching the trade to the young lad, will inform the secretary of the union that the young fellow has gone through his apprenticeship?—Yes.

8847. And after that the secretary of the union will hand over the certificate to the boy stating that he has served his four years' apprenticeship and that he is a qualified sett-maker?—Yes.

(*Mr. Lovett.*) Mr. Slevin, will you tell us who issues this certificate?

(*Mr. Slevin.*) The method is this: the sett-maker makes an application to the local branch for permission to take on the apprentice. The sett-maker making the application must guarantee that he will teach that boy for the period required, namely, four years. At the end of the four years the boy receives a certificate from the union saying that he has served his period as a journeyman. That is the method.

(*Mr. Lovett.*) It is not a certificate of efficiency. It is only a record of the mere fact that he has served his time.

(*Mr. Slevin.*) We assume when he has his certificate that he has served his time.

(*Chairman.*) Is this proposal of Mr. Fordyce that the Government should give the certificate as to the use of explosives, or who—I do not quite understand?

(*Witness.*) Of course the Government have not certified these men, but a Government certificate would give a man a better standing. There is no doubt about that. If you begin with a qualified man, of course you must begin a system of certificates. If you want to have a formal certificate then it is just the same as the sett-maker who gives a certificate that the man has served so long under him, and that he considers him a competent man.

8848. (*Mr. Jones.*) Do you not think that a rule prohibiting anyone using explosives at all unless he has been working for three years in a quarry would be sufficient?—I do not believe in an inexperienced man handling explosives at all.

8849. What I am trying to get at is this: an inexperienced man must handle explosives at some time or other. If there was a rule in existence that he should not be allowed to do so unless he had worked, say, for three years, at a quarry; he goes to a certain quarry as an apprentice for three years; at the end of three years after he has gained some knowledge of how the other men handle explosives, and that sort of thing, he is allowed to handle them—of course that is under the direction of someone else?—Yes, but he ought to be trained. That is my view of it. Practical training in the handling of explosives is absolutely necessary.

8850. I quite agree with you there, but my point is this; that he is trained?—Whatever the form the training may take, it would be a practical training, and of course that might mean a Government certificate.

8851. You never would get to the end of these certificates. Take slate quarrying; half the men in the quarry use explosives. The slate quarries in North Wales employ 11,000 men. Supposing 5,000 are qualified to use explosives; the Government would have no end of certificates to hand out.

(*Mr. Greaves.*) Every farm labourer uses explosives in our country.

8852. (*Mr. Jones.*) Men go there to work as quarrymen. They are quite incompetent and do not know anything about explosives when they start. If there was a rule that that man should not be allowed to use explosives for two or three years after he has entered the quarry, would not that meet your case as well—giving the man a certain period of time to get familiar with the working of the quarry?—Yes. The granite quarry system is different. There is just one man in each quarry at the outside; some men work two quarries and some men work three quarries. There might be three quarries working with only one blaster.

8853. I see what you are driving at: you could not apply that generally—only granite quarries?—That is so.

8854. (*Mr. Lovett.*) May I suggest that most of the sett-makers in most of the quarries in Cumberland and Northumberland use explosives. Of course, we are likely to mix this up when we get it on the notes. We want to know whether you are speaking of a particular quarry, or whether you are generalising?—I am not generalising. In the Aberdeen district the rule is that one man handles the explosives in the quarry.

8855. (*Chairman.*) I suppose the number of accidents which have happened through explosives is not very large?—No, but there are accidents which happen even with the best experienced men you can get, now and again.

8856. (*Mr. Lovett.*) May I suggest what Mr. Slevin puts forward would be quite sufficient as a safeguard. No one should be allowed to handle explosives without some reasonable proof of competency in the matter. That throws the responsibility on the employer to take care and ascertain that the man is reasonably competent. I do not say you could go any further?—That would do for me.

8857. You agree that that would be quite satisfactory?—Yes, I would be at one with Mr. Slevin in that.

8858. (*Chairman.*) Is there any other point you would like to bring out. The mess-rooms are not quite sufficient at present, I suppose?—That is a matter that was never in my mind.

8859. Let us hear what you think about it?—So far as my experience of the thing has gone a good few years ago a great many of the people lived in the country, and there was a good deal of messing on the job. That has gone away a good deal, because they have come to live in the neighbouring village, and the consequence is that there are not nearly so many who take their meals at the quarry as did before. They go to their own houses.

8860. Are you in favour of having reasonable mess accommodation for those who do not go home?—Yes, that would be a very good thing. Of course a great deal would depend upon the kind of conditions. In some works they do the cooking, as well as preparing the meals and providing accommodation for their being taken. That would be a matter of business arrangement as to how the scheme could be carried out.

8861. Have you anything else you would like to add?—I do not think so.

8862. I think we have gone through everything. I need not ask you to repeat all that Mr. Slevin has said. I shall take it that you both generally agree upon those views?—Yes.

8863. (*Mr. Lovett.*) Do you seriously put it forward that sett-makers to any large extent use gloves to prevent cut hands. Have you seen many of the sett-makers in any quarry use gloves to prevent cut hands?—During the winter season, when the hands are worn through with the rough work, they want protection, but the feeling is just the same as with regard to the wearing of glasses or goggles—they do not want them.

8864. It is an important matter. We have been dealing with the question of cut hands, and now you state you are speaking of something entirely different.

They just put on these gloves as something to protect the hands after they are worn through. The gloves, or whatever you call them, are really not worn to prevent accidents?—No, not in my experience.

8865. It would have been rather misleading if it had gone forth that you suggested that the sett-makers wore gloves to protect their hands?—No, they don gloves or some protection when they get a cut, but not before unless it be in bad weather when the hands get worn out. They are always felt to be an incumbrance to them.

8866. You say in your statement that you have never heard any complaint about the sheds, and the size of the sheds, or the convenience?—No.

8867. You put it down here that these sheds you have given the dimensions of are often supplemented by the men on their own account?—Yes.

8868. If they are satisfactory to the men, why do they take the trouble to supplement them?—The thing is like this; the shed with simply standing space does not afford sufficient shelter in a way. When it is supplemented with a screen put along the side it makes it much more comfortable, but if you increase the size of the sheds you reduce the portability, and being able to move them about. The common complaint with sett-makers is that the sheds are too big or too heavy, or they are too wet when there has been a wet spell—that they are too heavy to lift about. They can move about the simple shed, and put a screen along either side, or both sides sometimes, according to the wind, without any trouble, and they provide these things themselves.

8869. When speaking about the liability or otherwise of sett-makers to consumption or phthisis, you only had in your mind one kind of shed. I suppose you were not thinking of sheds five or six in a row, or running perhaps a score in a row?—I know what you mean.

8870. They would get more dust and the dust could not get away. You quite agree, I suppose, that the men would inhale a considerable amount of dust in that kind of case?—Yes, much more than they do in scathies.

8871. And you think that those men would, at any rate, be liable to phthisis?—No doubt if the dust were exercising an injurious effect such as many men believe it does—and there is no question about it.

8872. With regard to the crushers: you say on a windy day the dust blows about, and it goes on the grass surrounding the crusher?—Yes.

8873. That is not so when there is not so much wind. I take it you will agree when there is not so much wind the dust remains in the crusher, and the men inhale it?—Yes.

8874. You would not at all argue that that was not injurious to the men?—No; even the sett-makers, as I pointed out——

8875. I am thinking of the crusher just at the moment?—If the man inhales dust there is no doubt that it is bad for his lungs.

8876. Would you not agree, if it is better for the men on a windy day when the dust is blown out of the crusher, that they should get some kind of mechanical contrivance to take the dust away from the men working in the crusher—a fan we will say?—Yes, if it can be got.

8877. I suppose you are aware that many of the companies in the larger quarries have adopted these fans?—I am not aware of it.

SIXTEENTH DAY.

Tuesday, 10th January 1911.

PRESENT:

SIR HENRY HARDINGE SAMUEL CUNYNGHAME, K.C.B. (*Chairman*).

JOHN SCOTT HALDANE, Esq., M.D., F.R.S.
JOHN STIRLING AINSWORTH, Esq., M.P.
RICHARD ARTHUR THOMAS, Esq.
WILLIAM LEWNEY, Esq.
URIAH LOVETT, Esq.

G. W. CHRYSTAL, Esq. (*Secretary*).

Mr. CHARLES HENRY DARBISHIRE called and examined.

8878. (*Chairman.*) Do you come from Darbishires' Granite Quarries, Penmaenmawr?—Yes.

8879. What is your position there?—I am the owner.

8880. Do you manage it at all?—I do.

8881. You are not there every day personally, I suppose?—I am.

8882. Have you any manager under you?—Yes, there is my son and another manager.

8883. Now there are two points connected with the suggestion of certificates for managers. It is suggested, in the first place, that there should be an appointed manager to whom the inspectors could look for the carrying out of the rules and who would be responsible for them; and, in the second place, that he ought to have a certificate. I mention those points so that you may keep them clear of one another. I will ask you in the first place, do you see any objection to the appointment of a statutory manager, of course by the owners?—I do not.

8884. Somebody to whom the inspectorate could look as the person responsible in the quarry for seeing the law carried out?—Yes.

8885. Then come to the second point of the certificates; what do you think about that?—I think it depends greatly upon what sort of certificate is given.

8886. You would have a practical man, of course?—I think you must have a practical man: a man one trains one's self. I have drawn out a statement of how our quarry is managed. (*Handing.*) I may say that I was apprenticed to Sir James Brunlees in 1863 and I was with him three years; I then went to the Mont Cenis railway for two years, and when I came back I was for over four years in a slate quarry at Nantlle (Penyrorsedd quarry), and then I was employed by John Brogden and Sons, contractors for railways in Holland and New Zealand; and for the last 33 years I have been running my own quarry.

8887. In your statement I observe you have given a short devolution of the authority in your quarry. It stands that C. H. Darbishire is at the top and then under him H. W. Darbishire?—That is my son. I may say he was at Glasgow University under Dr. Barr, and at Glasgow, as you know, the session lasts from October to March, and then there are six months vacation when the good student goes to some of the works near. My

son went to Chaplain's and Caird's, and he was also at Hadfield's Steel Foundry Company for 18 months, and then came to me.

8888. Under him again there is James McClement? He is one who has trained himself. He has been with me 22 years.

8889. I observe you divide the establishment into quarry, mills, macadam, quay, and machine shops. Each of those has a head?—Yes.

8890. I will not give the names, it is not necessary. Now supposing there was a statutory manager, who of those gentlemen you have put down here in this statement would be the statutory manager?—Myself, because everything depends upon the head manager.

8891. You are there daily to superintend?—Yes, from 7 o'clock in the morning to 7 o'clock at night.

8892. You really do act yourself as a manager?—I do.

8893. Are we to take it your view is there would be no harm in a certificate provided it was made a practical certificate?—Yes; a practical one. Quarries are not like coal mines.

8894. Remember you are giving your answers with regard to quarries in general all over the country?—Yes. I may say I do not know much about others; I only know my own very well, and I can only give my experience of my own.

8895. Supposing you and your son were both removed and that the representatives of the quarry, whoever they were, had to find someone else to act as manager, would it be in the way of getting a good manager that a certificate was demanded for which a written examination, for instance, had to be passed?—I do not know that I quite follow you.

8896. Assuming you and your son out of the way, and it was necessary to appoint someone else, would the chance of getting a proper man be damaged by the fact that there was an examination of some kind—and if so, how? That is the most practical way I can put the question?—It is rather difficult to say. I think one would like to appoint a man who knew something about quarries, and had had experience in quarries before.

8897. That is obvious—and a long experience too.—Yes, I should prefer it.

8898. Would you put much weight upon a theoretical examination?—Not on simply a theoretical one.

8899. I am not trying to lead you at all?—I know the difficulty. The question depends so much upon what the examination is that entitles the man to the certificate.

8900. Some other members of the Commission will ask you questions about that, so that I will leave it there?—Quarrying is not now represented by a man sitting at the side of the road and breaking up stones. There are many inclines in our quarry—there are 20 miles of railways and nine locomotives, and two or three engines, one 250 h.p. and another 350 h.p., and there are all the complications connected with electricity, so that it is necessary to have someone with his senses about him.

8901. In the sense that he ought to have a decent education and ought to know something about engineering, I suppose?—He will not do, if he has not.

8902. There are smaller quarries where a man of good sense and practical experience would be quite competent without an elaborate examination?—Yes. For instance, the County Council have lots of quarries. I happen to have been Chairman of the County Surveyor's Committee for 14 years, and I know we have lots of county quarries, but you could not have a certificated manager very well where you have simply five or six, or eight or ten men engaged, perhaps, and then, probably, not all the year round. It would be difficult to get a certificated man there.

8903. I suppose in those quarries, the business would not require the engineering knowledge that it does in your quarry?—No, there is no machinery.

8904. They would not be required to tackle railway questions, and questions of locomotives, and things of that sort?—No.

8905. I think you are of opinion that working places ought to be inspected, and that the overburden ought to be carefully inspected?—Where there is overburden—we have none, as it happens, at our quarry. I have a very strong opinion upon this point of not removing responsibility from the men too much. When they go into a place they are accustomed to, and they understand the rock and face of the rock, always working in their same bargain, they quite realise whether any change has taken place, therefore it is desirable they should be responsible if they do not report any danger.

8906. Would you not think during each working day, when the men are working, that some responsible person should examine the working places to see that they are safe—I do not mean make such a minute examination as is occasionally done, but at least examine sufficiently to persuade himself that all is safe?—As a matter of fact, they do in every well-regulated quarry.

8907. Someone goes round in your quarry daily to look after the men and see they are not working in an improper and rash way?—Yes. What I wish to mention about not taking the responsibility from the men is this: unfortunately a man was killed in our quarry one spring when the quarry is often dangerous, because when the sun gets up and the thaw commences, stone comes down. As it happens, he was working in a place where the thaw was loosening the little stones up above, and the manager, McClement, to whom you alluded, made him come out and gave him some stones to break outside. But as soon as McClement left he went back again, and a very little stone came down and hit him on the head, and he was killed. That was absolutely his fault; he ought not to have gone back. I therefore think that the men ought to have a certain amount of responsibility thrown upon them.

8908. You think there should be rules incumbent upon the men, and in respect of which they should be punished for not obeying them?—Yes, I think that should be so.

8909. Just the same as they have in coal mines?—Quite so.

8910. Now, as to explosives. Would you be in favour of a Government test for quarries—I do not use the words "Government test" in the sense of being explosives which are tested for gas and dust, but do you think there should be an examination of explosives used in quarries, and that they should be reported upon by Government officers?—I think there should be—there are so many explosives on the market.

8911. You have great difficulty in choosing which is the best?—Well, we have a small quantity and try it. At present I use powder and gelignite and steelite and blastine. We do not use new explosives until after experimenting with them.

8912. There might be a Government report upon the behaviour of the different explosives, and the explosive force, and so on—there are many details in respect to which such a test would be valuable?—It would be very valuable.

8913. And in the same way report upon fuses?—Yes.

8914. And test the quality of fuse?—I think there would be no harm in that, and it would be useful.

8915. Then explosives in a quarry like yours ought only to be used and handled by experienced men?—Quite so.

8916. Would you have special men for handling explosives?—Yes.

8917. Would that be possible in small quarries?—The man ought to know something about explosives, or else he ought not to be allowed to use them.

8918. How would you ensure his not being employed until he did know something about them?—You must not employ him unless he can prove to you that he understands them.

8919. Would you have him appointed in writing by the owners—I mean that the owners should certify in writing that he was fit and proper, and give him an authority in writing by way of making it clear?—I do not think I should do that.

8920. Would you make it punishable for any man to handle explosives who had not a written authority to do so from the owners?—I do not think that is necessary.

8921. It is very difficult to see how you could enforce it. You could not very well say that no one should handle an explosive unless he was experienced enough to do so. Everyone who had handled it would say he was experienced. Would you have an authorisation in writing?—It would not do any harm; it adds a little trouble perhaps, but when you have appointed a man he generally stays in the quarry for some considerable time

8922. In drilling do you use water?—Always.

8923. Entirely?—Yes, always.

8924. Do you find any difficulty in getting from the makers drills to work with water?—No. We use the Ingersoll Sergeant drill.

8925. What is the motive power?—Air.

8926. You bring in water too?—We pour a little water in.

8927. You do not have the water automatically brought in?—No; we put a little water in the hole.

8928. How do you do that if you are drilling upwards?—But we do not; we drill down or horizontally only.

8929. You would have no objection to a rule that water should be invariably used so far as your quarries are concerned?—No, not in ours; but I do not know about other stone.

8930. You can have an arrangement to draw water from a bucket automatically and force it upwards. I am alluding to granite quarries like yours?—Well, we always put a little water in.

8931. Have you had many accidents in the last few years?—We have not. Last year for instance we had only 44 accidents that we had to report.

8932. Out of how many men?—From 500 to 550.

8933. How many were fatal?—We had none fatal last year.

8934. Were the accidents, most of them, disabling the men for a fortnight? I mean mostly grave, or mostly slight ones?—There were 15 bruised limbs, one from falling stone, 7 to the eye, 15 cuts, one a ladder—a man went up a ladder and he fell down; one a falling drill—a man was lifting up a drill, and there was a man underneath, and the rope on the drill broke, and it fell on him; 2 fractures, and one hernia. A man said he had got hernia by twisting; I do not think it was really so; I think he had hernia before. There was also one sprain, making a total of 44 accidents.

8935. That includes every kind of accident both small and big?—Those are cases where they were away for 14 days.

8936. How many smaller accidents had you where they were away for less than 14 days?—I cannot tell you all; there were a good many little cuts and things of not very much importance.

8937. You would be in favour of first aid arrangements?—Yes, I should. Of course, we have red cross emergency outfits at several places, but I think we ought to have a room too.

8938. Where you can keep things clean?—Yes, and where in the case of a serious accident the man could be accommodated—so that every man who gets cut, or injured, has to go down and report himself there, and have the cut washed out and the injury attended to.

8939. It strikes me that quarrymen are very careless about small cuts; they do not seem to know how to treat them; and they frequently get a wound poisoned, and they are laid up for a fortnight when two days should have been sufficient?—That is so.

8940. You agree with me?—Yes. I think it would be a good thing. It depends upon the size of the quarry, but I certainly think it would be a good thing. I have here our list of accidents. I notice one man cut a finger on the right-hand with a stone, and he was away 32 days.

8941. Would that be blood poisoning?—Yes, probably; but I do not think that ought to have been the case.

8942. What means are we to take for disseminating among miners a greater knowledge of how to treat a common cut instead of binding it up with a piece of dirty rag, which is usually the way in which it is done now?—The best way is to have a room down below, somewhere near the offices, where everything should be nice and clean, and make him go there and have his injury washed and properly attended to.

8943. Could he not do it himself—I mean he would not want a nurse for an ordinary cut—he could do it himself?—Yes, but there is always someone at the offices with plaster and clean things, &c.

8944. Do you suggest that such a man exists already at your quarry who would be able to treat it?—Yes.

8945. He is paid specially for that and nothing else?—No.

8946. Supposing he is away, and doing nothing?—There are always two or three there who could give First Aid. There are boys in the offices, and clerks.

8947. And you say they have special knowledge of how to do such a thing?—Yes; and as it happens in the quarry one of the weighing-machine men was articled to a chemist, so that he understands what has to be done. I think you spoke to him at the time you were there.

8948. Yes. There is a good deal of time lost for cuts and bruises?—I think there is.

8949. In your opinion quarries ought to be fenced?—Yes, to keep the public away. They are mostly, are they not?

8950. I think they are to a large extent; but in some cases they are not fenced. Where the men have to approach in winter, and you get dark days, it is complained that the men's ways of approaching the quarry are not always fenced?—Well, they should be.

8951. With respect to mess-rooms, do your men go home to dinner, or how?—We have mess-rooms with fire-places.

8952. I have spoken to many owners, and there seems to be no objection to the provisions of a reasonable mess-room with a fire in it?—No. It adds to the comfort of the men a great deal.

8953. Then I should like to ask you about phthisis caused by dust. In the first place you would admit, I suppose, at once that if men, at all events in a confined space, were breathing fine granite dust phthisis would probably follow sooner or later?—I am not a medical man, I cannot say; but I do not think it would be desirable to keep the men there.

8954. One does not require to be a medical man necessarily to know that. You would admit that proposition?—Yes, I think the dust ought to be taken out. The mode we have adopted is this which can be seen by these photographs. (*Handing photographs.*)

8955. What sort of stone is yours—is it a true granite?—Sir Andrew Ramsay calls it a massive intrusive feldspathic rock.

8956. It is a highly siliceous rock I suppose?—It is.

8957. It is not a pure granite?—Not a pure granite.

8958. Therefore, I suppose, we must not conclude too hastily that this dust is as dangerous as some of the pure granite dust?—No.

8959. That would be a matter to be found out?—Quite so.

8960. You do granite crushing?—Yes.

8961. You prefer to call it diorite?—Mr. J. S. Flett calls it quartz-enstatite-diabase. You see on the right of the photograph there is a big chimney which is 6 ft. by 7 ft. and about 70 ft. high. There are three fans blowing into that. Curiously enough I thought when I put that up the dust would blow away and be dispersed, but I found the fans drew in material so heavy that it dropped down into our gutters—so that I built that house which you see on the photograph on the left of the chimney as a settling chamber.

8962. Would it not be better on the mountain side to make a duct to go right downwards, as if conveying water away, and then put a fan in that—only suck it down instead of upright?—That is what I do; the stone is put in at the top of the mill and the fan is at the bottom.

8963. You have an upright chimney?—The system of breaking is by ordinary crushers at the top, and two pairs of rolls, and the fan is below the lower roll; so that the draught is right down and draws the dust out; and then when we have the dust in the fan we blow it up into the air and let it disperse.

8964. You cannot shoot it up?—We can.

8965. Suppose you tried to shoot it down?—Then the wind coming up would blow it amongst the men.

8966. Why try to cause it to ascend at all; why not keep it like water on the descent?—Because you would have the whole place full of dust like a fog. We blow it up right above all our men—we shoot it up 70 feet high.

8967. Is it not a vain endeavour to try to get it to rise 70 feet?—I was explaining. I found it blew the heavy dust up, and there is a house on the left-hand side of that chimney, and there is a conduit from there into another, and this is the stuff we get out (*producing specimens of dust*). You will see that this is so heavy that it is quite gritty and sharp.

8968. The one I have now before me is like fine sand?—That is the dust which if you blew it down below our workings would come back again in a fog. I should like to say, with regard to that, I wrote to our quarry doctor about it. My letter to him was "I "understand that as the quarry doctor you do not "consider the mill-workers are more liable to consti- "pation and kidney trouble than any who work in the "quarry, and that they are not more liable to phthisis "than the others. I am going to give evidence before "the Royal Commission next Tuesday, and I want to "be clear on these points." He writes to me "You "are quite right. From the observations of Dr. Clifton "Hughes and Dr. Roberts, and myself, who have been "surgeons to the quarries for many years, we are all of "opinion that the diseases mentioned are not more "prevalent in mill-workers than amongst others "working elsewhere in the quarry."

8969. That would seem to show that if the owners take precautions to remove the crushing dust by fans it can be made successful without danger to the workers. That is your conclusion?—Yes. We have never had a person who has come to us and said he was ill from phthisis he had caught in the mill. There is a temptation for a rather weakly man to come into the mill because there he is under cover, but if he has any tendency that way naturally it would probably increase.

8970. And it is not such cold employment as out on the hillside?—Quite so.

8971. Do you take precautions with regard to the men employed being of sound health?—Yes, because it is rather hard work, and they have to work late at nights sometimes.

8972. (*Mr. Lewney.*) You said you were not desirous of taking responsibility entirely from the workman. Did you mean that if the workman saw that the top or overburden, was dangerous he should go and remove it himself?—No, I did not mean that—not unless it was part of his duty—but I mean he ought to be responsible for not calling the manager's attention to the place.

8973. You consider that if it looked in any way dangerous the workman himself should inform the officials?—Yes, he ought to do; and if he thinks it is so, and the officials do not agree with him, he ought to say: "I will not work there."

8974. What is the system you have in operation at your quarries with regard to the use of explosives. Do you depute certain men to do the blasting?—No, there are regular drillers, and there are head men over the drillers.

8975. Practical quarrymen?—Practical men who have commenced by bringing drills and drilling, and who watch the other people putting the powder in, and ultimately when you have spotted a sharp man (which you do very quickly) then you allow him to deal with the explosives.

8976. You would not consider it necessary to appoint special men to supervise the blasting?—That rather depends upon the quarry.

8977. There have been suggestions made to that effect?—There is a good deal to be said on both sides. When they are not accustomed to it it would be rather difficult to introduce it. It is awfully hard to change the habits and customs of a lot of men; but I do think if one special person went round and charged the holes or superintended the charging, it might be advantageous—but it would be a difficult thing to do in a large quarry, a big place.

8978. Have you many blasting accidents?—We have not.

8979. So that really in your opinion there is no necessity for any change in the system?—I do not think so. I think the present regulations are sufficient. A short time ago unfortunately we had an accident that was due to a man, absolutely wrongly, charging a hole which had missfired. The regulations in our quarry are that they may not touch the hole for two firings—or four hours. Our times for firing are 8—10.30—12—3.30—and 5.30. When there is a misfire he must not touch the hole again for two firings or four hours. For some reason he wanted to go away and he went absolutely wrongly to charge the hole and it went off too soon.

8980. (*Mr. Lovett.*) As to certificated managers, would you have any objection to a regulation which would necessitate a man like Mr. McClement taking a certificate?—No—he began as a sett-maker.

8981. A man occupying his position is really the man we have been thinking about very much—in fact a man in his position has been very much in my mind when I have been discussing the question of certificated managers. I suppose you would call him the chief quarry manager?—He is the man who goes round and reports to me. He has to keep me informed of everything that is going on.

8982. And the other managers come under his supervision, but the whole lot would come under your supervision?—Yes, if I wanted to give a direction I should tell McClement.

8983. And you would expect him to see it was carried out to your satisfaction?—Yes; he is responsible to me to see things are carried out.

8984. You would not have any objection to his taking a certificate, or anyone occupying his position; but at the same time the idea is that they should feel the responsibility devolving upon them?—Yes.

8985. If a man in his position was a certificated man he would be more likely, speaking generally, to see that your instructions as managing director, or general manager, were carried out?—Yes; of course it would depend upon the sort of examination you would put him through.

8986. I would suggest the examination should be such as where the practical knowledge of the individual would score most heavily. A man with practical knowledge who also possessed a theoretical knowledge would be better than a man with practical knowledge who knew nothing of theory. One has to take a large view in discussing this question. Some companies are careful whom they do appoint, and others are rather inclined to pitchfork men into positions?—Yes. You want to stop that. I have an example. One of our managers who had been with me for many years has left. I have appointed a man named Morris, a sett-maker; he could not pass an examination, but he is a first-rate man; responsible in every way and straightforward and absolutely a good man. He can write, but I do not suppose he could pass an examination. It would depend very much upon the nature of the examination.

8987. It comes back to the point that it depends entirely on the nature of the examination?—He knows his work quite well, and you can rely upon him thoroughly to keep everything quite right.

8988. I quite agree that even if it was made compulsory for them to take certificates you would have to be very careful as to the nature of the examination?—You would; and also take into consideration what the work is you want him to do, and his ability to carry it out.

8989. For the moment I suggest the one man to be certificated is the chief manager?—Yes, I think there is no harm in that.

8990. With regard to the question of overburden, I take it you say there should be regular inspection of working places; and, of course, that would include the question of the overburden. Do you think it would be a hardship upon any employers if some definite regulation was brought into existence as to the distance the

overburden should be removed back from the working face of the rock?—That depends so much upon the extent of the overburden. We have not any overburden.

8991. You are fortunate?—It is different in slate quarries, where they have 20 or 30 yards perhaps.

8992. Some of the granite quarries have anything from 2 ft. to 20 ft. of overburden. But suppose they have 10 ft. of overburden in a quarry, what should you think would be a sufficiently safe distance to remove the overburden?—It ought to be safe. It depends upon what sort of stuff it is. Stone ought not to roll down, which it is especially likely to do in frosty weather when the sun gets on it, or if rain loosens it—the surface ought to be at an angle of rest.

8993. As you know, the regulations are very vague indeed now. You think it should be removed a sufficient distance to make it safe?—Not only that, but the slope of that overburden ought to be the angle of rest, so that nothing will slip down—like a railway cutting.

8994. You have a definite opinion that it should be made safe?—Yes.

8995. As you know, there is nothing in the regulations to enforce that at the present time?—There is not.

8996. You would not oppose any regulation that would ensure safety?—Oh, no; but I have a very strong opinion about not removing all responsibility from the men. The men are there and they ought to take a share of the responsibility of seeing that their working places are safe.

8997. Most decidedly, because the man has most at stake, as his life is at stake?—Yes, but if you take away the responsibility it makes him careless—that is the tendency.

8998. Of course, many of the men working at the face of the rock, and on the rock, are working in gangs?—Very seldom in gangs with us; they like working separately, a man and a boy sett-making.

8999. I am referring to the blockers?—Yes, the blockers are in gangs and at the face of the rock.

9000. It is piece-work?—All piece-work.

9001. Of course, naturally enough if they have a lot of inspection to do, and go round the top of the bank making daily inspections, and taking particular notice of the state of things, as to whether it is safe or otherwise, they think they should have something for that, and it should be taken into consideration when the bill of prices is drawn up?—I do not think they should be going tramping round the quarry. They can see their taking, and they can see whether it is safe or not.

9002. Mostly, not always?—I think they can. The drillers come round, and then the agent would come round. You do not want the men to spend their time in inspection; you want them to make setts and break up the stone.

9003. With regard to the overburden, in some quarries the overburden is removed by old men, and the quarry men are working at the face of the rock; the men at the face of the rock, working piece-work, have no control over the old men working the overburden—the company pay them independently. I do not quite see how the men working in gangs on and at the foot of the rock could control those men, and decide as to the point of safety?—I cannot help you: I have no experience of that.

9004. With regard to the question of explosives you have to spring the hole?—We often do it three times.

9005. Not more?—Not more.

9006. You sometimes have a misfire?—Yes, but very seldom—we always have two fuses in.

9007. How do you manage in the case of a misfire?—Unram.

9008. Do you use water?—Generally.

9009. Have you ever had any accident when you have been unramming?—As I say, we had one.

9010. Only the one?—The curious part of it was that the man who did it was not injured—it blew the rammer out of his hand and hit a man some distance away.

9011. Do you think it would be safer to unram or bore another hole?—If it is done carefully I daresay there is no danger in unramming the hole. You have to do it carefully with water—and it is done continually.

9012. If the hole is left the powder will dry again, and then it is just as effective, and just as likely to explode, as if water had never been used—provided the powder is allowed to get dry again. I have heard of tests having been made and I was rather surprised to find it was quite as effective after it was dry as if it had never been wetted at all?—You ought to be very careful; but there is no danger if done carefully.

9013. You think mess-rooms ought to be provided?—I think so, for the comfort of the men.

9014. How many mess-rooms have you?—Five, I think.

9015. How many men would each mess-room accommodate—shall we say 20, 25 or 30?—More—they take it in turns, they do not all go in at the same time. The five would not accommodate the 500 men all at the same time.

9016. That is what I was thinking; you would not have accommodation for perhaps more than 150?—Yes, I think so.

9017. You would agree that it is only right and reasonable that any new regulation should make provision for that accommodation?—Yes. There are many very nice sett sheds there as well.

9018. You built some in the winter, I think?—Yes, and the men have their meals there.

9019. You built some just lately?—Yes.

9020. With regard to the sett-makers' sheds, do you think it would be unreasonable to ask that partition walls should be extended 3 feet beyond the front of the sheds. When the men are chopping out frequently one man will drive a piece of stone into another man and accidents occur?—I have never had one of that sort. I look at the inconvenience of working. I do not think the men would like it. We built the sheds to meet their requirements.

9021. Supposing the men generally thought it would prevent accidents happening, do you think the employer would think it a hardship?—I am sure they would do it.

9022. Coming to the dust question in the mill, you provide a box for the reception of the dust. In this picture I see the dust coming out?—Yes.

9023. Have you a good supply of water inside?—No.

9024. Do you not think it would be better if water was provided?—No.

9025. It would do away with the inconvenience of the dust and the danger of the dust flying out?—I do not think it would; I tried it.

9026. What was your experience?—It was no good at all. I had a chamber 6 feet by 8 feet, and I blew the dust like that, and I had a pipe across with minute holes, a sheet of water, and the dust flew through it.

9027. You would take out sludge then instead of dust?—No.

9028. Sludge cannot possibly fly about?—I do not think you can do it.

9029. The best thing is to get the dust into sludge form as soon as possible?—I do not think so.

9030. It is the evil recurring in another way?—Yes.

9031. Some companies do it?—I should like to know which. Will you tell me which company does.

9032. They do it at our place. There is a good supply of water inside the chamber?—They had not when I was there.

9033. They have no chimney?—They used to have.

9034. I think not, but I may be mistaken. At any rate I will look again. Do you think that fans ought always to be put into these crushers?—I think so.

9035. Unless not of considerable size?—If the building is enclosed.

9036. You mean something like yours?—Yes. Some of them are not. Some mills are open.

9037. You have never heard men complain that the dust has proved injurious?—After your Commission came down they told me they were affected by constipation and kidney trouble. I have never had any complaint till you came down. Our doctor says the constipation and kidney trouble no more affects the millmen than other men.

9038. Have you had men ask to be removed out of the mill and set to other work because their health was affected?—There was one. He was ill and I put him outside, but he has gone back. He asked to go back. The reason he wanted to go out was not the effect of the dust; he had something the matter with him, and I put him outside, and he is back in the mill now.

9039. (*Mr. Ainsworth.*) With regard to the cuts and wounds, I suppose you would generally be in favour of the extension of ambulance drill and first aid drill?—Yes; we have those classes; there is a class going on now.

9040. That is the best way of dealing with it?—Yes.

9041. With regard to certificated managers it would depend a great deal on whom the examiners were, and the kind of examination, as to the difficulty of obtaining a practical certificate?—Yes.

9042. If you had a board consisting of something like two representatives of managers and two practical working men, you would soon be able to ascertain what the practical knowledge of any man was?—Yes.

9043. If it was worked on those lines there would be no difficulty about a certificate?—No.

9044. There are practically two kinds of managers to deal with. One the general manager, who may be a first-class engineer, and then what we call an underground manager whose business it is to be posted in the entire condition of the workings from day to day?—Yes.

9045. Those two men are rather of a different class?—Yes.

9046. So that the practical certificate would be wanted in one case and hardly be necessary in the other?—Yes. In our case McClement, the head man in the quarry, is not a very good mechanician; he does not know much about the engine, but is a first-rate man for going round. If anything is wrong with the engine the engineer tells him and he tells me.

9047. (*Mr. Thomas.*) He would practically be capable of taking what is equivalent in collieries to an under manager's certificate, which is granted chiefly for practical working, deleting any written examination?—Yes, he would not be able to drive the engine.

9048. There is great difficulty, and I appreciate there is, in having certificated managers for quarries however small they may be. The number of men employed would settle the question whether the necessity arose for a certificated manager?—Yes.

9049. The number would have to be fixed?—Yes. There are so many little quarries.

9050. You said you would not do anything to remove the responsibility from the men for the examination of their working place. You are no doubt aware of the Special Rules, the Model Code, and so on?—Yes

9051. And also of the clauses which are already existing?—Yes.

9052. Which for memory's sake I will read: "Each "workman shall, before commencing work, and during "the course of it, and especially after blasting, make a "careful examination of his working place, and remove "any loose rock, stones, or ground, which might be "dangerous." You would agree to retaining that in any regulations?—Yes, but the man who will be in danger when the blast takes place, is not the man who moves the stone which falls.

9053. No, but your general opinion is that you should retain some provision which throws the responsibility and retains the responsibility on the men as well as on the officials?—I go further. Will you read that again, please?

9054. "Each workman shall, before commencing "work, and during the course of it, and especially after "blasting, make a careful examination of his working "place, and remove any loose rock, stones, or ground, "which might be dangerous"?—It is not the duty of the man who will be in danger to remove the stone likely to fall. When the blast takes place the man goes out. He is making setts or breakers. Then the blast comes. This man does not clear the face of the rock.

9055. The next clause provides that: "No work-"man shall throw down rock, stones, ground or other "material which might endanger other persons, with-"out giving them warning and seeing that they have "retired to a safe place"?—I want to go further; after the blast takes place, if there is a loose stone I want the man who is in danger to have the responsibility of telling somebody and having that stone pulled down, although it is not his duty to pull it down.

9056. You are of opinion that these existing clauses require modification?—Directly you take the responsibility from a man of seeing his place is safe you make him careless.

9057. These provisions, especially the Model Code, seem to throw the responsibility on the workman at the present time?—In working a quarry a man who is making setts cannot remove the stone. A man accustomed to a rope will go up the face of the rock and pull down the dangerous stone. The bank is laid out into bargains 8 yards wide, and his business is to work at the bottom of that gallery. The gallery is 60 to 75 feet high. The blast comes at the top. The drillers are a different lot of men. If there is a dangerous stone they may not see, the man who is working below ought to be responsible for calling attention to it. He sees his bargain and is acquainted with it, and is the man to see whether there is something dangerous, and I think he ought to be responsible for calling attention to it at all events, although it is not his business to make it safe.

9058. Do you not think the present rules cover a suggestion of that kind?—The rule says he shall do it. Practically he often does not do it.

9059. The existing regulations require some modification?—Yes. I like the men to be responsible.

9060. You agree there should be some provision as to mess-rooms?—I think it would add to the comfort of the men, to what extent I cannot say; I should like to accommodate the men.

9061. In your place you are well situated in that respect, but there are a great many other quarries in the country?—There are.

9062. With regard to ambulance, do you agree you should lower the number of men. First of all, let me read this: "At quarries where more than 25 persons "are employed, ambulances or stretchers, with splints "and bandages, shall be provided at convenient places "ready for immediate use in case of accident." It has been suggested that the number of 25 should be lowered?—Yes. It is easy to get one of these ambulances. They have a tourniquet and everything with it, and I think it ought to be provided.

9063. You would lower the number?—Yes, I think it would be a good thing to have in the quarries. I think there should be one of these rooms, a room where you can have the appliances laid out in case of a serious accident. At present we have to bring injured men into the office. At most of the big iron foundries they have special accommodation, because the men are so liable to blood poisoning from the iron. I ought to have special accommodation myself.

9064. (*Mr. Ainsworth.*) You would have it adjoining the changing-house?—No, the office is better.

9065. (*Mr. Lewney.*) In regard to the ramming of holes, by what method do they carry that out?—They have a rammer.

9066. Of copper?—Yes, or wood. We have no iron about the place.

9067. Have you seen any holes unrammed by compressed air?—No.

9068. Mr. Lovett asked you a question in regard to your manager, as to whether, if he had a certificate it would enable him to carry out your orders. I am not sure whether you agreed or not; but, if you did, in what way would it assist the manager to carry out your orders if he had a certificate?—I do not see it would.

(*Mr. Lovett.*) I was generalising when I was speaking of a man in his position.

9069. (*Mr. Lewney.*) I want to find out whether the possession of that certificate would be an additional qualification?—No, I do not think it would.

9070. You mentioned a man who is an excellent quarryman, but you felt assured, in his case, it would

be impossible for him to pass an examination to qualify for a certificate?—It depends on the certificate. He is a first-rate man for what I want. I put him in command of the bank, and he is responsible for everything going on rightly. He has lived in the quarry, grown up in it, and he is a man one can be sure will not overlook anything, but I do not know that he would pass an examination.

9071. Can you imagine a case in which the possession of a certificate would add to a man's qualifications?—Not in a quarry like ours, where we select our overlookers. I agree there ought to be some responsible person the Inspector could go and see and find. The Inspector does not always come at the same time; he never tells us when he is coming, and if we made a certain man the certificated man, he might be away when the Inspector called. McClement is the one who would be responsible. I do not know if it would be desirable to have a man appointed thus.

9072. It does not follow because a man is a manager that it is necessary he should have a certificate?—No.

9073. The point is, would it add to the safety of the men and the better working of the quarry that the man should have a certificate?—I do not think it would.

9074. After all, you prefer the man with the practical experience?—Yes, whom I trained myself.

9075. Supposing there were a system of certificates instituted, do you not think in time it may come to this, that the man with the theory would get preference over the man with the practical knowledge?—It would depend on who was the owner or manager of the quarry and the practical ability of the man.

9076. There is that tendency?—Yes; it is different from a mine, where there are so many gases and other dangers and the work is carried on underground in the dark. A quarry is all open in galleries; it is more like a railway cutting. You want to have a practical man who will supervise carefully and intelligently.

Mr. James Albert Hadden called and examined.

9077. (*Mr. Ainsworth.*) You are a Solicitor, of Aberdeen, and you attend on behalf of the United Kingdom Granite and Whinstone Quarrymasters' Association?—That is so.

9078. You have been in touch with the whole question for some time?—I have.

9079. You have gathered from what has been passing that one of the principal points we want to ask you about is your opinion as to certificates for managers?—I may say I put that point before a meeting of my Association, and it was resolved: "The "meeting was of opinion that such certificates were "quite unnecessary because in the first place there is "not within the knowledge of any member of this "Association any allegation on the part of the "employees that the causes of accidents in quarries "are due to incompetency on the part of foremen, and "in the second place that the responsibility upon "employers is such at the present time that they are "not likely to employ or keep in their employment any "person as a foreman who is not duly competent. "Furthermore the duties of officials and workmen "seem sufficiently set forth in the Special Rules "framed relative to the Quarries Act, 1894."

9080. You will be aware that in the case of collieries certificated managers are required?—Yes. I am talking entirely in regard to granite and whinstone quarries alone.

9081. The object of the present inquiry is to ascertain how far many of the regulations as regards collieries would assist quarries. Might they not apply with advantage to quarries and metalliferous mines?—The feeling of the Association is that certificates for managers are not necessary in the case of granite and whinstone quarries: they prefer practical men.

9082. You would not be worse off if your underground manager was obliged to obtain a practical certificate from a practical man?—I think the feeling with regard to that is, we have to consider the General Manager of the quarry and the foreman who is the practical manager of it. Talking about the practical manager of the quarry, namely, the foreman, the feeling is that if he has to pass an examination and at the same time is a practical man, he would not remain in that position: he would get a much better situation than the one of foreman.

9083. That would be an advantage to him?—It would be, but I do not know that it would be an advantage to the management of the quarry.

9084. However, supposing such an arrangement was come to, you would agree that it would depend a great deal upon how the Board of Examiners was constituted, and what sort of certificate was required?—Undoubtedly.

9085. If it was for practical work you would not see much objection to it?—Not a great deal.

9086. The next point is as to the examination of working places and overburden. What are your views about that?—The opinion of the meeting was that these were sufficiently provided for by the Special Rules, which I understand have been put in.

9087. What are the Special Rules you work under: are they the Home Office Rules?—Yes.

9088. (*Mr. Lovett.*) The 1894 Model Code?—Yes.

9089. (*Mr. Ainsworth.*) You think the Model Code is sufficient?—That was the opinion of the meeting.

9090. Are you prepared to give any suggestions for a rule or rules as to the overburden, how far it should be kept back, or anything of that kind?—No. I think that is really a matter of circumstances.

9091. You do not think you could lay down any fixed rule?—No, not as to keeping it back a certain distance.

9092. It might not be necessary in your case, but it might be in others. We are anxious to get at whether it would be as well to lay down special rules in some cases?—I think if it was provided it should be put into a safe condition that should apply to all circumstances.

9093. You are not prepared to define what you mean by "safe condition"?—Not a hard-and-fast rule, I am afraid.

9094. Then as to explosives?—It was recommended that explosives should not be used indiscriminately by workmen, but only under the charge of a competent man appointed by the owner of the quarry, and fired by his direction. In the opinion of the Committee the explosives are at present sufficiently tested and reported on by the inspector, but if any further test or report is required it should be made to apply to the makers of the explosives and not to the users.

9095. It has been suggested that all explosives should be subject in the first instance to a Government test and approval?—Yes.

9096. You approve of that?—Quite.

9097. That no one should be in a position to offer you explosives which had not passed the Government test; that is approved of?—Yes.

9098. What are your rules as to unramming? That is also under the Home Office Rules?—Yes. Some of the other witnesses who will follow will give more details with regard to the quarries.

9099. We may take it you are satisfied with the Home Office Rules?—Quite.

9100. Then with regard to rock drilling, what is your opinion about the dust?—In the opinion of the Committee of my Association there are no injurious effects from dust in open quarries.

9101. How about in the working sheds, where you are cutting stone?—There are not very many quarries where the stone is cut in sheds—at any rate not in our part of the country.

9102. Do not the men run some risk of getting dust into their lungs?—I do not think so; it is chiefly worked in the open.

9103. Is the dust injurious? Have you had cases of phthisis?—No, I have no cases within my own knowledge.

9104. You are able to speak for the whole of the quarry-owners of Scotland, and granite owners?—I am trying to reflect the opinion of the quarry-owners so far as I have been able to gather it.

9105. Do you think many accidents are of a preventable nature?—I do not think so.

9106. When accidents happen, what arrangements have you for dealing with them? Have you arrangements for ambulance and first aid?—Of course, according to the Home Office Rules an ambulance must be provided where there are 25 employed, and the feeling of my Association is that ambulance arrangements should be provided in every quarry irrespective of the number of men employed.

9107. I am glad to hear that. That is important. You say irrespective of the number of men employed, there should be ambulance provision. You would be in favour of ambulance classes amongst the men?—Quite.

9108. What do you say about the fencing of quarries?—I am not sure I follow what is meant by "fencing" quarries.

9109. First, in order to prevent people falling over, and, secondly, to prevent stones becoming dislodged and falling over on to the men who are working. One witness pointed out that on mountain sides sheep might be grazing and might dislodge stones, and falling from a considerable height they might be dangerous?—I think in my quarries, so far as stones falling down from the top is concerned, that is provided for already by a fence along the top. So far as fencing the quarry itself from the general public is concerned, I think that is purely a matter of circumstances. In point of fact most quarries are fenced. The area comprised within the quarry is fenced in most cases.

9110. The point has been before us, and we wanted to know what you thought about it?—Some of the other witnesses might be better able to tell you about that from their own experience.

9111. As far as your experience goes it is of a satisfactory character?—That is my opinion.

9112. The point has been raised as to whether power should be given, as in coal mines, to the workmen employed at quarries to examine the same if deputed by the men to do so. What do you think about that?—It seems to my Association that that is sufficiently provided for already by the Home Office Rules, and I refer particularly to section 5, subsection 34: "Every workman who notices anything that appears unsafe or likely to produce danger, shall forthwith report it to the owner, agent, or person in charge." He is invited to make any complaint if he finds anything wrong.

9113. You think that will meet everything?—That is sufficient, in the opinion of my Association.

9114. You have spoken about ambulance arrangements?—Yes.

9115. How about mess-rooms, so that the men are able to get their meals?—My Association is of opinion that is purely a question of circumstances. It depends on the situation of the quarry. If a quarry is near a town where the men reside, then they go home to their meals, and it would be ridiculous to provide mess-rooms for 600 or 700 men that would be only used perhaps by 100 or 150.

9116. Most of the men remain to take their meals at the quarry. That might be the case. It might be necessary. Would you be in favour then of the mess-rooms being provided?—I do not think it should be made compulsory that mess-rooms should be provided.

9117. It adds largely to the comfort of the men?—I do not know that in some cases the men would use them. They have shelter of some sort at most quarries. The difficulty that my Association saw with regard to that point was this, as to the provision they would have to make for the number of men. That is the chief difficulty.

9118. (*Chairman.*) I should like to ask you a question about those mess-rooms. Supposing it could be proved to you and that you were convinced that a certain number of men, say 100, lived so far from their homes that they could not go home, that they were respectable orderly men who would use the mess-room properly, would you have any objection to providing a mess-room for 100 men in a quarry where there were a large number?—Not if there was any guarantee that these 100 men would use it.

9119. The only point the Association make is this, and we are of opinion that there is reason in it. There is no need to put them to the expense of providing unnecessary room for nothing. You would object to that yourself?—Undoubtedly.

9120. Provided you could be convinced there was evidence that a mess-room of a certain size would be used, you would have no objection to supply it?—None whatever, and I do not think the employers would have the slightest objection to do it.

9121. That admits the principle that where it will be used and there is a reasonable necessity for using it, it is fair an employer should give some form of shelter to the men during the mid-day meal?—Within reason.

9122. Without being obliged to go further?—It is to the employers' interest to see the men should be made comfortable.

9123. No employer could be asked to go further than that reasonable proposition, in my opinion. The second proposition I should make is this: The top of a boiler-house is hardly a sufficient provision. I say that because I have seen men sitting there eating their food from a handkerchief. They were sitting on the top of the asbestos covering in comparative darkness, eating out of a handkerchief on their knees. In another quarry there was a set of men in a shed sitting on benches and eating off tables. Do you not think the first ought not to be?—I think they are entitled to reasonable comfort in the taking of their meals.

9124. The last question connected with that is this: It is not a very expensive thing provided the men will use it. To provide a shed, for instance, is not expensive if you had 100 men employed?—It depends on the class of building that is proposed.

9125. Provided you put up something plain that will keep the wind and weather off, and also there should be a fire of some sort at which they can cook?—Quite.

9126. That is not very expensive?—It might depend on the material the shed is built of.

9127. Supposing you were requested to design a reasonable shed which would not be expensive, would not one with corrugated iron outside and wood inside be suitable?—That would not be a serious matter.

9128. The men would be contented with corrugated iron outside lined with wood?—That would be a comfortable thing.

9129. You would be contented with it?—Perfectly.

9130. So should I. I think our views are very much at one, after all, upon the whole question?—Yes, to a large extent I think they are.

9131. I do not think reasonable men would ask more than we agree is reasonable?—At least they should not get it if they asked for more.

9132. It is generally agreed that men are very ignorant in the way of binding up wounds and cuts. They bind them with a dirty rag, and the wound gets poisoned, and they are disabled longer than they need be. Is that a wrong or a right impression?—I am afraid I cannot express an opinion upon that.

9133. It is an impression I got from making inquiry. Many men I saw in the slate quarries had a rag round their hands, and I got some of them to remove the rags, and it appeared to me that there was a good deal of dead flesh about, and that they had been unskilfully treated, and that if they had been properly treated the wounds would have healed long ago?—I have not had any information laid before me with regard to that.

9134. A little more knowledge as to simple first-aid anybody might have would be of advantage?—Undoubtedly it would be; ambulance classes, for instance.

9135. (*Mr. Lovett.*) I understood you to say that the employers thought the Model Code was sufficient?—That was their opinion.

9136. They thought there was no need for amendment?—They cannot suggest any.

9137. Will you look at Rule 31, of the General Code. You quoted it, and that is why I call your attention to it. "Each workman working on the face of the quarry or standing on a narrow ledge

" shall when requisite use a rope or other appliance, " and every workman shall before commencing work " —that is where you commence to quote—" satisfy " himself as to the safety of any rope and other appli- " ances for his personal use"?—I do not think I quoted that. It was the last witness.

9138. It may be my mistake?—I did not quote it.

9139. (*Mr. Thomas.*) I think this witness quoted Rule 34?—Yes. "Every workman who notices any- " thing that appears unsafe or likely to produce " danger shall forthwith report it to the owner, agent, " or person in charge." That was the one I quoted.

9140. (*Mr. Lovett.*) Take them both, then. That is satisfactory so far as it goes, but it does not go very far; in fact, I do not think it goes far enough. It says that each workman working on the face of the quarry or standing on a narrow ledge shall when requisite use a rope or other appliance. That is quite right, but suppose the rope or other appliance is not provided, which is the case in some quarries at present?—I think in most quarries a rope is provided.

9141. There is no regulation that shall enforce that. Why not get that amended, at any rate?—There is no objection to it being made compulsory that a rope should be provided.

9142. That would be one amendment, at any rate. It would not only bring it up to date, but make it more satisfactory. Suppose you have a face of rock 120 feet, and a rope is provided only 80 feet long, it is hardly satisfactory from the point of view of safety. Again, the men are told to examine the place and see that it is safe, and also make complaints if they see fit. What is the use of making the complaint that a rope is not satisfactory, or that it is much worn, without you have a clause that will compel the owner to find a rope that is safe and satisfactory? As a matter of fact workmen do complain, but there you are. You have no regulation to say that the employer shall provide a rope that is safe and suitable. I suggest there is room for amendment, and stringent amendment?—I do not think it is contemplated under these rules that the workman should provide the rope. I think it is contemplated that they are to be provided by the employer, and, being provided, that the workman shall use them. That is my reading of it.

9143. Exactly, but if they complain that the rope is not satisfactory, and not such as will permit of them working with safety on the face of the rock and they report it, why not have a regulation to say a rope should be provided which would be suitable?—I understand it is an offence committed by the owner if he neglects anything provided by the rules, and I should say if a workman notices anything that appears unsafe or likely to produce danger, and reports it to the owner or agent, or person in charge, and that owner or agent or person does not take steps to remedy that, he is liable to be punished under the terms of the Act, and liable to the penalty provided by the Act.

9144. That is your opinion, I take it, as a legal man. Why not have a regulation which is plain and conclusive?—If your point is that you wish it more specifically provided here that a rope or appliance should be provided by the employer, I see no objection to that being put in definitely, if it is not already implied by the rules themselves.

9145. You think it would be more satisfactory to have it definitely stated?—I see no harm in it being definitely stated, but I think it is implied by the rule.

9146. I should like to be sure about it.

9147. (*Chairman.*) The point is that while the rules provide a number of things shall be provided, they do not mention ropes. There is no general regulation enforcing on the employers the provision of the necessary appliances?—I quite see the point.

9148. It is a point for consideration, certainly.

9149. (*Mr. Lovett.*) Now take Rule 32: "Each " workman shall, before commencing work, and during " the course of it, and especially after blasting, make a " careful examination of his working place, and remove " any loose rock, stones, or ground, which might be " dangerous." In doing that, a man might hinder somebody else's work. The man at the foot is more often on piece-work, and has nothing to do with the safety of the rock under which he works. Drillers or gangs of men will work on the rock, and they will make it safe as far as possible, drill the holes and attend to the machines. That is their work. The men working at the bottom have no control over the state of the rock. They might call attention to an unsafe place or a stone that might easily get dislodged, still they have no control over putting that right. If they do they are doing it for nothing?—If a workman notices anything unsafe he has to report it under section 34.

9150. He may have to report it?—I have no doubt the proper official would see to it.

(*Chairman.*) I think the way they are worked is this. The workman, under that clause, is only bound to examine, and has only a right to examine, his own working place. Rule 1 provides that the working of the sides, tops, or overburden of the quarry shall be carried on so as to prevent dangerous falls. Whether sufficiently expressed or not, it is rather meagrely expressed. I think the meaning is that the employer would be liable if the top was in a dangerous state. He would commit an offence if he did not cause the upper part to be made safe all along, because they could say "The working is not carried on to prevent " dangerous falls, therefore you are liable under Rule " No. 1."

(*Mr. Lovett.*) I am suggesting that it is far too meagrely expressed.

9151. (*Chairman.*) You might make a note of that, and when we deal with the Special Rules we might make some recommendations?—I think the wording of the rule bears out what you said, because it speaks of making a careful examination of his working place.

9152. He is only liable for not doing that, but what is he to do if he sees a rock that is not in the working place?—Then, as far as that is concerned, one goes back to Rule No. 1.

9153. (*Mr. Lovett.*) With regard to mess-rooms, I take it you agree that it would not be a hardship on the employers if the provision of mess-rooms was made compulsory?—Within reason.

9154. You may be aware that in many cases now men are supposed to be on the works at certain hours, and they get their meals when and as they can. They should clear out of the quarry, but they do not do so, for the reason that they have not a mess-room to go to. In the winter-time they can sit anywhere and get their meals as best they can, and at the same time they are tempted to sit about in the sheds during blasting, and there is a tendency to accidents from that cause. It would prevent that, and the men would be responsible entirely if mess-rooms were provided?—Of course, that would be their look-out.

9155. Do you see the temptation there is for a man to get into a sett-maker's shed in cold weather when blasting takes place, whereas if he had a mess-room where he would be comfortable and could take his meals in safety he would go there? He may be responsible now, but if he had a place to go to it would be better. That is one idea of the mess-room?—That always comes back to the point the Chairman put to me, it would depend upon the number of men who would use it. One could not be expected to provide mess-rooms for 600 men if only 100 were to use them.

9156. I quite agree?

9157. (*Mr. Ainsworth.*) On the point of the certificated manager, especially the certificated under-manager it would surely be to the advantage of the employer that that man should have some practical certificate, because it removes any possibility of a charge against him of employing a man who was not up to his work?—That raises the question as to the nature of the examination and who were to be the examiners.

9158. I am always assuming that the examiners would be men thoroughly qualified in the practical working of quarries or mines, and would satisfy themselves by a reasonable number of questions and by inquiry that the man was up to that?—It depends on the examination.

9159. Will you not be satisfied with a Board of that kind consisting of two first-class managers and two first-class workmen, who would satisfy themselves that the man was able to do what he undertook?—If a

man was able to pass satisfactorily an examination by two managers and two practical workmen. I should think that man would make a good enough foreman.

9160. If they were satisfied, it would be an advantage to the employer to feel the man they had employed had given satisfaction to a proper tribunal?—Quite.

9161. If it was done on those lines you would not see any objection to it?—I think the examination should be more of a practical than a theoretical nature.

9162. That is the point I want to bring before you—so long as it was, you would be satisfied?—Perfectly, if it is a thoroughly practical examination.

Mr. Alexander Archibald Russell Lang called and examined.

9163. (*Chairman.*) You are a quarry-master of Gourock, and you appear on behalf of the United Kingdom Granite and Whinstone Quarrymasters' Association?—Yes.

9164. How many granite quarries and whinstone quarries does that represent?—I represent the western district of Scotland.

9165. How many would there be, roughly? In the Association in the western district there are about six.

9166. Can you tell me how many men?—On an average I should say, perhaps, about 80 men each.

9167. How is your quarry worked?—The quarry is wrought on the level, and the stone is bored by rock drill, the holes ranging from 5 feet to 20 feet deep, and are both vertical and horizontal according to the position of the shot. Operations are commenced on the top and worked down in ledges or platforms, to give sufficient footing for the rock drill. Life lines are provided for the men engaged on this class of work. When about two-thirds of the depth of face has been worked, the boring of horizontal holes is commenced from the bottom, for removing the remaining third of the rock. When the rock has been blown down, pneumatic hand drills are employed reducing it to weights that a crane can lift. Those pieces are carried out by locomotive cranes to the sett-makers, who manufacture the setts at their huts. The refuse cuttings are placed in wagons at the sett-makers' huts, and drawn up to the crushers, where the material is crushed. It is then elevated 50 feet to the screens, where the crushed stone is divided into its respective sizes, and any unsuitable pieces returned to the crushers or to the crushing rolls, for the manufacture of chippings. From the screens the selected stone is dropped into depôts from which it is dropped into carts when required for removal. I also manufacture a class of setts of small dimensions and irregular shape by machines, and have cutting machines for the production of special road metal, similar in principle to hand-cut macadam. I also manufacture tar-macadam with crushed and cut stone. Gas engines and suction gas supply the power for driving crushers and rolls, compressers, tar-mixers, and sett and metal cutting machines. Steam on locomotive cranes, and occasionally on rock drills.

9168. You are familiar with the working of other quarries?—Yes.

9169. Both granite and whinstone?—Yes.

9170. Those are worked pretty much on the same principles you have just described to us?—Very similar to that.

9171. There was a meeting of the Committee of the Association at Carlisle on December 17th?—Yes.

9172. Was that of the United Kingdom Granite and Whinstone Quarrymasters' Association?—Yes; that was a committee meeting.

9173. I believe some points were resolved on at that meeting?—Yes.

9174. Those have been submitted by the Secretary to the Association?—Yes.

9175. With regard to those points, will you lay emphasis upon any that occur to you as particularly worthy of remark?—I think one of the principal questions was with regard to the manager's certificates.

9176. What do you say about those?—I consider that a manager's certificate is scarcely necessary in this way. The managers at present are, as we call them, really foremen. They may be good practical men, but might be unable to pass a written examination. A good deal would depend on the examination.

9177. You would be in favour of having some particular man told off as manager of the quarry, so that the Government would know to whom to look?—We have no objection to that.

9178. Would you be in favour of there being a certificate given in cases of quarries where more than a certain number of men were employed? Would you put it in that way?—Do you mean a certificate of efficiency?

9179. Yes, having passed an examination?—It would depend a good deal upon what sort of examination he would be required to pass.

9180. You would not be in favour of having an examination for all the managers of the small quarries?—No. I think that would probably be rather hard on the small owners who have only about 20 or 30 men, and act as their own managers or foremen. It is probable they could not pass an examination of that sort.

9181. You think it desirable apparently only in mines where complicated machinery is used?—Yes, or large quarries.

9182. And where the problems are more difficult to deal with?—Yes.

9183. You do drilling in your quarry, I suppose?—Yes.

9184. What drills do you use?—Compressed air and steam drills for large holes.

9185. What makes, do you remember?—The Cornish drill, made by Holman Brothers, of Camborne, and the Ingersoll.

9186. Is there not the Hardy Pick?—Yes, but I have not heard of it being used much in Scotland. There are a number of small drills used for pop-holes.

9187. How are they wetted?—We do not wet the smaller holes.

9188. Not even in granite and whinstone?—No, because the drill is apt to choke up with the water in the small drill. In the large drill they are wet in holes of from 4 inches in diameter down to about 1½ inches. When you pass under that they are bored dry.

9189. Are they drilled vertically downwards?—Horizontally and vertically downwards, that is the principle, seldom upwards.

9190. (*Mr. Thomas.*) The small drills are commonly known as the hammer drills?—Yes, little pneumatic drills.

(*Mr. Thomas.*) They are little things the men hold in their hands.

(*Chairman.*) Do not those cause a great deal of dust, if dry?

9191. (*Mr. Thomas.*) Yes?—The dust comes from them.

9192. (*Chairman.*) You cannot wet those?—We do not, for the reason that it sticks up the drill.

9193. (*Mr. Leveson.*) If there was a plentiful supply of water it would not cause the drill to stick?—It forms mud in the hole.

9194. (*Chairman.*) If there is a lot of water the mud would be washed away. If you give a little it is fatal, but a great deal clears everything?—I do not know but the cure might not be worse than the disease. It would blow the mud over the man's face.

9195. I do not think so?—If boring up and down the hole.

9196. If boring upwards it might fall on him.

9197. (*Mr. Thomas.*) Does the exhaust from these drills go to the bottom of the hole?—Yes, and blows the dust out.

9198. Water, with that type of drill, would be inadvisable?—Yes.

9199. You never use any spray attachment to these drills?—No; we have tried putting in water.

9200. They make a good spray attachment with those drills?—We have not used that.

(*Chairman.*) What would be the cost of fitting a water spray apparatus to such a drill?

9201. (*Mr. Thomas.*) About 2*l.* to 2*l.* 10*s.*?—I should not think more than that.

(*Chairman.*) You would draw the water out of a bucket for that. It does not use more than three or four gallons an hour.

9202. (*Mr. Thomas.*) Something like that?—I do not think the amount of water would be very deadly, but the trouble might be with it going wrong.

(*Mr. Thomas.*) Miners as a rule take a little wire in their pocket, and insert it in the hole.

9203. (*Chairman.*) There is a good deal of crushing done with whinstone and granite?—Yes.

9204. Stone cannot be crushed without dust being generated?—That is so.

9205. Can you wet the stone when it has been crushed?—If you wet the stone when it has been crushed, it means the smaller screens become choked up.

9206. Cannot you pass steam into it?—Not very well.

9207. That is being done in ganister crushing, I believe?—I was not aware of that.

9208. The crushing of granite, at all events, would produce a dangerous dust?—You cannot get away from the dust.

9209. You can ventilate?—You always have dust in crushing.

9210. You can ventilate by means of fans?—We keep the houses as open as possible.

9211. You do not keep them entirely open. You have a belt in the middle, and corrugated iron round them, open at the top, open a little at the bottom, and closed in the middle?—Mine are quite open, with a frame-work.

9212. A skeleton?—Just a skeleton. The majority of them about the West of Scotland are not covered. They may have a little roof over the crusher, a rain roof.

9213. Otherwise it is a simple skeleton without any closing?—Exactly.

9214. The man close to the hopper in the middle of it is surrounded with dust?—Yes.

9215. Does he not breathe it?—He is bound to.

9216. Does he not get consumption?—I have not heard of cases. I have had no trouble of that sort at all with the men.

9217. Will you describe the crushing plant at Gourock?—Yes. It is constructed with the crushers about 6 feet above the level of the ground. Two machines deliver into one elevator, and the third machine into a second elevator. The former pair have their own feeding platform, incline and storage gangways for the wagons of rubble. The elevators receive the crushed stone from the crushers in a pit in one case and on the ground level in the other. The elevators in each case being about 50 feet high, and deliver the crushed stone into a grading screen, which separates the stone into two sizes, namely, macadam and chips, each of which is again screened into eight grades sized by separate screens. The graded sizes of macadam and chips fall into boxes having a capacity of one ton each, the screens and boxes being partially enclosed. Those boxes are emptied by waggons moving on a platform directly below them, which is quite open to the atmosphere. The contents of the waggons are tipped into storage depôts until required for dispatch. Certain sizes of chippings are dropped down covered shoots into a set of crushing rolls; after being crushed, they are delivered into the elevator already mentioned, and are taken up thereby for screening. Any stone too large for the screens is rejected and returned to the crusher jaws. The men on the feeding platform and also the middle platform get very little dust, as the feeding platform is close-jointed. Underneath the crushing platform or the crushing rolls there is no boarding in, and only one man is employed underneath, his duty being to keep the elevator pit clean. This man is provided with a respirator, but it is seldom used, owing to the open nature of the erection. A fan would be of no service whatever in this method of construction; even if it was, the concentration of dust at the fan discharge would be highly objectionable to workmen and the surrounding property.

9218. I do not see why a fan would be of no service and how there would be a concentration of dust at the fan discharge. You may take the fan discharge a long distance off?—Unfortunately in our case I do not see that we could, because the road runs outside the crushing plant.

9219. Take them over the road?—Then you go down into a public recreation ground. A good deal would depend upon the situation of the quarry.

9220. (*Dr. Haldane.*) With regard to the crushers, in attending to these machines, is it necessary for the men to stay inside under cover amongst the dust?—Our crushers are quite open, and they have to be about when they are drawing off the material after it is crushed, into the wagons. The men must be attending there. The screens are enclosed in boxes with sliding doors, and the men have to go there to draw off their loads.

9221. They have to go inside?—No, not inside, on the platform underneath the box.

9222. That is a place where they are exposed to breathing dust?—There is dust there. As the box discharges a little dust comes out along with the macadam.

9223. You mean the actual crusher is enclosed in a box?—No, the crusher is right down below in the bottom. There are no men working alongside of the crusher; the men are above that, on the tipping platform.

9224. How is the crushed stone raised again?—By an elevator.

9225. Then it is assorted?—Yes, into a number of different sizes in screens, revolving screens.

9226. Are these screens enclosed?—Yes, in boxes.

9227. There is a great deal of dust inside that box?—Yes.

9228. It is in filling in the classified stuff that the men get exposed?—They would get a little dust there as it comes out of those screens.

9229. Would it not be possible to wet the stuff after it has been through the screens, as it comes out?—It might be sprayed in the box.

9230. Just as it is coming out?—Just as it is coming out of the box.

9231. I do not know how much the men are exposed to this dust?—It is very slight; there is not a great deal of dust comes as they open the boxes.

9232. In some crushers I have seen there was a very great deal of dust to which the men were exposed?—You cannot get away from it. There is a great deal of dust round about a crushing plant. It is impossible to do away with it in the crushing.

9233. (*Mr. Thomas.*) Would it be impracticable to use sprays on the jaw crushers? They are the ordinary jaw type of crushers?—Yes. The trouble is it would choke up the finer screens. They range from one-sixteenth of an inch upwards, and in wet weather those screens become clogged up. The holes are choked with mud, and it would spoil the finer sample of material completely.

9234. All the dust is when you open the box afterwards?—Yes, it is where the principal dust is. There is a good deal round about the crusher jaws underneath the feeding platform.

9235. You say it would not do to spray that?—No.

9236. (*Dr. Haldane.*) Is the dust that men are exposed to carried out with the air from the drums, or just formed as they shovel it about?—It is worse down where the material leaves the jaw of the crusher, and there is a little of it when the elevator discharges into the screen. There is always a little there at the point of discharge, and it is carried along the screens also, but getting less all the time. As the stone gets larger the dust practically disappears. It is worse in the finer sizes. The worst point of all is just at the jaws of the crusher.

9237. You have no arrangement for exhausting the air?—We have none. We have no arrangement for drawing it away.

9238. Do you think any arrangement of that sort would not be practicable?—With our construction I

do not see that it would be very practicable, because it is so open that I do not see we could have a concentrated draught to draw it off.

9239. Your drums are enclosed?—Yes.

9240. They are only open at places where the stuff has to come out?—Yes, just at doors down below.

9241. If you had a current passing through these drums and taking the dust away, the current would be in an inward direction at the openings where the men are working?—Yes. There is a worse point which is down underneath at the crusher jaw. On the other hand, there is no one there at the point of discharge. A man has to go occasionally, but he does not require to be there constantly, and even the men on the other platforms taking the stone away are not there constantly. They are taking their wagons out and coming back. They are out in the open and come back with the wagons.

9242. The crushing plant is the general arrangement as used in many other quarries throughout the kingdom?—Yes, practically the same as all the other quarries in the West of Scotland.

9243. And in England?—And in England also, not so large as some of the quarries in England. We have not such extensive plant.

9244. (*Mr. Thomas.*) Have you seen the arrangements of the crushing plants in North Wales?—No, I have not seen them in the large quarries there.

9245. They have a good many exhaust fans there, and take the dust away, particularly from underneath the breaker jaws?—The trouble with the Scotch quarries would be that they are close to towns and villages, and the difficulty would be the discharging of that dust from a shoot. It would become a nuisance, I am afraid.

(*Dr. Haldane.*) It would get into the air and be carried round.

9246. (*Mr. Thomas.*) It must get into the air now?—But it is pretty well scattered when it gets there.

9247. (*Dr. Haldane.*) You cannot give an analysis of the composition of whinstone?—I have not an analysis with me, but there is about 50 per cent. of silica: it is not pure whinstone.

9248. Is that free silica?—Yes. I am not sure of the actual figures, but it is somewhere about 50 per cent.

9249. Roughly speaking, what is the rest?—There is a little iron and some lime. I cannot say what the other constituents are from memory.

9250. (*Chairman.*) Could you give us some specimens?—Yes.

9251. We should like some of the very finest you can collect, and also of the coarser?—I can do that.

9252. From whinstone and granite, marking in each case which is the finest and the coarsest, and whether whinstone or granite, and where they came from?—Yes; I can supply you with samples of the dust.

9253. (*Dr. Haldane.*) Is the distinction between whinstone and granite a very definite one?—Yes.

9254. I know what whinstone is in Scotland and what granite is, but we have been shown things which were called granite in Wales which, for instance, I should call whinstone?—Quite. Some of the English granites really are not the same as the Scotch granites, at least those that are called granites in England.

9255. (*Mr. Thomas.*) They are more commercial terms than geological ones?—That is about it.

9256. (*Mr. Lovett.*) Will you tell us what were the objections of the Executive of the Quarrymasters' Association against the appointment of certificated managers? What was the chief objection?—The principal objection that was raised was that if you are going to ask a man to pass an examination, we would like to know what sort of an examination, and who is going to set the paper, and what class of paper it is going to be. If you wish a certificated man he will have to acquire more knowledge than the foreman has got to-day.

9257. You are assuming then really that they will have to know a good deal of theory, and that a theoretical knowledge possibly might count more than practical experience?—That would be the danger, I am afraid. I should imagine a certificated manager should be able to have a pretty thorough knowledge of machinery in connection with a quarry of any size, for instance, as to the transmission of power, and the amount of work an engine would do. It would be difficult to get a man brought up in a quarry to grasp all that.

9258. Supposing that the examination did not require that he should have a knowledge of machinery, would the objection still hold good?—I think it might in some ways. Some of the quarrymen, probably very good men, are, I would not say illiterate, but men who have been from school a long time, and they might not be able to pass an examination, although very good quarrymen.

9259. If the present managers were not required to take up a certificate or pass an examination of any kind, would your objection still hold good?—I do not follow.

9260. If the present managers were not expected to pass an examination of any kind, would you still have the same objection?—I think a good deal would depend on the certificate that would be required, and what examination they were required to pass.

9261. Suppose, before a man was allowed to sit for an examination, he was required to have put in 10 years in a quarry. Would that be a sufficient safeguard, and would it ensure the Company getting a practical man with a thorough knowledge of the working of the quarry?—It certainly would, to a certain extent. If the man was of much use he ought to pick up something in that time.

9262. I notice the previous witness said if he was required to pass an examination and get a certificate, he would not remain in that position. He would probably get a better job, and that looks like improving the status of the man?—Exactly, but a great many quarry owners could not afford to pay for that—to pay for a man who would be qualified on all those points.

9263. Speaking of a certificated manager, I am not thinking of the foreman, I am thinking of the chief quarry manager?—The difficulty with that is that a number of the quarry people in Scotland manage their own quarries, and I think a number would not be able to pass that examination.

9264. I quite see you have to differentiate, perhaps, in different districts, and particularly in regard to the size of the quarry and the number of men employed?—And also the quantity of machinery used.

9265. I do not see why employers should oppose it. I should submit it would only raise the status of the men, and would tend to bring about a greater efficiency, and, consequently, would benefit the industry at the same time, if the present foremen were not asked to get a certificate. It would be an inducement and interest to them to become more efficient with a view some day to taking the managership of a quarry?—Yes, quite.

9266. I put this because you have not any suggestion to make?—I do not think there is much more I can say, beyond the fact that the foreman at present is a practical man, and where there is a large quantity of machinery the owner generally has someone who understands machinery, for his own sake. He would be in charge of the machinery, probably under the manager or foreman, and while that foreman may not know anything about machinery, he has a man who does know something about it.

9267. With regard to sett-makers, I take it the men at your place work in sheds?—Yes.

9268. And scathies?—Yes.

9269. You bring out the stone from the face of the rock?—Yes, we bring it out with locomotive cranes.

9270. Do you get many accidents to the eye?—Very few.

9271. Do any of the men wear goggles?—I have seen an old man wearing them, but very few. We are particularly free from those accidents.

9272. (*Mr. Lewney.*) Do you find that the class of men you appoint as foremen at the present time are satisfactory?—Quite.

9273. From what you say I take it you can hardly imagine how a certificate would improve the qualifications of these men?—I do not see that it would improve their qualifications.

9274. Many of these men start in quarries when they leave school?—Yes.

9275. And work there continuously?—Exactly.

9276. So that from an educational point of view it would be difficult for them to pass an examination?—It would, with a number of these men.

9277. In that case many of those men would be shut out entirely?—Yes.

9278. That would not be a very desirable state of affairs?—It would be rather rough on them.

9279. And not a great benefit to the quarry-owners?—You may get men who could get the certificate and who would not be as good practical men as the present foremen.

9280. That is the point?—Because you might cram a man for a certificate, and yet he would have very little practical experience.

Mr. George Henry Bragg called and examined.

9281. (*Chairman.*) You appear on behalf of the United Kingdom Granite and Whinstone Quarry-masters' Association?—Yes.

9282. You are the Managing Director of the Threlkeld Granite Company, Limited, of Keswick, and have been acquainted with the working of granite quarries for 24 years?—Yes.

9283. Will you describe the system of working at your quarries?—Yes. Each quarry (80 to 125 feet in height) is in charge of a foreman or manager who superintends the whole of the work in dislodging the rock. The drilling is accomplished by machine drills driven by compressed air at a pressure of 80 to 90 lbs. on the square inch. For heavy blasting, holes up to 18 or 20 feet are bored with a 3½-inch gauge drill to commence with, and finishing about 2½ inch or 2¾ inch diameter at the bottom. From a compressor outside the quarry the compressed air is conveyed in pipes up to the quarry face where flexible hose is used to attach from branches on to the power drill. In drilling, water is used continually to clean out the dust and to facilitate the working. For second gear or small hole drilling, such as "pop" holes for reducing larger stones down to smaller ones, a small hammer drill is used which works at a high speed, and in this case the dry dust during the drilling is blown out by means of a drill with a small hole bored up the centre. It is found that in open working the dust from this is at once blown away and is perfectly harmless. Experienced and competent tried men only are allowed to quarry on face of rock. The rock in our quarries is almost invariably dislodged by means of blasting with coarse-grained powder, occasionally dynamite or gelignite was used in wet holes, but latterly the ordinary powder placed in waterproof tubing has been used in cases where a hole draws water. In charging the holes are always stemmed with fine granite sand. Wooden rammers are used in the case of the large holes, and rods tipped with about 6 inches to 12 inches in length of copper for the smaller holes. Single or double tape fuse is always used. The Code of Special Rules (Mines and Quarries Form 16) is strictly observed in regard to blasting, and in fact generally, and in my opinion these rules, if properly carried out, must of necessity, ensure as safe a working of a quarry as it is possible. We have one experienced man only appointed to charge the holes and carry out the blasting in each quarry, and I think such a rule should be enforced in every quarry, as the practice followed in some quarries of allowing any workman to use explosives cannot be too strongly condemned. The explosives should be kept in the magazine, and one man only allowed to take charge of it and know exactly where it is distributed. I have seen the case of a man using his own dynamite, and after using a portion of a boxful, store the remainder in the fire-box of a crane boiler used only occasionally. The man took ill in the meantime, and the explosive in the boiler was discovered when the fireman was lighting his fire. Where indiscriminate use of explosives is allowed by any workmen the men will hide their explosives in all kinds of places, and in cold weather will use their trousers' pocket to keep dynamite warm even where warming pans are provided. Blasting in the Threlkeld Quarries is at regular intervals, 9.15, 12.0, 3.0, and in summer 5.30, when the men have ceased work. All the men are warned of the blasting, and cleared out of the quarry. The man in charge makes his fuses of various ample lengths and knows how many shots have to explode. He then shouts all is right and the men can return to their working places. In the case of a mis-fire it is reported at once to the foreman or manager and approach is allowed only after 30 minutes at least has elapsed, and never under any circumstances is a charge withdrawn, or unrammed, but another hole drilled at a safe distance—care being taken to avoid going in the direction of the unexploded hole. By using a good reliable tape fuse, cases of mis-fire are very rare indeed. I have only been able to induce two or three sett-makers to use goggles to prevent splinters of rock damaging the eyes, and even these few abandoned them after a short time, as the men say they cannot see the cleavage of the rock, or strike the stone accurately with their hammers. In regard to accidents of a preventable nature, I may mention I have for some two or three years adopted a leather safety belt for men working high up in the face—drilling on ledges. The belt is fastened round the waist by means of a strong buckle and a ¾-inch diameter cotton rope is attached to an eye at the back of the belt. This rope is fixed to the same mooring bar at the top of the quarry as the larger rope used by the men for lowering themselves down. In the event of a man having a giddiness, or stumbling backward, or the platform supports sometimes giving way, the man would be held suspended by the waist. All the quarry chains and crane chains are made hot through the fire at intervals to see if any weak places are disclosed and to render the links safer. The best cotton ropes are provided for the quarrymen. The Inspector visits the quarry at intervals and invariably, in the case of a slight accident being reported, he pays a special visit and will make a general inspection all round. The working in general is discussed with him, and any suggestion noted and attended to. For a period of over seven years (from June 1903 to December 1910), out of over 200 men employed there have only been 10 slight accidents and one fatal. The fatal accident having occurred five years ago, caused by a stone falling over upon the man whilst engaged in drilling. The slight accidents are chiefly bruises and cuts. The stone after being reduced to workable sizes is conveyed by means of travelling cranes along the face of the rock to the sett-makers' sheds, where each man works his stone into various sized blocks.

9284. Then in the crushing department you crush the granite for macadam purposes at your quarries?—Yes.

9285. What arrangements do you make for allaying the dust?—We have a spray just as the stone enters the top of the jaw.

9286. We were told that that damaged the finer qualities of stone?—It does to a certain extent, but we find it better.

9287. Why does it damage the stone?—It does not harm the big sized stone so much as the smaller stone.

9288. Why do you do it at all? What is the object of it?—To keep the dust down.

9289. Is it for the health of the operative?—If you get a copious supply of water it runs into the screens, but if you have a moderate supply you keep down the dust, and very effectively, I think.

9290. What is the deleterious effect it has on the smaller kinds?—The smaller kinds stick to the larger stone going through the screen if you have too much water.

9291. If there is enough water to keep the dust down and yet prevent them sticking it does no harm?—It clogs up the small holes to a certain extent, but we prefer that to having so much dust.

9292. In case it did clog the holes of the small screen, could not you wash them?—We could wash them or beat them but it is very difficult to get out.

9293. Could not you fling water through them every now and then and wash them clear with a hose?—No, the water has a tendency to harden the dust in the holes.

9294. It sets a little like cement?—Almost like cement.

9295. At all events from your experience it is possible to damp the stone in such a manner as to stop the dust and yet not to damage the work?—That is so, on the feeding platform.

9296. Only it requires skill?—The greatest portion of the dust comes where the stone leaves the crushers for the rolls just below. That we box in as far as possible to keep it from rising to where the men are feeding, and the screens are also boxed in.

9297. If you saw one of the men at work could you brush the dust off his coat?—Very fine dust.

9298. There is a certain amount in spite of stopping it?—Yes, just like flour. That comes from below the platform next the roll where the material goes in.

9299. Why cannot you damp it there?—We have tried that, and that comes back to the point that it spoils the screening entirely.

9300. You could box it in with a fan. It would not be difficult to box in fine dust?—I am more confirmed in my opinion since I heard what Mr. Darbishire said, and I do not think any fan will take it out in a perfect manner. The very fact of disturbing the dust seems to disseminate it through the atmosphere.

9301. (*Mr. Ainsworth.*) How would you deal with it?—The only way I would deal with it is partially dealing with it, as I have said, a little water in the top of the jaw.

9302. (*Chairman.*) Are your crushing sheds open?—No, covered in.

9303. At the top and the sides, too?—Yes.

9304. Is not that a source of danger, the covering in at the sides?—I do not think so. If you had a room where crushing took place closed up entirely, there would be a better chance of getting the dust into the exhaust fan. You have so many currents. Below the screens the wind blows through the building and that seems to make the fans rather inadequate for the work.

9305. You consider that granite dust is not injurious to health?—I do.

9306. How can you maintain that opinion in the face of the phthisis that has occurred in trades where silica is given off. You would not deny that the Sheffield grinders have suffered in health?—That is a most peculiar thing. If you take a freestone mason he suffers from chest complaints, but I have not known a granite mason or a crusherman or a cement worker suffer from phthisis.

9307. Have you come across cases of men engaged with pneumatic drills in granite?—I have a man engaged on the Hardy Simplex drill.

9308. No, I mean pneumatic dressers?—They use those in Aberdeen, but I could not speak from memory. I have not had experience of those.

9309. Your theory is that granite dust such as it exists has not been injurious to health?—We have men who have been working 20 years with us and they are healthy now.

9310. Have you had a single case of a man dying of phthisis?—Not a single case; in fact we have great competition for that class of work.

9311. That surprises me rather. Does it not surprise you?—Yes.

9312. Would you not have expected to find it otherwise?—I should have expected to find it more injurious to health than it really is.

9313. We only want to get at the truth?—I am anxious to speak the truth exactly as I have found it.

9314. Is there a doctor who attends your Association?—No, not the Association. In our own case we have our own doctor.

9315. Do you know the views of the medical men in those parts?—I have discussed it with the doctor.

9316. With your own doctor?—Yes.

9317. What does he say about it?—He says he cannot understand why this should be so.

9318. He would expect to find it?—Yes. He has never had a single case. Those men are as healthy as any quarryman.

9319. (*Dr. Haldane.*) He is the doctor to the quarry?—Yes.

9320. He sees a great number of the men?—He is there almost every day, not all day, but at certain times.

9321. (*Mr. Thomas.*) Is this material you work actually granite?—It is syenite.

9322. Is it another material?—It is commercially called granite.

9323. (*Chairman.*) The exact stone you are working is a siliceous stone?—Yes, about 67 per cent. silica.

9324. What is the rest composed of?—We have about 8 per cent. of alumina.

9325. A lot of it is a silicate of alumina?—It is really free silica, 67 per cent.

9326. (*Mr. Thomas.*) Eight per cent. of silicate of alumina?—Yes. I do not know whether you have the analysis of the Penmaenmawr?

9327. (*Chairman.*) Yes?—Ours has a similar analysis.

9328. They call theirs diorite?—We have more silica in ours, ours is 67 per cent.; I do not know what it is in Penmaenmawr.

9329. You can let us have some dust and an analysis?—With pleasure.

9330. Now with regard to ambulance arrangements and first aid, you think that it would be a good thing to have everywhere some simple provision for first aid?—I should have it everywhere. I should have it in every quarry, whatever number of men you have.

9331. And a box of ambulance bandages and material?—Yes, and a stretcher.

9332. You say they should be "kept," but are there not great differences in what people mean by kept?—What do you mean?

9333. Would you be surprised on opening the box of contrivances occasionally to find the bottle that ought to contain brandy empty, and a box that ought to contain antiseptic dressing empty?—I would charge the manager or foreman to see that it is replenished from time to time.

9334. It would be a good thing to have a certain quantity of some dressing stuff, like mercurial solution, to wash a wound, and a proper bandage, instead of binding it up with a dirty handkerchief?—Quarrymen are, as a general rule, apt to neglect their cuts. Whatever superintendence you have, they will simply put a dirty cloth round it, and let it go, with the result that probably blood poisoning sometimes sets in.

9335. You have a messroom with a stove?—Yes.

9336. The messrooms in your place are sufficient?—We have five messrooms altogether.

9337. You would agree with the other witnesses that it is a right thing to provide men with a reasonable messroom to the extent they require it?—Yes, if you value your men and want to keep them comfortable, you must provide proper accommodation for them to have their meals.

9338. I think I need hardly press that question because the witnesses all say the same thing. You do not suggest providing immense messrooms where you know they will not be used. To the extent they would be used you think they should be provided?—Yes; used regularly.

9339. You would have a rule against allowing any intoxicating liquors in the quarry at all?—Yes.

9340. Do you think accidents happen through the use of them?—I could not trace accidents to that, but I think probably they might.

9341. Would you be against beer being provided?—Unless special permission was given to a man who preferred it to any other beverage—it is making the rule rather lax, I think.

9342. That dispensation modifies to a certain extent the strictness of your previous view?—I am not a temperance man, but I think it is better kept off the work.

9343. They had better have it in the evening, you think?—Yes.

9344. Your boilers are inspected at intervals?—Yes, regularly.

9345. You are not in favour of compulsory certificates for managers of quarries?—I do not see how they would benefit the existing men. I am rather of opinion since I have heard some of the evidence to-day that they might be granted in such a way as the Surveyors Institution has been granting certificates.

9346. Might you make this distinction, in quarries where power was used?—Power drills?

9347. You would have some form of certificate but not where only hand power was used. Would you make that distinction?—I do not think so. Supposing you had a man who has been very competent and satisfactory for 10 or 15 years, you would not like to dispense with that man.

9348. Assume that all the existing interests are protected and that nobody would be dismissed, would it be a good thing in future to have a rule that where power was employed in a quarry that there the man should have some certificate?—From a practical examination?

9349. Where there was steam or electricity or something of that kind?—As a general rule that sort of work is entirely separate from the quarry work. The man in charge of the steam power or motive power is generally an engineer.

9350. (*Mr. Lewney.*) A mechanical engineer?—Yes. If you come to an examination, if you had a man with a Board of Trade certificate, it would be ample and he would be subject to the quarry manager.

9351. Would not that rather require a certificate as an engineer than as a quarry manager?—No, if under a quarry manager and he saw he had a competent engineer under him with a Board of Trade certificate that would be enough. These certificates are quite common with fitters.

9352. (*Chairman.*) How do the men get down into some of these quarries? Are they pit quarries?—No, all open on the hill side.

9353. Have they to descend by ladders into them?—No, they get down from the top by ropes for quarrying purposes.

9354. You do not lift the metal from the bottom?—No.

9355. It is all lowered down below?—No, quarried off the face on the hillside.

9356. (*Mr. Lewney.*) I understand that the witness does not think it necessary for foremen of quarries to have certificates?—I do not think it is really necessary.

9357. (*Mr. Ainsworth.*) How many men do you employ?—Something like 200 men, a little over.

9358. With regard to the dust, which we are all anxious, and I am sure you are, too, to put under control if it can be controlled——?—Yes.

9359. ——is there any plan of dealing with it to your knowledge, either by spraying or by fans?—I would prefer the spraying to the fans.

9360. You provide a great deal of gravel for the ballasting of the London and North Western Railway?—Yes.

9361. It is essential that that should be kept dry?—Yes, for screening.

9362. Still, you think the best way of dealing with the dust is by spraying?—Spraying a little in the jaws. I would not come below the jaw platform, because it would ruin the screening.

9363. You do not think you could do much with fans?—The men are feeding on the platform where the bulk of the dust is likely to arise, and below that it is boarded off: in fact the platform keeps the dust away from them.

9364. With regard to the question of certificated managers, there are two kinds of managers, the general manager, who cannot know too much of everything, and the underground manager who must be thoroughly up to the practical work?—Yes.

9365. I am assuming the general manager, if the place is big enough, would be able to pass any reasonable examination, and ought to be able to pass it, but do you see any objection to the underground manager having something in the shape of a certificate that he thoroughly understands practical underground work?—I do not see any real objection, but the very fact that the man is there appointed by his employers must point to his being a competent man.

9366. Just as a certificate from his employers would show that they considered him competent, is it not also a good thing that he should have a certificate from an independent Board, say, of two managers and two practical working men, that they considered him competent?—That raises the question of who would constitute the Examination Board. They must be practical men to grant such a certificate. It would be a great advantage to a foreman or under-manager to be able to get such a certificate, and it would be an incentive to the other men to aspire to it, but in many quarries I know of some of the very best men are quite illiterate.

9367. Those men we would not propose to interfere with, as the Chairman said?—You might have a man who, from a theoretical point of view, might be better educated and able to pass an examination on paper, but he might not be as good as an illiterate man in the practical working. Of course, the two combined would be an advantage.

9368. Anyhow, it would be an advantage to the man from the practical point of view to have a certificate to say that he was thoroughly up to the practical work?—Yes, it would be an advantage to the man.

9369. There would be no possible objection to that. Is it not rather an advantage to the employer that he can say, "Here is a man I think good, and not only do "I, but an independent authority thinks him good "enough"?—It would be a decided advantage.

9370. With regard to mess-rooms, I think we all agree it is largely a question of circumstances, but it might be left for the men, if they thought such a thing was desirable, to call the attention either of the employer or of the inspector to it, and then the thing could be dealt with, and of course, if it was unreasonably asked for there would always be an appeal to the Home Office?—Yes.

9371. Your evidence was that you considered anything of that kind, where it was wanted, was in every way a desirable thing?—I think it is very desirable indeed for the comfort of the men. If you value your men and are anxious to keep them with you, you must give them facilities for getting their meals comfortably.

9372. Would you be in favour of having the explosives which we find in the market all subject to the Government approval?—I would. At present the Explosives Inspector examines it, but he has no chance of demonstrating whether it is good or bad, unless they are high explosives.

9373. So long as these things required the approval of the Government, you would feel quite safe?—Yes.

9374. (*Mr. Thomas.*) Are you working under the Quarries Act, 1894, Model Code?—Yes, the Special Rules.

9375. Are there any provisions in them which you think necessary to delete or strengthen?—No; I think they are admirably drawn up. There may be some little phrase which wants altering, but I think they are admirably drawn up for the safety of the workmen.

9376. On the whole you think they meet practical conditions, although perhaps in a few instances they are not sufficiently explicit?—There may be one or two at the close which are not sufficiently explicit, but taken as a whole I think it is an admirable code. These should be insisted on, I think, in most quarries. I do not see why a quarry that is 20 feet deep should be subject to certain laws, and a quarry 19 feet 6 inches should not.

9377. We have already had that point brought out?—It seems so ridiculous.

9378. Your view in regard to the certification of the manager and the under-manager is somewhat in abeyance at the present time. You want more definition as to the nature of the examination?—If it was a simple examination, a sort of elementary examination, but chiefly relating to practical work, I think it would be an advantage.

9379. That is for the under-manager?—Yes, on the principle of what the Surveyors' Institution does. When they started their institution all surveyors in

existence were taken in as members on account of the position they held, and I think it would be only fair that the existing managers or foremen who have been for a number of years in a satisfactory way might be constituted as certificated.

9380. They would obtain their certificates as a matter of course owing to their long practical training?—Yes. I think that is satisfactory.

9381. The full certificate for a manager would be for such a man as yourself?—Yes.

9382. Presumably you would pass any examination devised?—Yes.

9383. In certificating the under man, practical knowledge should be the first consideration?—Yes. If any certificate was wanted by anybody it must be by the practical man in charge of the quarry.

9384. Any examination would be of the nature of an inquiry as to his practical knowledge, and he would have, so to speak, the hall-mark of practical efficiency. Such an examination, or such an inquiry is rather the word to use than "examination," followed by a certificate of proficiency for practical work, coupled together with some slight examination as to theory, would be advantageous taking it through the country?—It is a question of what is the subject for examination, and the constitution of the Examination Board. You must not overlook the fact that there are some very good men who would never be able to get an elementary certificate.

9385. You mean now?—You are going to narrow the number of men from which you can draw those foremen or managers.

9386. If the proposition were made, but the inquiry is on this line; you would grant the existing ones certificates and the under-managers certificates. The present men who are coming on would have sufficient secondary education to pass any examination put upon them, bearing in mind that practical proficiency is the thing to be brought out?—The practical part is the main part, undoubtedly. In most places in the remote country districts it will narrow the selection of the men to a great extent.

9387. No. I was rather interested to hear what you had to say in regard to spraying the rock as it goes into the breakers. Do you spray it or put a water jet there?—Just a water jet; it is not sprayed.

9388. You do not use such a spray as they use for lime-washing?—It sprays down in a way, with a piece of zinc tied on to the end of the tube.

9389. You do not actually spray?—There is no pressure behind.

9390. Simply water dripping?—Yes.

9391. You have never tried an attachment at the end of a piece of half-inch or three-quarter inch pipe such as they use for hydraulic lime-washing?—No; I have not thought of that.

9392. They are good, especially if you can move to-and-fro, or a crank arrangement on the top of the breakers?—Yes.

9393. You see no practical objection to the use of a spray at that point?—No, but not below it.

9394. (*Mr. Ainsworth.*) With regard to what you said about certification, even though it was confined, as we have suggested here, as far as possible to practical knowledge, you still think it would narrow your choice?—Yes.

9395. Suppose you selected a man as under-manager, all he would have to do would be to go before a small Board consisting of two managers and two practical workmen. Do you not think if you thought him good enough they would?—There would be an incentive to get those coming on ready for such an examination.

9396. Is it not an advantage to him and to everybody concerned that this man's capability should be certified, not only by having chosen him but by the independent Board he has gone before?—Yes, it would be an advantage.

9397. (*Mr. Lewney.*) Supposing that the foreman gets a certificate, he would still be under the control of the manager?—Yes.

9398. So that, whatever certificate he may hold, he is only a servant after all?—Yes.

9399. A manager or managing director may go without a certificate and direct the operations at the quarry while the foreman must be compelled to get one?—I do not think a managing director would direct any operations against his practical foreman; at least I know I would not. I should rely on my practical man to do what was necessary without instructions from me, except perhaps in special cases of danger.

9400. Are you satisfied with the class of men you have now?—Very well satisfied.

9401. Do you know any reason why they should have the certificate?—They would not be any better with the certificate. It is to the employers' interest, of course, to get men who will safeguard the interest of the men. The Workmen's Compensation Act makes you very careful, and you must have men to carry out your desires.

9402. As a matter of fact, you exercise care in choosing your foremen?—We exercise every care.

9403. I suppose you will find even with Education Acts in force for a considerable time, that men are not very well advanced from an educational point of view?—That is so. As lads they may turn out with a sixth standard knowledge from school and be very sharp, but they do not attend night schools as a rule, and they go back again in their knowledge.

9404. In cases of that description it would make it difficult sometimes for them to pass an examination?—In remote districts it would narrow the number of men you had to choose from.

9405. Have you had many blasting accidents at your quarries?—I have not known of any. We have only had some slight accidents. We had an accident, but it was not a blasting accident. It was due to a piece of rock falling on a man while drilling against it.

9406. Do you unram any holes?—No; I am very strict about that. I would rather pay for another hole than run the risk of unramming. That is according to the Special Code. We stick very well to the Special Code of Rules.

9407. Have you seen steam used in crushing mills to keep the dust down?—Never. I have heard it mentioned here; it is rather interesting.

9408. I was wondering whether you had any experience of it?—It might be a very costly method to adopt, especially where we have suction gas plant. You would have to have special boilers. I think the other is quite as effective.

9409. (*Mr. Lovett.*) Has the United Kingdom Granite and Whinstone Quarrymasters' Association discussed the dust question?—Do you mean with regard to the crushers?

9410. Yes?—Yes. I said we had men 20 years who had never suffered anything from dust. In regard to drilling in the quarries, there is a copious supply of dust, except in the little hammer drills, but in open work it does not matter.

9411. What conclusions did they arrive at with regard to dust being injurious or otherwise?—We arrived at the conclusion that what I stated would do very well in some stones, that is spraying the top of the jaw, but the previous witness has told you in his case it does not suit. Different stones must have different methods. Some stones will make more dust than others in crushing.

9412. Was it the opinion of the members of your Association that dust is injurious?—That it is not injurious.

9412. Can you suggest why so many of the quarry owners are going to such considerable expense in putting down fans to clear away the dust out of the crushers?—I can only suggest that it is a safeguard against any injurious effect. In my experience, and I know in the experience of another member of our Association, they are whinstone people in Middleton, they have men who have been 25 years in the crushers who have not suffered anything.

9414. The quarrying industry is rather an old one, and for many years crushers have been used very extensively. There must be some reason why these fans are being introduced. If it is not because the dust has proved injurious why are they introduced?—

You see the evidence of the previous witnesses all seems to point the same way, that there has not been any case of phthisis or chest complaint. I have not known of any, although I am surprised it is so. I can only think it is put up more for a matter of appearance; I mean to the layman, or a Commission like yourselves coming into a place and seeing this dust, you would naturally conclude it was injurious, so that if you take it away as much as you can, the people think you are doing your best.

9415. My experience of quarry owners leads me to think they are keen enough as business men not to spend much money for the sake of sentiment or for the purpose of clearing away dust to make it more pleasing to the eye?—There is another way of looking at it. The more dust you take away from the plant the better it is for the machine.

9416. You suggest it is taken away for that reason?—I could not say.

Mr. John Malcolm Fyfe called and examined.

9417. (*Chairman.*) You are Managing Director of John Fyfe, Ltd., of Aberdeen?—Yes.

9418. Your firm carries on the granite quarries at Kemnay, Corrennie, Toms Forest, Tillyfourie and Cove?—Yes.

9419. You have been connected with the quarrying industry for 17 years?—Yes.

9420. You have heard the evidence given by the previous witnesses on behalf of the United Kingdom Granite and Whinstone Quarrymasters' Association?—Yes.

9421. Is there any point you would like to add, or is there anything you would like to correct in what they said?—There might be some slight differences in some things; the question of mess-rooms I think I should like to say something about.

9422. I should like to join issue with you there. You heard Mr. Darbishire say all that was required was a building, not a very expensive building, if necessary corrugated iron outside and wood-lined, with a fire-place in it and, provided he was convinced the men would use them, he did not feel it was unreasonable to ask that they should be supplied. Do you differ from that?—No, but we have three of them at three different places, and they are practically not used at all.

9423. According to my proposition, if they are practically not used they would not require to be kept up?—That is why I hardly think it necessary to have legislation on the point. Where they would be used and are necessary I fancy they would be provided.

9424. I have seen a dozen men sitting on the top of a boiler in the boiler-shed, with no window to it, and the only ventilation was the natural ventilation, which was considerable. Do you consider that a good arrangement?—No.

9425. If that exists somewhere, and it does exist, you cannot say wherever they would be wanted they would be provided in the natural course of events, because that contradicts it?—We have cases where we have men in a boiler-house when there is a mess-room.

9426. They go there for warmth?—Yes.

9427. If you provided a fire they would not go?—They have a fire in the mess-room.

9428. Why do they go to the boiler-room?—I do not know.

9429. Shall I suggest the reason? It is because friends come in and they want to discuss something with the people driving the boiler?—Very often.

9430. They will not sit on the top, but round close to where the fire is?—I never saw them sitting on top of the boiler. I should think they would be uncomfortably warm.

9431. No, I felt it. There was a good non-conducting composition on top. It was rather nice. But, speaking seriously, do you not think where proof is given, say to an inspector, that men will use a room or do want a room, that in moderation those mess-rooms could reasonably be required to be provided?—There are cases in which it is unnecessary. The majority of our quarries are near the village, and most of the men go home.

9432. Then it is not necessary?—We have men travelling from Woodside, a matter of 16 miles or so by train. As a rule those men only travel in the summer-time, but we have some who travel all the year round. There are quarries in Woodside, and those men often, during the short days when the trains are inconvenient for them, will work at Woodside, but in the summer-time they will come to us.

9433. Would it be unjust to ask that it should be provided in the summer-time?—If it was provided at all it would be permanent.

9434. Would it be unjust to ask you to provide it permanently, to be used in the summer provided it really was used?—I do not think it would be unreasonable.

9435. If those were the conclusions we came to, you would agree to them?—Within limits.

9436. Within the reasonable limits I have stated?—I wish to guard myself against any hard-and-fast rule being laid down saying that, if you have a certain number of men you must provide certain accommodation.

9437. You would agree that there must be some intervening authority to say when it was necessary. Provided you have a fair way of doing that, you would not think it a hardship for the men to have them?—I was thinking of one firm who work a large number of quarries, not in our district. I do not know what the mess-rooms would cost, probably 100*l.*

9438. How many?—They would require 50 or 60.

9439. At 100*l.*?—Yes.

9440. I think that would be very much under-estimating. Do you mean 50 or 60 men?—50 or 60 mess-rooms.

9441. You could never build those for 100*l.*?—Separate ones.

9442. How many men would each mess-room hold?—That would depend on the number of men.

9443. You must have formed an impression of the size of the mess-room for 100*l.*?—You might get about 40 men in it.

9444. In each mess-room?—Yes.

9445. How much would a mess-room to hold 40 men cost?—About 100*l.*

9446. Not in a quarry where you had slates?—We have not got slates.

9447. This is granite?—Yes.

9448. You have granite to build the walls?—You would find it was cheaper to do it with timber.

9449. I think so, too; probably corrugated iron outside and wood inside?—You would want something you could move and use afterwards.

9450. There are only 550 men employed in the whole of the Association's quarries?—No; we employ 500 ourselves.

9451. I thought they told us the whole Association was 500.

9452. (*Mr. Lovett.*) Mr. Lang was speaking of another district?—We have 500 men in our quarries.

9453. (*Chairman.*) Take the 500 men in your quarry. How many men would you have to give accommodation to? According to my contention it is not necessary to do it for all?—There might be 50 men. Those men are divided over the different quarries. You could have two or three at one place and half-a-dozen at another, and 20 at another.

9454. For two or three men how much would it cost to build a place to eat in?—For two or three men I should say it was hardly necessary, because there are places where they would be as well off, even in the smithy.

9455. According to that it would not cost these hundreds of pounds?—No, not if you had a very few men working. I would suggest, if that is the case, there is no necessity for any place at all.

9456. If a compulsory rule was brought in to-morrow it would not make much change?—I can perceive it would make a considerable change.

9457. If it would, is it not a proof that that change is required? You are rather between the horns of a dilemma?—I am thinking of Cornwall, as a matter of fact, where you have one firm working between 50 and 60 quarries, and those quarries are scattered.

9458. Could you not make some arrangement that would be reasonable at each place, to be sure they had some decent place to eat in?—If you have only two or three men you would not think it necessary.

9459. Would not a double sentry-box do?—Yes. They probably have that.

9460. How would you like to eat your dinner in the middle of a cutting east wind in the winter without any sentry-box at all?—I would probably find some place where I could get out of it.

9461. If you could, that would probably satisfy the inspector, if it was a reasonable one?—Yes.

9462. This points to what is reasonable to be done in each case. There should be for the men that really require it some place where they can eat their dinner without being frozen out and exposed to the weather. You see that, do you not?—Yes. I have no objection to providing a mess-room where it is necessary, but I do not see that the existence of a quarry makes it necessary to have a mess-room.

9463. I think we quite understand your view now. What accidents have you had at your quarry? I think there are very few?—131 over the last 10 years.

9464. Is that inclusive of all for which you paid compensation?—Those are the only ones we have paid compensation for.

9465. Thirteen a year out of 500 men?—Yes.

9466. That is small in number?—Yes. Some, unfortunately, have been fatal.

9467. Taking it altogether, that seems a small number?—It is not a particularly large one.

9468. Are a good many of those cut hands?—A good many. The principal way a man gets hurt is very often in handling the stone he is working on. He is splitting it and gets his fingers nipped.

9469. Have you known any consumption?—No; our district is clear of that. I have only known two cases of men dying. I think there are only two cases of masons dying in our district in the last 10 years.

9470. Do you mean dying of consumption?—Yes.

9471. Was that proved to be due to their occupation?—One, I should say, was probably hereditary. I had a call from Dr. Matthew Hay, who will be giving evidence later on in the week. He is the Public Officer of Health of Aberdeen, and he mentioned those two men to me. One was a foreman mason who had not been working for about 30 years. He had not been working as a mason in the sheds; he had been superintending. The other was a mason, and he must have been between 70 and 80 years of age when he died.

9472. These were men employed by you?—Yes.

9473. Have you any granite crushers?—Yes, we have crushers at Cove and Kemnay.

9474. Have you reason to think the men suffer from phthisis who are about those crushers?—No.

9475. What does your doctor think of the matter? Can you tell us his opinion second hand?—I have not discussed the question with him.

9476. Have you sett-making carried on in your quarries?—Yes, at all our quarries.

9477. You are not of opinion, apparently, that there is danger of consumption in the processes?—No. With anyone working in the open air I think the risk is nil.

9478. (*Mr. Thomas.*) As a matter of interest, are these granite quarries, or what are they?—I believe ours are really granite quarries, the nearest approach to granite that can be got.

9479. Did we understand you to say that there are as many as 50 or 60 quarries in Cornwall working with the same firm?—Yes, on occasions. There are a great many small holes all through Cornwall. They may not all be worked at one time, but at some time or other. I think Freeman's pay rent for about that.

9480. They are working on granite?—Yes.

9481. Have they no mess-rooms there?—I do not think so. They might at some of the larger places.

9482. (*Mr. Lovett.*) Have you had any fatal accidents at any of your quarries recently?—We had one a few weeks ago.

9483. How did that happen?—The fireman, a very experienced man and a very good man, fired a shot and went and examined it, and turned the two borers on to bore the hole. He went on to a little ledge to shovel down the stuff that had become loose, and quite a small chip had come down from behind him and struck his shoulder, and turned him round, and he fell to the bottom of the quarry.

(*Chairman.*) It seems a very small number of accidents, and it compares very favourably with most of the quarries.

9484. (*Mr. Lovett.*) You have had considerable experience in raising stuff in skips?—Yes.

9485. Can you tell us the size of the skips?—5 feet 0 by 15 and 18 inches.

9486. When bringing up the loose stone you load above the top. It is customary to load above the level of the skip?—Yes, not much above the level.

9487. Do you not think it would be desirable that some regulations should be enforced which would prevent loading above a certain height? If you have them 18 inches in your case, is it safe to load 3 feet high?—That would be impossible practically, except you are dealing with chips, of course. The majority of our stuff that goes up in boxes is perhaps muck.

9488. I know that you have had a lot of experience, and I want your opinion, because in some cases they load as high again as the skip or box is deep?—We could not do that, because we have chains. The chain is coming down like *that* near the side of the box. The centre may be higher than the side, but not much more.

9489. It tapers to a fine point in the centre, and is often more than double the depth. Do you think it right that that sort of thing should be allowed?—Our experience is that it is safe. We have never had an accident from that cause, although working blondins for 35 years. In fact, the first blondin made was worked at our works.

9490. Have you not had the stuff fall off? Of course, it is one thing to say you have never had an accident, but a piece might drop off when there was no one about, and, of course, an accident would not happen; but on another occasion a piece might drop off when there was somebody about, and then an accident would happen?—I have not seen or heard of anything coming down.

SEVENTEENTH DAY.

Wednesday, 11th January 1911.

PRESENT:

SIR HENRY HARDINGE SAMUEL CUNYNGHAME, K.C.B. (*Chairman*).

RICHARD AUGUSTINE STUDDERT REDMAYNE, Esq.
JOHN STIRLING AINSWORTH, Esq., M.P.
RICHARD ARTHUR THOMAS, Esq.

WILLIAM LEWNEY, Esq.
URIAH LOVETT, Esq.

T. E. BETTANY, Esq. } *Joint*
G. W. CHRYSTAL, Esq. } *Secretaries.*

Mr. JOHN GARDNER called and examined.

9491. (*Chairman.*) You are the manager of one of the quarries we saw: what is the name of it?—The Bonawe granite quarries.

9492. Are you the manager of it or the managing director?—Both, I think.

9493. Supposing a rule were brought in that there should be a nominated responsible manager of the quarry who would be nominated as the responsible manager, corresponding to the manager of a coal mine: what do you say to that?—The foreman I have there is the working manager.

9494. Not yourself?—No.

9495. You would be in the position of managing director?—I would.

9496. With regard to certificates for managers, there are two questions involved and they are quite different: one is the provision that there should be what I may call a statutory manager, a man to whom the Inspector looks for the responsibility of seeing the law is obeyed and whom he prosecutes if the law is not obeyed, and it is strongly pressed on all hands by the Inspectors that there should be some gentleman responsible as in a coal mine. I suppose you would be agreed upon that point?—Yes.

9497. The second question is whether that manager should have a certificate in all cases. Evidence has been given that he ought to receive a certificate after some examination. Opinions differ very much as to the examination he ought to go through. That might depend upon the character of the quarry, whether there is machinery of a complicated character used there or it is a place with a very few men working with hand power. What is your view with regard to the certificate? Do you think it would be better to insist on having a certificate of competency or not?—It depends altogether what the examination would be, I think.

9498. If there was an entirely practical examination without any written paper, would that be a good thing?—That would be better, I think.

9499. Do you think it necessary to have a certificate—I am not endeavouring to lead you, I want your opinion. There is a great deal of difference of opinion on the whole question?—I do not think so; because a man would not put in a foreman unless he thought he knew his work.

9500. You consider it unnecessary?—I do not think it is necessary.

9501. To have any form of examination?—No, I do not think so.

9502. That would be by the State?—Yes, I understand.

9503. I think I had better ask you about the mode in which your quarry is worked. It is a quarry of hard granite?—Yes.

9504. And is worked in rather a peculiar way?—Yes.

9505. It is worked by putting a very large charge of explosive in and bringing down a very large quantity of granite. A considerable time is afterwards occupied in taking up and putting into wagons and disposing of it?—Yes.

9506. How big is the charge of explosive you put in generally?—We have been as high as 25 tons.

9507. How far is that into the deep end beyond the surface of the granite?—It depends on the height. The further you go in the more powder you require, if you have the height to keep.

9508. I mean with 25 tons?—About a hundred feet in from the face.

9509. You take it in one hundred feet?—Yes.

9510. How many tons do you expect to bring down?—We run from 200,000 to 300,000 tons.

9511. That would take you how long to dispose of, as a general rule?—Three to four years.

9512. Unless there was some great demand, I suppose?—It depends on the rate you are working at.

9513. With regard to explosives, a proposal has been made which has been approved a great deal in most quarters, I think, that the Home Office experts, who at present examine explosives, should report upon their suitability for quarry work, and upon their general characteristics, and further that no explosives should be used in quarries that have not been certified as fit?—We use nothing but gunpowder except for the mining where we use the blasting gelatine.

9514. You would be in favour of a Government report and certificate for explosives used in the mining part, to prevent rubbish being used in some places?—There would be no harm in that.

9515. Would there be benefit in this, that the report of the Inspector would contain particulars about explosives, their keeping qualities and their power?—It would be a guide to the quarrymaster.

9516. The same thing is proposed with regard to the fuses. I dare say you use good stuff?—We try to get the best we can.

9517. There is some bad stuff which it is desirable to keep out in the interest of safety?—I quite agree with that.

9518. As regards the examination of working places, would you demand as a principle that once a day somebody ought to go round and see what the men are doing, and that they are working safely—I do not mean a minute examination of the whole quarry, but a reasonable examination should be made every day of every working place to see that the men are working properly and not in a dangerous manner?—That is done with us every day by the foreman.

9519. Would the same thing apply to the overburden, that somebody should look round every day and see it is safe?—That is necessary.

9520. As to rock drilling, I do not suppose you do much, yours is rock tunnelling more than drilling?—Rock drilling is tunnelling. We only use it in a hurry.

9521. Do you use it dry or wet?—Always wet. At some of the holes where they are working with steam or air drilling, they cannot get water in.

9522. Could you not have drills that have a mechanical arrangement for ejecting the water round

the centre of the drill, round the bottom of the hole?—We do not use that.

9523. Is it not better to use that?—We only use the hand drill.

9524. You do not use machine drills except wet. The wet ones are machine drills?—We do not use machine drills at all, only once or twice when we are in a big hurry.

9525. Would you have any objection to a rule compelling all machine drills that are drilling granite and siliceous rocks in confined places, to be used wet?—We have not had any experience of them.

9526. You do not feel qualified to answer that question?—No, we have not wrought them.

9527. Have your men experienced bad results through the drilling?—No.

9528. Have you had any phthisis?—No.

9529. Have you consulted the local doctor on that point? Have you had any conversations with him on the question of phthisis?—We have only had one case I know, a man who died of consumption brought on by drink.

9530. How long ago?—About two years ago.

9531. How do you know that it was not partly due to the dust?—He lay out for three nights I think and died not very long afterwards.

9532. He lay out exposed on the mountain?—Yes.

9533. Has the doctor expressed any views upon those questions of phthisis as far as you know?—I have not heard any.

9534. Is the mortality from phthisis large in your district?—That is the only one I know of during the time I have been in the quarries.

9535. There must have been regular medical certificates of death in the district?—That is the only case I know. All our people are connected with quarries.

9536. You have a good many granite crushers there?—Yes.

9537. Is there not a great deal of dust from those?—There is always dust.

9538. I have seen men working in the middle of it and the dust was on their clothes?—Yes.

9539. Is that not liable to give them consumption?—We have had no consumption from any of the men who were working there.

9540. You attribute that to being partly open?—We keep it as open as possible.

9541. Would it not be better to remove the corrugated iron round the centre part of the sheds?—If you remove too much you cannot work in a gale of wind, the wind is too strong.

9542. It does not affect the machinery?—No, but rather blows the dust down and blows it in about the machinery and people.

9543. Would it not be possible to use water to damp the stuff that is being crushed, but not sufficient to clog the screen?—In very dry weather we keep the stone damp before crushing.

9544. Why do you do that?—To keep down the dust.

9545. Would there be any objection to that being constantly done?—No.

9546. I suppose it comes to this. You would say: "Once convince me there is any danger of consumption "to the men and I would do it," but you do not think there is?—Yes.

9547. That is the sum of your position in the matter?—Yes.

9548. If it could be shown it is a source of danger, it would possibly be right to do it?—We damp it after it comes out of the screen, but if you damp it too much it would not come out.

9549. No one can ask you to go much further than that. At present you have no evidence of it?—No.

9550. Have you any figures showing the number of your accidents?—No.

9551. Has it been slight?—Very slight: we are very free from accidents.

9552. Can you tell us what the figures have been in the last year?—Last year we had no fatal accident at all. We have only had two fatal accidents during the last 20 years.

9553. And other accidents?—Very little—cut fingers.

9554. How many cases have you had under the Workmen's Compensation Act?—I think we have had three this last year.

9555. Out of how many men?—From 220 to 230.

9556. How long were those men disabled? I want a guide to the severity of the accidents?—We had a bit of finger cut off and the man was off for three or four weeks.

9557. That is a moderately grave accident?—Two stones met and the finger was cut.

9558. That was in the crusher?—No, in the bank. He was cutting a stone and one stone came against the finger and a little bit was taken off. Another man got his back hurt a little bit.

9559. Are those the only compensation cases that have occurred?—That is so.

9560. That seems a small number?—We are very free.

9561. I mean, if you take the general average, it is small?—Yes.

9562. As to fencing, I do not know how far your quarry is fenced, or how far it is necessary?—It is not fenced.

9563. It is not likely from the look of it anybody would be walking there?—If they go up there they go up for a purpose. They do not go up to wander about.

9564. It has been suggested that power should be given to men employed in quarries and metalliferous mines to depute one or more of their number to go round and look at things. You know that exists in coal mines, have you any objection to that?—None.

9565. As regards ambulance arrangements, you would be in favour generally of sets of appliances for first aid being kept?—We have two. I think you saw the box when you were there.

9566. You would have no objection to providing mess-rooms if you are satisfied as to the extent they would be used. May I take it that is your opinion?—Yes.

9567. Nobody would ask you to do it where the men go home and never use them, but if they would be used, and in so far as they would be used, you would have no objection as a principle to providing them?—None.

9568. (*Mr. Lovett.*) In regard to mining, would you tell us what methods you adopt in loading the mine, charging it with powder?—They carry the powder in in bags.

(*The witness explained to Mr. Lovett.*)

9569. Are the men allowed to wear hobnailed boots?—No.

9570. What special precautions do you take in that respect?—They have felt shoes.

9571. Felt bottoms?—No, just felt shoes they put on.

9572. What other methods are adopted. Do they not have wooden rails and trucks and almost wooden everything in charging in some places?—They just take in the powder in bags and pass it in.

9573. They lay down wooden rails in some mines?—I do not know about others. I am talking of our own. We have no rails. It is all carried in by hand.

9574. You could not have rails in your place?—No.

9575. At some places the entrance is on a level with the floor of the quarry?—Some of ours have that.

9576. Take Furness, I was wondering whether they have rails, because I think they mine from the bottom?—When you went to mine inwards you may have it up 40 or 50 feet or down in the level.

9577. Sometimes they use wooden trucks and rails when on the level?—No, it is always carried in in a bag.

9578. Mostly they have felt slippers?—Mostly felt boots.

9579. Have you known any accident happening in the charging of mines?—No, we never have any.

9580. With regard to the crushers, would you have any objection to the introduction of a regulation that would make it compulsory for sprays to be pitched over

the jaws of the crushers?—It would be better to have a spray over the stone before you put it in. It is apt to make the jaws too slippery and the stone would jump up. If the stone is too wet when going into the jaw it does not catch and it jumps.

9581. Some of the larger firms have already introduced the spray and they are using them in North Wales and in other places?—We spray it outside before bringing it in to keep the stone wet. It is as broad as it is long.

9582. Have you found that the minor accidents have been on the increase considerably since the Workmen's Compensation Act came into force?—We hear more about them. I had a man in the other day with a sore finger who wanted compensation, but I found that a ferret had bitten it.

9583. (*Mr. Ainsworth.*) With regard to the certificate for managers, especially men for underground managers?—We have no underground managers.

9584. I mean quarry managers as apart from general managers?—Yes.

9585. Of course, at a place such as your own, your quarry manager would not have any difficulty in passing any reasonable examination, but if you come to a smaller quarry where it might be rather to the interest of the concern to put in what you call a man who is hardly first class because he did not cost so much, do you not think it would be an advantage if he had to pass a practical examination before a small Board which could be easily appointed, say, of one or two managers and one or two qualified workmen who would be able to say at once if they were able to certify he was thoroughly up to his work. In the event of accidents occurring it takes a great deal of responsibility off the manager if you are able to say: "The "man we have appointed as manager has been approved "by an independent authority"?—At a great many small quarries it would be a little bit of a tax to get a man appointed.

9586. If the man is sufficiently good for the job he should not have any difficulty in passing a reasonable examination?—No.

9587. It is to the interest of everybody he should be reasonably good?—Yes.

9588. If the examination for the certificate were confined to practical matters you would not see any objection?—No, I see no reason why it should not be.

9589. (*Mr. Redmayne.*) What would you make the limiting number of persons employed in a quarry to necessitate the appointment of a manager. In the Coal Mines Regulation Act every mine employing 30 persons or more has to have a manager. Have you any idea as to the number of persons that should necessitate the appointment of a manager?—Thirty persons would not be many for a quarry; it would not be a big quarry, if you take all the men who are employed, that is, the dressers as well as the quarry men. There are many men employed.

9590. Apart from the actual quarriers?—We run about one-half.

9591. It is 30 persons employed underground in the Mines Act?—Thirty in a quarry is a good big quarry for actual quarrying.

9592. Thirty quarriers?—That is a good big quarry About ten or a dozen are quite enough.

9593. You suggest a quarry employing ten or a dozen quarriers should have a manager?—Roughly. They always have a foreman; you can call them anything you like.

9594. That is the type of person who could pass the examination Mr. Ainsworth has sketched, namely, a thoroughly practical examination?—Yes.

9595. (*Mr. Lovett.*) They have a working foreman up to about 20 men employed?—Yes, anything above that.

9596. They have a working foreman or ganger?—Yes. Some places can pay for a manager and some cannot.

9597. (*Mr. Redmayne.*) It is as well that that person should be of the best type practicable?—Undoubtedly.

(*Mr. Lovett.*) That is in those quarries where the greater responsibility falls on the manager because the proprietor is out of the way every minute, whereas in larger quarries the managing director has a general oversight, and is there more frequently. The running of a smaller quarry would not necessitate the visit of an engineer or general manager.

9598. (*Mr. Redmayne.*) That is so, is it not?—Yes.

9599. (*Mr. Thomas.*) I understand from the sketch which Mr. Redmayne gave me that you were driving a tunnel about 80 ft. long, and you extend 40 ft. on either side?—Yes, it depends on the rock.

9600. Generally speaking?—Roughly speaking that is so.

9601. What quantity of powder would you have as a blast?—At some of the mines we have had it as high as 10 tons of powder in each chamber.

9602. You blast 10 tons at a time?—20 tons. 10 tons in each chamber. In the one we are putting in just now there will be four chambers with about 30 tons in it.

9603. Thirty tons of powder at one blast?—Yes.

9604. (*Mr. Redmayne.*) Is that gunpowder?—Yes. it is all gunpowder that we use.

9605. (*Mr. Thomas.*) How do you fire that?—By electricity, electric fuses and detonators. We generally put in two or three pounds of gelignite, blast the gelignite, and put the fuse into that.

9606. You really fire the powder by the gelignite?—We fire the gelignite first and it stirs up the powder.

9607. You fire the gelignite by a cap and the gelignite in turn fires the powder?—Yes.

9608. (*Mr. Redmayne.*) By ignition, not concussion?—Probably by both.

9609. You have to light the powder?—Yes, I think it is pretty well lit.

9610. The gelignite does that?—I do not know; I have not been in it. I cannot say.

9611. (*Mr. Lovett.*) Have you known a case where a mine has mis-fired?—Yes.

9612. How did you set about getting the stuff out?—We had one mine mis-fire. This chamber here went off, and this one did not, so we just closed up the one and let the water lie for a fortnight.

9613. (*Mr. Redmayne.*) You drowned it out?—Yes, it is the only thing we could do.

9614. Your gelignite was there still?—Yes, it would be.

9615. The water would not drown that out?—No. By the time the powder was washed there was nothing left but the gelignite. After the powder had been drowned out there was nothing but black muck coming out. The powder was dead.

9616. (*Mr. Lovett.*) There is no regulation to say how you should treat a case like that?—No. There are only the two quarries in the country that do that.

9617. Do you think employers would have any objection to a regulation being brought into existence stating what should be done, and what should not be done in those cases. Somebody with not such large experience and sound judgment as yourself might have done differently, and life might have been lost. There is a great risk?—Yes.

9618. It is better to take preventive measures before something serious happens than bring into existence some regulation after the thing has happened?—Yes. That is the only thing you can do, to close it up.

9619. That is the only thing, to be safe?—Yes, you could never attempt digging it out till it was dead.

9620. It would be wrong to try experiments, and yet it is possible somebody might try experiments, and then there would be considerable risk?—No white man would.

9621. I am not so sure.

9622. (*Mr. Redmayne.*) They would not be happy in working over the place where it had been drowned out?—When once drowned out it is quiet enough.

9623. The gelignite is still there?—Yes, but it is all right so long as you do not disturb it.

9624. So long as nothing falls on it?—Nothing could fall 80 feet in.

9625. (*Mr. Lovett.*) After you have drowned it out the powder is very effective, quite as effective if it dries again?—There is always the water gaining on it. It could not dry very well.

9626. If the thing is done thoroughly and clean washed out, but if a lot is left in and it dries again, I think it is as effective as if the water had not been supplied?—Yes.

Mr. WILLIAM WALKER called and examined.

9627. (*Mr. Redmayne.*) You are the Divisional Inspector of Mines for the whole of Scotland?—Yes.

9628. You have been in the inspectorate since 1889, and have had experience in various districts, including the Durham Mines Inspection District, comprising South Durham, the North Riding of Yorkshire, and Westmorland?—And also in the Midland and Yorkshire District.

9629. Where you were in temporary charge?—Yes, in the Yorkshire District.

9630. In the west of Durham and in Westmorland there are in all a considerable number of metalliferous mines and quarries?—Yes. In Weardale there are a number of lead mines, and also large limestone quarries, the limestone being used for fluxing purposes in the Cleveland iron ore district.

9631. You have had considerable experience with the iron ore mines too?—Yes, in Cleveland.

9632. Those, of course, come under the Coal Mines Regulation Act?—Yes.

9633. I notice you say something about the lead mines in Derbyshire. You are acquainted with those also?—I was for a year in charge of the Midland District, prior to the districts being re-organised on the 1st June last year. There are many lead mines there, one of them a large one, but the others are small, lead mining having practically died out in Derbyshire with the exception of one mine.

9634. Coming to your present Division of Scotland, you have put in a tabulated statement,* extending over the period 1900–1909 inclusive, containing the number of mines worked, number of persons employed, the output of minerals, the death-rate underground, and the death-rate at the surface, per thousand persons employed?—Yes.

9635. That covers the mines and quarries connected with barytes, ganister, graphite, lead ore, limestone, sandstone, oil shale, quartz, red marl, and zinc ore?—The first table only refers to metalliferous mines. There is one further on referring to quarries.

9636. This first table* refers to metalliferous mines only?—Yes. It also gives the average death rate for the 10 years.

9637. It works out at 2·104?—That is above and below ground.

9638. You have something to say with regard to the inspection as carried out in your division?—The present staff in Scotland consists of myself, two senior inspectors, and three junior inspectors, and all are qualified inspectors under the Coal Mines Acts. The staff is distributed so as to obtain the least possible travelling and the greatest amount of inspection as far as the number of inspectors on the staff will permit. Two at first resided in Dunfermline, but one of these has since June gone to Kirkcaldy—two in Edinburgh, one at Airdrie, and one at Glasgow.

9639. You state that they are all qualified under the Coal Mines Regulation Act; that does not mean to say they are not qualified to administer the Metalliferous Mines and Quarries Act?—No, they are all inspectors who have passed the examination for an inspector under the Coal Mines Regulation Act as well as the Metalliferous.

9640. Metalliferous mining does constitute part of that examination?—Yes.

9641. Is this the proper moment to ask a question about that? I take it you would not be averse to metalliferous mining taking perhaps a still more important part in the examination of inspectors of mines?—I quite agree, especially in the districts where there are important metalliferous mines.

9642. And in view of the fact that inspectors change from district to district as they are promoted?—Yes.

9643. They might come from a purely coal mining district to a metalliferous mining district?—I agree.

9644. Then will you continue with your statement?—Nearly all the metalliferous mines are visited, and a large number of quarries are also inspected annually. I am of opinion that at present, the Metalliferous Mines Act is out of date and requires to be amended in several important particulars, amongst which I think the following are desirable:—1. The Acts applying to metalliferous mines should be strengthened and consolidated so that the owners and persons employed would be aware from one Act what was required of them. At present there are the Metalliferous Mines Act, the Factory Act, the Explosives Act, the Prohibition of Child Labour Act, Notice of Accidents Act, and this causes confusion; and I doubt whether in many cases all the requirements are understood by anyone except the persons in charge of the mine and often they have only a confused idea of their responsibilities under the numerous Acts.

9645. By consolidation do you mean that all these Acts should be put into one Act?—In future legislation I mean there should be a Mines Act covering everything at a metalliferous mine.

9646. Whether coal or metalliferous?—No, metalliferous; I am speaking only of metalliferous mines. I think all legislation applying to mines of any kind should be under one Act and not several.

9647. Instead of hunting about the Factory Act for the parts bearing on dressing floors, you would have it in a Metalliferous Mines Act?—There is another point not mentioned in my statement; that is, that we have considerable difficulty as inspectors to know where the factory inspector ends and where we begin. We have often experienced that difficulty.

9648. You would desire to see that more closely defined, as to the sphere of operations?—Yes, I think it is very important.

9649. (*Mr. Thomas.*) Probably, at a later stage in your statement, you will deal with some specific points which may require alteration. I may be anticipating the question?—I do not know. I think this practically covers all I want to say.

9650. Generally you think the various Acts contain sufficient provisions, and if consolidated into one Act, would be looked upon as practicable for the mines, and for the inspectors to administer?—Do you mean to say the Acts as they at present stand?

9651. Yes?—No, I suggest several amendments afterwards.

9652. You do that afterwards?—Yes, in my proof.

9653. (*Mr. Lewney.*) The parts of these particular Acts that apply to mines you would pick out and put into a special Act?—Into a Metalliferous Mines Act.

9654. (*Mr. Thomas.*) You would re-cast the Metalliferous Mines Act retaining the main provisions as they at present exist, with such other additions as might be considered necessary after reconsideration?—Yes.

9655. (*Mr. Redmayne.*) And incorporate the scattered provisions that exist in the Factory Act and so on?—My point is that there should be one Act dealing with everything in connection with metalliferous mines.

9656. (*Mr. Thomas.*) So that the inspectors and the managers and those responsible for the conduct of the mines should not have the necessity of making themselves familiar with so many Acts?—I agree. I am sure at present in the small mines the people do not understand them. You ask if they are carrying

* *See* Appendix H.

out the Children Employment Act, and they have never heard of it. They may have it posted up, but there are so many Acts that these men, who are not highly educated, if they were to read them all, would be so confused that at the end they would not know what they were or to whom they applied.

9657. (*Mr. Redmayne.*) It is confusing even for those who are highly educated?—I agree.

9658. You would desire to see the special rules covering many of the points now raised in the general rules?—I think there should be as few special rules as possible, that where there are any they should be only to deal with local conditions.

9659. Your point would be that all special rules which are of general applicability should go into an act or code of regulations under an act universally applicable?—I agree.

9660. And the special rules of each individual mine to be as few as possible, simply dealing with the local conditions?—Yes.

9661. Then as to returns, what is your opinion in respect to returns?—At present the returns are required to be sent in on or before February 1st. I think the Act might be amended in that respect, and require them to be sent in on or before the 21st January, the same as with the Coal Mines Act.

9662. With a view to getting the statistics out sooner?—All out the same time.

9663. You would make returns as to mineral dressed, and the value of the mineral possibly?—I think there should be a statutory obligation on the part of owners to supply all the information that is now given voluntarily.

9664. (*Mr. Thomas.*) Would you define the nature of the information given. For instance, Mr. Redmayne has in his mind, I have no doubt, that when metalliferous mines were making returns of their mineral they should state the metal contents of that mineral, and accurately.

(*Mr. Redmayne.*) That is the point. We have debated that question. It is a very difficult question in Cornwall.

9665. (*Mr. Thomas.*) It is difficult to get accurate returns; I can appreciate that from the Home Office point of view, but you would make it obligatory to furnish what is now given voluntarily, with more specific information as to the metal contents?—I say I should ask the owners for what they give now voluntarily, and make it compulsory for them to give it.

9666. (*Mr. Redmayne.*) Supposing they were returning copper, and they returned 100 tons of copper, the copper ore. One wants to know the amount of copper in that ore, and there are several processes of analysis. Would you, or would you not require of them that they should state definitely the percentage of ore and the method by which it was determined?—I think it desirable that the owners should give the same information. I do not know the form it should take.

9667. And it should be accurate in respect of the contents of the ore?—I think so. Whatever method is adopted should be the same right through, otherwise the statistics are not worth very much.

9668. Do you require these statistics from owners at the present time?—We ask them to give us the average selling price.

9669. You do not ask for the analysis?—Yes, there is a place where they give the quantity of lead obtained from the ore.

9670. (*Mr. Thomas.*) What quantity would that lead be? In Derbyshire they return galena. Would that be accompanied by any percentage statement as to the lead contents, or simply so many tons of galena sold for *x* number of pounds?—The way they return it is, so many tons of lead ore were worked, and it contained so much per cent. of lead.

9671. They do that now?—Yes, always, and give the ounces of silver per ton.

9672. Your chief point in bringing this forward from February 1st to January 21st is in order to enable the Home Office to publish their reports a little earlier than has been possible in the past?—I think so. I think it is reasonable, because under the Coal Mines Act there are very much more extensive returns, which have to be sent by January 21st. As a rule, these very small metalliferous mines returns keep the statistics for the whole country hanging up for the extra time.

9673. (*Mr. Redmayne.*) With a view to making those statistics absolutely reliable you would advocate that the metalliferous contents should accompany the return?—I do. I say it should be standardised.

(*Mr. Ainsworth.*) Would you require the whole of the contents, or only the contents of the mineral in question?

(*Mr. Redmayne.*) Not all the by-products.

9674–5. (*Mr. Ainsworth.*) If iron, the percentage of iron?—I think this form at present is one prescribed by the Secretary of State under the present Act.

9676. (*Mr. Redmayne.*) Then with regard to certain notices you have something to say?—I think it should be made compulsory for notice of the commencement and abandonment of mines to be sent to the inspectors, of change of ownership, and manager, and I would suggest that the requirements of the Coal Mines Act be adopted in this respect.

9677. What do you mean by "abandonment": would you read that as discontinuance?—I suggest in my proof it should constitute 12 months without having been worked or produced ore.

9678. That you would define as abandoned?—Yes.

9679. With regard to plans of abandoned or discontinued mines, you have something to say?—I think plans of all abandoned mines should be required to be deposited at the Home Office within, say, three months and a definition of abandonment should be introduced. Personally, I should say that in all cases a plan made and certified as to its accuracy by a competent person should be forwarded to the Secretary of State after a mine has ceased to produce any output for 12 months. I should like to see receivers and liquidators made responsible.

9680. You would put them in the position of owners?—Yes. I have some difficulty in that way, even under the Coal Mines Act at present. A firm becomes bankrupt, and there is no one responsible.

9681. (*Mr. Thomas.*) The definition of "abandonment" I take it might be, according to your own wording here, after a mine has ceased to produce any output for 12 months?—Yes.

9682. You would reckon that to be an abandonment?—I think plans should be deposited.

9683. The definition of abandonment of a mine could scarcely be that, because many mines may develop for 12 months and not have any output?

9684. (*Mr. Redmayne.*) So long as any person is employed in carrying out actual prospecting work, would you call that abandonment? A man working a pump is a different thing?—That is the point. I want to cover the case of keeping one man to look after a pump: that is not sufficient to prevent them depositing plans. My experience is they do that, and when you want the plans, they are not to be had: they have disappeared. I do not think there would be any hardship in asking the owners to deposit plans after a mine had not worked 12 months.

9685. (*Mr. Ainsworth.*) Either in output or in development?—I might say "produce or develop."

9686. (*Mr. Thomas.*) Obviously the mine may not produce, and yet develop. It may be in active operation, although not producing?—I agree.

9687. The definition of abandoned mines, you say, should be introduced. A definition of that kind would require some careful consideration?—I think it would. At present it is not necessary unless there are 12 persons employed underground to deposit plans. At present there are dangerous places without any record of the workings.

9688. (*Mr. Redmayne.*) Whatever the size or operation of the mine you would require a plan?—Yes, at all mines.

9689. (*Mr. Thomas.*) You have said that a plan should be certified as to its accuracy by a competent person. Would you go so far as to say a surveyor should be approved or certified by some authority?—I should adopt the Coal Mines Act. A plan under

that Act has to be made by a qualified person approved by the Inspector of Mines.

9690. The Inspector of Mines would naturally satisfy himself that man was competent to make a survey?—Yes.

9691. You have known, and many other Inspectors, that surveyors have been appointed to make plans whose plans have not been accurate, and it would be fatal to rely on those plans?—There was a case in the Forest of Dean, where an accident occurred.

(*Mr. Redmayne.*) In that connection, I may just read the recommendations* of the Royal Commission on Coal Mines, and ask Mr. Walker if he would approve their application in respect of metalliferous mines.

(*Mr. Thomas.*) That is the present Coal Mines Commission.

9692. (*Mr. Redmayne.*) Yes, it is now sitting: "After considering the evidence submitted to us and "the circumstances of the accidents which have "occurred in recent year, we are of opinion that steps "should be taken to ensure that the persons entrusted "with the work of surveying and preparing the plans "of a colliery are fully qualified. We think that the "best method of achieving this object would be to "amend the law so as to require that the plan of the "workings required by the Acts shall be prepared "under the supervision of and certified by a surveyor "who has obtained after examination a certificate of "competency in surveying." Would you seek to apply some such recommendation to metalliferous mines also?—I think it would be desirable. At the same time, if you are going to give certificates, there are many men to whom you would have to give certificates at present. It depends altogether on the class of examination.

9693. It should be an examination that would ensure a man being capable of making an accurate survey—not necessarily a highly technical examination?—Under the Coal Mines Regulation Act there is a form of certificate required to be endorsed on the plan itself by the surveyor, and the Inspector also fills in a form stating that he approved of the qualifications of the surveyor. If the Inspector were to approve a person in the same way in this case, it would meet the point. If he had a certificate he would have no difficulty at all; that would be his qualification.

9694. (*Mr. Thomas.*) That is a certificate from some well-known educational institution?—Yes.

9695. (*Mr. Redmayne.*) That might be required as complying with the requirements, but failing that he should pass an examination?—I agree. If the man has passed the examination he would be qualified, but otherwise he would have to be approved by the Inspector of Mines.

9696. (*Mr. Thomas.*) Any surveyor practising as a surveyor of mines would have no difficulty in passing any such examination framed with the idea of ascertaining his knowledge of that particular branch of practice?—I should not think so.

9696*a*. (*Mr. Ainsworth.*) How would it be to leave it to the Inspector of the district. He is supposed to have been through the mine—assume a small one open for a short time—he has been in it and knows something about it. He would be able to see if the plan the owners submit as the plan of the mine as left is sufficiently good. He would have some notion, and also if the man who made the plan was a sufficiently good draughtsman?

(*Mr. Lewney.*) That would be hardly fair to the Inspector.

(*Witness.*) Might I just mention an instance that occurred in Durham. There was a case where the Inspector had been the manager of a colliery before he was appointed an Inspector, and he was asked by the manager, when approaching the old pit of which he (the Inspector) had been manager, what barrier he should leave round the shaft. He said: "If you leave a circle of a certain diameter"—putting a circle on the plan—"that will keep you safe." Eventually the workings from this colliery holed into those from this shaft and some men were drowned, and the Inspector had to say he had been misled by his memory, although he had been manager, and would know more than an Inspector under ordinary circumstances could know. I do not think you can possibly rely on memory. It must be an accurate plan after surveying.

9697. (*Mr. Ainsworth.*) I am not suggesting he should rely on his memory, but suppose he or his subordinates had been into the mine at regular intervals?—I think the responsibility must rest on the owner or manager for the accuracy of the plans, not on the Inspector. I think the scale of the plan should not be less than Ordnance 25-inch.

9698. (*Mr. Thomas.*) You say that the plans, and where necessary sections, should be required of all mines no matter what the size or how many men are employed and should be on an Ordnance Scale of 25 inches to a mile?—I mean "not less than."

9699. But if the plan is drawn to a practical scale and coupled to the nearest Ordnance Survey bench mark, do you not think that important?—Yes.

9700. For abandoned mines in particular?—It would probably be better with old mines, where you had a definite scale to require that.

9701. Whatever scale it may be drawn to, if that mine is coupled to the nearest Ordnance Survey bench mark, it becomes a permanent record which can be filed away, and the workings of that mine can be found at any time hence?—I agree.

9702. Would you also agree with the suggestion which has been made that the deposited mine plans should have their depths stated below the Ordnance Survey bench mark?—Yes, I agree, and I think it would be a good thing in all cases to have on the plan the number of the Ordnance map on which the mine is situate.

9703. You would also make it obligatory on the part of those making mine plans to deposit them, and that they should be drawn either to the true North, or the magnetic North, but properly stated with the date on which the plan was drawn?—I agree it is very important indeed.

9704. It is rather more important perhaps to have the plan drawn to the true North with the variation stated rather than the date?—Yes.

9705. Provided one or the other is given, you would be satisfied?—Yes, one or the other, and a statement from the person who made it that the allowances have been made for the variations in the magnetic declinations from time to time.

9706. If it was made obligatory that the plan of the mine should be drawn to the true North, then the variations would have to be calculated as the plan was being made?—Quite so, in the case of coal mines that is necessary now.

9707. Your suggestions on these matters have in view, or at least in the suggestions you have made you appreciate the difficulties that occur from time to time in getting accurate plans of old workings and abandoned mines which cause a very great deal of trouble, inconvenience, and expense of those re-opening mines? Yes, and the risk of accidents that is run.

9708. (*Mr. Redmayne.*) It would be rather necessary, would it not, that there should be some requirements as to the manner in which these plans are to be prepared. One has seen, and I have no doubt you have seen, the plan put forward which has been drawn in pencil on indifferent paper. I take it you would require that the plan should be drawn with some more permanent material than pencil.

9709. (*Mr. Thomas.*) And in ink?—Yes, on tracing cloth, if it is a copy of the plan.

9710. (*Mr. Redmayne.*) In the statutory plan you would not be averse to it being drawn with such material and in such manner as should be prescribed by the Secretary of State?—Not at all.

9711. As to the true North, it would be necessary to have the true North on the plan?—Yes, I think it is better to insist on the true North being given always, and a statement from the surveyor that proper allowances have been made from time to time.

9712. Have you anything more to say with regard to plans?—I think not.

9713. As to the date at which they should be kept up, have you anything to say?—This would mean that plans,

* *See* Second Report of the Royal Commission on Mines (Cd. 4820, 1909), page 203.

and when necessary sections, would have to be kept at all mines. That is not required now. In my experience, I have had some difficulty with mines where there has not been the necessary number of persons underground. When working whinstone in a vein, in some cases they drift in from the day through a hill, abandon these workings, and come down below, leaving a small barrier between the two and drive underneath the workings above again. There are no plans and no sections; the upper portion becomes inundated with water, and there is, I think, considerable risk. There have never been accidents simply from the fact there have been backs in the stone, and there has not been a sudden inrush.

9714. (*Mr. Thomas.*) You say there should be plans, and, when necessary, sections. Would you consider with regard to plans of abandoned mines, that sections should be absolutely necessary to accompany the plan?—I think so, where necessary.

9715. It would be a great advantage?—I think it is absolutely necessary where you require the sections. I say "where necessary," because stone mines come under the Metalliferous Mines Act, where you have a seam or bed.

9716. (*Mr. Redmayne.*) In all metalliferous deposits?—You should have the section as well as the plan.

9717. (*Mr. Thomas.*) That is the longitudinal and the transverse section?—Yes.

9718. (*Mr. Redmayne.*) Leaving the question of plans, and passing on to workings, what have you to say with regard to the compulsory provision of second outlets in mines?—So far as my experience goes I have found there have always been two outlets to mines. I do not know of any case I can call to mind where there have not been two shafts or adits.

9719. By outlets you mean outlets to the surface?—Either in the shape of shafts or drifts or adits. Therefore, I do not think it would be a great hardship to require that this should be done in all cases, but in view of the fact that it may be of hardship, I think power should be given to the inspector to require this to be done if he thinks it necessary in any particular case.

9720. By two outlets do you mean two distinct shafts or one shaft divided into two?—Two distinct shafts.

9721. Because there are cases, more particularly in the iron ore district of North Lancashire and West Cumberland, where they have one shaft in a few cases. The addition of another shaft in some cases might mean the closing of the mine?—I do not think any of us wish to legislate mines out of existence. That is why I say I would put in a provision that second outlets should be provided where the Inspector gives formal notice.

9722. Where he thinks they are absolutely necessary?—Yes, and in the event of the owners not agreeing, to go to arbitration as provided by the present Act. In one mine in Derbyshire they work with safety lamps, that is the only case I know of safety lamps being used in a lead mine. It is a case where a second shaft is important for ventilation purposes.

9723. Is that Darley Dale way?—Yes.

9724. (*Mr. Lewney.*) Is it hard ground?—Yes, it is the ordinary ground of that district, I think the gas comes from the shale above.

9725. (*Mr. Redmayne.*) It is semi-carbonaceous shale?—Yes.

9726. As to the employment of certificated managers in mines, where would you draw the limiting line?—It is difficult, but I think 15 persons underground might be taken. That is half the number fixed for the coal mines.

9727. Would you adopt the same mode of procedure as that used in respect of coal mines in the Coal Mines Act with regard to the awarding of certificates?—Yes, I think I would let the same Boards grant certificates, but put on them representatives from metalliferous mines.

9728. (*Mr. Thomas.*) I think in your proof after "examination" the word "as" should come in—use the examination as under the Coal Mines Act applicable to the examination for certificated managers?—"Certificates should be granted by the Boards of Examination under the Coal Mines Acts." They are in existence now.

9729. Why under the Coal Mines Acts?—The same Boards now appointed under the Coal Mines Act could be added to by the addition of representatives of metalliferous mines.

9730. (*Mr. Lewney.*) If it is necessary to appoint a separate Commission to inquire into the administration of the Metalliferous Mines Act, surely it is also necessary there should be a separate Board to deal with this matter?—It would not be in my district, because we have only 31 mines.

9731. We are here inquiring into the whole mines of the country?—I am speaking for Scotland at the present time, and when you have only 668 men employed in the district, it would be rather a big thing to ask to have a special Board appointed for them.

9732. (*Mr. Redmayne.*) Would this meet the point? Suppose there were, as recommended by the Royal Commission on Coal Mines,* one Central Board for the whole of the Kingdom to examine for certificates, and on that Board, which would be composed of different individuals, not necessarily coal miners, there were representatives of the coal mines, representatives of the metalliferous mines and quarries, and different papers entirely were kept for the colliery managers and the metalliferous mines managers?—That is my view.

9733. With a local *viva voce* examination conducted by men having knowledge of metalliferous mines?—That is my view.

9734. It quite alters the existing system. The Boards as now existing under the Coal Mines Regulation Act would have to be dispensed with and a new Central Mining Board created?—I agree. I think that is what we want in all the Acts. Thereby you get a uniform standard of examination. At present you have eight different districts, all probably with different standards, and a man who is examined and obtains a certificate in the district where the lowest standard is can go to the worst mine in the kingdom and manage it, although he may not have passed an examination which qualified him to do it.

9735. (*Mr. Thomas.*) Reading this as it is drafted, what was in some of our minds, and what would be in the minds of many quarry owners throughout the country, would be why examine metalliferous mine managers and the quarry people by examination under the Coal Mines Act? Evidently you did not intend that, and therefore, I suggested just now that following the word examination should be inserted the word "as," as under the Coal Mines Regulation Act?—I quite agree.

9736. Use that as a model, but modify the examination according to the requirements?—I agree. I had no intention of suggesting that.

9737. I did not imagine you had; therefore, I raised the point?—That is why I used the words "after a suitable examination."

9738. (*Mr. Redmayne.*) It should be an examination dealing with that branch of the industry particularly?—Yes.

9739. Of course, you would not inflict any hardship on the existing managers. As when the coal mines examination came into operation, so with the metalliferous mines examination you would give certificates of service?—Yes.

9740. To many old men who are excellent managers it would be a hardship if they had to pass it?—Yes, certificates of service would be necessary. You would not have sufficient managers to manage the mines unless you granted such certificates. Therefore, I would give certificates of service when the Act came into force.

9741. The limiting line you would make 15 persons underground?—Yes, I suggest 15.

9742. You got really down to half the number in the coal mines?—Yes.

9743. Because the mines are smaller?—Considerably smaller. In the whole of Scotland 670 men are employed underground in the 31 mines.

* *See* Second Report of the Royal Commission on Mines (Cd. 4820, 1909), page 195.

9744. (*Mr. Thomas.*) Have you any particular ideas as to the nature of the examination for the full manager's certificate, that is assuming that in addition to the full manager's certificate you would make it necessary to have an under manager's certificate?—No, I do not think I should have an under manager's certificate in metalliferous mines.

9745. Would you not consider it a hardship for small mines to have to employ such an expensive man as naturally they would have to employ if he was capable of passing a full manager's certificate, which would be rather a stiff examination?—"15 persons underground" does not mean 15 at or about the mine. They are employed underground, and I should make the examination such that it could be passed by practical men. In the coal mines we have a number of coal miners working at the coal face with first class certificates. I think if they can do it in coal mines they can do it in metalliferous mines; they are quite as intelligent.

9746. I am glad to hear you say so, but the thought has occurred and the point has been brought out at many examinations as to the advisability, in addition to having an examination for the general manager, that is, the man capable of taking charge of big concerns or groups of concerns, the general manager, or in some parts of the country, the engineer, that is mining as well as mechanical engineers, of having an examination for the under manager who would be in charge of the underground workings or in charge of the actual quarry face as the case may be. Such an examination would be more in the nature of an inquiry as to the practical work that man has undertaken and he should satisfy a Board of Examiners that he has had sufficient practical experience to undertake the actual work of operations. It has been felt by some witnesses that that would rather strengthen the position of the employers in having, in addition to their own knowledge of this man, so to speak a hall mark of this man's practical experience as being qualified to carry on the actual working of the quarry or the mine as the case may be?—Of course he is the man I rather look upon as being the certificated manager. I do not like the idea of the underground manager as he is sometimes called, because a certificated manager takes responsibility for both above and below ground.

9747. That would be so, but I suppose you get many small mines and quarries where it would be a hardship to expect them to employ—I speak with all due deference in regard to practical workmen—a higher class man possibly than could be expected from a practical man only?—I do not think there would be much difficulty in the practical men passing that examination. The working men in the coal mines have already passed it.

9748. That comes back to the point of making it clear that the nature of the examination should not bar that class of men from obtaining it?—I agree. That is a question for this central board to deal with. As to the standard of examination you require, there are many practical men who have obtained first class certificates, and I should be sorry to see anything to prevent them, because some of them are among the best men we have in the coal trade.

9749. (*Mr. Redmayne.*) It is clear you are against two forms of examination?—I do not think I would have two. I would have the one certificate for the manager of the mine, or group of mines, as the case may be.

9750. The mine with 15 persons would have to have a manager?—Yes.

9751. A manager of that calibre the same as the manager of a mine like Dolcoath?—Quite so, or one such as Leadhills.

9752. You would not think that a hardship?—I do not think so. I think that is practically carried out now. The man who is in charge of the mine now would be able to obtain the certificate, and would therefore be the certificated manager. I am not referring to what Mr. Thomas calls the engineer, who is probably some consulting engineer, a firm of engineers it may be in many cases, not residing anywhere near the mine. I mean the man carrying out the daily work and supervision at the mine.

9753. (*Mr. Thomas.*) That is the point I want to meet, because that body of engineers would, under the Act at present, be the actual statutory manager of the mine, having under him a practical man in charge, and this engineer of a group of mines, as the case might be, would occasionally visit that mine, but the man in charge would be in charge of the actual operations, and it has been thought by some witnesses that if he were granted (assuming it was found necessary to have certificates at all) a certificate, the nature of that examination would be to satisfy the Board of Examiners that he has had sufficient practical experience, and that examination need not necessarily be a written examination at all?—It would require some written, but I think most of it could be oral.

9754. (*Mr. Redmayne.*) Take a big mine like Dolcoath. Will you put me right, Mr. Thomas, if I am wrong. I take it there is a mining engineer who has charge of the whole of the operations of the concern and in close touch with the directors, and every difficult mining operation would come before him for consideration as to whether such-and-such should be done. There would be a mine captain who goes down the mine every day, and for all I know goes through every working place. That is the man you have in mind?—That is the man I should call the under-manager.

9755. That man has not the power to direct the operations really; he is a very superior foreman?—That would have to be clearly defined, because it would be wrong that because a man had a certificate he should be held responsible for something he could not alter. It is the man who has full control that should be held responsible. I take it from Mr. Thomas's questions that it referred to consulting engineers practically. Consulting engineers as a rule are people who have offices in large towns, who seldom see the mines practically. The meetings are probably held in their offices.

9756. (*Mr. Thomas.*) That is not so in the Cumberland district?—No. I have no particular district in mind, but that is so in some cases.

9757. There are districts in the country where that is not so, and what you call the engineers are directly in charge of the whole operations, although not resident.

9758. (*Mr. Lewney.*) Engineer in charge?—If the man is on the spot and has the direct charge, then he should be the manager.

9759. (*Mr. Thomas.*) I was rather hoping you were going to say that if it was found desirable to have an examination for that man who was in charge, then that examination, to repeat my own words, should be more in the nature of an inquiry as to his practical experience and his fitness for carrying on the practical work of the undertaking, rather than that coupled together with a written examination such as many of these men, more or less illiterate, would be quite unable to pass?—I do not know. I think probably some of these men would be able to pass such an examination as I have in view.

9760. I do not wish to disparage any acquisition of technical knowledge which these men may get, but I am laying stress on the advisability of having thoroughly practical miners or quarrymen to efficiently carry out the work for the economy and safety of the mine?—I agree, and I think that is necessary.

9761. Therefore I suggest that the nature of the examination is the determining factor of the necessity for the examination?—I agree. I think the examination should be a practical examination.

9762. A practical inquiry, really?—An examination is the same thing.

9763. (*Mr. Ainsworth.*) You would not see any object in that examination going to any extent far beyond the actual work the man would have to do?—The examination should be in accord, and deal with the work a man was expected to do?—In his everyday work, such as methods of working, ventilation, and so on, you mean?

9764. Yes, everything of that kind?—Quite so.

9765. There would be no need to carry the examination into any subjects further than that?—He would probably require to know the chemistry of mine gases, and that sort of thing, for the purpose of knowing where to find them.

9766. (*Mr. Lewney.*) The chemistry of mine gases? You are going back to the engineers?—No. For instance, if you ask a man where you would find carbonic acid gas, any miner would tell you at once. That is practical knowledge, and that is what I mean.

9767. If you are going to insist upon that, it would mean in all our metalliferous mines in the North that we should require two sets of managers. We have at present engineers who are not exactly consulting engineers, and reside at a considerable distance, but who are frequently at the mines. Under these men we have men who are termed local managers. I take it that these are the men that Mr. Thomas has been asking you about, and whether you would insist on these men having over them a fully qualified engineer having a technical as well as a practical training. You say you would require that they should have a knowledge of the chemistry of gases, which, in my judgment, is a very technical training for men of that class?—We do not agree; that is all. If your everyday work teaches you where gas is to be found, and whether it is heavier or lighter than air, it would, I think, be very practical.

9768. I think we pride ourselves in the North that our practical men are the first to find out where the gases are found?—Quite so.

9769. In the new workings it is a very rare thing to find any gas. We find it in going through ground a second time, through the decaying of timber, and almost solely in cases of that sort?—You must remember if you grant a certificate, that man may not always be at that mine, and may go to another mine where there are gases. If you give a man a certificate it entitles him to manage any mine in the country, no matter how dangerous, and therefore you have to keep that in view in saying what the standard of an examination shall be.

9770. (*Mr. Thomas.*) I expect Mr. Walker is anticipating the time which is not far distant, when the greater number of these practical men coming on will take advantage of the facilities for technical education which are granted to them, and you will have a class of men better educated than those who have gone before?—I think the result will be as I suggest, that requiring an examination would bring that about.

9771. Can one detect in that remark an indication that the facilities of education are being grasped?—I think so, in Scotland.

9772. Why do you lay stress on Scotland?

(*Mr. Redmayne.*) Are not Scotland and Belgium the two best educated countries in the world?

9773. (*Mr. Thomas.*) The necessity for education is more pronounced?—I think the facilities are certainly greater.

9774. (*Mr. Ainsworth.*) Have you found in Scotland in your district that there is a general desire to make use of technical education, and so forth, especially on the part of the miners?—Yes; and there are very good technical schools and technical classes all over the district.

9775. They are well attended?—I think so.

9776. I am glad to hear that, because from some other parts of the country we heard that was not the case?—The Technical College in Glasgow and the Heriot-Watt College in Edinburgh are well attended.

9777. (*Mr. Thomas.*) By what class of men, by the sons of well-to-do people, or by the actual workers?—By men actually working in the mines, some of them.

9778. You have a fair sprinkling of that class of men availing themselves of that opportunity?—Men occupying the same position in a mine improve themselves by attending Saturday afternoon or evening classes.

9779. There is a disposition amongst the men to attend?—Yes.

9780. Evidence has been forthcoming here, when we have learned, rather regretfully it is true, that the facilities are not taken advantage of?—To-morrow Mr. McLaren will be here, and will be able to tell you more than I can. I have only been in the district seven or eight months, but he was a teacher at the technical classes before his appointment as an Inspector.

(*Mr. Ainsworth.*) That is very satisfactory.

9781. (*Mr. Redmayne.*) As to the inspection of working places, you think that should be made by competent persons?—There should be a competent person in the smaller mines.

9782. That was the whole point. A mine employing 15 persons has to be under a manager?—Yes.

9783. Below that you require a competent person?—I want a competent person who shall be nominated in writing to the Inspector, because I find that one goes to a small place and does not know who is responsible: often nobody is responsible.

9784. (*Mr. Lewney.*) I think the Inspector ought to know who is the competent person in every mine.

9785. (*Mr. Thomas.*) Why should not such a person be a contractor for working a mine?—I do not think a person who is a foreman should be a contractor, because it does not tell for safety.

9786. Why should not the contractor be directly responsible?—Suppose a firm determine to open a mine and they ask for and receive prices from contractors to open that mine—it may be in the way of clearing an adit or sinking a shaft—the owners of that mine hand over the contract to a person to carry out the work. Would it not be a hardship that they should have, in addition, to appoint a manager?—From the point of view of safety I think it would not at all, because it would be to the contractor's advantage to make all he could possibly out of his contract, and therefore if he skimped timber or anything which added to the danger, he would be putting money into his pocket. That is the temptation I want to remove.

9787. You want to provide for possible contingencies in the event of it being done by a contractor?—Yes.

9788. It is rather a reflection on the selective abilities of the owner?—Not at all. I think a man who is responsible for the safe conduct of the place should not have any temptation to do anything which would reduce the safety of the mine in order to obtain money.

9789. (*Mr. Ainsworth.*) Have you not rather the case in mind of what is called contracting a pit, where a man undertakes to raise the whole of the stuff, and so forth, at a certain price?—Yes.

9790. Therefore it is to his interest not to spend too much time or too much money on inspection or anything of that kind, but simply to get all the stuff he can?—That is the case I have in view.

(*Mr. Redmayne.*) Such as the chartermaster system in mines in Staffordshire, which the Royal Commission on Coal Mines have condemned. They have stated the chartermaster himself shall not have the appointment of officials.

(*Mr. Ainsworth.*) That, no doubt, is the same point.

9791. (*Mr. Redmayne.*) It is the same point?—In some metalliferous mines at the present time the only man in charge is the man who is paid so much a ton for the output.

9792. In metalliferous mines you have the chartermaster system applied in Scotland?—I say so. There is a man who goes once a fortnight or once in three weeks and looks round the mine, but he is not the manager. The man who has the working of the mine, which is taken at so much a ton, and employs everyone at the mine and pays them, is the manager, and I say should not be.

(*Mr. Thomas.*) To be perfectly clear, this would be only in what you call smaller mines, that is employing less that 15 people underground. Your remarks apply to smaller mines.

9793. (*Mr. Redmayne.*) You would apply that to all mines?—Yes. The certificated manager would not be a contractor.

(*Mr. Thomas.*) I agree with you. I was taking smaller mines with under 15 men.

9794. (*Mr. Lewney.*) I take it that is your minimum?—Yes.

9795. (*Mr. Ainsworth.*) Has not this system you have been speaking of, what I call contracting the pit,

rather come to an end since the passing of the Workmen's Compensation Act?—In Scotland we have some places now where the metalliferous mines are worked on that principle.

9796. I know it has obtained in Scotland, but I did not know that it was in force to any extent now. It is so, you say?—Yes.

9797. Under those circumstances manifestly the interests are not exactly the same. The object of the contractor is to get everything as cheaply as he can, and necessarily: therefore probably there would not be the same attention to inspection.

(*Mr. Redmayne.*) Skimping with timber, and so on.

(*Mr. Ainsworth.*) That is the danger about it.

9798. (*Chairman.*) With regard to the inspection of the working places, will you give us your view. You are speaking of mines?—Metalliferous mines. I think the inspection of working places should be made by a competent person authorised in writing by the owner or manager, whose duty it should be to examine all the working places in his district or portion of the mine and a written report made of its condition. Where an actual inspection of the roof cannot be made owing to its height, I think it should be required that this should be done periodically by the erection of staging and ladders. Probably this might be done once at least in three months.

9799. They are very small mines. I suppose there are not many employing very few people. Would it be unnecessary in those cases to have written reports, or would you have it in all cases?—I think I would have it in all cases.

9800. It would only be a few words in many cases?—It is just a heading, Yes or No. Is the mine in good condition? Are the roof and sides in good condition?

9801. There would be no hardship in making a man write that out and send it to the office to be filed?—It is difficult to say it should be applied to a mine employing 30, but that in a mine employing seven or eight men it should not, because in one the conditions may be good and in the other bad.

9802. There is always a certain number of men about a mine. It is not like a quarry?—We have just been dealing with the certificated manager and the competent person.

9803. (*Mr. Thomas.*) Are those remarks made chiefly to apply to your particular district?—Certainly.

9804. Not generally?—I am only speaking of my experience.

9805. You would not suggest you would want an appointment in writing by the owner and manager, and that he should write a report as to his inspection? That is in very large undertakings.

9806. (*Chairman.*) He would wish him to beappointed in writing, and would want a daily report, but it need only contain the words "All satisfactory," or something of that kind?—There is such a requirement in quarries under the Special Rules. It is necessary for a man to make a report of machinery. It is that kind of thing I want.

9807. (*Mr. Lewney.*) By an appointment in writing do you mean the Inspector for the district should be notified?—No, I said the owner or manager should keep a book in which it should be stated, and he should give the man written notice that he is appointed, because that is very important. At present if you get a case, as I have had, of so-and-so did not do his duty, he may say he is not the competent person, and you have to produce every man in the mine in order to show who is the competent person. I think all appointments should be in writing, so as to know who is responsible for this work.

9808. (*Mr. Thomas.*) You say, "Where an actual "inspection of the roof cannot be made owing to its "height, I think it should be required that this should "be done periodically by the erection of staging and "ladders." Providing it were efficiently done, you would have no objection to the method employed. You could not define the method in every case. You mean to say the inspection should be efficiently done?—That is so.

9809. The suggestion is that you might do it by such and such a thing?—It might be necessary to put staging or ladders, or something else.

9810. Obviously. You say probably this might be done once in three months. That is the working places. You would not make it obligatory to inspect the places which were not working?—No, only to places that work.

9811. (*Mr. Lewney.*) For instance, where the stopes were worked out it would not be required?—You could not possibly do that. This has always to be read "as far as reasonably practicable."

9812. (*Chairman.*) You think also there should be a daily inspection of the appliances in shafts and of the shafts themselves weekly, and reports of their condition as in General Rule 5 of the Coal Mines Regulation Act?—Yes.

9813. (*Mr. Thomas.*) By "appliances" you mean the winding engines and the ropes?—Chains, cages, guides, and other appliances. The shaft I should examine once a week.

9814. I suppose that is really done now, in a well-conducted mine probably oftener?—I think it is.

9815. It would inflict no hardship?—It is not required by the Act.

9816. (*Chairman.*) Have you any opinion about safety catches. There are detaching hooks and safety catches?—Detaching hooks and controllers. By safety catches you mean anything catching the cage if the rope breaks?

9817. Yes?—I was a member of the Committee appointed by the Coal Mines Commission, and we went into that very carefully, and we came to the conclusion that we could not recommend their adoption.

9818. Safety hooks?—Safety hooks and controllers, yes, but not safety catches.

9819. Are you sure in some cases the time has not come when we could get hold of a good safety catch?—I do know of one at present, and I have known of an accident caused by one.

9820. There was a case last week where the men went to the bottom. They were not injured, but they would have been arrested if the safety catch had come into operation?—I knew where two men were killed through one of the safety catches coming into operation when it should not have done so.

9821. I wonder if it is a subject a series of experiments ought to be tried upon?—I think it is.

9822. It is nobody's business to try it at present?—The Transvaal Commission tried experiments.

9823. I do not know whether we ought to try something or not?—I think so. You have to remember, especially, in some coal mine shafts, you have a cage travelling at the rate of 72 ft. a second.

9824. How fast is that?—That is about 49 miles an hour, and the load is 26 tons. If that was suddenly stopped in its ascent by the rope breaking no catch would stop it.

9825. Still, these safety catches are used in many mines, almost universally in Germany, and to a certain extent in Great Britain?—The speed of the winding must be much lower.

9826. Or they must have wooden guides?—I do not know that any guides would stand that.

9827. They are tried in cases where wooden guides are used?

9828. (*Mr. Thomas.*) Many experiments have been made to arrest the cage in the event of a rope breaking, but unsuccessfully so far?—There are some. There is a man in Bristol who has one.

9829. The modern practice is to equip shafts with rail guides where the cage is guided on one side. I am not aware of any safety catch?—I do not know any that would arrest a cage under the conditions I have mentioned.

9830. Especially having regard to the enormous speed of winding?

9831. (*Chairman.*) You have two things to remember. Where the cage is rising that point does not arise. It stops temporarily, and then you ought to clutch hold if you can. If you could, there would be no strain on the guides or ropes?—You have the descending

cage travelling at the same rate which would be liberated with the loss of load on one side.

9832. (*Mr. Thomas.*) Accelerated rather than liberated?—Yes.

(*Chairman.*) Anyhow, safety catches are rendered compulsory in Germany.

(*Mr. Lewney.*) I believe they are in some of the Colonies.

(*Mr. Thomas.*) I do not remember noticing them on my visit to Westphalia.

(*Chairman.*) I know they are largely used in Westphalia.

(*Witness.*) They are.

9833. (*Mr. Thomas.*) The Committee of which you were a member came to the conclusion that a safety catch might be too much relied on instead of placing reliance on a proper rope and taking good care that it was examined daily?—Yes.

9834. Would you not rather prefer, instead of having the necessity of fitting the cages with safety catches, to have a factor of safety fixed for the winding rope itself?—Yes, but that is a very difficult matter with these deeper mines. It is difficult to get the factor of 10 to 1.

9835. Whatever factor may be determined upon?—The whole matter requires some inquiry and some experiments made.

9836. (*Chairman.*) We adopted the conclusions suggested to us after hearing a good deal of evidence, but times progress and invention progresses, and many things are invented every day. My question was rather whether the subject was not one which was worthy of a further practical trial?—I agree.

9837. I do not think it is any use taking opinions. Opinions vary very much?—The only thing to settle this, as mining is becoming deeper, would be to get an old shaft and fit it up for the purpose of having trials with particular apparatus, but you cannot do it at a going colliery or mine.

9838. (*Mr. Thomas.*) The number of winding accidents that have occurred in the past throughout the country are not sufficient to make any urgent necessity for any provisions of that kind?—Considering the number of winds, the number of accidents from winding is very small, but I think it is a question for experiment and research.

9839. (*Chairman.*) As to the support of the roof, you think a system of support ought to be required in certain cases?—Where it cannot be examined. In the particular case I have in mind the accident that occurred at Hunter's Hill sandstone mine, near Glasgow, which the members of the Commission saw, a fall of roof occurred from a height of 50 ft., and the width of the stone which fell was 66 ft. by 40 ft., and its greatest thickness 3 ft. 9 in. Stoops or pillars were left for the support of the surface, and the width of the exposed roof was more than 70 ft. I think the size of stoops or pillars should be required to be not less than—that is in this instance—30 ft. by 30 ft. and the width of the road not more than 30 ft. In connection with that I should like to explain that a definite line cannot be drawn as to the size of stoops. It is rather a proportion of what is excavated to what is left. I think also that the insertion of hard wood wedges between the joints in the roof stone is a good thing. This had never been thought of at this particular mine.

9840. (*Mr. Lewney.*) Would it not be better to allow larger powers to the inspector?—I go on to say that I think some rule should be introduced in connection with future legislation, requiring that some support should be given to the roof—I think power should be given to the inspector, where he thinks it necessary, to require that support should be given to the roof, and in case the owners do not agree the matter should go to arbitration as provided for by the present Act.

9841. (*Chairman.*) That sandstone mine is a glaring instance?—It is.

9842. It was a case in which no sane man could possibly pretend affairs were being safely conducted. It was an outrageous case?—I think it was. They placed reliance on the fact that they had worked for 50 years and never had an accident.

9843. It was outrageous to leave such enormous spaces unsupported?—It was very wrong.

9844. Your point is that there is no proper machinery for dealing with a case of that kind?—We should have to stop the mine. That is all.

9845. You could not stop it under the general powers, but there ought to be specific powers for dealing with cases of that kind?—That is my point.

9846. (*Mr. Thomas.*) May I read what you have here: "The Secretary of State should have power to "require the owners of mines to systematically support "the roof of any mine where it cannot be examined"?—By "examined" I mean getting up to it.

9847. Would you insert words of this kind, "where considered dangerous and is in work"?—Yes.

9848. Otherwise the interpretation of this may mean, in big mines, particularly, supporting places which are not worked?—I agree. I do not refer to those places.

9849. Personally I see, and I have no doubt the rest of the Commission can see, that you have in mind this particular instance we went to see, which was undoubtedly rather a glaring case, but it would be rather dangerous to generalise from this particular instance for the whole of the mines in the country?—I think you could get over that by giving the inspector power to require it.

9850. (*Chairman.*) You want it more specific?—I want to deal rather with the support of the roof.

(*Mr. Thomas.*) I should anticipate on further inquiry we should find the question of the support of roof is a serious one.

(*Chairman.*) He does not bring in a hard-and-fast rule, but wants to treat each case on its own footing.

(*Mr. Thomas.*) I bring this particular case forward because publication of this to the outsider may be considered as to the expression of a definite opinion on the part of Mr. Walker applicable to every case, whereas we know that is not so.

(*Chairman.*) Quite so. I think he has accepted your qualification.

(*Mr. Thomas.*) I know what he means, personally.

(*Chairman.*) It is only where there is danger to life.

(*Mr. Thomas.*) And where work is going on.

(*Mr. Ainsworth.*) If this evidence of Mr. Walker's is likely to be published as it stands in the draft before us, I think words should be put in carrying out what Mr. Thomas has said, that these suggestions only apply to where work is going on.

(*Chairman.*) I put it in a different way, where men are likely to be injured.

(*Mr. Ainsworth.*) And where work is going on.

(*Chairman.*) Work would not be going on in the entrance to a mine where people had to go to their work, but that place ought to be made secure.

(*Mr. Ainsworth.*) If those words are added you will be satisfied.

(*Mr. Thomas.*) I suggested "where considered dan-"gerous and is in actual work or operation."

(*Chairman.*) I should prefer "where men have to go or work."

(*Mr. Thomas.*) Some words to that effect.

(*Witness.*) "Work or pass."

9851. (*Mr. Thomas.*) Or "use for the purpose of"?—Would you not introduce some question of fencing off disused places?

9852. (*Chairman.*) If there is any danger to men going there they ought to be fenced off?—I mean the entrance to disused places.

9853. It depends on the chance of men being injured. If the Inspector considers a thing dangerous he gives notice to the owner, and if he does not agree it would go to arbitration?—You see openings to places which are dangerous which would not be examined.

9854. This is another point?—It affects the question which Mr. Thomas has raised. If you have a rule in the Act that the entrance to all places must be fenced so as to prevent persons entering inadvertently, I think that would do.

9855. (*Mr. Lewney.*) In metalliferous mines you will have hundreds of those places, cross-cuts which have been abandoned, which are safe for any purpose?—Some are, and some are not.

9856. (*Mr. Thomas.*) I am glad to hear you say you think there should be provision for the fencing off of places, and make it explicit that men should not go into places where a fence or a "denial" is put up?—It is a small matter. You simply put two props like that (*indicating*). Every miner knows what that means.

9857. (*Chairman.*) In regard to blasting, you are in favour of allowing an increase in the amount of explosive under certain precautions in certain cases?—There is a greater amount of blasting in metalliferous mines than in coal mines. In one case you have 4 lbs. allowed, and in the other 5 lbs. There is a difficulty in getting sufficient explosive for a round with 4 lbs.; therefore I would allow 5 lbs. to be taken into a mine in a secure case or canister, and as metalliferous mines, as a rule, require more explosives to be used, I would delete the present General Rule 2 (*c*) altogether, and substitute the following:—"Every workman or party "of workmen possessing explosives shall keep them "during the shift in a secure chest placed in a safe "place. No workman or party of workmen shall have "more than one chest for keeping explosives and it "shall be kept securely locked. On the outside of the "chest shall be affixed in large and legible characters "'Explosives' by means of securely attached label or "other mark. No chest shall contain more than "40 lbs.," or eight of the secure canisters, 5 lbs. in each. The interior of the chest shall be kept clean and used only for explosives. No such chest shall be used to store explosives in the mine.

(*Mr. Thomas.*) I made a note about that when reading your statement. Obviously you meant that no such chest shall be used as to store explosives in greater quantities than that specified, namely, 40 lbs.

9858. (*Mr. Ainsworth.*) You mean no other chest shall be used?—What I think is reasonable is this: a quantity goes down each shift that is reasonably expected to be used in that shift. I do not call leaving what a man may have over at the end of the shift storing, but he would have to fill this chest each day.

9859. (*Chairman.*) Something should be put in, such as "no more shall be taken down daily than is "reasonably necessary for the use of the mine"?—Yes. That has been held, I think, in the coal mines, if a man takes down what he reasonably thinks he requires, he may leave what is over at the end of the shift, and that is not storing, but my suggestion is that at no time or in any case is the quantity to exceed 40 lbs.

(*Mr. Thomas.*) If you say no chest shall be used to store explosives in greater quantity than that specified (40 lbs.) the words cover the whole business.

9860. (*Chairman.*) He means you ought not to take 40 lbs. down and leave it six weeks. As a general practice you should carry down what you expect to be used, and this cupboard should not be used as a store for explosives, but merely for the daily keeping of explosives?—It would be dangerous to have many of these 40 lb. cases filled with explosives if the place got on fire.

9861. That is pretty obvious. Then with regard to detonators, what do you say?—Detonators must be kept in a securely locked box and not to be put into the chest containing explosives and shall be only issued to and carried by a person authorised in writing by the owner or manager. The danger from detonators which may get astray is so great that I think the provisions of the Explosives in Coal Mines Order should be made to apply: in 2 (*c*) the word "explosives" should be used for "gunpowder."

9862. (*Mr. Lewney.*) With regard to the question of detonators you say "shall be carried by a person "authorised in writing by the owner or manager." Do you mean carried down the mine?—Yes, always.

9863. That would be quite a revolution?—It may be in the metalliferous mines, probably, but it is not in coal mines.

9864. Metalliferous mines we are dealing with?—The Cleveland mines, for instances, are very much like some of the metalliferous mines.

9865. In my judgment it would be an inconvenience, and I believe as a rule things are carried out with due regard to safety, at least that is my experience?—There are many accidents from stray detonators.

9866. Does not that rather occur after they have got down the mine than in transit?—No. I have heard cases of boys finding them lying about on the road, and they try to use them for protecting the ends of pencils.

9867. The boxes are sealed?—A man may break a box.

9868. As a rule they carry it down the mine sealed?—At Leadhills the box was, as we saw, open in the mine.

9869. Your suggestion would not prevent the men opening the box directly they arrive at the place. Would it secure proper distribution of the detonators afterwards?—My suggestion is that you have a man in charge of explosives and detonators on the surface, as a rule, and he issues them to the workmen. There would be no hardship in the man having a small box to carry in his pocket to take the number of detonators required, which would have a lock on it.

9870. I take it that you require someone specially appointed to carry the detonators down the mine?—Of a gang or of a set of men. Supposing a detonator gets astray and a man is injured; if it is required that a person shall be authorised to carry them, it can be proved who has had that detonator, who is responsible for it getting astray.

9871. They are carried down the mine in boxes securely fastened, and are put into a case similar to what you recommend?—They may be in Cumberland, but they are not in all cases.

9872. I am endeavouring to point out that in my judgment your suggestions would really be restricting the use of detonators too much. We have never had a case, so far as my recollection goes, where an accident has occurred through men carrying detonators down the mine. How they are dealt with afterwards is another matter. As to their getting amongst children, I suggest that it is possible that they come out in the stuff, and that by some means or other they may get scattered after they get down in the mine?—They would be in the locked box in the charge of the authorised person.

9873. Whatever you put it into, you have to get to them occasionally?—To get one out, but you lock the box again.

9874. All the same it is possible that they may have been scattered in some fashion, but evidently not in transit?—Yes, in transit they may.

9875. That is not my experience?—I know since this clause was introduced in the Explosives Order that the accidents from detonators have been very much less, because you have the person in charge of the store and the man who receives them from him who are held responsible until they are about to be used.

9876. Do you not think that is rather due to people becoming better acquainted with the danger of these detonators?—No, I do not think so.

9877. In my younger days I remember a man who was pricking a detonator for the purpose of putting it on the top of a pencil?—They do that now.

9878. There is no grown-up person who would do that now?—Yes. They do strange things with them now. There was a case the other day where a detonator got astray amongst some coal and went to a house and blew the place up. Detonators are too dangerous to be allowed to be carried out in any manner.

9879. I am suggesting to you the danger arises after getting down in the mine, and not during transit?—In some cases I know it is in transit, and I am strongly of opinion that this is necessary.

9880. (*Chairman.*) You would be in favour of the rules about freezing applying to explosives in metalliferous mines in the same way as in the coal mines?—Yes, and it should be provided that the warming-pan should be used. There is another point I might mention where exhaust steam is available. It might be used by taking it round magazines to keep explosives thawed during the winter-time.

9881. (*Mr. Thomas.*) In the clause before you have "the word 'explosives' should be used for 'gunpowder.'" I think you mean "including gunpowder"?—I think it has got in the wrong place.

9882. (*Mr. Thomas.*) I think it should read "the word 'explosives' should include." I think that is a copy practically from the Coal Mines Act, which is not applicable to the same extent to metalliferous mines. Metalliferous Mines chiefly use high explosives?—These last two lines are another paragraph. 2 (*e*) of the Metalliferous Mines Act says a charge of powder if misfired shall not be unrammed.

9883. I point it out because it would not convey your exact meaning?—Yes, it is another paragraph altogether. Then, if the process of charging, stemming and firing of shots was done by a special man, I am convinced it would result in more safety and more methodical working of many mines.

9884. (*Chairman.*) You are not prepared to make that rule absolutely compulsory?—No.

9885. It is only an observation?—In some mines it would be difficult, but in many it would be very easy. In Derbyshire, for instance, where it largely prevails in coal mines, 2½ million shots were fired in one year without a single fatal accident.

9886. In regard to using drills, have you an opinion upon whether they cause phthisis if used dry?—Yes, with certain kinds of dust.

9887. You would say that the whole subject is one that requires a great deal more investigation than we have been able to give to it at present?—Yes.

9888. Enough is known at present to make it in the highest degree certain in confined places that there are kinds of dust which can be produced by drills dry which would be very dangerous?—Yes.

9889. It cannot be put beyond that?—I think the matter should be gone into very carefully, and the dust should be examined microscopically, and as a result the dust from different rocks classified.

9890. In fact we want some scientific inquiry in that direction?—Yes. I think something of that kind should be done, and then you could say: "You have a "certain dust in this quarry, you must take certain "precautions." I know, in Yorkshire, we went into the question of the ganister dust, and it resulted in the adoption of special rules similar to those established in Cornwall, and the result has been satisfactory, I think, in diminishing the phthisis.

9891. Would it not be possible in most cases to use drills wet?—In nearly every case, especially with downward holes.

9892. Have you seen spraying?—Yes.

9893. That is a good precaution?—Yes. An important thing is that they should be sure that the supply of water cannot be turned off by the person operating the drill.

9894. Otherwise you think he will occasionally turn it off?—Often in a mine you will hear the drill going tap, tap, tap, and it stops, and you go in and find the man all dry dust, he has turned the water on when he heard you coming. Often it is not very comfortable being under this water.

9895. (*Mr. Thomas.*) Upon the wording of this statement, and the result of your answer to the Chairman, I rather take it you would have the water laid on simultaneously with the air?—And apply it through hollow-nose drills.

9896. Why define the method provided that the dust is allayed by some appliance used?—Or other efficient means.

9897. Providing you allay the dust and stop it getting into the air, that would meet the purpose?—Or other efficient means. Then there is the question of the breakers on the surface. Much dust is made by them which (I think) is harmful. That was found in Yorkshire to be the worst dust there was. There they adopted water and steam, applying the steam underneath, and allowing it to come up.

9898. (*Chairman.*) In some of the cases the water is sucked up in a bucket and thrown on. The bucket man might let the bucket get empty?—In the cases I mean, the steam was put in.

9899. You could not have steam where you were working with compressed air?—No.

9900. In some cases you would have a drill working with compressed air having this water from the bucket?—I am speaking of breaking machines on the surface.

9901. I think we understand your views. They are all intended to be subject to the proper working of things, and to be reasonable?—Yes.

9902. They must apply your means to each case. What you are laying down here is the principle that you ought to work wet wherever it is practically possible to do so?—Yes.

9903. And all means possible should be taken that the men do not turn the wet off or tamper with it?—Yes.

9904. The detail of carrying it out is another matter?—Yes.

9905. Those are the ends to be aimed at?—Yes.

9906. (*Mr Ainsworth.*) At the end of page 6, in clause 13, you say, "Much dust is made by them which "is harmful. The rules in Yorkshire provide for "this." What are they?—There is a copy at the end of my statement.

9907. Could you tell us what they are?—It is No. 4, of the Special Rules, at the end of the statement: "The owner, agent, or manager shall cause all stone-"breaking machines used at the mine to be provided "and kept provided with an efficient watering or other "arrangement to prevent the escape of dust into "the air."

(*Mr. Ainsworth.*) That is what the Chairman said.

(*Chairman.*) Then there is No. 1, too: "During "the progress of drilling holes by manual labour in "ganister or stone, which gives off dust of a gritty "nature, water or other efficient means shall be used."

9908. (*Mr. Thomas.*) These were adopted following the adoption of special rules designed for Cornwall?—About the same time. Small changes were made to meet local conditions.

9909. (*Chairman.*) I think I have covered that clause?—Yes.

9910. Then you are in favour of the workmen having power to appoint two of their number to make periodic inspections just as in coal mines?—Yes. I have had experience of that in coal mines in Durham in particular, where it is done periodically once in three months, and in case of a fatal accident the scene of the accident is always visited by the men appointed, and they give evidence at the inquest, and produce the report made of the inspection. Many of these reports were very good and helpful. The managers there encourage such inspection.

9911. You are in favour of the compulsory provision of first-aid of some sort?—Yes.

9912. Stretchers, splints or bandages at a mine or group of mines?—I think I should say at a mine or a group of mines, because often there are small mines all together where the same set of bandages might be provided.

9913. Does not a good deal of damage take place to men's hands by small and insignificant cuts which they tie up with dirty rag and allow to fester?—I am afraid it does.

9914. Would it not be a good thing—all the owners were asked about it—if some simple first-aid arrangement could be kept for binding up men's hands, or do it themselves?—I should always have antiseptic dressing handy.

9915. Supposing you had something of this sort (*producing a box*). You put a tabloid into a little water and that bottleful makes enough to wash the wounds completely. You cut a piece of boric lint, lay it on, and fasten it on with sticky tape, such as they use for telegraph wires; that secures it fast to the wound, and instead of using the usually thin lint you put on a good strong bandage and tape, with a safety pin. Something of that sort commends itself to you?—I think that should be necessary.

9916. To be kept at the mine for the use of the men?—The men should be informed that it is there, and in the case of cuts that they were to at once use it or apply for it. It is necessary that a certain number of men should be instructed how to use it. In my own places it is provided, but no one can use it.

9917. We find a good many cases in which there were good ambulance arrangements for people who had wounded themselves severely, but generally speaking

the arrangements for mere cuts were almost non-existent?—Yes.

9918. And in consequence the men had their hands tied up, and many with cuts which had been there two or three weeks, with dead flesh all round them?—Particularly in slate mines that is so.

9919. (*Mr. Ainsworth.*) Have you ambulance classes at most of your places?—They have ambulance classes, but there are not as many as I would like to see.

9920. (*Chairman.*) You are in favour of uniformity in signals used in shafts?—Yes, I would have uniformity of signals right through the country.

9921. Supplemented by signals different from the ordinary code, were specially required?—Yes, authorised and signed by the manager. I think signals in shafts should be given direct to the engineman and banksman at the same time, and the return signals should be given by the engineman and not the banksman.

9922. (*Mr. Ainsworth.*) Do you consider it a good thing that the engineman should be called off from his engine to answer signals?—He would not. He would have the means of giving the signal by his side.

9923. It must be absolutely by his side?—Yes.

9924. To leave his seat to talk on a telephone would not do?—No. It is by pulling a handle or pushing a button.

9925. Are you in favour of hammer signals?—Either that or electric signals.

9926. Of the two is there not advantage in the hammer signal from the fact that everybody hears it, both engineman and banksman at the same moment, and that it is hardly possible for it to get out of order?—There is this objection to the hammer signal—there are objections to both—that supposing anything catches a wire in a shaft, a hammer signal will give the signal "one" when it is not intended. I have had cases in coal mine shafts where men have been caught owing to the engineman moving the cage where "one" was a signal to go on. I think that can be got over by altering the code of signals and never having a "one" signal, except for stopping the cage in motion, or for raising mineral from the bottom or landings midshaft.

9927. Is not an electric wire rather apt to get out of order? It might not ring?—It may ring "one" when you want to ring "two," but as a rule they do not. I have had no accidents of that kind.

9928. (*Mr. Thomas.*) Is it customary in your district to use trembling or single stroke bells?—They use single stroke bells, but in my present district the hammer signal is principally used.

9929. Assuming you had electric signalling, would you make a single stroke compulsory?—I think so, because you get the definite signals. In connection with signals at the coal mines in Scotland, there is a Special Rule in regard to gates at mid-insets in shafts which should be made compulsory at all shafts. In the engine-house there is an arrangement which shows whether the gates are closed or not, and the engineman is not allowed to move his engine until the gates are closed and a signal (four) must be given by him to draw the attention of the bottomer—that is the onsetter—to the fact that the gate has not been closed. It works very well indeed.

9930. You say there is a Special Rule. Can you give us that off-hand?—I can before I go.

9931. It struck me that a provision of that kind is extremely necessary?—It is very good indeed, and works very well, especially drawing the attention of the man below by the engineman.

9932. In the Cumberland district one noticed in visiting the mines that they had many on-setting places, what are locally known as "eyes." Where catches or keps are used in the shaft it strikes me it would be of extreme importance that the signalling arrangements should be so designed and used that there would be no possibility of these catches remaining in when the signals are given from below.

(*Mr. Lewney.*) There are few cases where the catches are used where they draw from more than one eye.

9933. (*Mr. Thomas.*) There are a great many through the country?—It is additional special rule No. 2

> "Where a mid-working of a vertical shaft is not "provided with an appliance which constantly acts "as a fence, the gate fencing the shaft at every such "mid-working being a mid-working in use for the "regular passage of workers, or the drawing of minerals "from the mine, shall be connected with an indicator "in the engine-house, which shall indicate to the "winding engineman whether the gate is open or shut, "and the engineman is prohibited from moving the "cage from said mid-working until the indicator shows "that the gate is closed. Should the indicator show "at any time that the gate is open when the cage is "not at said mid-working, the engineman shall at once "call the attention of the bottomer to the fact by "signalling 'four'."

9934. (*Mr. Ainsworth.*) You suggested at the eye there should be a gate. You do not suggest there should be what we call a kep?—No, a gate, just a fenced gate.

9935. The kep would be dangerous. It might be closed when a bogey was coming down?—I do not like keps at mid-shafts. It might be in, as the cage was coming down, and cause an accident.

9936. You want a gate across an eye?—Yes.

9937. (*Mr. Thomas.*) What was in my mind particularly was that you have not only a gate across the eye, or the entrance to the mine, but in addition keps used for unloading cages. You are anxious to provide against any possibility of signals taking place from below while the catches are in to arrest the cage?—I do not know of any mine where we have keps at mid-shafts.

9938. I know them?—This is an actual gate guarding the entrance to the shaft. That is what the rule refers to.

9939. That point you will find is provided for in the Metalliferous Mines Act and Special Rules in many instances?—We have no Special Rules.

9940. It is a further instance bringing out the suggestion you made this morning, that these various provisions should be consolidated into one Act, so that people know where they are?—Quite so. There are very few districts which have Special Rules for metalliferous mines.

9941. (*Mr. Lewney.*) What is your idea of having a speaking-tube down the shaft?—I think a telephone is a very good thing. Communication by telephone from the surface underground is very good and might always be required. I should think the oscillation and noise of the shaft would probably prevent it carrying far if a speaking tube were used. I think some communication such as a tube or telephone might be required.

9942. (*Chairman.*) Now with regard to the question of bore-holes, where old workings are being approached which are likely to contain water, bore-holes should be made?—Yes.

9943. Is there any rule about bore-holes at present? None.

9944. In your view there ought to be?—I think there should be.

9945. Will you tell us what rule you would have?—There should be such a rule that it should provide for the holes being kept in advance, being drilled in all directions from which there can possibly be an inrush of water. I say "in all directions" because it is sometimes overhead in metalliferous mines. The width of the place should not exceed 8 feet.

9946. Is it possible to lay down any rule about the length of the bore-holes?—It is difficult to specify the minimum distance, but I suggest 5 to 6 feet. A longer distance cannot very well be drilled in very hard rock, and that thickness would in such rocks prevent a sudden inrush.

9947. That should be a minimum, more where necessary?—Six feet of very hard rock would prevent a sudden inrush.

9948. In soft rock?—It ought to be more.

9949. I can imagine cases of iron ore, the poorer qualities, which are very soft. You would have to put a longer hole for that?—Yes. I have known 9 feet of coal washed clean out.

9950. (*Mr. Ainsworth.*) I see on the first page of your statistics of the output there seems to be on the whole

a decrease, especially in 1909. How do you account for that?—The decrease in 1909 is about the largest in the whole table?—In the output do you mean?

9951. Yes. How do you account for it?—Because some of the larger mines were not working during that year and have been since taken up by another company. I am speaking without quite knowing, but I think Wanlockhead, which produces a large output was not working at that time, and has been taken over by a company. It was simply worked by the landlord for the purpose of giving employment to the people in that district at that time.

9952. So that you say there is a probability that the output will increase?—I think it will be more this year.

9953. Not only there, but over the whole of Scotland, do you think there is a probability of increase?—Not to a very large extent.

9954. I see that the number of people employed is much about the same. There is not much decrease there?—No, but they would probably be working less time.

9955. What is the depth of the shaft as a rule in the metalliferous mines you had to do with in Scotland?—I think the one we saw was 140 fathoms.

9956. Is that Wanlockhead?—Yes.

9957. What is the depth in other places?—Those are the only two lead mines we have got.

9958. Take the metalliferous and everything under the table?—The others are principally shallow stone mines, limestone and sandstone.

9959. But still worked by shafts?—Yes.

9960. (*Mr. Lewney.*) Followed down on the dip?—Some of them, but we have them where they have shafts.

9961. (*Mr. Ainsworth.*) Shale mines?—30 or 40 fathoms if as much.

9962. With regard to what you recommend about the Inspector having power to recommend a second shaft, where shafts happen to be shallow it is a small matter, but where you come to shafts of over 100 fathoms it is another question. No doubt one of the reasons why the second shaft is insisted on in a coal mine, or practically insisted on, is that you may have an explosion or a fire and your shaft may be rendered useless altogether, but in metalliferous mines you have no risk of that kind?—I think you have the same risk as they had at Hartley where the pumping machinery broke.

9963. Would you not get over that by having a sufficiently large shaft in compartments, so that if the machinery broke in one compartment of the shaft, you would have the other compartments through which the men could be got out. You might, but the falling machinery might break all the compartments away.

9964. Supposing you had ladders in the pump shaft, or in one of your compartments, would not that get over the necessity for a second shaft?—It might; it depends on the circumstances altogether, therefore I think I should leave it in the hands of the Inspector of the district to give notice if he required it to meet certain conditions.

9965. Do you not think you would be inclined to exhaust every means of making your present shaft applicable before you threw on a concern the expense of sinking a shaft of over 100 fathoms?—I think I would, but I have no case where they have not two.

9966. That is where it happens to be shallow?—It is 140 fathoms.

9967. Have they two shafts at Wanlockhead?—Yes.

9968. The object of the second shaft is to provide an outlet in case of the original shaft being injured?—Yes.

9969. Supposing the original shaft is sufficiently large so as to minimise the danger of breakage of machinery or anything of that kind blocking the shaft, is there much object in a second shaft?—It is difficult to answer a question like that, because it depends very much on what is in the shaft and how it is divided into compartments, and what machinery there may be. The machinery may fall down the shaft and carry away every compartment in the shaft. Such a case as that would have to be considered by an Inspector when he required the second shaft to be provided. That is one of the circumstances he would take into consideration.

9970. Are you not suggesting an extremely remote danger?—I do not know. I do not know of any accident that has occurred ——

9971. Except the Hartley colliery?—There have been others besides the Hartley colliery. The Hartley colliery accident was the one which brought about this necessity. There have been many cases since, and there would have been bad accidents but for the second shaft in coal mines.

9972. How about metalliferous mines?—I do not know of any.

9973. There would be equal danger of the men being confined if you had an accident in any of your roadways, and if you had an accident in a side roadway, the second shaft would be no benefit at all?—The shaft is the main thoroughfare for the whole of the mine

9974. Your shaft and main roads are?—There are different roads from the shaft. All the men would not be in one road.

9975. Take a road turning away from the shaft and a fall in the road; the second shaft would be absolutely useless?—You would have communication between the two shafts.

9976. Of course you would; that is what I call the main road, but if a fall of roof happened in a side road, of what benefit is the second shaft?—That would be quite an abnormal condition, but as a rule you have different districts in a mine. You would not have all your men on one road. It would only take a section of them, a fall of road. Where you are just turning away from a shaft it might take them all, but there would not be a very great number at that time.

9977. What would you put the cost at? Take the Wanlockhead shaft. I suppose the second shaft has been sunk because the minerals happen to go in that direction, and it is more economical to work from the second shaft. That has probably been the reason of the shaft having been sunk. It has been put down for the purpose of working the mine. It has not been put down for safety?—I do not know sufficient of it. I have only been there on one visit.

9978. You cannot say what the cost of it was?—I could not.

9979. You told us we should hear from another witness about the attendance at the technical classes?—Mr. McLaren will be here to-morrow and has had some experience of that.

9980. (*Chairman.*) In metalliferous mines in Scotland you have barytes, ganister, graphite, lead ore, limestone, sandstone, oil shale, quartz, red marle, and zinc ore. Those are the various mines?—Yes.

9981. Is there any one of those mines that requires very special precautions other than those you have mentioned? Lead mines might require the question of lead poisoning to be watched?—Yes.

9982. There is not much lead poisoning in a mine?—I do not think so. They provide all the washing arrangements, and they do not smelt at the mine.

9983. Are there any others which present particular danger?—Except in regard to the height of the seams. They are worked from 30 to 50 feet in the limestone and sandstone.

9984. That you have dealt with under the powers of the inspector?—I do not think there is any point I have not mentioned already.

9985. The points you have given us cover the whole of those different classes of work and cover them sufficiently so far as you are aware?—I think so.

9986. What is a quartz mine? Is that for the purpose of getting crystals?—The quartz is a whinstone really.

9987. It is a generic term?—Yes.

9988. Now as regards quarries, you put in a list of the minerals worked in quarries. They are brick-earth, ganister, granite, gravel and sand, igneous rocks, limestone, oil shale, sandstone, and slate?—Yes.

9989. You put in a table * showing the number of persons at work from 1900 to 1909, and the death-rate?—Yes.

9990. The present Act, you think, should be amended and made complete in itself?—Yes, I think there should be one Act applying to everything in and about a quarry. Instead of having so many Acts applying to the quarries I should have one.

9991. Or half an Act would do. It does not matter whether it is one separate Act provided it is a separate part of an Act. Metalliferous Mines and Quarries, Part I., applying to metalliferous mines, and Part II., applying to quarries?—I would have everything in the Act. I do not think you should have to refer to Act so and so, and Act so and so. The Quarries Act, 1911, should include everything a quarry manager or a quarry workman should have to look at.

9992. I suppose in printing copies of the Act if there was a reference there would be no difficulty in printing the paragraph referred to?—I find in many cases that the foremen at the quarries do not understand it.

9993. If you print them as part of the Act, that would be convenient. There may be difficulties in Parliament in having to put upon the Statute Book quantities of repetition. That is the only difficulty, whereas in a version of the Statutes prepared for the use of quarry owners you could reprint portions?—I object to this. Under a Quarries Act a quarry more than 20 feet is a quarry, and it is also referred to in the Factory Act as a workshop. That is one of the principal points.

9994. Secondly, that there is so much reference that a man who owns a quarry has great difficulty in knowing what Acts of Parliament he has to refer to. You want that made plain and easy, and you do not mind how it is done as long as it is made plain and easy?—Yes. If a man has to post up all the Acts he is working under he requires a big place to post them, bigger than we have, as a rule, in a quarry.

9995. You think that returns should be made available by the 21st January?—Yes, and all voluntary information should be required by the Act. There is a point about the posting of the Act. There are many places where there is nothing you can post them to. I should still require that this should be done where it is reasonably practicable, but if it cannot be done I think every man working in the quarry should have a book of the rules given to him, and sign a declaration that he has received them to show he has had a chance of reading them.

9996. (*Mr. Thomas.*) On a quarry or mine making application to you for these abstracts of special rules, you furnish them?—To a miner?

9997. No, to the quarry owner?—We do.

9998. Do you not think it would meet the case if these were printed on better paper? It is rather extravagant to think of these being printed on enamel?—They are of course.

(*Chairman.*) We give them to the owners as a matter of courtesy really. We could not supply them to all the men.

9999. (*Mr. Thomas.*) I do not mean that. You have no doubt seen cases where these special rules and Metalliferous Mines Act have been put up, sometimes pasted on boards or sheets, and they do not stand weather exposure?—I have often seen the enamel notices posted up.

10,000. If the Treasury had ample funds we might suggest that they could get them printed on something of a permanent nature.

10,001. (*Chairman.*) The enamel is irreparably damaged if a boy throws a stone on it?—It is such a tempting target every boy that goes past throws at it.

10,002. That is an administrative point which you must leave to be dealt with administratively?—Do you not think if every man was supplied with a copy, that would do?

10,003. That ought to be sufficient. Would you be content with every man having a copy and leaving the posting of it?—Where it is not reasonably practicable to post, give each man a copy.

10,004. That is an alternative?—Yes.

10,005. There are some small quarries where it is impossible to keep the rules posted?—There are, and there are some large quarries too, road-side quarries which work three months in the year. It is difficult to keep these papers posted up even when working three months.

10,006. On account of the rain?—And people passing close to them.

10,007. You have a lot of them?—Yes, and in many quarries there is a right of way through them and the public are passing.

10,008. They ought to be allowed to be dealt with administratively with more latitude?—Yes. I think the owner might be allowed to show by a book that he had given each man a copy of the rules and that would be as good as posting.

10,009. What is the present definition of a quarry and how far do you agree with it?—The present definition is that it must be more than 20 ft. in depth. I do not agree with it. I should make it apply to almost any quarry, because I know cases where quarries are worked 18 ft. in depth, which do not come under the provisions of the Special Rules, and there is quite as much blasting done at them as at one which is 21 or 22 ft.

10,010. Do you know the ironstone quarries at Lincoln?—That is where I refer to.

10,011. Hardly any are 20 ft.?—They are coming in gradually as the overburden increases, but to start with none of them were under the Act.

10,012. A great portion of them do not come within the Act?—No.

10,013. Although there are hundreds of men employed?—And much blasting done. They would be workshops, but there is no rule under the Factory Act to apply to their working.

10,014. It is absurd to take a quarry like the ironstone quarries of Lincoln, and call them workshops?—I think so.

10,015. The rules show they should be treated as quarries?—At Scunthorpe in one field is a quarry, and in the next field the same company works another 2 ft. less in depth, and it is a workshop.

(*Mr. Lewsey.*) Could it not be defined as a quarry wherever blasting operations were carried on?

(*Chairman.*) It is a mass of ironstone that lies horizontal, and you take the overburden off and you see 12 ft. of iron ore. It is good stuff, and they are blasting it often. A portion of that is under the Quarries Acts, a portion under no Act at all, and a portion is a workshop, and there is no practical danger, or very little.

(*Mr. Lovett.*) I think the witness suggests the proper way would be to make all quarries come under the Quarries Act irrespective of depth.

10,016. (*Chairman.*) Then you include the little pit at the bottom of the garden where the gardener goes to get gravel, you make it a quarry, and you have to conform to the Quarries Acts?—It is quite as absurd now. You have a place 20 ft. deep and a man works at it one day a year.

10,017. The thing is to remove the absurdities. We want a practical rule to bring in everything that ought to be brought in. One suggestion is that where men are employed in a commercial way to take mineral out, that should constitute a quarry. That keeps out the gardener going to the garden to get gravel. It is much like a factory at present?—You would have to be careful how you word that, or all these estate quarries would be taken out.

10,018. Can you solve it for us?

(*Mr. Lewsey.*) Can you not combine what the witness suggests with what I suggest, and make it applicable where there is blasting?

(*Chairman.*) Any place where there is blasting ought to be looked after.

(*Mr. Lovett.*) At some of them they do not do much blasting, and will go months without doing any.

10,019. (*Chairman.*) Every place where there is blasting ought to be brought in, and something more,

* *See* Appendix H.

too?—It is a very difficult matter, and that is the reason I say I should include all. You may exclude those used for private purposes.

10,020. You would have to exclude that, otherwise an inspector would be expected to visit the whole lot?—You would have to define what are private purposes.

10,021. We shall have to address ourselves to that problem?—I am certain there is a number of quarries which should be under rules which are not at present.

10,022. Because they are not 20 feet deep?—Yes.

10,023. Your suggestion is that the present 20 feet limit is not a good one?—Yes. You want some other method of defining a quarry.

10,024. You are not prepared at present to suggest a universal formula?—I should include all excavations, perhaps taking out those used absolutely for private domestic purposes, such as gardeners, but being careful to define what private purposes mean.

10,025. (*Mr. Lewney.*) Supposing a man is going to quarry stone to build a house, would that be private purposes?—No, I should think that would be for commercial purposes. The Chairman means a man taking a little material out of a hole for a garden walk.

10,026. (*Mr. Thomas.*) Is it sufficiently and explicitly defined at the present time as to where a quarry ceases and where a mine begins? It appears to me when you get to 20 feet deep you get a quarry?—Yes.

10,027. Anything above 20 feet you are a factory?—More than 20 feet you are a quarry.

10,028. More than 20 feet is a quarry?—Yes; under 20 feet you are a workshop.

10,029. Is it sufficiently and explicitly defined now where a quarry ends and a mine begins?

10,030. (*Chairman.*) That is another point—where you cannot see daylight?—I have always taken it where you had a roof.

10,031. (*Mr. Thomas.*) It is arbitrary what you do take. It is not defined now?—No, I do not think it is.

(*Mr. Thomas.*) All these Acts want consolidating.

10,032. (*Chairman.*) It was suggested to us at a previous meeting, just as the Secretary of State defines absolutely whether a mine falls within the definition of coal-mine, or something else, so in cases where there was doubt whether it was a quarry or a mine he should decide it. That was the solution suggested, if it commends itself to the Commissioners. This point is more difficult in practice, because while they feel quarries escape which ought to be in, to bring in every hole in the ground should be unnecessary and is not desirable. The witness feels 20 feet will not do, and we all feel where blasting is carried on it should come under the Act?—That should always be so, but there may be other dangers apart from that.

10,033. It will be for us to think of some reasonable Rule for bringing in those that are likely to be dangerous. Mr. Lewney was suggesting something about a private house. There is a difficulty again with regard to that?—I think it should not be regarded as such.

10,034. Would you regard building a coal shed or a garden shed as a private job?—It is a difficult matter. There is something in the contention that a small hole in the ground would be absurd to take, but we do practically take such places now over 20 ft., take sand pits from which they take about two cart loads a year.

10,035. The justification is a man may tumble from the top to the bottom?—He is never at the top.

10,036. (*Mr. Lewney.*) If you go down 7 ft. in a sand pit it is dangerous if not properly timbered?—It is not a pit; it is the bottom of the hole. What they call a sand pit is a sand quarry.

10,037. (*Mr. Ainsworth.*) In that sentence about quarries you say "especially iron ore quarries." It is in the sentence beginning "At present there are a large "number of important quarries just under 20 ft., "especially iron ore quarries." What kind of iron ore do you refer to?—Scunthorpe and Lincolnshire iron ore quarries. Northamptonshire is the same. I am referring in my statement to all the districts I have been in.

10,038. (*Chairman.*) Now with regard to the removal of the overburden, what have you to say?—Since you were in Scotland I have come across the original Special Rules in Ballachulish Quarry, in which there is a special rule relating to overburden. Rule No. 3 reads: "When the quarry is worked in steps or "galleries, the breadth of every one of these shall be "at least one half its height; but in no case shall the "breadth thereof be less than 12 ft. When the quarry "is worked without steps or galleries, sufficient support "to the sides shall be left to ensure safety to those "employed." That rule I hardly think is practicable for many reasons. If you had a quarry 100 ft. in depth you could hardly have a ledge of 50 ft. in width, as this rule would require.

10,039. That rule was made to fit a particular quarry?—It is the only case I knew, and it was mentioned when you were in Scotland. It also says. "But in no case shall the breadth thereof be less than "12 ft.," which seems contradictory. I think a good rough rule as to overburden is if you could have it, as far back as its depth, with a minimum, say, of 10 ft.

10,040. The only thing is that if you have a mountain-side going up an angle of more than 45° it would be impossible to comply with that rule?—It is difficult.

10,041. We must have a rule that would positively preclude people from working on a mountain-side where there was a natural inclination of earth of 50°. If you had that, your rule would render it impossible to work it?—With all rules there is the heading that they shall be observed so far as reasonably practicable.

10,042. The suggestion you make here must be taken in conjunction with that?—In one large quarry I knew there was a wall about 2 ft. high built after the overburden has been taken off near the edge of the quarry to prevent loose clay or stone falling over into the quarry for the whole of the face, and it was suprising the quantity of stones and loose earth which was caught by it and which would otherwise have gone over the quarry face. The depth of the quarry was about 100 to 120 ft. This would be a good precaution to take in all quarries. It was just a small rubble wall built a certain distance from the face of the quarry on to the floor of the overburden.

10,043. (*Mr. Lewney.*) That again raises the question Would that be protection in the case suggested by the Chairman?—Supposing you had a wall of that description at the top of Bonawe Quarry, and a stone came down and hit the wall, the chances are the wall would go down?—It depends on the overburden. In this particular quarry it did not in fact come down.

10,044. (*Chairman.*) The conclusion I was inclined to come to, after seeing many of them, was that they differed so enormously that it was difficult to lay down any rule, and I suggest to you this possible way of solving it, that in every quarry the manager should be required to lay down a scheme for the removal of the overburden, such a scheme to be as safe as was reasonable in the circumstances, and that if the Inspector was not content with that scheme he could require it to be altered or carry the matter to arbitration. In that way you would compel every man to put down a scheme of removing the overburden, and if the Inspector was not satisfied he could compel him to do it or go to arbitration. I do not know if anybody else agrees with that, but it would be one way of doing it?—This safety wall, I think, would meet many cases.

10,045. I agree a wall would be a good thing in many cases?—It must be closed to prevent stones or earth falling into the quarry.

10,046. (*Mr. Lewney.*) Supposing an owner said, "I will fence round with timber"?—It would be sufficient.

10,047. (*Chairman.*) He ought to do the best a man can in the circumstances, and if he did not it would be the Inspector's duty to keep him up to the mark. If there was a difference of opinion you must have somebody to decide what was reasonably practicable in the circumstances. I do not see any General Rule under which you could not immediately bring up an instance that was quite clearly an exception, and yet I see the intense necessity of removing the overburden properly?—The present Special Rule covers a lot. It says it must be cleared far enough back from the edge of the quarry to prevent danger to the persons employed.

10,048. We may come to the conclusion that that rule is hardly specific enough. You could contend for ever under it, because you would have to take the owner before a magistrate. It would be better to compel each quarry to adopt some system and keep to it in the same way as you compel the sandstone mines to keep to a system as to the width of their roads?—I agree.

10,049. The question is whether that would suit you. We can consider it?—I think it would meet the cases where such provisions as I suggest would not do.

10,050. You would like these for the normal state of things where they can be carried out?—I think they are very good.

(*Mr. Lovett.*) I do not see that it is practicable to build a wall around the quarries.

10,051. (*Chairman.*) According to my solution it would be only part of the precautions. A man might offer to build the wall as part of the scheme?—It might be built of the sods taken off the top of the overburden.

10,052. Sods are good, but loose stone is not?—It is always built of sods, or something of that kind.

10,053. According to the scheme suggested, there would be no particular thing laid down, but an owner would have to satisfy an inspector as to the system he was adopting, and stick to it, and each quarry would stand on its own footing.

(*Mr. Lovett.*) I was pointing out the impracticability of this suggestion. The overburden is continually being removed. As the quarry is worked they have to take the overburden off. That goes on, and the quarry gradually forces its way into the mountain, and to build a wall 2 feet high would be an expensive undertaking.

10,054. (*Chairman.*) You would not compel that in every case? It is one method?—It is not such an expensive method. It is all taken in with the removal of the overburden, and when the quarry face comes up to the sods it is taken down.

10,055. (*Mr. Lovett.*) Sods are different from a wall?—If it is stone it is the rubbish built loosely in.

10,056. (*Mr. Lewney.*) You see the danger of loose stones. Supposing a sheep fell on to it, probably that would push half the wall over?—Before the sheep can touch it they have to fall down the overburden.

10,057. Then it is no protection?—In this case it was. I was behind the wall and saw the rubbish it caught, which was surprising.

10,058. (*Chairman.*) You do not suggest it universally. You say in one large quarry it was adopted?—It is showing what was done.

10,059. (*Mr. Thomas.*) Did we not understand you to say that you agreed with what struck me as being an admirable solution, the provision the Chairman put forward that the quarry owners should submit a scheme to the Inspector, and if the Inspector and the quarry-owner could not agree, then refer the matter to the Secretary of State and appoint a man to settle the difference?—I quite agree. My object was simply to point out how it had been done efficiently in one case. I am suggesting that is one method by which accidents can be prevented.

10,060. (*Chairman.*) There are cases in which you could not have a wall?—If you had the beds like *that*, you could not have the sort of wall I meant.

10,061. Now with regard to the size of the ledges, that depends, apparently, on the backs or joints of stone, and their height, and all sorts of considerations?—Yes.

10,062. You are of opinion that the overburden ought to be effectively removed as far as possible, and in all cases so as to make the place as safe as it could reasonably be made. That is what it comes to?—Yes.

10,063. (*Mr. Lovett.*) What quarries are you referring to? Are they sandstone quarries?—These are limestone.

10,064. They work on ledges only?—Yes.

10,065. I believe the minimum width of a ledge is now about 4 feet?—Often less than that. That is the quarry I am referring to (*producing photograph*). You do not get the idea of the wall, but that is a photograph of the quarry itself.

10,066. You suggest it should be 10 ft.?—I mentioned 10 ft. I think there should be a minimum. It is difficult, where you have the backs in different ways, to get it. I had one case in Derbyshire where a man was on a ledge like that (*indicating*), and was tipping a stone over and he slipped and came on to the part leaning like *this* on to the face. The ledge was wide enough, but there was a dipping place, and he slipped over. In addition to the width of the ledge ropes should be used in a place like that. As a rule I find out the men do not like ropes. They say it impedes them and they are likely to be caught by falling stones, and cannot get out of the way.

10,067. (*Chairman.*) Who provides the rope as a rule?—The employer.

10,068. Is that providing of ropes under the rules compulsory?—I do not think so.

10,069. (*Mr. Thomas.*) It is Rule No. 31 of the Model Code?—"Each workman working on the face of the "quarry or standing on a narrow ledge shall, when "requisite, use a rope or other appliance."

10,070. (*Chairman.*) It does not say who provides it?—Or when it is requisite.

10,071. (*Mr. Thomas.*) A witness yesterday said* there was no regulation to enforce the provision of a rope?—When requisite it has to be used.

10,072. (*Chairman.*) The point is that it is no part of our duty to determine who has to pay for things, but the question of provision has relation to the efficacy of the thing provided. I mean to see that it is a good one?—In connection with the size of ledges I have said where it is practicable I would suggest 10 ft. as a minimum.

10,073. What do you say with regard to the withdrawal of workmen?—I think the general rules should require the men to be withdrawn in case of danger by the foreman, if present, and if he is not present, they should withdraw themselves and report the matter to the foreman.

10,074. Is there no such provision at present?—There is a provision that the workmen shall come out. Rule 34 says: "Every workman who notices anything "that appears unsafe or likely to produce danger shall "forthwith report it to the owner agent or person in "charge." I think they should be withdrawn by the foreman if present, and they should come out themselves if he is not present.

10,075. The rule should be made more specific in that respect?—Yes.

10,076 As regards supervision, you would like to have a recognised person responsible for general safety to whom you could look?—Yes.

10,077. Would you have him certificated in all cases, or not, in the case of mines and quarries?—Not in the case of quarries.

10,078. (*Mr. Ainsworth.*) How do you define "a competent person"?—I would have him appointed by the owner in writing. All these appointments should be in writing, so that we know with whom we are dealing.

10,079. You would accept the judgment of the owner as to whether he was competent for that purpose?—I would hold the owner responsible for obtaining a competent person.

10,080. Do you not think it would be a test of competency if he went through some examination before an independent authority?—I do not think so, in quarries.

10,081. Why not in quarries? Is it not just as difficult? It wants a good a man to look after quarries?—Quarries work so intermittently. You may have a perfectly good quarryman working three weeks or a month in a quarry, and another time he is a farm labourer or working on some other work altogether. In connection with County Council quarries that work for roads, the foremen are quite good men. They only work these quarries three months in the year, and I doubt whether they would pass an examination.

10,082. The only examination we are suggesting as essential is some test of his knowledge of practical work. At any rate, I suppose if an Inspector was to

* *See* Q. 9141.

consider that the overman was not competent, then he would be justified in calling the attention of the management to the fact?—Yes, he would, and that is why I should require him to be appointed in writing. He would simply write and say, "We are starting such-" and-such quarry, and so-and-so is the competent " person."

10,083. They would inform the Inspector, and it would be for the Inspector, if he did not think he was competent, to inform the management?—To inform the owner.

10,084. (*Chairman.*) Then as to ownership, you have considerable difficulties of which we have heard before, in knowing whom to look to as the owner?—Several.

10,085. There ought to be means of settling that?—Yes. Recently a complaint was sent from the Home Office regarding a quarry near Stirling, where a man was taking stone out for the purpose of building, and a resident living close to in a house said stones were projected by the shots in his house and garden. We could not hold anybody responsible. It was a parish quarry, and everybody had a right to work in it, and there is no responsibility at all.

10,086. You want to make the parish council responsible to see that the law is obeyed?—Yes.

10,087. I presume it would be wise in cases of doubt to give an Inspector power to take the case before a magistrate to decide who was to be looked upon as the owner?—Yes. I think somebody should be responsible.

10,088. In cases of dispute it would seem proper that an Inspector should bring the whole matter before a magistrate and get the magistrate to decide it?—Since I sent in my statement a firm have started a sand quarry, and they did not post the rules. I drew their attention to it, and they said it did not come under the Quarries Act because sand was not a mineral.

10,089. What did you do, because that is clearly wrong?—I said it was rather late in the day to raise the question, as there were over 2,000,000 tons of gravel and sand worked last year at quarries. They said they would not contest it, it was a small point, and they posted the rules.

10,090. I suppose if you make requirements as you might have to make in regard to overburden, as we suggested, you generally find what you propose is accepted and you get your way?—As a rule.

10,091. It is not very often that resistance is offered to a reasonable demand?—Not often, but you do come across a cantankerous person who will not agree.

10,092. In quarries where the number of men exceeds 10 you would like to have authorised shot-firers?—In all quarries where the number of men exceeds 10, I would like to have the shots charged, stemmed and fired by one man chosen for his knowledge of the work.

10,093. Would that be practicable?—That is very largely done in some districts—who would also examine the place after blasting before the workmen returned to it, and as far as possible I think they should be fired electrically.

10,094. Do you think that the world is prepared for electric firing in quarries?—It is largely, but I do not know that everybody is prepared.

10,095. If they made a mess of it and muddled the electrical machinery, it would be worse than the old-fashioned fuse?—I do not think so. With fuse, where you have a shot hole which has to be shaken or sprung, there is the danger of igniting the second charge by burning fuse from a former charge. There may be portions of the burning fuse in the hole when the second charge is put in, and we have many accidents from that cause.

10,096. What causes the burning fuse to be left?—It is the tape on the outer side.

10,097. Has not the time come when we ought to have a non-combustible tape?—I do not know. It is always there at present. There have been many accidents.

10,098. A tape prepared with pitch is very inflammable?—It is not the tape that burns rapidly, it smoulders. It is set on fire by the explosion and smoulders in the cracks, and you put the gunpowder in and there is an explosion.

10,099. We are going to bring in electrical firing into mines universally?—I think that is good. As I said this morning we had 2½ million shots fired in the old Midland district in 1909 without a single fatal accident.

10,100. Electrically?—Over 1,700,000 electrically.

10,101. (*Mr. Thomas.*) Are they low or high tension fuses? Which do they use?—Both, but low tension usually.

10,102. Have they any method of testing them?—They have a galvanometer and test every detonator and cable and everything in connection with a big shot. The percentage of missed shots was only 0·20 with that number.

10,103. (*Chairman.*) The Home Office policy is to encourage electrical firing at present?—Yes.

10,104. (*Mr. Lewney.*) In regard to the use of gunpowder in these deep holes where they spring two or three times before giving the final charge, do you think the difficulty about burning fuse might not be got over by saying no second charge shall be inserted before the lapse of one or two hours?—In some quarries you have them where they do not allow them to be fired the same day. That is better.

10,105. That is what I am suggesting, that instead of compelling them to adopt a new process they do that?—In connection with electrical firing, too, you have everybody in safety before you turn the handle.

10,106. I am not suggesting that electrical firing would be impracticable so far as these deep holes are concerned, but I have in mind a quarry where there are 20 or 30 gangs of men, and each gang of men may have at least four or five shot-holes to fire. These are all fired practically simultaneously at lunch time or dinner time, or when the men are leaving. These holes are bored in large stones that have been blasted down by the deep holes you speak of?—Pop shots.

10,107. In my judgment it would be impracticable to adopt your suggestion in regard to these?—I have had accidents with pop shots.

10,108. I daresay. It is quite conceivable you would have accidents under any system, but so far as my recollection goes, the accidents are very rare?—I do not see why you should not fire a pop shot electrically. Mr. Lovett knows places where they do.

10,109. (*Chairman.*) There are three points arising in connection with this blasting. First, are you still of opinion, where the number of men exceeds 10, only certain authorised men should do it?—I quite think that is the safest possible method to adopt.

10,110. Is it possible it is not applicable in some cases?

(*Mr. Lewney.*) Is it practicable in all cases?

10,111. (*Chairman.*) That is the first point?—I think it is practicable, but I have had a difficulty in connection with the quarries in Derbyshire through some of the men using straw fuses. They want to do away with them and introduce the tape fuse. As soon as they did, every man in the quarry left. There is a lot of cracking or springing done there.

10,112. I am speaking of authorised shot-firers?—I think they should be authorised.

10,113. Mr. Lewney is not convinced of that yet. Now, take the second point, as to not putting in further explosive before the lapse of a certain time. Would you make it more than half an hour as it is at present?—Certainly. That is far too little.

10,114. The third point is, would you be prepared to insist upon electrical firing everywhere, putting it at the extreme?—Yes, I would, personally.

10,115. Notwithstanding the possible danger of the tapes, because they may be dangerous with electrical firing?—I would say where reasonably practicable. There may be cases where you could not fire an electric shot. I quite admit that, for instance, at a very high place along a high gallery. A man can light his fuse and get out, and you would probably have half a mile of battery wires laid out and damaged by the falling stone. There are exceptions to every rule.

10,116. (*Mr. Thomas.*) Are there many blasting accidents?—Not taking the whole of the quarries together, but in Derbyshire we had a great many. In one particular year at one quarry there were several fatal accidents, all from the same cause.

10,117. (*Mr. Lewney.*) Was it due to the straws?—Yes.

10,118. (*Mr. Thomas.*) What are "straws"?—Squibs.

10,119. (*Mr. Lewney.*) Oat straws gathered in the field whilst the corn is still standing, then dried and filled with gunpowder?—And a touch put to them.

10,120. (*Mr. Thomas.*) They prefer those to modern fuses?—Yes.

10,121. (*Chairman.*) What do you say with regard to the straw fuse on consideration?—I should not allow it to be used under any consideration in a quarry. Wherever it is practicable the best and safest method I think is electric firing.

10,122. (*Mr. Thomas.*) Do the men pay for their own fuses there?—I do not know.

10,123. You do not think the continual use of these straw fuses is prompted by the fact they have to pay for them?—No, I think they honestly believed they were safe and that the fuse was not.

10,124. If the Home Office were, in addition to testing the explosives, to test the fuses, as the Chairman has suggested, would they not be entirely satisfied with that?—I do not know; but personally I think it would be better.

10,125. (*Mr. Ainsworth.*) It would be a good thing if all the fuses in the market had passed the Home Office?—I agree.

10,126. (*Chairman.*) With regard to firing an ordinary fuse, the fire runs along the centre, and if any part of the casing is inflammable it will set light to it. Electricity running along the wire would not set light to the body of the casing but only to the charge at the end. Is it not true the explosion or non-explosion, in the case of a misfire, is very unlikely to set light to the casing, whereas with an ordinary fire fuse you have greater liability of setting light to the casing?—Yes, there is a possibility of the cover of the fuse bursting. In charging the hole there is the possibility of a fuse getting nipped or kinked. I have known a case where this was done and the place was fenced off and the shot actually exploded the next day. It had been smouldering till it got past the kink and then continued to run.

10,127. The Committee I have been on are recommending the compulsory use of electric fuses?—I am strongly in favour of it.

10,128. (*Mr. Lovett.*) Do you suggest that 30 minutes is not sufficiently long for recharging?—Yes.

10,129. You apply that of course to the springing as well as the holing?—Yes.

10,130. Rule 9. You are aware that considerable care would have to be taken if we alter or amend that regulation. Supposing we said what you have suggested it might throw a number of men out of work for anything from a day to a fortnight in many cases. I have known holes that have to be sprung 13 or 14 times perhaps. That is an exceptional number, but frequently they have to be sprung in deep holes five or six times. If you said a day instead of 30 minutes, it might throw a dozen men out of work for a week?—You might take a less time than a day—overnight, say.

10,131. Have you known accidents to happen where no recharge has been made?—Many in the springing shots where 30 minutes have elapsed and the men recharge.

10,132. I have seen men blown to pieces through going back in four or five minutes?—I had a case last November where a man's clothing was burnt. He put a little powder down to test the hole. He said 35 minutes had elapsed since the previous charge was fired. The powder ignited and ignited the powder in the canister he was carrying (it had 9 lbs. in it), and set his clothing on fire and he was practically burnt to death. Just to drop a handful down to see if there is any fire is the way they test if any fire is left in the hole.

10,133. Where men are told off to do the blasting I should think they do?—I use Rule 13 often in connection with springing shots to get a longer time if possible, that the owners shall frame regulations and signals as to blasting, and I have got the time extended to an hour in some cases. To secure safety a long period I am sure is necessary.

10,134. (*Chairman.*) You are in favour of explosives that do not freeze?—Yes.

10,135. I suppose there is a sufficient number that do not freeze which can be used?—There are a number of them.

10,136. If we took to reporting on explosives it is a question whether we should license those?—There is another point I want to mention. Special Rule 8 should be amended. It is necessary to provide a warming pan, but it is not compulsory to use it at present.

10,137. I know that little defect?—I was surprised when I wanted to take a prosecution against some owners in one district to find that I could not. They had the warming pan, but had not used it. The explosive had not been thawed, but it was the opinion of legal experts that they had complied with the law by *providing* the pans.

10,138. Supposing we prohibited all these explosives that freeze, do you think in quarries, at all events, we should be in great difficulties?—You would be in some probably. I do not know what non-freezing gelignite will do. It has been introduced recently, within the last 12 months or so.

10,139. Then you think that the signals for explosions ought to be a horn or whistle and not by shouting?—Yes.

10,140. The ambulances I think you told us about when you were dealing with the mines. You are in favour of first aid?—I suggest the grouping of small quarries too.

10,141. And reasonable first aid?—Yes.

10,142. (*Mr Lewney.*) That is where they are not far apart?—Yes.

10,143. (*Chairman.*) You are in favour of encouraging, wherever possible, men to learn first aid?—I am.

10,144. It should be encouraged?—Yes. Might I add one point I want to bring before the notice of the Commission. In connection with a colliery in Nottingham I was asked by the Chief Inspector of Mines to investigate a system which the checkweigher there brought out, his idea being that where you had a missed shot you could take out the detonator and put another in. I went into it carefully and it struck me as being an ingenious arrangement which would be useful in quarries or metalliferous mines.

10,145. By means of a tube?—He takes a round hollow brown paper tube at the end of the last cartridge or primer and both are placed in the shot hole. Through the tube a copper needle or pricker is passed, and the hole is then stemmed in the ordinary way, after which the needle is withdrawn and the detonator passed up through the tube with a wooden rod into position in the primer, the detonator being attached to this wooden rod.

10,146. (*Mr. Lewney.*) That is done after the stemming is put in?—Through a little tube in the centre of the stemming.

10,147. That presupposes that the hole has to be filled to the top?—No.

10,148. Supposing you have a hole down 3 feet and a foot of stemming on it, how will you find the hole when you put your wire down?—The paper tube is in position all the time.

10,149. What would be the length of the paper tube?—The length of the stemming.

10,150. (*Chairman.*) The thing has been investigated and there are difficulties?—Through the tube a copper needle or pricker is passed, and the hole stemmed in the ordinary way, after which the needle is withdrawn and the detonator pushed up through the tube with a wooden rod into position in the primer and fired electrically. In the case of an electric detonator the wires are threaded through what is called a "rool," which is pushed into the tube along with the detonator. In the case of a misfire the detonator is withdrawn

by means of a piece of string attached to the copper capsule, and another is then pushed up through the tube into the charge. Mr. Redmayne has a model of it at the Home Office.

10,151. The only question that has been raised is whether it is not dangerous to put a detonator in and push it in. I do not think so.

10,152. On the top of the charge?—They put it into the primer and then push it in. When I saw it I thought it was a good idea. My objection in coal mines was that the stemming was not airtight and it would not do for permitted explosives.

10,153. For quarries it might be useful although not in coal mines?—Yes. Often a missed shot is due to a defective detonator and there is always the temptation to bore out the stemming. This does away with that difficulty. You pull the detonator gently out and put another in and try again to fire the charge.

10,154. The paper hole does not interfere with the efficacy of the shot. The stemming is never round the hole?—You have not often the stemming the full length of the hole.

10,155. (*Mr. Lewney.*) The same object might be attained by limiting the amount of stemming put on the hole where high explosives are used. In that case another charge could be put on the top of the stemming and exploded in the usual way. This I have found effective on many occasions?—How much between each?

10,156. I would never put more than 2 inches. The danger arises frequently when men fill the hole. They have to prick it out, and if they put another charge on the top it is ineffective?—Supposing he had another miss, you have two missed charges and detonators in the same hole.

10,157. It rarely occurs?—It has occurred. They tried that near Sheffield in the ganister. They made experiments and knew exactly what length of the stemming they could detonate the first shot through It requires hard stone, I think.

10,158. A gentleman I worked under at one time asked me to try several experiments without putting stemming on, and I found the blasting as effective as with stemming.

(*Chairman.*) That was using high explosive?

(*Mr. Lewney.*) Yes.

(*Chairman.*) How would that do, to use high explosive and put no stemming at all or very little?

10,159. (*Mr. Lewney.*) Limit the quantity?—I do not think they put very much in these big holes.

10,160. (*Chairman.*) It would not make much difference?—With high explosives you get the force downwards as a rule.

10,161. It would be a safer thing if you put no stemming at all?—I do not think it would work always.

10,162. (*Mr. Lewney.*) I am prepared to say that 2 inches of stemming is sufficient for any purpose? It would not do in coal mines. Charging as a rule is done with too much force. The men have an idea that you have to ram the explosive hard up to the back of the hole, and this causes the explosions.

APPENDICES.

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METALLIFEROUS MINES.

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QUARRIES.

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APPENDIX A.

Metalliferous Mines.

Table I. showing the Total Number of Persons Employed, Output of Mineral, Deaths from Accidents and Death Rate per 1,000 Persons Employed during each of the Years 1873–1909 inclusive; also the Death Rate per 1,000 Persons Employed at Mines under the Coal Mines Acts.

Year.	Persons Employed.	Output of Mineral.	Number of Deaths from Accidents.	Death Rate per 1,000 Persons Employed.	
				Metalliferous Mines Act.	Coal Mines Act.
		(Tons.)			
1873	62,683	3,795,589	104	1·66	2·08
1874	56,361	3,659,848	103	1·83	1·96
1875	58,073	4,079,964	119	2·05	2·32
1876	57,497	4,120,742	70	1·22	1·81
1877	57,395	4,455,443	97	1·69	2·44
1878	51,458	4,068,485	77	1·50	2·97
1879	47,060	3,882,921	64	1·36	2·04
1880	52,908	4,595,201	84	1·59	2·72
1881	54,942	4,911,622	99	1·80	1·93
1882	55,506	5,215,962	92	1·66	2·23
1883	50,235	4,522,859	86	1·71	2·05
1884	44,120	3,911,426	56	1·27	1·81
1885	41,044	3,941,986	64	1·56	2·21
1886	41,122	3,994,319	65	1·58	1·83
1887	41,749	4,235,375	56	1·34	1·89
1888	43,472	4,266,377	72	1·66	1·65
1889	43,420	4,225,968	64	1·47	1·91
1890	42,054	4,147,762	46	1·09	1·89
1891	39,428	4,033,905	51	1·29	1·50
1892	38,166	3,820,706	52	1·36	1·49
1893	35,739	3,768,533	65	1·78	1·55
1894	33,857	3,667,866	46	1·36	1·60
1895	33,373	3,655,470	54	1·62	1·49
1896	33,119	3,872,062	40	1·21	1·48
1897	33,500	3,783,916	49	1·46	1·34
1898	34,231	3,812,728	33	0·96	1·28
1899	35,157	3,672,841	56	1·59	1·26
1900	34,465	3,590,650	38	1·10	1·30
1901	32,443	3,230,565	30	0·92	1·36
1902	30,812	3,322,820	29	0·94	1·24
1903	29,823	3,243,633	25	0·84	1·27
1904	29,504	3,246,336	35	1·19	1·24
1905	29,151	3,444,478	46	1·58	1·35
1906	30,231	3,712,436	36	1·19	1·29
1907	31,602	3,388,024	34	1·08	1·32
1908	29,927	3,138,728	37	1·24	1·32
1909	28,437	3,095,780	40	1·41	1·43

Table II. showing the Number of Persons Employed at Metalliferous Mines from the Year 1873 to 1909.

Year.	Metalliferous Mines Act.			
	Underground.	Above-ground.		Total.
	Males.	Males.	Females.	
1873	37,378	20,271	5,034	62,683
1874	34,036	18,189	4,136	56,361
1875	34,905	19,365	3,803	58,073
1876	34,109	19,815	3,573	57,497
1877	34,095	19,964	3,336	57,395
1878	30,624	18,016	2,818	51,458
1879	28,265	16,602	2,193	47,060
1880	32,045	18,600	2,263	52,908
1881	33,291	19,405	2,246	54,942
1882	33,814	19,290	2,402	55,506
Averages for 10 years	33,256	18,952	3,180	55,388
1883	30,492	17,773	1,970	50,235
1884	26,614	15,718	1,788	44,120
1885	24,902	14,469	1,673	41,044
1886	24,795	14,890	1,437	41,122
1887	25,113	15,094	1,542	41,749
1888	26,104	15,946	1,422	43,472
1889	25,579	16,405	1,436	43,420
1890	24,858	15,803	1,393	42,054
1891	23,098	14,967	1,363	39,428
1892	22,528	14,410	1,228	38,166
Averages for 10 years	25,408	15,548	1,525	42,481
1893	21,240	13,464	1,035	35,739
1894	20,011	12,754	1,092	33,857
1895	19,660	12,914	799	33,373
1896	19,299	13,223	597	33,119
1897	19,921	12,956	623	33,500
1898	20,173	13,549	509	34,231
1899	20,618	14,080	459	35,157
1900	20,019	14,031	415	34,465
1901	18,804	13,246	393	32,443
1902	18,035	12,456	321	30,812
Averages for 10 years	19,778	13,267	624	33,669
1903	17,571	11,984	268	29,823
1904	17,284	11,985	235	29,504
1905	17,286	11,640	225	29,151
1906	17,818	12,187	226	30,231
1907	18,569	12,819	214	31,602
1908	17,417	12,299	211	29,927
1909	16,735	11,497	205	28,437

TABLE III.—QUANTITY of each Kind of MINERAL obtained from MINES under the

Name of Mineral.	YEAR.																	
	1873.	1874.	1875.	1876.	1877.	1878.	1879.	1880.	1881.	1882.	1883.	1884.	1885.	1886.	1887.	1888.	1889.	1890.
Alum Shale	Tons. —	Tons. —	Tons. —	Tons. —	Tons. —	Tons. —	Tons. —	Tons. —	Tons. —	Tons. —	Tons. —	Tons. —	Tons. —	Tons. —	Tons. —	Tons. —	Tons. —	Tons. 200
Antimony Ore	—	—	—	—	—	—	—	—	—	—	—	4	—	—	—	cwts. 7½	67	14
Arsenic	5,187	4,219	3,783	4,091	4,111	4,465	4,785	4,350	3,660	5,972	7,622	7,905	8,129	5,927	4,618	4,624	4,758	7,276
Arsenical Pyrites	—	—	12,948	12,949	5,341	3,638	2,506	5,188	14,322	7,197	1,300	1,762	1,911	4,918	4,364	5,325	7,688	5,114
Barium (Compounds).	13,360	13,022	15,845	21,254	19,162	21,716	16,424	17,633	19,036	22,295	21,396	20,062	26,153	25,142	24,813	25,191	24,849	25,353
Bauxite	—	—	—	—	2,763	3,426	3,657	3,470	7,732	8,389	13,478	8,560	9,030	8,262	4,169	9,066	9,150	11,527
Bismuth	1	—	—	½	½	—	½	—	—	—	—	—	—	—	—	—	—	—
Building Stone, &c.	180	95,440	144,894	109,122	331,201	264,722	280,937	308,467	395,809	332,139	224,674	36,830	24,095	54,646	24,434	2	21,348	1,800
Chalk	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	785	740	730
Chert, Flint, Jasper, &c.	—	—	3,900	3,790	3,290	3,997	3,303	3,901	4,573	4,859	—	—	—	2,714	1,821	3,075	2,810	3,878
Clay and Shale	35,551	49,022	50,059	49,162	44,986	69,261	59,068	57,937	55,271	51,503	67,395	59,395	70,557	63,022	69,208	79,659	82,699	89,674
Cobalt and Nickel Ore.	69	147	96	42	27	99	117	65	64	38	49	66	169	109	154	152	155	84
Copper Ore and Precipitate.	80,316	72,885	66,425	72,512	65,845	55,101	49,100	51,877	53,170	52,518	46,819	42,149	36,379	18,617	9,359	15,550	9,310	12,481
Fluor Spar	14	634	359	406	229	580	905	387	373	145	99	581	451	279	283	140	263	258
Gold	*	ozs. 391	ozs. 8	ozs. 294	ozs. 143	ozs. 703	ozs. 448	ozs. 5	—	ozs. 226	—	—	—	—	—	—	—	—
Gold Ore	*	—	132	—	3	—	cwt. 4	lbs. 220	lbs. 167	—	869	—	35	—	1	3,844	6,226	375
Graphite	—	—	—	6	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Gypsum	60,124	61,113	65,068	68,276	73,908	74,908	62,443	75,452	70,409	86,086	84,372	77,222	75,778	84,849	84,442	86,227	94,257	115,055
Igneous Rock	1,339	1,351	11,462	14,922	18,308	17,871	—	—	—	—	60,876	4,537	47,882	46,816	43,860	47,985	44,789	52,968
Iron Ore	2,715,574	2,468,732	2,673,890	2,637,546	2,815,840	2,530,334	2,483,979	3,140,270	3,244,057	3,596,747	3,138,857	2,803,896	2,625,868	2,092,626	2,898,022	2,937,253	2,853,436	2,648,267
Iron Pyrites	43,760	31,595	18,115	18,552	17,295	14,760	6,952	10,870	11,765	18,556	20,178	21,256	21,090	20,829	15,595	17,124	11,908	11,350
Jet	—	—	1	*	*	*	*	*	*	*	cwt. 1½	—	—	2 lbs.	1,148 lbs.	2,217 lbs.	618 lbs.	1,128
Lead Ore	71,315	69,545	74,499	77,121	80,499	76,581	65,604	68,552	63,679	63,005	56,487	54,485	51,302	53,420	51,563	51,219	48,431	45,627
Lignite	1,310	150	20	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Limestone	583,817	396,702	500,284	553,639	545,895	409,602	467,459	447,933	538,967	555,340	322,397	315,515	496,539	478,309	525,291	458,501	566,754	572,366
Manganese Ore	8,621	5,456	3,725	2,797	3,639	1,734	1,052	2,479	2,737	1,548	1,287	969	1,088	12,763	13,777	4,342	8,852	12,444
Ochre, Umber, &c.	3,149	3,896	5,045	3,610	2,867	2,903	2,690	2,595	3,243	5,102	7,802	3,551	7,883	5,156	4,128	5,230	4,169	3,950
Oil Shale	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Phosphate of Lime	—	479	122	185	6	16	24	—	60	59	80	66	—	—	—	—	—	—
Rock Salt	177,348	200,806	191,119	186,841	207,942	182,960	189,809	198,744	197,631	185,002	233,170	197,521	190,480	173,448	180,422	217,456	161,205	188,730
Sand	—	—	272	—	—	—	671	94	264	—	—	—	—	250	—	—	1	4,035
Sandstone	¶92	—	48,750	§389	2,519	11,196	1,144	1,295	1,201	3,370	10,310	71,670	47,930	75,150	84,234	95,840	60,544	152,749
Silver Ore	†5	†5	†1	†1	142	ozs. 153 86	23	16	6	cwts. 7	—	—	—	—	—	—	—	—
Slate	*	2151,989	153,282	156,887	172,210	169,941	143,261	154,429	163,291	169,881	160,686	153,276	160,286	161,848	152,530	158,360	160,107	146,290
Soapstone	100	100	151	75	68	57	—	50	30	—	—	—	—	—	—	—	—	—
Tin Ore, Dressed (Black Tin).	14,066	13,162	12,611	12,637	13,294	14,220	13,389	12,327	11,788	12,158	12,826	13,581	12,887	12,801	12,847	12,540	12,465	12,988
Tungstate of Soda	11	22	—	—	—	—	—	—	—	—	—	—	—	11	1	2	—	—
Uranium Ore	—	—	—	—	cwt. 2	cwt. 8	cwt. 5	—	—	—	—	—	—	—	—	—	—	22
Wolfram Ore	22	33	45	10	15	10	13	1	54	58	111	64	374	140	54	60	1	104
Zinc Ore	14,279	19,433	22,992	23,720	24,228	25,221	23,338	28,619	36,440	32,514	29,728	25,563	24,668	23,156	25,445	26,224	22,996	21,853
Total	3,795,589	3,630,848	4,079,964	4,120,742	4,455,483	4,068,485	3,882,921	4,396,201	4,911,622	5,215,962	4,522,850	3,911,426	3,941,396	3,394,319	4,235,375	4,260,377	4,225,968	4,147,262

* Quantity unknown. † Including Copper and Silver Precipitate (mixed). ‡ Excluding output of Ireland.

Metalliferous Mines Regulation Act in each of the Years 1873 to 1909.

Year: 1891.	1892.	1893.	1894.	1895.	1896.	1897.	1898.	1899.	1900.	1901.	1902.	1903.	1904.	1905.	1906.	1907.	1908.	1909.	Name of Mineral.
Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	Alum Shale.
15	6	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	Antimony Ore.
6,016	5,114	5,969	4,754	4,798	3,616	4,165	4,174	3,829	4,081	3,361	2,131	902	976	1,528	1,300	1,497	1,919	2,865	Arsenic.
5,005	4,197	2,912	3,285	2,900	8,808	12,634	10,823	13,429	9,573	2,578	829	57	43	641	540	627	2,063	179	Arsenical Pyrites.
26,876	24,217	22,343	20,656	20,570	23,037	21,723	21,175	23,064	27,456	26,413	22,908	23,671	21,130	24,323	27,827	30,343	32,071	35,212	Barium (Compounds).
10,763	7,322	8,740	7,970	10,098	7,219	13,327	12,402	8,009	5,779	10,191	9,917	6,128	8,700	7,300	6,654	7,337	11,716	9,500	Bauxite.
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	Bismuth.
13,626	11,524	9,731	16,565	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	Building Stone, &c.
—	—	—	—	1,616	1,821	2,211	1,878	4,558	10,124	1,561	8,691	6,885	5,322	7,880	2,902	1,765	849	1,032	Chalk.
2,749	3,256	3,271	3,706	3,197	2,298	2,163	2,313	2,529	3,721	2,976	2,929	3,610	4,063	5,663	4,912	5,372	6,251	5,672	Chert, Flint, Jasper, &c.
72,211	80,020	77,394	74,099	97,694	130,819	103,656	86,641	113,543	111,370	104,907	95,963	112,818	115,892	114,690	118,521	114,525	123,911	120,282	Clay and Shale.
—	—	—	—	—	—	300	—	—	—	—	—	—	—	—	—	—	—	—	Cobalt and Nickel Ore.
9,158	6,265	5,576	5,094	7,291	9,168	7,352	9,131	8,319	9,488	6,792	6,112	6,867	5,465	7,131	7,258	6,759	5,121	3,620	Copper Ore and Precipitate.
130	98	58	39	36	204	257	56	733	1,413	1,164	4,970	10,637	16,889	37,908	36,290	40,229	24,097	27,537	Fluor Spar.
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	Gold.
14,117	9,200	4,489	6,003	13,266	2,265	4,517	705	3,047	20,802	16,374	29,953	28,600	23,263	15,981	17,384	12,278	7,123	5,338	Gold Ore.
—	—	—	—	50	—	—	—	—	—	—	—	—	—	—	—	—	101	—	Graphite.
114,870	111,312	105,230	115,221	118,113	119,520	117,061	131,116	158,326	152,729	151,199	170,196	176,080	195,665	216,945	196,143	196,919	191,497	200,962	Gypsum.
65,064	56,163	77,327	77,257	78,020	87,471	82,525	99,440	96,461	97,698	98,912	93,634	99,236	94,253	84,927	72,722	69,871	67,627	70,318	Igneous Rock.
2,576,203	2,353,706	2,350,616	2,264,185	2,128,323	2,237,600	2,216,772	2,167,100	1,955,796	1,861,714	1,671,053	1,700,411	1,695,148	1,603,855	1,768,229	1,824,415	1,802,916	1,549,169	1,671,613	Iron Ore.
8,979	7,182	8,788	7,540	2,091	2,728	2,018	2,584	2,411	3,201	2,577	1,617	2,739	2,776	3,613	3,708	2,900	2,236	1,256	Iron Pyrites.
lbs. 566	lbs. 929	lbs. 888	lbs. 479	lbs. 168	lbs. 294	lbs. 84	—	—	—	—	—	—	—	—	—	—	—	—	Jet.
43,813	39,889	40,295	39,886	38,404	40,466	35,082	32,679	30,990	31,985	26,970	23,615	26,355	26,371	27,246	30,226	31,361	28,540	29,088	Lead Ore.
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	Lignite.
475,478	503,746	490,579	457,708	498,860	520,614	530,612	555,625	588,916	580,483	512,158	571,721	573,011	510,898	498,633	765,718	470,563	500,517	467,839	Limestone.
9,476	6,078	1,336	1,809	1,273	1,080	509	231	415	1,362	1,016	1,278	818	8,756	14,474	22,262	16,098	6,308	2,708	Manganese Ore.
4,432	4,020	3,908	3,431	3,976	3,168	2,759	2,900	4,056	4,270	5,228	8,423	5,678	7,061	6,001	4,415	4,789	6,185	6,992	Ochre, Umber, &c.
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	409	210	166	129	Oil Shale.
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	Phosphate of Lime.
221,203	175,258	192,940	197,429	232,072	214,219	182,078	182,770	179,010	150,860	151,318	162,193	162,269	185,387	231,546	250,528	246,020	222,500	260,552	Rock Salt.
2,913	2,474	2,005	—	1,030	1,250	4,321	31,130	27,311	27,026	11,863	13,075	15,053	12,830	15,291	12,642	23,580	21,600	21,878	Sand.
176,467	139,393	166,302	171,335	210,533	213,445	216,160	246,721	239,968	258,286	230,604	201,760	183,320	195,367	173,776	168,077	156,924	198,822	148,925	Sandstone.
—	—	—	—	—	—	—	—	—	—	—	—	58	35	14	1	1	—	—	Silver Ore.
138,578	141,393	145,951	156,934	152,341	172,071	179,808	177,694	178,398	165,214	154,224	159,540	164,278	165,173	148,092	126,620	116,570	104,050	92,221	Slate.
—	—	—	10	—	—	28	—	—	—	—	—	—	—	—	—	—	—	—	Soapstone.
13,074	12,987	12,395	11,338	9,587	6,927	6,215	6,588	5,002	6,600	6,542	6,698	6,199	6,000	6,358	6,276	6,097	6,955	7,461	Tin Ore, Dressed (Black Tin).
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	Tungstate of Soda.
31	37	25	19	40	35	30	26	7	41	79	32	6	—	103	11	71	71	6	Uranium Ore.
138	125	22	—	—	43	125	324	89	8	18	9	272	156	163	363	314	229	368	Wolfram Ore.
22,000	23,083	23,553	21,670	17,100	19,220	19,278	23,552	23,135	24,675	23,752	25,060	24,888	27,653	23,969	22,824	20,082	15,225	9,992	Zinc Ore.
4,033,905	3,820,706	3,768,523	3,667,868	3,655,470	3,872,062	3,783,916	3,812,728	3,672,841	3,590,650	3,230,563	3,322,820	3,243,613	3,246,336	3,444,478	3,712,826	3,388,624	3,138,728	3,095,780	Total.

‡ Output of Ganister only. | Including mixed ores. * Excluding output of Scotland.

TABLE IV. showing the Number of PERSONS EMPLOYED in the various kinds of METALLIFEROUS MINES in the UNITED KINGDOM in 1909.

Kind and Output (in tons) of Mineral.	Persons Employed.		
	Under-ground.	Above-ground.	Total.
Iron Ore, 1,674,643	4,944	1,910	6,854
Limestone, 407,830	1,067	398	1,465
Rock Salt, 209,552	249	152	401
Gypsum, 200,962	430	350	780
Sandstone, 148,925	565	696	1,261
Clay and Shale, 120,282	222	129	351
Slate, 92,223	1,297	2,030	3,327
Igneous Rock, 70,318	115	96	211
Barium, 35,212	321	260	581
Lead Ore	681	406	1,087
Lead and Zinc Ores	1,773	1,089	2,862
Lead Ore and Fluor Spar.	211	138	349
Lead, 29,688; Zinc, 9,902	2,665	1,633	4,298
Fluor Spar, 27,577	43	35	78
Sand, 21,878	19	13	32
Zinc Ore. (*See also Lead Ores.*)	49	62	111
Tin Ore,* 7,403	4,250	3,575	7,825*
Gold Ore, 5,538	67	27	94
Other Minerals	432	336	768
Total	16,735	11,702	28,437

* 2,513 of these persons were employed at mines getting mixed ores of tin, copper, arsenic and wolfram.

TABLE VI. showing the NUMBER of

PLACE OR CAUSE OF ACCIDENT.	YEAR.																
	1873.	1874.	1875.	1876.	1877.	1878.	1879.	1880.	1881.	1882.	1883.	1884.	1885.	1886.	1887.	1888.	1889.
Explosions of Firelamp	—	—	—	—	—	—	—	—	—	—	—	—	—	—	5	1	—
Falls of Ground	27	40	32	25	41	27	24	31	36	30	31	22	31	21	23	25	28
Shaft Accidents :—																	
Overwinding	—	1	—	3	—	—	—	1	—	—	—	1	—	—	1	—	—
Ropes or Chains breaking	2	—	5	2	—	—	2	1	4	—	14	—	1	1	2	—	—
Whilst ascending or descending by Machinery.	3	10	—	—	1	7	—	3	1	3	1	3	3	1	2	2	4
Falling into Shaft from Surface	1	1	—	—	2	3	1	—	5	1	2	1	1	—	1	3	—
Falling from part way down	19	11	18	6	9	6	8	11	8	14	7	4	2	3	4	6	5
Things falling into Shaft from Surface	1	1	1	1	3	—	—	—	2	1	1	—	—	—	—	1	—
Things falling from part way down	4	2	6	1	4	—	1	5	2	2	2	1	1	2	—	2	—
Miscellaneous	—	5	5	3	2	3	4	—	—	6	—	2	—	4	3	—	3
Total	30	34	35	16	21	19	16	21	22	27	27	12	8	11	13	14	12
Miscellaneous Underground :—																	
By Explosives	9	6	12	12	9	17	6	9	12	9	8	8	4	11	7	9	6
Suffocation by Natural Gases	1	3	2	—	—	—	—	—	2	—	—	1	—	—	—	3	—
By Underground Fires*	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Irruptions of Water	—	—	3	—	—	—	1	3	8	—	2	—	3	—	—	—	—
Haulage :—																	
(*a*) Ropes or Chains breaking	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
(*b*) Run over or crushed by Trams or Tubs.	—	—	—	—	1	1	2	—	—	—	1	1	—	1	—	—	1
(*c*) Other Haulage Accidents	—	—	—	1	1	—	—	—	1	—	—	—	1	—	2	—	1
Electricity*	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
By Machinery	1	2	1	1	2	—	1	—	—	1	—	—	2	2	1	2	2
Sundries	14	4	15	9	11	5	6	7	9	7	10	6	9	9	4	11	5
Total	25	15	33	23	24	23	16	19	32	17	21	16	19	23	14	25	15
Total Underground	82	89	100	64	86	69	56	71	90	74	79	50	58	55	53	65	55
On Surface :—																	
By Machinery	10	7	9	3	3	4	3	4	6	8	4	1	2	3	—	2	3
Boiler Explosions	4	1	—	—	—	1	—	1	1	5	—	1	1	1	—	—	—
On Railways, Sidings, or Tramways*	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Electricity*	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Miscellaneous	8	6	10	3	8	3	5	8	2	5	3	4	3	6	1	5	6
Total on Surface	22	14	19	6	11	8	8	13	9	18	7	6	6	10	1	7	9
Gross Total	104	103	119	70	97	77	64	84	99	92	86	56	64	65	56	72	64

* The headings "By Underground Fires" and "On Railways, Sidings, or Tramways" (Surface) did not appear in the

TABLE V. showing the OUTPUT of MINERALS from MINES under the METALLIFEROUS MINES ACT in CORNWALL during the Years 1890–1909.

Year.	Antimony Ore.	Arsenic.	Arsenical Pyrites.	Copper Ore and Copper Precipitate.	Fluor Spar.	Iron Ore.	Lead Ore.	Ochre and Umber.	Silver Ore.	Slate.	Stone.	Tin Ore.	Uranium Ore.	Wolfram Ore.	Zinc Ore.	Total.
	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.
1890	—	3,143	1,536	5,273			—			150	—	12,945	22	104	—	23,173
1891	10	3,016	1,104	4,298		—	15	10	—	100	220	13,030	31	138	—	22,002
1892	6	2,567	1,086	2,813		691	—	196	—	240	—	12,891	37	125	12	20,664
1893	—	1,744	711	2,673		—	—	211	—	270	—	12,343	25	22	21	18,020
1894	—	1,853	1,516	3,370		—	—	106	—	150	—	11,507	19	—	57	18,578
1895	—	1,821	1,506	5,509		—	—	—	—	300	—	9,557	40	—	—	18,733
1896	—	1,366	6,201	5,616	109	—	—	—	—	291	—	6,921	35	43	55	20,634
1897	—	1,014	11,511	4,140	—	—	—	—	—	223	—	6,214	30	125	57	23,317
1898	—	1,062	9,729	5,293	—	—	—	—	—	360	—	6,586	26	324	—	23,380
1899	—	1,361	9,679	5,172	—	—	—	19	—	185	—	5,639	7	89	42	22,513
1900	—	1,160	9,019	5,926	—	—	—	15	—	375	—	5,992	11	7	20	22,555
1901	—	1,258	2,351	4,251	—	—	—	144	—	117	—	6,533	79	18	237	15,271
1902	—	1,029	535	4,547	—	—	—	170	—	10	—	6,690	32	9	—	13,072
1903	—	690	—	5,351	—	—	9	23	58	—	—	6,471	6	269	10	12,887
1904	—	827	43	4,433	—	—	—	—	35	—	—	5,991	—	156	—	11,485
1905	—	1,523	17	4,632	—	240	—	—	14	—	—	6,331	105	158	4	13,052
1906	—	1,599	333	3,053	—	60	—	—	1	—	—	6,237	11	233	38	11,565
1907	—	1,368	207	2,802	—	50	—	—	1	—	—	6,003	71	250	150	11,205
1908	—	1,409	—	1,556	—	133	—	—	—	—	—	6,763	71	220	50	10,202
1909	—	1,817	—	1,580	—	43	—	—	—	—	431	7,280	6	324	824	12,305

DEATHS during the Years 1873–1909.

YEAR.																						
1890.	1891.	1892.	1893.	1894.	1895.	1896.	1897.	1898.	1899.	1900.	1901.	1902.	1903.	1904.	1905.	1906.	1907.	1908.	1909.	Average, 1873-79 = 7 years.	Average, 1880-89 = 10 years.	Average, 1890-99 = 10 years.	Average, 1900-09 = 10 years.
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	·6	—	—
14	24	19	23	13	21	15	10	20	19	16	12	15	11	14	22	11	12	17	12	30·9	27·8	17·8	14·2
—	—	—	1	2	—	—	—	—	—	—	—	—	—	—	1	—	—	1	—	·6	·3	·3	·2
2	—	—	1	1	7	—	—	1	—	1	—	—	—	—	—	—	—	—	—	1·6	2·3	1·2	·1
3	2	3	—	1	5	4	—	—	3	2	4	—	—	1	2	1	—	—	1	3·0	2·3	2·1	1·1
—	1	—	—	5	—	1	—	—	3	—	—	—	—	1	—	—	—	—	—	1·1	1·4	1·0	·1
4	7	7	5	3	1	3	1	—	4	3	3	1	2	4	6	6	2	3	5	11·4	6·4	3·5	3·5
—	—	—	1	—	—	—	—	—	1	—	—	—	—	—	—	—	—	—	—	1·0	·5	·2	—
1	2	2	1	2	—	—	1	1	1	—	1	1	—	—	—	1	2	1	—	2·6	1·7	1·1	·6
—	1	—	3	2	—	3	—	—	2	—	—	1	—	—	1	—	1	2	2	3·1	1·8	1·1	·7
10	13	12	12	16	13	11	2	2	14	6	8	3	2	6	10	8	5	7	8	21·4	16·7	10·5	6·3
6	1	3	4	2	5	—	6	4	5	3	5	2	1	2	4	5	4	1	7	10·1	8·3	3·6	3·4
—	—	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1	—	·9	·6	·1	·1
—	—	—	—	—	1	—	20	—	8	—	—	—	—	—	—	—	—	—	—	—	—	2·9	—
3	2	—	20	3	—	1	—	—	—	—	—	—	—	—	—	—	—	—	—	·6	1·6	2·9	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	1	—	1	—	—	—	—	—	—	2	1	2	1	—	1	·6	·4	·2	·7
3	1	—	1	—	—	—	—	—	1	—	—	2	—	—	—	1	—	—	—	·3	·5	·6	·3
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	1	—	—	1	2	1	—	—	—	—	—	—	1	1	1·1	1·0	·2	·5
2	5	9	2	6	6	5	3	1	2	5	2	4	7	4	6	2	3	5	4	9·1	7·7	4·1	4·4
14	9	13	27	11	13	7	30	5	17	10	8	8	8	8	11	10	10	8	13	22·7	20·1	11·6	9·4
38	46	44	62	40	47	33	42	27	50	32	28	26	21	28	43	29	27	32	33	78·0	65·2	42·9	29·9
2	2	3	—	4	1	3	2	1	1	1	—	2	—	1	1	1	—	2	2	5·6	3·3	1·9	1·0
3	—	1	—	—	—	—	—	—	—	—	—	—	—	—	—	1	—	—	—	·9	1·0	·4	·1
—	—	—	—	—	4	—	2	1	2	2	1	—	3	1	2	3	3	1	—	—	—	·9	1·6
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
3	3	4	3	2	2	4	3	4	3	3	1	1	1	5	—	2	4	2	5	6·1	4·3	3·1	2·4
8	5	8	3	6	7	7	7	6	6	6	2	3	4	7	3	7	7	5	7	12·6	8·6	6·3	5·1
46	51	52	65	46	54	40	49	33	56	38	30	29	25	35	46	36	31	37	40	90·6	73·8	49·2	35·0

classification before the year 1895, nor the heading "Electricity" before 1907.

TABLE VII.—RATIO of ANNUAL MORTALITY from different causes of ACCIDENTS in and about MINES classed under the METALLIFEROUS MINES REGULATION ACTS, per 1,000 PERSONS EMPLOYED, in each Year from 1873 to 1909.

YEAR.	Death Rate from Accidents per 1,000 Persons.						
	Employed Underground.					Employed Above-ground, from all Causes Above-ground.	Employed Under and Above ground.
	By Explosions of Fire-damp.	By Falls of Ground.	Shaft Accidents.	Miscellaneous.	From all Causes Under-ground.		
1873	—	·72	·80	·67	2·19	·87	1·66
1874	—	1·18	1·00	·44	2·61	·63	1·83
1875	—	·92	1·00	·95	2·86	·82	2·05
1876	—	·73	·47	·67	1·88	·26	1·22
1877	—	1·20	·61	·71	2·52	·47	1·69
1878	—	·88	·62	·75	2·25	·38	1·50
1879	—	·85	·57	·57	1·98	·43	1·36
1880	—	·97	·66	·59	2·22	·62	1·59
1881	—	1·08	·66	·96	2·70	·42	1·80
1882	—	·88	·80	·50	2·19	·83	1·66
Averages for 10 years	—	·94	·72	·68	2·35	·58	1·62
1883	—	1·02	·89	·69	2·59	·35	1·71
1884	—	·83	·45	·60	1·88	·34	1·27
1885	—	1·25	·32	·76	2·33	·37	1·56
1886	—	·85	·44	·93	2·22	·61	1·58
1887	·20	·92	·52	·56	2·19	·06	1·34
1888	·04	·96	·54	·96	2·49	·40	1·66
1889	—	1·09	·47	·59	2·15	·05	1·47
1890	—	·56	·40	·56	1·53	·47	1·09
1891	—	1·04	·56	·39	1·99	·31	1·29
1892	—	·84	·53	·58	1·95	·51	1·36
Averages for 10 years	·02	·94	·52	·67	2·15	·39	1·44
1893	—	1·08	·57	1·27	2·92	·20	1·78
1894	—	·65	·80	·55	2·00	·43	1·36
1895	—	1·07	·66	·66	2·39	·51	1·62
1896	—	·78	·57	·36	1·71	·51	1·21
1897	—	·50	·10	1·51	2·11	·52	1·46
1898	—	·99	·10	·25	1·34	·43	·96
1899	—	·92	·68	·83	2·43	·41	1·59
1900	—	·80	·30	·50	1·60	·42	1·10
1901	—	·63	·43	·43	1·49	·15	·92
1902	—	·83	·17	·44	1·44	·23	·94
Averages for 10 years	—	·83	·44	·69	1·96	·38	1·31
1903	—	·63	·11	·46	1·20	·33	·84
1904	—	·81	·35	·46	1·62	·57	1·19
1905	—	1·27	·58	·64	2·49	·25	1·58
1906	—	·62	·45	·56	1·63	·56	1·19
1907	—	·65	·27	·54	1·45	·54	1·08
1908	—	·98	·40	·46	1·84	·40	1·24
1909	—	·72	·48	·78	1·97	·60	1·41

TABLE VIII. showing the Number of PERSONS EMPLOYED, Number of DEATHS from ACCIDENTS and the DEATH RATE per 1,000 PERSONS EMPLOYED at the IRON MINES in the CUMBERLAND and LANCASHIRE DISTRICT during the Years 1895–1909.

Year.	Persons Employed.			Deaths.			Death Rate per 1,000 Persons Employed.		
	Under-ground.	Above-ground.	Total.	Under-ground.	Above-ground.	Total.	Under-ground.	Above-ground.	Total.
1895	5,742	1,922	7,664	8	2	10	1·39	1·04	1·30
1896	5,609	1,947	7,556	6	—	6	1·07	—	·79
1897	5,795	2,035	7,830	6	2	8	1·04	0·98	1·02
1898	5,732	2,054	7,786	6	1	7	1·05	0·49	0·90
1899	5,432	2,021	7,453	20	1	21	3·68	0·49	2·82
1900	5,257	2,473	7,730	10	1	11	1·90	0·40	1·42
1901	4,577	2,296	6,873	6	—	6	1·31	—	0·87
1902	4,406	2,156	6,562	7	1	8	1·59	0·46	1·22
1903	4,299	1,893	6,192	3	2	5	0·70	1·06	0·81
1904	4,014	1,627	5,641	—	2	2	—	1·23	0·35
1905	4,269	1,574	5,843	8	1	9	1·87	0·64	1·54
1906	4,627	1,770	6,397	4	1	5	0·86	0·56	0·78
1907	4,817	1,953	6,770	5	2	7	1·04	1·02	1·03
1908	4,597	1,754	6,351	5	2	7	1·09	1·14	1·10
1909	4,580	1,780	6,360	3	—	3	0·66	—	0·47

TABLE IX. showing the Number of PERSONS EMPLOYED UNDERGROUND and on SURFACE, OUTPUT OF MINERAL, DEATHS from ACCIDENTS and DEATH RATE per 1,000 PERSONS EMPLOYED at the SLATE MINES in the NORTH WALES DISTRICT during each of the Years 1873–1909 inclusive.

Year.	Persons Employed.			Deaths from Accidents.			Death Rate per 1,000 Persons Employed.		
	Under-ground.	Surface.	Total.	Under-ground.	Surface.	Total.	Under-ground.	Surface.	Total.
1873 } 1874 }	*	*	*	*	*	*	*	*	*
1875	1,887	2,430	4,317	8	5	13	4·24	2·06	3·01
1876	1,999	2,621	4,620	5	—	5	2·50	—	1·08
1877	2,238	2,732	4,970	15	3	18	6·70	1·10	3·62
1878	2,268	2,452	4,720	5	1	6	2·20	0·41	1·27
1879	2,166	2,301	4,467	2	3	5	0·92	1·30	1·12
1880	2,301	2,453	4,754	7	3	10	3·04	1·22	2·10
1881	2,394	2,560	4,954	8	3	11	3·34	1·17	2·22
1882	2,510	2,524	5,034	7	5	12	2·79	1·98	2·38
1883	2,396	2,352	4,748	5	—	5	2·08	—	1·05
1884	2,321	2,385	4,706	10	3	13	4·30	1·25	2·76
1885	2,404	2,414	4,818	8	2	10	3·32	0·82	2·07
1886	2,263	2,361	4,624	6	2	8	2·65	0·84	1·73
1887	2,224	2,412	4,636	5	—	5	2·24	—	1·07
1888	2,119	2,451	4,570	11	—	11	5 19	—	2·40
1889	2,155	2,315	4,470	7	2	9	3·24	0·86	2·01
1890	2,252	2,173	4,425	7	—	7	3·10	—	1·58
1891	1,939	1,999	3,938	5	—	5	2·58	—	1·27
1892	2,084	1,959	4,043	7	1	8	3·36	0·51	1·97
1893	2,146	2,259	4,405	6	—	6	2·79	—	1·36
1894	2,286	2,299	4,585	9	1	10	3·94	0·43	2·18
1895	2,335	2,527	4,862	5	3	8	2·14	1·19	1·65
1896	2,557	2,812	5,369	4	1	5	1·56	0·36	0·93
1897	2,565	2,940	5,505	4	—	4	1·56	—	0·73
1898	2,716	3,174	5,890	1	2	3	0·37	0·63	0·51
1899	2,583	3,015	5,598	5	1	6	1·94	0·33	1·07
1900	2,295	2,746	5,041	7	1	8	3·05	0·36	1·61
1901	2,179	2,516	4,695	4	1	5	1·84	0·40	1·07
1902	2,294	2,626	4,920	5	2	7	2·18	0·76	1·42
1903	2,494	2,719	5,213	6	1	7	2·14	0·37	1·34
1904	2,269	2,899	5,168	1	2	3	0·44	0·69	0·58
1905	1,975	2,672	4,647	5	—	5	2·53	—	1·08
1906	1,692	2,309	4,001	5	4	9	2·95	1·73	2·25
1907	1,496	2,043	3,539	3	1	4	2·01	0·49	1·13
1908	1,368	1,933	3,301	1	1	2	0·73	0·52	0·61
1909	1,202	1,914	3,116	3	1	4	2·50	0·52	1·28

* No information available for these years.

TABLE X. showing the Number of PERSONS EMPLOYED, Number of DEATHS from ACCIDENTS and the DEATH RATE per 1,000 Persons employed at the CORNISH MINES during the Years 1873–1909.

Year.	Persons Employed.			Deaths.			Death Rate per 1,000 Persons employed.		
	Under-ground.	Above-ground.	Total.	Under-ground.	Above-ground.	Total.	Under-ground.	Above-ground.	Total.
1873	14,054	12,760	26,814	40	14	54	2·85	1·10	2·01
1874	11,588	10,529	22,117	37	4	41	3·19	0·38	1·85
1875	10,334	9,190	19,524	31	7	38	3·00	0·76	1·95
1876	9,781	8,851	18,632	16	3	19	1·64	0·34	1·02
1877	9,027	8,375	17,402	25	1	26	2·77	0·12	1·49
1878	7,084	6,662	13,746	15	5	20	2·12	0·75	1·45
1879	6,461	5,750	12,211	12	2	14	1·86	0·35	1·15
1880	7,261	6,242	13,503	23	2	25	3·17	0·32	1·85
1881	8,308	7,263	15,571	24	2	26	2·89	0·28	1·67
1882	8,645	7,578	16,223	22	4	26	2·54	0·53	1·60
1883	7,995	6,711	14,706	31	3	34	3·88	0·45	2·31
1884	7,033	6,150	13,183	15	2	17	2·13	0·33	1·29
1885	6,687	5,786	12,473	14	—	14	2·09	—	1·12
1886	6,186	5,483	11,669	19	4	23	3·07	0·73	1·97
1887	6,120	5,507	11,627	11	—	11	1·80	—	0·95
1888	6,495	5,788	12,283	20	1	21	3·08	0·17	1·71
1889	6,242	5,766	12,008	20	1	21	3·20	0·17	1·75
1890	6,086	5,442	11,528	9	3	12	1·48	0·55	1·04
1891	5,501	5,152	10,653	17	3	20	3·09	0·58	1·88
1892	5,303	4,972	10,275	7	3	10	1·32	0·60	0·97
1893	5,035	4,620	9,655	36	1	37	7·15	0·22	3·83
1894	4,487	4,214	8,701	7	2	9	1·56	0·47	1·03
1895	3,772	3,593	7,365	13	1	14	3·45	0·28	1·90
1896	2,975	2,856	5,831	8	1	9	2·69	0·35	1·54
1897	2,960	2,618	5,578	4	1	5	1·35	0·38	0·90
1898	2,749	2,444	5,193	7	2	9	2·55	0·82	1·73
1899	3,238	2,593	5,831	2	—	2	0·62	—	0·34
1900	3,551	2,759	6,310	4	—	4	1·13	—	0·63
1901	3,678	3,022	6,700	5	—	5	1·36	—	0·75
1902	3,473	2,793	6,266	4	—	4	1·15	—	0·64
1903	3,440	2,706	6,146	5	—	5	1·45	—	0·81
1904	3,508	2,717	6,225	7	1	8	2·00	0·37	1·29
1905	3,508	2,770	6,278	13	1	14	3·71	0·36	2·23
1906	3,861	3,274	7,135	14	1	15	3·63	0·31	2·10
1907	4,595	3,958	8,553	11	2	13	2·39	0·51	1·52
1908	4,319	3,963	8,282	12	1	13	2·78	0·25	1·57
1909	4,187	3,460	7,647	14	3	17	3·34	0·87	2·22

TABLE XI. showing the Number of PERSONS INJURED by NON-FATAL ACCIDENTS during the Years 1895–1909.

PLACE OR CAUSE OF ACCIDENT.	Year.															Average, 15 years.
	1895.	1896.	1897.	1898.	1899.	1900.	1901.	1902.	1903.	1904.	1905.	1906.	1907.	1908.	1909.	
Explosions of Firedamp	4	6	1	1	—	—	—	—	—	1	2	1	4	3	1	1·6
Falls of Ground	66	64	72	74	72	58	54	49	55	44	43	48	58	52	50	57·3
Shaft Accidents:—																
Overwinding	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	·07
Ropes or Chains breaking	2	1	—	—	—	—	1	—	—	—	—	1	1	—	2	·5
Whilst ascending or descending by Machinery.	2	5	4	4	3	2	4	6	—	3	3	2	2	3	1	2·9
Falling into Shaft from Surface.	1	—	—	—	—	—	—	—	—	2	—	—	—	6	3	4·6
Falling from part way down	1	3	4	5	8	3	5	1	5	6	1	5	10			
Things falling into Shaft from Surface.	—	—	—	—	1	1	1	—	1	1	2	—	—	4	2	3·2
Things falling from part way down.	4	4	5	3	2	5	—	1	1	4	1	1	4			
Miscellaneous	—	3	3	2	5	3	3	7	4	7	4	2	5	5	2	3·7
Total	11	16	16	14	19	14	14	15	11	23	11	11	22	18	10	15·0

TABLE XI. showing the Number of PERSONS INJURED by NON-FATAL ACCIDENTS, &c.—*continued.*

PLACE OR CAUSE OF ACCIDENT.	Year. 1895.	1896.	1897.	1898.	1899.	1900.	1901.	1902.	1903.	1904.	1905.	1906.	1907.	1908.	1909.	Average 15 years.
Miscellaneous Underground :—																
By Explosives	29	27	33	45	25	25	23	24	30	28	29	25	26	18	24	27·4
Suffocation by Natural Gases	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
By Underground Fires	—	—	4	—	2	—	—	—	—	—	—	—	4	—	—	·7
Irruptions of Water	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Haulage :—																
(*a*) Ropes or Chains breaking.	—	3	1	1	1	—	—	2	—	—	—	1	—	1	1	·7
(*b*) Run over or crushed by Trams and Tubs.	11	21	7	9	15	14	14	11	4	4	6	10	13	8	14	10·7
(*c*) Other Haulage Accidents.	—	1	4	1	4	1	3	9	8	5	6	5	5	5	5	4·1
Electricity*	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1	·07
By Machinery	11	12	14	11	9	18	11	11	12	13	14	14	10	7	9	11·7
Sundries	51	76	60	74	82	73	56	65	67	73	76	51	81	72	72	68·6
Total	102	140	123	141	138	131	107	122	121	123	131	106	139	111	126	124·1
Total Underground	183	226	212	230	229	203	175	186	187	191	187	166	223	184	187	198·0
On Surface :—																
By Machinery	17	25	18	27	28	22	22	16	21	16	17	14	20	14	18	19·7
Boiler Explosions	—	2	—	—	4	1	1	—	1	—	—	—	2	—	—	·7
On Railways, Sidings, or Tramways.	7	13	18	17	16	15	11	13	10	12	16	10	16	8	14	13·1
Electricity*	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1	·07
Miscellaneous	25	61	60	61	85	53	48	39	47	27	45	33	46	53	52	49·0
Total on Surface	49	101	96	105	133	91	82	68	79	55	78	57	84	75	85	82·5
Gross Total	232	327	308	335	362	294	257	254	266	246	265	223	307	259	272	280·5

* The heading "Electricity" did not appear in the classification previous to the year 1907.

TABLE XII. showing the NON-FATAL ACCIDENTS and the Number of PERSONS DISABLED for more than Seven Days at METALLIFEROUS MINES during the Years 1908 and 1909.

PLACE OR CAUSE OF ACCIDENT.	Accidents. Year. 1908.	1909.	Persons Injured. Year. 1908.	1909.
Explosion of Fire-damp	1	1	3	1
Falls of Ground	233	188	235	191
Shaft Accidents :—				
Overwinding	—	—	—	—
Ropes or Chains breaking.	1	1	1	1
Whilst ascending or descending by Machinery.	3	4	10	4
Failing down Shaft	5	12	5	12
Things falling down Shaft.	23	9	24	9
Miscellaneous	61	28	61	28
Total	93	54	101	54
Miscellaneous Underground :—				
By Explosives	16	24	17	32
Suffocation by Natural Gases.	—	—	—	—
By Underground Fires	—	—	—	—
Irruptions of Water	—	—	—	—

PLACE OR CAUSE OF ACCIDENT.	Accidents. Year. 1908.	1909.	Persons Injured. Year. 1908.	1909.
Miscellaneous Underground—*continued.*				
Haulage :—				
Ropes or Chains breaking.	2	1	2	1
Run over or crushed by Trams and Tubs.	52	63	52	63
Other Haulage Accidents.	100	79	100	79
Electricity	1	1	1	1
By Machinery	24	25	24	25
Sundries	505	640	509	644
Total	700	833	705	845
Total Underground	1,027	1,076	1,044	1,091
On Surface :—				
By Machinery	32	30	32	30
Boiler Explosions	1	—	1	—
On Railways, Sidings, or Tramways.	57	55	57	55
Electricity	1	1	1	1
Miscellaneous	272	257	272	257
Total on Surface	363	343	363	343
Gross Total	1,390	1,419	1,407	1,434

TABLE XIII. showing the NUMBER of PERSONS DISABLED for more than Seven Days by ACCIDENTS at METALLIFEROUS MINES during the Years 1908 and 1909, arranged according to PERIOD of DISABLEMENT.

Year.	8 days.	9 days.	10 days.	11 days.	12 days.	13 days.	2 and under 3 weeks.	3 and under 4 weeks.	4 and under 13 weeks.	13 and under 26 weeks.	26 and under 39 weeks.	39 weeks and over.	Not recovered at end of year.	Left Mine.	Total.
1908	32	50	43	36	68	29	313	212	429	55	9	4	123	4	1,407
1909	27	33	50	47	59	12	362	215	454	53	8	—	112	2	1,434

TABLE XIV. showing DIFFERENCES between the COAL MINES REGULATION ACTS and the METALLIFEROUS MINES REGULATION ACTS.

Coal Mines Regulation Act.	Metalliferous Mines Regulation Act.	Remarks.
Sections 4–6 (employment of boys, girls, and women underground).	Sections 4–5	Same, except as to proviso in Section 5 (1) of Metalliferous Mines. ? necessary to retain.
Section 7 (employment of boys, girls, and women aboveground).	- - - -	Factory Act applies to surface of Metalliferous Mines.
Section 8 (register)	Section 6	Minor differences.
	Section 7	*Cf.* General Rule 24 of Coal Mines, which differs in making 22 the age for raising and lowering men, and requiring constant attendance.
Section 9 (and section 64) (penalties)	Section 8	Same; one small difference.
[Section 10—payment of school fees out of wages].	- - - -	Obsolete.
Section 11 (payment of wages at public houses).	Section 9	Same.
Sections 12–14 (payment by weight and checkweighing). Acts of 1894 and 1905.	——	——
Section 15 (inspection of weights and measures).	- - - -	Section 117 of Factory and Workshop Act applies, except in "men's workshops."
Sections 16–18 (provision of two shafts)	——	——
Section 19 (division of mine into parts)	——	——
Section 20 (mine to be under certificated manager).	——	——
Section 21 (daily personal supervision by manager or undermanager).	——	——
Sections 22–32 (grant of certificates, &c.) Act of 1903.	——	——
Section 33 (annual returns)	[Section 10] Act of 1875.	(Different. Power to require further information, *e.g.*, as to percentage of metal in the mineral, value, amount of explosives used. Metalliferous Mines not subject to limitation in Coal Mines as to not publishing output of individual mines. ? as to barmaster provisions.)
Section 34 (plan of mine). Act of 1896, section 3.	Section 19	Different.
Section 35 (notice of accidents)	Section 11	Notice of Accidents Act, 1906, has made the provision the same in both cases — except that no provision in Metalliferous Mines as leaving place of accident untouched.
Section 36 (notice of opening, abandonment, &c.).	Section 12	Same. (Coal Mines applies to seams also; ? not appropriate in case of Metalliferous Mines) except that mines employing 12 or less below ground exempted in Metalliferous Mines.
Section 37 (fencing of abandoned mines)	Section 13	Same, except as regards mines abandoned before 10th August 1872; and subsections (3) and (4) of Coal Mines.
Section 38 (plans of abandoned mines). Section 4 of Act of 1896.	Section 14	Different. No power to obtain order for inspecting or copying plans as appears in 1896, Section 4 (2). ? Include mines employing 12 or less. Proceedings have to be taken within three months of the default. Extend provisions in Coal Mines allowing proceedings six months after notice.

TABLE XIV. showing DIFFERENCES between the COAL MINES REGULATION ACTS and the METALLIFEROUS MINES REGULATION ACTS—*continued.*

Coal Mines Regulation Act.	Metalliferous Mines Regulation Act.	Remarks.
Sections 39–41 (inspectors)	Sections 15–17	"Welsh speaking" in coal mines.
Section 42 (notice of danger not provided against).	Section 18	Same.
Sections 43–44 and 46 (reports by inspectors).	Section 20	——
Section 45 (formal investigation of accidents).	——	——
Section 47 (arbitration procedure). Act of 1896, section 2.	Section 21	Same, except for minor differences, and no provision in Metalliferous Mines as to representation of workmen.
Section 48 (coroners)	Section 22	Same, generally, except as to power to relatives, &c. to attend and take part.
Sections 49–50 (general rules). Act of 1896, section 5.	Section 23	——
Sections 51–56 (special rules)	Sections 24–27, 30	Same, except that special rules not required by Act for every Metalliferous Mine.
Sections 57–58 (posting of abstract and rules).	Sections 28–29	Same.
Sections 59–70 (legal proceedings)	Sections 31–38	Extend to Metalliferous Mines section 66 (report of result of proceedings against workmen) and section 69 (owners, &c. not to act as Justices).
Sections 71–77 (miscellaneous) Sections 78–84 (transitory and repeal)	Sections 39–45	Section 9 of Factory Act wider than section 74 of Coal Mines.
Act of 1896, section 6 (power to prohibit explosives).	——	——
Act of 1908. (8 hours)	——	——

APPENDIX B.

QUARRIES.

TABLE I. showing the NUMBER of PERSONS EMPLOYED and OUTPUT of MINERALS at QUARRIES under the QUARRIES ACT, 1894, from 1895 to 1909.

Year.	Persons Employed.			Output.
	Inside.	Outside.	Total.	
				Tons.
1895	53,915	50,710	104,625	29,911,070
1896	56,123	56,706	112,829	35,079,118
1897	58,845	64,525	123,370	37,378,108
1898	62,752	71,726	134,478	41,709,179
1899	64,159	33,836	97,995	43,451,973
1900	60,631	33,264	93,895	41,071,605
1901	59,968	34,220	94,188	40,701,869
1902	62,429	34,679	97,108	44,230,894
1903	62,921	35,234	98,155	45,600,775
1904	62,249	35,328	97,577	45,701,818
Averages for 10 years	60,399	45,023	105,422	40,483,641

Year.	Persons Employed.			Output.
	Inside.	Outside.	Total.	
				Tons.
1905	59,978	34,841	94,819	46,144,912
1906	58,385	33,131	91,516	46,985,443
1907	55,894	31,920	87,814	46,481,407
1908	54,449	31,026	85,475	44,732,016
1909	53,064	30,873	83,937	44,614,931

TABLE II. showing the QUANTITY of each KIND of MINERAL obtained from QUARRIES under the

Kind of Mineral.	Year.					
	1895.	1896.	1897.	1898.	1899.	1900.
	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.
Barium (compounds)	600	700	1,000	1,050	1,000	2,000
Chalk	2,922,619	3,557,408	3,856,237	4,296,136	4,673,574	4,363,207
Chert, Flint, Jasper, &c.	91,590	105,679	91,547	79,744	66,305	73,972
Clays, other than China Clay	7,261,100	8,537,327	9,270,370	11,205,897	11,299,738	10,299,482
China Clay			477,193	483,499	503,735	552,384
China Stone			59,713	59,725	57,737	61,204
Coal	8,800	9,309	10,735	12,273	9,413	11,137
Diatomite	—	—	—	—	—	—
Fluor Spar	—	—	40	—	50	35
Gravel and Sand	1,008,359	1,258,964	1,349,217	1,590,134	1,740,085	1,807,961
Gypsum	59,479	73,781	64,334	61,833	54,237	55,318
Igneous Rocks	3,453,692	3,956,863	4,120,352	4,378,868	4,613,464	4,536,603
Ironstone	1,790,429	2,613,271	2,628,559	2,759,490	3,408,755	2,933,562
Lead Ore	—	582	256	306	9	25
Limestone, other than Chalk	8,989,485	10,387,641	10,436,711	11,386,320	11,681,579	11,287,930
Mica	—	—	4,983	907	650	—
Phosphate of Lime	—	—	—	—	21	20
Ochre and Umber	2,649	6,383	11,310	16,877	12,258	10,930
Oil Shale	—	—	—	—	—	—
Sandstone, Quartzite, &c.	3,892,824	4,156,328	4,565,237	4,883,637	4,867,625	4,655,894
Slate	429,419	414,862	430,186	491,195	461,242	419,645
Sulphate of Strontia	—	—	100	1,242	475	257
Tin Ore (dressed)	25	20	28	46	21	39
Total	29,911,070	35,079,118	37,378,108	41,709,179	43,451,973	41,071,605

TABLE III. PERSONS EMPLOYED in and about QUARRIES according to MINERAL WORKED during the years 1908 and 1909.

Kind of Mineral, and Output of County where *chiefly* Worked.	Year 1908. — Tons.	Year 1909. — Tons.	Number of Persons Employed.					
			1908.			1909.		
			Inside.	Outside.	Total.	Inside.	Outside.	Total.
Chalk			1,897	613	2,510	1,714	478	2,192
Kent	2,534,476	2,602,495						
Essex	611,026	577,160						
Cambridge	251,820	239,872						
Sussex	210,086	201,479						
Clay and brick earth			9,335	2,507	11,842	9,288	2,849	12,137
Lancaster	1,164,496	1,161,766						
York	1,037,198	1,056,592						
Stafford	976,195	972,391						
Cornwall	755,582	730,872						
Huntingdon	551,613	545,862						
Warwick	570,303	552,133						
Igneous rocks			10,914	6,578	17,492	11,089	6,655	17,744
Leicester	1,265,893	1,246,394						
Carnarvon	624,834	654,522						
Salop	374,261	387,954						
Cornwall	296,327	275,111						
Pembroke	258,170	317,917						
Iron ore			3,501	700	4,201	3,234	609	3,843
Northampton	2,235,100	2,327,410						
Lincoln	1,941,120	1,827,195						
Leicester	528,194	514,896						
Limestone, other than chalk			12,400	4,761	17,161	12,345	4,732	17,077
Durham	1,972,780	2,035,811						
Derby	1,722,798	1,882,704						
York	1,074,070	1,071,104						
Somerset	508,361	488,194						

QUARRIES ACT, 1894 (*i.e.*, all Quarries more than 20 feet deep), in each of the Years 1895–1909 inclusive.

Year.								
1901.	1902.	1903.	1904.	1905.	1906.	1907.	1908.	1909.
Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.
1,200	700	600	738	706	719	1,334	1,656	1,657
4,323,780	4,387,007	4,463,089	4,433,406	4,527,695	4,746,408	4,777,622	4,260,736	4,435,891
127,591	96,415	69,491	61,163	65,622	63,297	48,292	57,536	47,153
10,508,369	11,435,793	12,202,532	11,873,183	11,192,172	11,245,646	10,729,578	10,384,651	10,196,775
517,568	546,014	546,392	583,984	629,160	656,017	714,437	721,416	710,380
59,923	57,882	53,680	66,994	52,171	57,174	68,174	75,473	56,028
9,705	10,171	10,174	16,138	16,259	14,114	18,110	15,783	14,982
—	—	—	—	—	—	150	450	240
50	1,317	1,214	1,271	1,448	1,995	4,653	9,703	14,906
1,947,066	2,054,670	2,230,704	2,226,773	2,226,329	2,354,343	2,376,812	2,171,387	2,142,959
49,567	49,749	37,781	34,107	34,607	28,884	33,327	34,451	36,629
4,950,400	5,373,300	5,332,656	5,893,762	5,871,023	6,092,604	5,604,453	6,045,704	6,212,428
2,424,951	3,089,438	3,528,812	3,597,764	3,818,302	4,410,291	4,993,808	4,801,561	4,682,253
1,006	991	212	3	155	369	979	622	56
10,640,706	11,567,784	11,611,446	11,494,738	11,969,980	11,960,054	12,016,513	11,094,723	11,386,900
3,165	8,542	13,197	7,140	11,640	11,384	14,615	21,161	23,927
7	15	37	18	—	—	—	—	—
8,491	7,790	7,939	8,644	10,076	9,749	9,821	8,871	9,260
—	—	—	—	218	—	14,039	309	—
4,793,817	5,185,456	5,123,442	5,003,977	5,351,403	4,966,398	4,727,626	4,715,497	4,332,518
334,448	357,823	367,334	397,995	365,922	365,964	326,984	310,279	309,961
—	—	—	—	—	—	—	—	—
59	37	43	20	24	33	80	47	28
40,701,869	44,230,894	45,600,775	45,701,818	46,144,912	46,985,443	46,481,407	44,732,016	44,614,931

TABLE III. PERSONS EMPLOYED in and about QUARRIES according to MINERAL WORKED during the years 1908 and 1909—*continued*.

Kind of Mineral, and Output of County where *chiefly* worked.	Year 1908. Tons.	Year 1909. Tons.	Number of Persons Employed. 1908. Inside.	1908. Outside.	1908. Total.	1909. Inside.	1909. Outside.	1909. Total.
Sandstone			9,954	9,243	19,197	9,316	9,196	18,512
Lancaster	698,227	609,693						
York	687,744	736,005						
Glamorgan	636,908	650,290						
Derby	396,357	290,991						
Monmouth	396,099	327,742						
Slate			4,188	5,972	10,160	4,006	5,835	9,841
Carnarvon	211,968	211,694						
Cornwall	19,297	20,584						
Argyll	16,094	13,259						
Devon	4,345	6,756						
Lancaster	15,933	15,660						
Cumberland	2,590	3,241						
Westmorland	1,466	769						
Merioneth	5,307	5,146						
Pembroke	5,310	5,164						
Perth	5,079	5,246						
Carmarthen	1,631	1,527						
Tipperary	3,207	3,416						
Other rocks and minerals			2,260	652	2,912	2,072	519	2,591
Mainly gravel and sand, gypsum, flint, &c.								
Gravel and sand in Bedford, Hertford, Kent, Nottingham, Stafford, and Lanark.								
Gypsum—Nottingham, Somerset, and Westmorland.								
Total			54,449	31,026	85,475	53,064	30,873	83,937

TABLE IV. showing the COUNTIES in which the PRINCIPAL QUARRIES are situated and the TOTAL NUMBER of PERSONS EMPLOYED in each COUNTY during the years 1908 and 1909.

	The Number of Persons Employed at *all* the Quarries in the County.					
	1908.			1909.		
	Inside.	Outside.	Total.	Inside.	Outside.	Total.
England:—						
Cornwall.—China clay and china stone, granite, and slate.	3,916	2,180	6,096	3,808	2,174	5,982
Devon.—China clay, china stone, limestone, igneous rock, and clay.	1,239	754	1,993	1,272	799	2,071
Derby.—Clay, limestone, and sandstone	2,606	1,219	3,825	2,467	1,375	3,842
Durham.—Limestone, clay, and whinstone	2,585	654	3,239	2,467	657	3,124
Kent.—Chalk, clay, and gravel	1,382	483	1,865	1,341	366	1,707
Lancaster.—Clay, limestone, sandstone	2,855	2,252	5,107	2,549	2,117	4,666
Leicester.—Igneous rock, ironstone, and clay	2,614	1,442	4,056	2,595	1,445	4,040
Lincoln.—Ironstone	1,513	232	1,745	1,560	215	1,775
Northampton.—Ironstone	2,278	495	2,773	2,208	478	2,686
Northumberland.—Igneous rocks	1,069	561	1,630	1,031	454	1,485
Stafford.—Clay, igneous rocks, and limestone	1,518	686	2,204	1,551	656	2,207
York.—Clay, limestone, and sandstone	3,624	4,500	8,124	3,683	4,552	8,235
Wales:—						
Carnarvon.—Slate, limestone, igneous rock. (The slate *mines* are chiefly in Merioneth).	4,793	5,365	10,158	4,790	5,379	10,169
Glamorgan.—Sandstone, limestone, clay	1,765	327	2,092	1,742	334	2,076
Scotland:—						
Aberdeen.—Granite	538	612	1,150	536	541	1,077
Argyll.—Granite and slate	580	532	1,112	446	565	1,011
Ireland:—						
Antrim.—Limestone, igneous rocks, and clay	520	194	714	486	212	698
Down.—Granite and other igneous rocks	221	177	398	184	177	361
Tipperary.—Slate and limestone	260	139	399	231	140	371
Wicklow.—Granite	138	140	278	165	110	275

TABLE V. showing the NUMBER of DEATHS from different causes of ACCIDENTS at QUARRIES under the QUARRIES ACT, 1894, from 1895 to 1909.

Year.	Inside the Quarries.					Outside the Quarries.	Gross Total.
	Falls of Ground.	By Blasting.	During Descent or Ascent.	Miscellaneous.	Total Inside.		
1895*	43	8	1	30	82	20	102
1896	43	10	2	35	90	34	124
1897	51	13	4	25	93	30	123
1898	44	10	2	44	100	34	134
1899†	44	8	2	44	98	19	117
1900	53	13	4	45	115	12	127
1901	39	15	3	29	86	12	98
1902	44	16	3	40	103	16	119
1903	44	8	1	31	84	11	95
1904	38	11	3	44	96	16	112
Averages for 10 years	44	11	2	37	95	20	115
1905	33	15	1	36	85	14	99
1906	39	11	1	34	85	12	97
1907	36	14	—	25	75	14	89
1908	40	10	—	26	76	16	92
1909	32	10	1	30	73	11	84

DEATH-RATES from different causes of ACCIDENTS per 1,000 PERSONS EMPLOYED at QUARRIES under the QUARRIES ACT, 1894, from 1895 to 1908.

Year.	Employed inside the Quarries.					Employed outside the Quarries.	Gross Total.
	Falls of Ground.	By Blasting.	During Descent or Ascent.	Miscellaneous.	Total Inside.		
1895*	·80	·15	·02	·56	1·52	·39	·97
1896	·77	·18	·04	·62	1·60	·60	1·10
1897	·87	·22	·07	·42	1·58	·46	1·00
1898	·70	·16	·03	·70	1·59	·47	1·00
1899†	·69	·12	·03	·69	1·53	·56	1·19
1900	·88	·21	·07	·74	1·90	·36	1·35
1901	·65	·25	·05	·48	1·43	·35	1·04
1902	·70	·26	·05	·64	1·65	·46	1·23
1903	·70	·13	·02	·49	1·34	·31	·97
1904	·61	·18	·05	·71	1·54	·45	1·15
Averages for 10 years	·73	·19	·04	·61	1·57	·45	1·09
1905	·55	·25	·02	·60	1·42	·40	1·04
1906	·67	·19	·02	·58	1·46	·36	1·06
1907	·64	·25	—	·45	1·34	·44	1·01
1908	·73	·18	—	·48	1·40	·52	1·08
1909	·60	·19	·02	·57	1·38	·36	1·00

* It is not certain that all deaths were reported this year.
† In this year a large number of outside workers were transferred from the jurisdiction of the Mines to the Factory Department of the Home Office.

TABLE VI. showing the NUMBER of DEATHS at QUARRIES during the Years 1895–1909.

PLACE OR CAUSE OF ACCIDENT.	Year.															Average.
	1895.	1896.	1897.	1898.	1899.	1900.	1901.	1902.	1903.	1904.	1905.	1906.	1907.	1908.	1909.	
Inside the Quarries (i.e., *inside the actual Pits, Holes, or Excavations*).																
Falls of Ground:—																
From beyond the Person's own working place.	21	9	12	16	16	16	15	14	13	17	12	14	12	5	12	13·6
From the Person's own working place.	22	34	39	28	28	37	24	30	31	21	21	25	24	35	20	27·9
Total	43	43	51	44	44	53	39	44	44	38	33	39	36	40	32	41·5
By Blasting:—																
While charging or tamping	3	4	3	6	3	6	8	9	6	3	3	4	7	5	4	4·9
From Stones projected by Shots, when persons had not taken sufficient shelter.	3	3	9	2	3	3	3	4	1	3	1	2	4	2	1	2·9
From Misfires	—	3	1	—	—	—	2	1	1	4	3	—	2	—	1	1·2
Miscellaneous	2	—	—	2	2	4	2	2	—	1	8	5	1	3	4	2·4
Total	8	10	13	10	8	13	15	16	8	11	15	11	14	10	10	11·5
During Descent or Ascent:—																
Falling from Paths, Steps, or Ladders.	1	2	3	1	2	3	3	3	—	3	1	1	—	—	1	1·6
When ascending or descending by Machinery.	—	—	1	1	—	1	—	—	—	—	—	—	—	—	—	·2
Miscellaneous	—	—	—	—	—	—	—	—	1	—	—	—	—	—	—	·1
Total	1	2	4	2	2	4	3	3	1	3	1	1	—	—	1	1·9

Place or Cause of Accident.	Year.															Average.
	1895.	1896.	1897.	1898.	1899.	1900.	1901.	1902.	1903.	1904.	1905.	1906.	1907.	1908.	1909.	
Inside the Quarries (i.e., *inside the actual Pits, Holes, or Excavations*)—cont.																
Miscellaneous :—																
Ropes or Chains breaking	1	3	1	3	—	3	1	1	—	—	3	—	—	2	—	1·2
Machinery	6	3	1	9	3	4	—	5	6	4	3	7	3	1	2	3·8
Boiler Explosions	—	—	—	—	—	—	1	—	—	—	—	—	—	—	—	·1
On Inclined and Engine Planes.	—	—	—	1	2	—	1	1	2	3	1	—	—	1	—	·8
On Railways, Sidings, or Tramways.	3	6	8	7	8	11	4	7	2	7	5	4	1	4	3	5·3
Falling from Ledges	8	8	6	4	13	12	10	9	14	10	7	10	7	4	9	8·7
Electricity*	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Sundries	12	15	9	20	18	15	12	17	7	20	17	13	14	14	16	14·6
Total	30	35	25	44	44	45	29	40	31	44	36	34	25	26	30	34·5
Total inside Quarries	82	90	93	100	98	115	86	103	84	96	85	85	75	76	73	89·4
Outside the Quarries.																
Machinery	6	14	10	15	8	2	4	6	4	1	3	1	1	2	6	5·5
Boiler Explosions	1	2	—	—	1	—	—	—	—	—	—	—	1	—	—	·3
On Inclined and Engine Planes	1	—	3	4	—	2	1	—	—	—	2	—	2	—	—	1·0
On Railways, Sidings, or Tramways.	8	5	6	5	6	3	6	7	4	5	4	7	6	7	4	5·5
Electricity*	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Miscellaneous	4	13	11	10	4	5	1	3	3	10	5	4	4	7	1	5·7
Total outside Quarries	20	34	30	34	19	12	12	16	11	16	14	12	14	16	11	18·1
Gross Total	102	124	123	134	117	127	98	119	95	112	99	97	89	92	84	107·5

* The heading "Electricity" did not appear in the classification previous to the year 1907.

Table VII. showing the Number of Persons Injured at Quarries during the Years 1895–1909.

Place or Cause of Accident.	Year.															Average for 15 years.
	1895.	1896.	1897.	1898.	1899.	1900.	1901.	1902.	1903.	1904.	1905.	1906.	1907.	1908.	1909.	
Inside the Quarries (i.e., *inside the actual Pits, Holes, or Excavations*).																
Falls of Ground :—																
From beyond the Person's own working place.	122	178	185	188	218	74	114	83	106	93	44	85	76	85	77	84†
From the Person's own working place.						132	126	147	153	134	151	136	193	175	177	152†
Total	122	178	185	188	218	206	240	230	259	227	195	221	269	260	254	217
By Blasting :—																
While charging or tamping.	33	36	27	25	34	32	28	40	35	45	34	56	35	33	24	34
From Stones projected by Shots, when persons had not taken sufficient shelter.	14	21	26	25	25	21	23	31	23	38	22	29	26	40	37	27
From Miss-fires	13	16	13	9	18	27	13	16	13	12	8	13	17	8	9	14
Miscellaneous	22	19	24	23	29	15	19	29	32	24	23	22	25	16	29	23
Total	82	92	90	82	106	95	83	116	103	119	87	120	103	97	99	98
During Descent or Ascent :—																
Falling from Paths, Steps, or Ladders.	—	3	11	7	8	12	12	11	15	18	6	13	9	5	6	9
When ascending or descending by machinery.	—	—	—	—	—	1	—	—	—	1	—	—	—	—	—	0·13
Miscellaneous	1	3	—	1	1	—	—	4	2	—	—	—	2	3	1	1·2
Total	1	6	11	8	9	13	12	15	17	19	6	13	11	8	7	10

Place or Cause of Accident.	Year. 1895.	1896.	1897.	1898.	1899.	1900.	1901.	1902.	1903.	1904.	1905.	1906.	1907.	1908.	1909.	Average for 15 years.
Miscellaneous :—																
Ropes or Chains breaking.	5	6	10	6	6	8	4	2	7	3	2	5	1	2	4	5
Machinery	18	36	32	37	40	40	35	35	65	35	29	28	24	25	17	33
Boiler Explosions	—	1	1	—	—	—	—	—	—	—	2	—	—	—	—	·3
On Inclined and Engine Planes.	—	—	7	12	24	9	6	15	20	12	15	13	17	16	5	11
On Railways, Sidings, or Tramways.	41	55	73	96	78	65	64	93	118	105	104	91	105	82	100	85
Falling from Ledges	38	36	42	34	57	58	53	67	59	57	38	49	89	66	49	53
Electricity*	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Sundries	121	205	210	305	380	369	379	433	517	416	466	516	595	719	661	419
Total	223	339	375	490	585	549	541	645	786	628	656	702	831	910	836	606
Total inside Quarries	428	615	661	768	918	863	876	1,006	1,165	993	944	1,056	1,214	1,275	1,196	932
Outside the Quarries.																
Machinery	80	123	169	225	72	35	38	40	48	50	42	29	26	35	23	69
Boiler Explosions	2	—	1	—	1	—	—	—	—	—	—	—	2	—	2	·5
On Inclined and Engine Planes.	4	4	10	7	4	5	7	4	4	8	2	7	9	7	2	6
On Railways, Sidings, or Tramways.	21	64	68	110	43	40	41	44	64	53	52	55	54	55	44	54
Electricity*	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Miscellaneous	40	125	217	324	129	88	103	96	145	208	187	231	186	171	161	161
Total outside Quarries	147	316	465	666	249	168	189	184	261	319	283	322	277	268	232	290
Gross Total	575	931	1,126	1,434	1,167	1,031	1,065	1,190	1,426	1,312	1,227	1,378	1,491	1,543	1,428	1,222

* The heading "Electricity" did not appear in the classification previous to the year 1907.
† Average for 10 years.

Table VIII. showing the Number of Non-fatal Accidents and the Number of Persons Disabled for more than Seven Days at Quarries during the Years 1908 and 1909.

Place or Cause of Accident.	Accidents. Year. 1908.	1909.	Persons Injured. Year. 1908.	1909.
Inside the Quarries (i.e., *inside the actual Pits, Holes, or Excavations*).				
Falls of Ground	603	526	605	529
By Explosives	87	85	102	98
During Descent or Ascent :—				
Falling from Paths, Steps, or Ladders.	35	30	35	30
When descending or ascending by Machinery.	—	2	—	2
Miscellaneous	9	21	9	21
Total	44	53	44	53
Miscellaneous :—				
Ropes or Chains breaking.	12	13	12	13
Machinery	67	43	68	43
Boiler Explosions	1	3	1	3
On Inclined and Engine Planes.	28	12	28	12
On Railways, Sidings, or Tramways.	320	394	321	394
Falling from Ledges	96	76	96	76
Electricity	—	—	—	—
Sundries	2,243	2,377	2,243	2,377
Total	2,767	2,918	2,769	2,918
Total inside Quarries	3,501	3,582	3,520	3,598
Outside the Quarries.				
Machinery	96	84	96	85
Boiler Explosions	—	1	—	1
On Inclined and Engine Planes.	10	13	10	13
On Railways, Sidings, or Tramways.	252	260	254	260
Electricity	1	—	1	—
Miscellaneous	927	899	928	899
Total outside Quarries	1,286	1,257	1,289	1,258
Gross Total	4,787	4,839	4,809	4,856

Table IX. showing the Number of Persons Disabled for more than Seven Days by Accidents at Quarries under the Quarries Act during the Years 1908 and 1909, arranged according to Period of Disablement.

Year.	8 days.	9 days.	10 days.	11 days.	12 days.	13 days.	2 and under 3 weeks.	3 and under 4 weeks.	4 and under 13 weeks.	13 and under 26 weeks.	26 and under 39 weeks.	39 weeks and over.	Not recovered at end of year.	Left Quarry.	Total.
1908	94	105	109	96	109	66	1,237	796	1,491	183	36	5	473	9	4,809
1909	45	86	132	81	76	16	1,364	822	1,562	178	32	4	445	13	4,856

TABLE X. showing the NUMBER of PERSONS EMPLOYED, DEATHS from ACCIDENTS, DEATH RATE per 1,000 PERSONS Districts of NORTH WALES, LANCASTER, CUMBERLAND and WESTMORLAND, CORNWALL.

Year.	NORTH WALES (Carnarvon, Denbigh, Merioneth, and Montgomery).									LANCASTER, CUMBERLAND and WESTMORLAND.									CORNWALL.					
	Persons Employed.			Deaths from Accidents.			Death Rate per 1,000 Persons Employed.			Persons Employed.			Deaths from Accidents.			Death Rate per 1,000 Persons Employed.			Persons Employed.			Deaths from Accidents.		
	Inside.	Outside.	Total.	Inside.	Outside.	Total.	Inside.	Outside.	Total.	Inside.	Outside.	Total.	Inside.	Outside.	Total.	Inside.	Outside.	Total.	Inside.	Outside.	Total.	Inside.	Outside.	Total.
1895	4,703	5,250	9,953	12	5	17	2·55	·95	1·71	*	*	436	—	—	—	—	—	—	*	*	441	—	1	1
1896	5,166	4,950	10,116	7	1	8	1·36	·20	·79	193	215	408	1	—	1	5·18	—	2·45	222	313	535	2	—	2
1897	3,823	5,166	8,989	13	1	14	3·40	·19	1·56	229	267	496	2	—	2	8·73	—	4·03	240	310	550	1	—	1
1898	4,678	6,198	10,876	7	3	10	1·50	·48	·92	225	243	468	2	—	2	8·89	—	4·27	221	318	539	—	—	—
1899	5,127	5,263	10,390	9	1	10	1·76	·19	·96	203	243	446	—	—	—	—	—	—	223	290	513	—	—	—
1900	4,015	5,462	9,477	4	1	5	0·98	·18	·53	194	243	437	—	—	—	—	—	—	208	307	515	1	—	1
1901	3,202	4,931	8,133	6	—	6	1·87	—	·74	205	245	450	2	—	2	9·76	—	4·44	217	282	499	1	—	1
1902	3,566	5,073	8,639	10	1	11	2·80	·20	1·27	251	272	523	—	—	—	—	—	—	217	315	532	—	—	—
1903	3,701	5,437	9,138	10	1	11	2·70	·18	1·20	252	308	560	—	—	—	—	—	—	239	315	554	—	—	—
1904	3,870	5,456	9,326	11	3	14	2·84	·55	1·50	222	310	532	—	—	—	—	—	—	231	302	533	—	—	—
1905	3,659	5,288	8,947	10	—	10	2·73	—	1·12	225	294	519	2	—	2	8·89	—	3·85	193	284	477	—	1	1
1906	3,560	5,174	8,734	2	—	2	0·56	—	·23	194	258	452	1	—	1	5·15	—	2·21	176	266	442	—	—	—
1907	3,297	5,014	8,311	8	2	10	2·43	·40	1·20	168	216	384	1	—	1	5·95	—	2·60	183	276	459	—	—	—
1908	3,212	4,844	8,056	10	1	11	3·11	·21	1·37	177	244	421	1	—	1	5·65	—	2·38	160	298	458	1	—	1
1909	3,101	4,712	7,813	7	1	8	2·26	·21	1·02	155	230	385	—	—	—	—	—	—	151	293	444	—	—	—

* Information not available.

TABLE XI.—DEATH RATES from ACCIDENTS at QUARRIES classified according to the kind of MINERAL WORKED.

Inside the Quarries.

Mineral worked.	1895.	1896.	1897.	1898.	1899.	1900.	1901.	1902.	1903.	1904.	1905.	1906.	1907.	1908.	1909.
Chalk	·89	1·46	1·65	1·88	1·52	2·56	·88	2·23	—	1·25	2·05	1·53	1·04	1·05	—
Clay and Brick-earth.	1·25	1·85	1·90	1·15	1·89	2·38	1·44	·95	·95	1·07	·92	1·35	1·04	1·50	1·08
Granite	1·03	1·59	·86	·98	1·43	1·62	·96	1·61	·92	1·50	1·10	1·58	·75	1·19	1·08
Igneous rocks (except Granite).	·43	·88	1·36	·81											
Iron ore	—	1·89	1·09	—	·48	1·01	·53	·46	—	—	—	·32	·84	·29	·62
Limestone (other than Chalk).	1·34	1·10	1·15	1·77	1·46	1·82	1·67	1·29	1·18	1·56	1·41	1·42	1·61	1·05	1·86
Sandstone	1·78	2·23	1·41	2·21	1·63	2·13	1·85	2·52	2·17	1·73	2·06	1·87	1·55	1·71	1·61
Slate	2·31	1·69	3·67	1·96	1·37	1·12	2·00	2·05	2·40	3·18	2·39	1·07	2·35	2·87	1·75
Other Rocks and Minerals.	5·54	1·52	1·38	2·07	1·54	2·26	·43	1·64	1·60	·81	·75	1·62	1·97	1·77	1·93
Total	1·52	1·60	1·58	1·59	1·53	1·90	1·43	1·65	1·34	1·54	1·42	1·46	1·34	1·40	1·38

Outside the Quarries.

Mineral worked.	1895.	1896.	1897.	1898.	1899.	1900.	1901.	1902.	1903.	1904.	1905.	1906.	1907.	1908.	1909.
Chalk	·41	·78	·29	·26	1·02	—	—	—	1·18	2·33	—	1·36	—	—	—
Clay and Brick-earth.	·21	·81	·31	·50	·71	·41	·79	·44	—	·88	·42	·45	—	—	—
Granite	·30	·30	·26	·50	·77	·60	·90	·66	·27	·27	·54	—	·45	·91	·45
Igneous rocks (except Granite).	—	—	·97	—											
Iron ore	2·70	—	3·72	—	—	—	—	—	—	—	—	—	—	1·43	—
Limestone (other than Chalk).	·38	—	·18	·64	·59	·19	·38	·58	·37	·72	·18	·41	·42	·63	·42
Sandstone	·22	·42	·90	·48	·63	·48	·09	·51	·34	·26	·64	·66	·50	·54	·43
Slate	·77	·16	·15	·39	·15	·15	—	·16	·15	·43	·15	—	·32	·17	·34
Other Rocks and Minerals.	12·24	2·14	4·09	2·29	—	—	—	—	2·17	—	—	1·99	3·71	—	—
Total	·39	·60	·46	·47	·56	·36	·35	·46	·31	·45	·40	·36	·44	·52	·36

EMPLOYED, INSIDE and OUTSIDE, respectively, the SLATE QUARRIES under the QUARRIES ACT, 1894, in the ARGYLL, and PERTH, and the UNITED KINGDOM, during the Years 1895–1909 inclusive.

CORNWALL.			ARGYLL and PERTH.									UNITED KINGDOM.									Year.
Death Rate per 1,000 Persons Employed.			Persons Employed.			Deaths from Accidents.			Death Rate per 1,000 Persons Employed.			Persons Employed.			Deaths from Accidents.			Death Rate per 1,000 Persons Employed.			
Inside.	Outside.	Total.	Inside.	Outside.	Total.	Inside.	Outside.	Total.	Inside.	Outside.	Total.	Inside.	Outside.	Total.	Inside.	Outside.	Total.	Inside.	Outside.	Total.	
—	*	2·27	*	*	1,074	—	1	1	—	*	·93	6,057	6,506	12,563	14	5	19	2·31	·77	1·51	1895
9·01	—	3·74	691	493	1,094	—	—	—	—	—	—	6,500	6,298	12,798	11	1	12	1·69	·16	·94	1896
4·17	—	1·82	554	527	1,081	3	—	3	5·42	—	2·78	5,175	6,604	11,779	19	1	20	3·67	·15	1·70	1897
—	—	—	606	513	1,119	—	—	—	—	—	—	6,120	7,629	13,749	11	3	14	1·96	·39	1·09	1898
—	—	—	575	522	1,097	—	—	—	—	—	—	6,592	6,680	13,272	9	1	10	1·37	·15	·75	1899
4·81	—	1·94	528	491	1,019	—	—	—	—	—	—	5,377	6,862	12,239	6	1	7	1·12	·15	·57	1900
4·61	—	2·09	494	453	947	—	—	—	—	—	—	4,506	6,215	10,721	9	—	9	2·00	—	·84	1901
—	—	—	472	444	916	—	—	—	—	—	—	4,867	6,405	11,272	10	1	11	2·05	·16	·98	1902
—	—	—	406	390	796	2	—	2	4·93	—	2·51	4,999	6,778	11,777	12	1	13	2·40	·15	1·10	1903
—	—	—	602	493	1,095	—	—	—	—	—	—	5,340	6,925	12,265	17	3	20	3·18	·43	1·63	1904
—	3·52	2·10	563	446	1,009	—	—	—	—	—	—	5,013	6,646	11,659	12	1	13	2·39	·15	1·12	1905
—	—	—	412	343	755	1	—	1	2·43	—	1·32	4,680	6,345	11,025	5	—	5	1·07	—	·45	1906
—	—	—	312	432	744	—	—	—	—	—	—	4,263	6,197	10,460	10	2	12	2·35	·32	1·15	1907
6·25	—	2·18	407	346	753	—	—	—	—	—	—	4,188	5,972	10,160	12	1	13	2·87	·17	1·28	1908
—	—	—	353	350	703	—	—	—	—	—	—	4,086	5,835	9,811	7	2	9	1·75	·34	·91	1909

* Information not available.

TABLE XI.—DEATH RATES from ACCIDENTS at QUARRIES classified according to the kind of MINERAL WORKED—*continued.*

Inside and Outside the Quarries.

Mineral worked.	1895.	1896.	1897.	1898.	1899.	1900.	1901.	1902.	1903.	1904.	1905.	1906.	1907.	1908.	1909
Chalk	·56	·95	·65	·67	1·38	1·87	·63	1·66	·32	1·53	1·48	1·49	·80	·80	—
Clay and Brick-earth.	·49	1·09	·71	·66	1·65	1·98	1·30	·86	·78	1·03	·82	1·18	·83	1·18	·82
Granite	·73	1·03	·59	·77	} 1·20	1·25	·93	1·25	·67	1·03	·89	·98	·63	1·09	8·5
Igneous rocks (except Granite).	·33	·67	1·26	·59											
Iron ore	·66	1·39	1·69	—	·43	·91	·48	·40	—	—	—	·26	·71	·48	5·2
Limestone (other than Chalk).	1·06	·79	·86	1·41	1·23	1·38	1·30	1·10	·96	1·32	1·04	1·15	1·29	·93	1·46
Sandstone	1·15	1·47	1·20	1·49	1·19	1·41	1·07	1·60	1·34	1·04	1·40	1·29	1·01	1·15	1·63
Slate	1·51	·94	1·70	1·09	·75	·57	·84	·98	1·10	1·63	1·12	·45	1·15	1·28	·91
Other Rocks and Minerals.	6·42	1·84	1·88	2·13	1·22	1·81	·36	1·38	1·69	·69	·64	1·68	2·27	1·37	1·54
Total	·97	1·10	1·00	1·00	1·19	1·35	1·04	1·23	·97	1·15	1·04	1·06	1·01	1·08	1·00

TABLE XII. showing the NUMBER of QUARRIES at WORK in 1909 and the NUMBER of QUARRIES where SPECIAL RULES have been ESTABLISHED.

District.	Number of Quarries at work.	Number of Quarries with Special Rules established (including some which did *not* work in 1909.)
East Scotland	724	208
West Scotland	299	318
Newcastle	370	104
Durham	210	83
York and Lincoln	647	264
Manchester and Ireland	972	329
Liverpool and North Wales	390	376
Midland	817	365
Stafford	617	289
Cardiff	207	147
Swansea	232	178
Southern	1,647	1,133
Total	7,132	3,794

TABLE XIII.—OUTPUT of the CHIEF PRODUCTS of OPEN WORKINGS (not under the QUARRIES ACT) during the Years 1895–1909.

Year.	Iron Ore.	Sulphate of Strontia.	Bog Ore.	Gypsum.	Coal.
	Tons.	Tons.	Tons.	Tons.	Tons.
1895	1,464,625	12,273	5,652	—	—
1896	993,307	18,042	6,652	—	—
1897	1,149,379	14,887	7,124	—	—
1898	1,349,302	11,699	5,418	—	—
1899	1,320,911	12,154	4,321	—	—
1900	1,563,354	8,864	4,153	—	—
1901	1,329,296	16,651	2,606	—	—
1902	1,421,845	32,281	4,905	4,724	—
1903	1,108,449	22,842	4,090	5,136	—
1904	1,014,930	18,169	4,543	4,233	350
1905	1,143,153	14,294	3,205	3,956	1,527
1906	1,055,820	14,112	5,425	—	2,705
1907	698,732	10,745	6,290	3,271	—
1908	789,181	16,469	4,295	2,368	798
1909	583,642	14,042	2,676	1,405	768

APPENDIX C.

TAKEN OUT FOR THE FORMER NUMBER 14 (PURELY A METALLIFEROUS MINING) DISTRICT DOWN TO 1892: COMPRISING CORNWALL, DEVON, DORSET, AND PART OF SOMERSET.

No. 14 District.	Persons employed.			Falls.		Shafts.		Explosives.		Irruptions of Water.		Miscellaneous Underground.		Total Underground.		Surface.		Total Below and Above-ground.	
	Under-ground.	Above-ground.	Total.	Falls.	Death Rate per 1,000 employed Under-ground.	Deaths.	Death Rate per 1,000 employed Under-ground.	Deaths.	Death Rate per 1,000 employed Under-ground.	Deaths.	Death Rate per 1,000 employed Under-ground.	Deaths.	Death Rate.	Deaths.	Death Rate.	Deaths.	Death Rate per 1,000 employed Above-ground.	Deaths.	Death Rate.
1873	15,718	14,286	30,004	10	·64	19	1·21	5	·32	—	—	11	·70	45	2·86	15	1·05	60	2·00
1874	13,316	11,976	25,292	16	1·20	20	1·50	4	·30	—	—	4	·30	44	3·30	7	·58	51	2·01
1875	11,968	10,552	22,520	7	·58	16	1·34	4	·33	3	·25	8	·67	38	3·17	8	·76	46	2·04
1876	11,085	10,153	21,238	7	·63	5	·45	2	·18	—	—	3	·27	17	1·54	4	·39	21	·98
1877	10,328	9,653	19,981	13	1·26	9	·87	3	·29	—	—	3	·29	28	2·71	2	·21	30	1·50
1878	8,160	7,824	15,984	7	·86	4	·49	4	·49	—	—	2	·25	17	2·08	5	·64	22	1·37
1879	7,477	6,762	14,239	5	·67	5	·67	1	·13	1	·13	1	·13	13	1·74	3	·44	16	1·12
Total	78,052	71,206	149,258	65	·83	78	1·00	23	·29	4	·05	32	·41	202	2·59	44	·62	246	1·65
1880	8,553	7,581	16,134	9	1·05	11	1·29	3	·35	3	·35	1	·12	27	3·16	3	·40	30	1·86
1881	9,734	8,601	18,335	6	·62	6	·62	2	·21	8	·82	3	·31	25	2·57	2	·23	27	1·47
1882	9,950	8,793	18,743	5	·50	11	1·11	6	·60	—	—	4	·40	26	2·61	5	·57	31	1·65
1883	9,089	7,738	16,827	9	·99	19	2·09	3	·33	2	·22	3	·33	36	3·96	4	·52	40	2·37
1884	7,942	7,046	14,988	2	·25	5	·63	5	·63	—	—	3	·38	15	1·89	2	·28	17	1·13
1885	7,575	6,664	14,239	4	·53	6	·79	3	·40	—	—	4	·53	17	2·24	1	·15	18	1·26
1886	7,047	6,320	13,367	2	·28	8	1·14	5	·71	—	—	6	·85	21	2·98	4	·63	25	1·87
1887	6,801	6,156	12,957	2	·29	7	1·03	2	·29	—	—	3	·44	14	2·06	—	—	14	1·08
1888	7,243	6,496	13,739	7	·97	9	1·24	4	·55	—	—	2	·28	22	3·04	2	·31	24	1·74
1889	6,969	6,495	13,464	9	1·29	8	1·15	4	·57	—	—	—	—	21	3·01	2	·31	23	1·70
Total	80,903	71,890	152,793	55	·68	90	1·11	37	·46	13	·16	29	·36	224	2·77	25	·35	249	1·63

1890	6,783	6,162	12,945	3	·44	5	·74	1	·15	—	—	—	—	9	1·33	3	49	12	·92
1891	6,156	5,893	12,049	6	·97	9	1·46	—	—	2	·32	2	·32	19	3·09	3	·51	22	1·80
1892	5,932	5,538	11,470	1	·17	—	—	1	·17	—	—	6	1·01	8	1·35	3	·54	11	·96
1893	5,634	5,198	10,832	10	1·77	6	1·06	—	—	20	3·55	1	·18	37	6·57	1	·19	38	3·51
1894	5,017	4,815	9,832	1	·20	3	·60	2	·40	—	—	1	·20	7	1·40	2	·42	9	·92
1895	4,387	4,257	8,644	3	·68	5	1·14	2	·46	—	—	3	·68	13	2·96	1	·23	14	1·62
1896	3,595	3,520	7,115	4	1·11	4	1·11	—	—	—	—	—	—	8	2·22	1	·28	9	1·26
1897	3,569	3,299	6,868	—	—	1	·28	3	·84	—	—	—	—	4	1·12	1	·30	5	·73
1898	3,332	3,051	6,383	6	1·80	1	·30	1	·30	—	—	1	·30	9	2·70	2	·66	11	1·72
1899	3,786	3,205	6,991	3	·79	2	·53	1	·26	—	—	1	·26	7	1·85	—	—	7	1·00
Total	48,191	44,938	93,129	37	·77	36	·75	11	·23	22	·46	15	·31	121	2·51	17	·38	138	1·48
1900	4,086	3,461	7,547	1	·24	4	·98	—	—	—	—	—	—	5	1·22	2	·58	7	·93
1901	4,266	3,557	7,823	3	·70	2	·47	1	·23	—	—	—	—	6	1·41	—	—	6	·77
1902	3,851	3,059	6,910	4	1·04	1	·26	—	—	—	—	—	—	5	1·30	—	—	5	·71
1903	3,837	2,948	6,785	2	·52	1	·26	—	—	—	—	2	·52	5	1·30	—	—	5	·74
1904	3,976	2,965	6,941	3	·75	4	1·01	1	·25	—	—	1	·25	9	2·26	1	·34	10	1·44
1905	3,967	3,050	7,017	9	2·27	4	1·01	—	—	—	—	3	·76	16	4·03	1	·33	17	2·42
1906	4,400	3,655	8,055	5	1·14	4	·91	3	·68	—	—	3	·68	15	3·41	2	·55	17	2·11
1907	5,257	4,409	9,666	3	·57	4	·76	1	·19	—	—	3	·57	11	2·09	2	·45	13	1·34
1908	4,923	4,472	9,395	8	1·62	4	·81	—	—	—	—	2	·41	14	2·84	1	·22	15	1·60
1909	4,762	3,926	8,688	7	1·47	5	1·05	3	·63	—	—	1	·21	16	3·36	3	·76	19	2·19
Total	43,325	35,502	78,827	45	1·04	33	·76	9	·21	—	—	15	·34	102	2·35	12	·34	114	1·45

APPENDIX D.

1. Name of mine	Margaret Winder.	Ullbank	Montreal	Sir John Walsh.	Ullcoats	Kelton	Parkside	Beckermet	Lord Leconfield.	Winder Gill.	Wyndham Falcon, Gillfoot.	Moss Bay	Postle-thwaite's.	Pallaflat	Woodend	Park House.	Lonsdale	Lindows
2. Cwts. per bogey	9 cwts.	10	10	10 to 12	12	10	7 to 8	10 to 12	8	9 to 10	10	9	11	10	9	10	9	8
3. No. bogeys per ton	Must fill bogey.	4	Nett ton		5	Nett ton	3	5	5	6	6	4	5	3	4	6	5	5
4. Dynamite in use	Nobel's	Nobel's	Nobel's	Gelatine	Nobel's	Gelatine	Nobel's, Kynoch's.	Nobel's	Nobel's	Nobel's	Nobel's	Nobel's	Gelatine	Gelatine	Nobel's	Nobel's	Nobel's	Nobel's
5. Is payment stopped for gear	Every-thing.	Yes	Yes	Free to be-ginners.	Yes	Only what is lost.	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No
6. Are tins provided for dynamite	Yes	Box	Yes	Box	Box	Box	Box	Box	Box	Box	Box	Box	Box	Box	Yes	Box	Box	Box
7. No. of men riding cage	8	4	4-8	10 ride against 10.	8	8	8	8	4	4	4	8	4	8	4	10 against 10.	8	4
8. Have you Special Rules	No	No	Yes	Yes	No	Yes	?	Yes	Yes	Yes	?	Yes	Yes	No	Yes	Yes	Yes	No
9. Are your working places inspected	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
10. Can you see the reports	No	No	Yes Book.	Yes Board.	No	No	Yes	No	No	Yes	No	Yes	Yes	Yes	Yes	No	No	No
11. What signal for raising men	3/1	4/3	3/1	3/1	Bell	Bells 3/1	3/1	3/1	3/2	3	3/1/1	3/1	3/1	3/1	3/1	3/1	3/1/1	3/1
12. What signal for raising ore	1	3	1	1	Bell	Bells 1/2	1	1	2	1	1	2/1	2/1	1/1	1	1	1	1
13. Have you ambulance or stretcher	Stretcher	No	Stretcher	Stretcher	No	Yes	Stretcher	?	Stretcher	Neither	Stretcher	Stretcher	Stretcher	Stretcher	No	?	Stretcher	?
14. Have you sufficient change house accommodation.	No	No	No	No	No	No	No	Enlarging	Yes	Yes	No	No	No	Yes	No	Yes	No	No
15. Would all men change if you had	Yes	?	?	Yes	Probably	Yes	?		Yes	Yes	Probably	Perhaps	Yes	Yes	Perhaps	Might	?	No
16. Are your bargains made fortnightly	Yes	Not regular.	Yes	Yes	Yes	Daily	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
17. Have you enginemen on every shift	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
18. What takes the place of a closet in the mine	Gutter	Any-where.	Any-where.	Dynamite paper case.	Gutter	Gutter	Old working.	Gutter	Old working.	Any-where.	Old working.	Old drift.	Sump	Go to shaft.	Old bogey emptied sometimes.	Anywhere	Any-where.	Stream
19. How much per 4-lb. packet dynamite	4s.	6s.	5s.	4s.	4s.	6s.	5s.	4s. 6d.	3s.	4s.	4s.	4s.	4s.	4s. 6d.	4s. 6d.	4s.	4s. 8d.	4s.
20. How much per lb. candles	4d.	4d.	4d.	4d.	4d.	6d.	4d.	4d.	4d.	6d.	4d.	4d.	4d.	4d.	4d.	4d.	4d.	4d.
21. How much for fuse	10d.	1s.	1s.	1s.	1s.	1s. 6d.	2s.	1s.	1s.	1s.	1s.	1s.	1s.	1s.	1s.	1s.	1s.	1s.
22. How much for caps	4s.	3s.	3s.	3s. 6d.	3s. 6d.	4s.	3s.	3s. 6d.	3s. 6d.	3s. 6d.	3s. 6d.	3s.	3s.	3s. 6d.	3s. 6d.	3s. 6d.	3s. 6d.	1s. 8d. for 50.
23. Is there a second way out of mine	No	No	Yes	No	Yes	Yes	No	No	Yes	No	Yes	Yes	No	No	Yes	No	No	Yes
24. Do you think there should be	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
25. Is doctor's money stopped at office	Yes	No	Yes	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
26. How much is stopped	6d.	6d.	6d.	—	—	6d.	6d.	6d.	6d.	6d.	6d.	6d.	6d.	6d.	6d.	6d.	1s. 6d.	6d.
27. Have you free choice of doctor	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	No	Yes	Yes	Yes	No	Yes	Yes	No	Yes	No
28. Who inspects your working places	Under Manager.	Nobody	Workmen appointed.	Deputy	Under Manager.	Night Deputy.	Deputy	Deputies.	Deputy	Under Manager.	Deputy	Deputy	Deputy	Workmen appointed.	Workmen appointed.	Deputy	Deputy	Deputy
29. Any shiftman employed timbering	4	None	2	4	6	2	4	2	None	2		3	2	1	3	6	2	2
30. Has pit stopped through bad air	Yes	No	No	No	No	No	No	No	No	Yes	No	No	No	No	No	No	No	No
31. Has pit stopped through water	No	No	Yes	No	No	No	No	No	No	No	No	Yes	No	Yes	No	No	No	No
32. Is more inspection needed	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
33. Any drill machines used	Yes	No	No	Yes	No	No	No	No	No	No	No	No	No	Yes	No	No	Yes	No
34. Is anything paid for timbering	No	No	No	No	No	—	No	No	No	No	No	No	No	No	No	No	No	No
35. Have you acetylene gas plant	No	No	No	No	Yes	No	No	No	No	No	No	No	No	No	No	No	Yes	No

APPENDIX E.

Extract from the "Whitehaven Free Press and Farmers' Chronicle" of the 8th January 1910.

SINGULAR DEATH OF A FRIZINGTON MAN.

Inquiry on Tuesday.

On Tuesday there was an inquest into the circumstances relating to the death of Mathew McQuire, iron ore miner, aged 62 years, who resided at 64, Mill Street, Frizington, which took place on the 28th December, in the Lonsdale Mine, Frizington, under rather sudden and peculiar circumstances.

The inquiry was conducted by Mr. W. T. Highet, deputy coroner for the Lordship of Egremont, and a jury over whom Mr. John Brocklebank acted as foreman.

Mr. W. Leck, H.M. Inspector of Mines, Mr. John Nelson, solicitor, Egremont, representing the Lonsdale Mining Company, and Mr. T. Gavan-Duffy, who appeared in the interest of the relatives, were also present.

Elizabeth McQuire (64), widow of the deceased, stated that on the 28th ult. her husband left home about 5.30 a.m. to go to work at the Lonsdale Mine. He was then in his usual health, and made no complaint to witness about feeling unwell. Deceased had been employed at the mine about three weeks. Prior to this he had been out of work for 18 months, through losing an eye at the Lonsdale pit. He recovered from that and never made any complaint with regard to the loss of his eye, as it caused him no trouble.

By Mr. Gavan Duffy: She had been married 43 years, and had ten children. Deceased had never suffered from any disease, and had only been under a doctor when his eye was injured. Her husband, since he had been engaged at Lonsdale pit had repeatedly complained of having a bad head. On the morning of the 28th, he went out to work, and only took a drink of tea before going. He took a bit of bread with him, as he had done before, but he always brought it back, as he could not eat it. The deceased had a good appetite, but he had said that the bad air at the pit was killing him. Witness had never known her husband to suffer from any affection of the heart.

By Mr. J. Nelson: Her husband was never ill during their married life. He might have had a doctor attending him, but nothing much ailed him. Sometimes he had the doctor when his foot was lamed. She did not think he had had a doctor only on that occasion. The doctor had attended him for his injured eye. The day before his death, deceased only ate a little bread and butter, and at night he took a little sup of beer. Deceased had never complained of dizziness. Since he had been working at the mine, he had never complained of dizziness, but he had complained of having a bad head.

Thomas Sandwith, miner, residing at 150, Frizington Road, Frizington, said he knew the deceased and worked with him. On Tuesday, the 28th December, he went to work with McQuire. He did not complain to witness of feeling unwell. Deceased was employed boring in the mine, and witness was constantly in his company. Witness noticed something unusual with the deceased between eight and half past eight, when the deceased complained to him about a pain in the stomach. Witness thereupon sent him out to have a rest. Shortly afterwards he returned to the working and witness again advised him to go home, but deceased said he would try and work on till bait-time. Later he said he was all right when he gave another bore of the hole, but at ten minutes past nine, he told witness he was in shivers. Witness further advised him to go home, but McQuire said he would sit down for a minute, and sat down in the working. A few minutes later he seemed to collapse, and Sandwith got hold of him, and assisted by a labourer they carried him out of the working about four or five yards away, and eventually he was taken under the air fan. There was plenty of ventilation on the morning in question at the working, and prior to deceased's collapse they had had no accident of any kind. When they got deceased to the fan, ambulance men were sent for, but artificial respiration, tried by them, was without avail. Deceased, when working, appeared in good health.

By Mr. Leck: Deceased was sitting on a pick in the sole of the working. Mr. Wright, deputy overman, was present in the pit at the time.

Richard Hartley, mining engineer, of Whitehaven, produced a plan of the pit.

Sandwith, questioned by Mr. Gavan-Duffy, said deceased complained when in the working about pains in the stomach and vomiting. Deceased, during the last week he was at the mine, ate all his food.

Alexander Wright, of 11, Wilson Terrace, Frizington, deputy overman at the pit, said on the 28th December, he was in No. 6 company's working about seven o'clock, and made an inspection. The deceased at that time was alright, and the ventilation was very good. When deceased stopped work, he made no complaint to witness with regard to the ventilation. When the deceased was sitting witness noticed that he was sweating very much, but all miners were the worst for sweating the first half hour. Witness first heard that something was wrong about nine o'clock, and he sent a man down to get him up as quick as possible. A man named James Crellin reported the affair to Wright. He had known the deceased for years, and he appeared to enjoy good health. The only complaint he made to witness was with regard to his hand, which was caused when working at first in a mine.

Dr. Lincoln deposed that on the morning of the 28th ult., he received a message from the mine about the affair, and he proceeded to the place immediately and on arrival he was taken into the engine-house, where he saw the deceased lying on a stretcher. Witness was told the man was dead. He made an examination, and found the deceased suffering from an affection of the heart, and he had been over-strained.

By Mr. Duffy: The man might have strained himself by driving the hole in the working, or he might have strained himself while at work during the past three weeks.

The coroner summed up, after which a discussion took place between the jury and the coroner as to the advisability of holding a post-mortem examination.

The jury returned a verdict of death from natural causes.

Extract from the "Whitehaven News" of the 24th February 1910.

DEATH OF MR. GEORGE STEELE, RHEDA TERRACE, ARLECDON.

An inquest touching the death of George Steele, of Rheda Terrace, Arlecdon, was held at the Mason's Arms before Mr. G. A. L. Skerry, coroner for the Lordship of Egremont, and a jury, of which Mr. John Laidlaw was chosen foreman.

Mr. William Dixon, engineer, represented the Cleator Iron Ore Company and produced a plan of the working, and Mr. Wm. Leck, Government Inspector of Mines, was also in attendance.

The first witness called was Elizabeth Ann Steele, widow of the deceased, who identified the body, stated she last saw him when he left home for work, and he was in good health, and had his breakfast as usual. She heard nothing more until he was carried home about 1 p.m. On Monday night he complained of a pain in his wrist going up to his chest, but he was all right the next morning.

James Morton, 86, Main Street, Harris Villa, Frizington, who was working with the deceased, stated that they commenced work about 8.30 a.m. boring holes, and the deceased then appeared all right, but at bait-time he complained of a pain in his chest. He advised him to get something hot, which he did, and then sat down. Shortly after he came to him for a light and thought he would be better. He then sat down again. This took place near where he was working. Afterwards, thinking he was fainting, he tried to warm the bottle. The deputy (John Horne) then arrived, and they then found him lying on his left side, and he expired in a few minutes. The air in the working was very good, and he did not think his death was due to any accident.

John Horne, Yeathouse Road, stated he was through the working about 8.30 a.m. He saw the deceased then and he appeared to be all right. He was again in the same place soon after 11 o'clock, and seeing Morton heating a bottle to give deceased a drink he went up to deceased and asked him if he had cramp, but received no answer. Deceased was then lying on his left side and gave a few gasps. They called for help, but could do nothing.

Dr. Lincoln stated that he had made a superficial examination, but there were no marks of violence and he thought that the evidence which he had heard pointed to an angina attack, a form of heart disease. The pain across his chest pointed to heart trouble and would be consistent with angina pectoris. Had he been under a medical man he might have been warned, and was of the opinion death was not due to an accident.

By Mr. Leck: A place fouled by blasting might, in his opinion, affect a man in such a condition.

Mr. Leck stated he had examined the work, and found everything satisfactory.

The coroner said the evidence appeared to be very clear, and the jury returned a verdict in accordance with the medical evidence.

APPENDIX F.

(*a*) *Tables referred to in Question* 330.

TABLE 1.

DEATHS FROM ALL CAUSES PER 1,000 LIVING AT EACH AGE.

	Ages.					
	15–20.	20–25.	25–35.	35–45.	45–55.	55–65.
All occupied Males, England and Wales, 1900–1902	2·4	4·4	6·0	10·2	17·7	31·0
Coal Miners, England and Wales, 1900–1902	3·2	4·5	4·9	7·6	14·7	36·0
Ironstone Miners, England and Wales, 1900–1902	3·1	3·0	5·3	6·6	12·2	28·0
Lead Miners, England and Wales, 1900–1902	6·1	4·8	7·4	12·9	17·4	50·6
Tin Miners, Cornwall, 1890–1892	3·0	7·0	8·1	14·3	33·2	66·1
" " " 1900–1902	1·55	5·8	13·4	27·9	39·85	66·8
All Miners (including Gold Miners) living in Cornwall, 1900–1902	1·7	5·8	20·9	39·0	44·6	70·5
Cornish Miners, 1849–1853	8·9		9·0	14·3	33·5	63·2
All Males, England and Wales, 1849–1853	8·1		10·1	13·0	19·0	34·8

TABLE 2.

DEATHS FROM LUNG DISEASES PER 1,000 LIVING AT EACH AGE.

All occupied Males, England and Wales, 1900–1902	0·8	2·0	2·8	4·4	6·3	8·7
Coal Miners, England and Wales, 1900–1902	0·7	1·4	1·6	2·4	4·8	12·0
Ironstone Miners, England and Wales, 1900–1902	1·0	0·7	1·9	2·4	5·6	8·7
Lead Miners, England and Wales, 1900–1902	2·3	1·2	5·2	5·2	8·7	22·4
Tin Miners, Cornwall, 1890–1892	1·3	3·7	3·9	9·5	23·0	40·7
" " " 1900–1902	0·5	2·6	10·5	23·2	29·6	42·8
All Miners (including Gold Miners) living in Cornwall, 1900–1902	0·7	2·7	17·3	33·2	32·2	42·6
Cornish Miners, 1849–1853	3·05		4·4	8·5	24·3	44·5

TABLE 3.

DEATHS FROM ACCIDENT PER 1,000 LIVING AT EACH AGE.

All occupied Males, England and Wales, 1900–1902	0·4	0·5	0·6	0·7	1·0	1·3
Coal Miners, England and Wales, 1900–1902	1·2	1·2	1·2	1·6	2·1	2·8
Ironstone Miners, England and Wales, 1900–1902	1·6	0·7	1·5	1·4	1·4	3·0
Lead Miners, England and Wales, 1900–1902	0·8	0·6	0·9	1·2	1·3	0·0
Tin Miners, Cornwall, 1890–1892	1·0	2·1	0·9	0·3	0·3	4·4
" " " 1900–1902	0·5	1·8	0·9	0·6	1·4	0·0
All Miners (including Gold Miners) Cornwall, 1900–1902	0.5	1·7	0·8	0·55	1·25	0·5
Cornish Miners, 1849–1853	2·0		2·1	1·9	2·4	1·5

TABLE 4.

DEATHS FROM ALL OTHER CAUSES PER 1,000 LIVING AT EACH AGE.

All occupied Males, England and Wales, 1900–1902	1·2	1·9	2·6	5·1	10·4	21·0
Coal Miners, England and Wales, 1900–1902	1·3	1·9	2·1	3·6	7·8	21·2
Ironstone Miners, England and Wales, 1900–1902	0·5	1·6	1·9	2·8	5·2	16·3
Lead Miners, England and Wales, 1900–1902	3·1	3·0	1·2	6·5	8·4	28·2
Tin Miners, Cornwall, 1890–1892	0·7	1·2	3·3	4·5	9·9	21·0
" " " 1900–1902	0·5	1·4	2·0	4·2	8·9	24·0
All Miners (including Gold Miners), Cornwall, 1900–1902	0·5	1·4	2·8	5·25	11·15	27·4
Cornish Miners, 1845–1853	3·85		2·45	3·9	6·8	17·2

TABLE 5.

	Phthisis.	Other Lung Diseases.	All other Causes.	Total.	Average Age at Death.
Transvaal only	47	2	1	50	36·3
Cornwall only	26	7	4	37	37·5
Cornwall and Transvaal	29	—	3	32	36·4
Cornwall and India	3	—	—	3	37·0
Cornwall and America	1	—	—	1	32·0
Cornwall and West Africa	1	—	—	1	35·0
Cornwall, India, and Transvaal	3	—	—	3	35·0
Cornwall, Transvaal, and America	2	—	—	2	37·0
America only	4	2	1	7	43·9
India only	2	—	—	2	41·5
America and Transvaal	2	—	—	2	41·5
Brazil and Transvaal	1	—	—	1	40·0

TABLE 6.

DEATHS PER 1,000 MINERS LIVING, REDRUTH DISTRICT, 1900–1902.

	Ages.					
	15–20.	20–25.	25–35.	35–45.	45–55.	55–65.†
Including men who had worked rock-drills	1·15	6·65	20·7	38·6	47·0	64·8
Excluding men who had worked rock-drills	1·15	6·2	6·3	14·8	32·3	61·4

(*b*) RETURN of CASES of PHTHISIS PULMONALIS which occurred in the FESTINIOG URBAN DISTRICT during the Year 1909. *See* Q. 7622.

POPULATION (1901), 11,546—FESTINIOG URBAN DISTRICT, MERIONETH COUNTY.

Number.	Name.	Sex.	Age.	Married or Single.	Residence or Occupation.	Remarks.
			Years.			
1	Agnes Thomas	Female	11	Single	134, Manod Road	Brother and father died of caries of spine.
2	Thomas Jones	Male	68	Married	Slate quarrier.	
3	Maggie Davies	Female	29	"	1, Maenofferen Terrace.	
4	Owen Parry	Male	52	"	Slate quarrier	Wife died of phthisis.
5	Jannett Jones	Female	51	Single	134, High Street.	
6	Margaret Ann Evans	"	35	Married	49, Manod Road.	
7	Ellen Wynne	"	23	Single	Penybryn, Festiniog.	
8	Mary Roberts	"	62	Married	Blaendol Lodge, Festiniog.	
9	Jane Jones	"	23	Single	164, Manod Road	Mother died of phthisis.
10	Ann Jones	"	45	Married	Hafodyspyhty, Festiniog.	
11	Blodwen Jones	"	28	Single	12, Glynllyon Street N.	Mother died of phthisis.
12	Ellis Jones	Male	37	Married	Slate quarrier	Father died of phthisis.
13	Catherine Jones	Female	38	"	6, Bellevue, Festiniog.	
14	Maria Hughes	"	22	Single	Haulfryn, Bl. Festiniog.	
15	Hugh Lloyd	Male	38	Married	Grocer, insurance agent, slate quarrier.	Disease contracted whilst employed at the quarry.‡
16	Thomas Rowlands	"	33	"	Quarry labourer.	
17	John Williams	"	24	"	Journeyman painter.	
18	Matilda Davies	Female	57	Single	Dorvil Street.	

Average Age.

Males	42 years.
Females	34½ ,,
Slate quarriers	52 ,,
Slate quarriers with quarry labourers	47½ ,,
Slate quarriers with grocer, formerly slate quarrier	45¾ ,,

Sex.

			Percentage.
Total number of cases	18	Males 6	= 33·3
		Females 12	= 66·6

Males.

Slate quarriers	= 50
Slate quarriers with quarry labourers	= 66·6
Slate quarriers with grocer, formerly slate quarrier	= 83·3
Total number of men employed at quarries during 1909 taken at	= 2,700

Males.

	Percentage.	
Slate quarriers	3	
Quarry labourers	1	6 = 50
Grocer (slate quarrier)	1	
Painter	1	

Rates per 1,000 Men employed.

Slate quarriers	1·1
Slate quarriers with quarry labourers	1·4
Slate quarriers with grocer, formerly slate quarrier	1·8
Rate per 1,000 for Festiniog Urban District, males and females	1·5

(Signed) RICHARD JONES, M.D., D.P.H.,
M.O.H. Festiniog Urban District.

APPENDIX G.

RETURN OF ACCIDENTS AT THE DINORWIC SLATE QUARRY REFERRED TO IN Q. 8094.

—	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Total.	Average per 100 on Number employed.	Average per 100 on hand Cases.	Total Number of Men employed.
																Year 1905
Injury to—																
Head	2	1	3	—	2	—	1	4	2	1	1	—	17			
Eye	1	—	1	3	1	1	1	2	—	4	1	4	19			
Body	—	—	5	1	—	—	—	2	1	1	1	1	12			
Arm	4	—	3	1	4	6	4	1	3	3	3	2	34	13 per cent.	Out of 377, 60 per cent.	2,899
Hand	20	19	28	21	27	20	14	14	16	13	21	13	226			
Leg	—	7	1	2	7	1	7	2	1	5	—	3	36			
Foot	2	2	2	1	3	2	—	2	2	2	2	1	21			
Sprains	3	—	4	—	1	—	1	1	1	—	—	1	12			
Total	32	29	47	29	45	30	28	28	26	29	29	25	377			
																Year 1906.
Injury to—																
Head	1	1	3	1	—	1	2	2	3	1	1	2	18			
Eye	2	3	1	1	—	3	2	1	2	—	1	1	17			
Body	—	4	1	—	2	—	3	—	—	1	1	—	12			
Arm	1	4	3	1	1	3	2	6	—	4	3	3	31	11·7 per cent.	Out of 338, 56·5 per cent.	2,872
Hand	22	16	21	13	15	17	25	13	15	11	12	11	191			
Leg	6	3	6	3	1	3	4	5	1	1	2	4	39			
Foot	3	2	2	3	1	2	1	2	1	1	3	1	25			
Sprains	—	—	—	—	1	1	—	—	—	—	2	1	5			
Total	35	33	37	22	21	30	39	29	25	19	25	23	338			
																Year 1907.
Injury to—																
Head	2	2	—	1	4	4	7	3	—	7	4	1	35			
Eye	—	—	1	2	4	1	1	2	2	3	3	2	21			
Body	2	2	—	—	3	1	2	3	5	4	4	2	28			
Arm	1	1	3	6	1	6	3	3	6	4	5	3	42	16·5 per cent.	Out of 468, 54·5 per cent.	2,825
Hand	13	11	19	14	16	8	27	33	31	30	27	26	255			
Leg	3	—	4	4	2	5	5	5	1	2	5	1	40			
Foot	3	2	3	3	—	4	6	7	1	2	2	—	33			
Sprains	—	—	—	1	2	—	2	4	1	3	1	—	14			
Total	24	18	30	31	32	29	53	60	50	55	51	35	468			

RETURN OF ACCIDENTS AT THE DINORWIC SLATE QUARRY REFERRED TO IN Q. 8094—*continued.*

——	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Total.	Average per 100 on Number employed.	Average per 100 on hand Cases.	Total Number of Men employed.
																Year 1908.
Injury to—																
Head - -	1	4	6	3	1	1	1	2	1	6	2	1	29			
Eye - -	—	1	1	2	3	4	2	2	4	2	3	1	25			
Body - -	—	—	1	1	1	4	2	1	1	3	—	3	17			
Arm - -	4	1	2	4	4	4	8	6	1	9	4	3	50	18·5 per cent.	Out of 503, 54·4 per cent.	2,708
Hand - -	23	34	26	23	20	25	25	15	21	20	24	18	274			
Leg - -	8	2	4	4	4	2	2	6	7	5	4	2	50			
Foot - -	2	3	4	3	5	5	2	4	—	4	—	5	37			
Sprains - -	2	—	2	4	2	—	2	1	4	2	1	1	21			
Total -	40	45	46	44	40	45	44	37	39	51	38	34	503			
																Year 1909
Injury to—																
Head - -	4	1	2	3	2	3	2	1	1	3	2	1	25			
Eye - -	3	2	4	—	6	2	7	2	2	1	4	3	36			
Body - -	—	2	—	2	5	1	1	1	2	3	1	1	19			
Arm - -	1	1	4	4	4	6	3	5	4	1	5	1	39	20·3 per cent.	Out of 549, 54·2 per cent.	2,694
Hand - -	19	29	29	15	26	32	26	18	25	23	34	22	298			
Leg - -	5	5	7	2	5	7	3	3	4	3	1	4	49			
Foot - -	4	4	7	2	6	4	4	1	9	4	2	5	52			
Sprains - -	1	9	2	2	1	1	6	1	—	1	2	5	31			
Total -	37	53	55	30	55	56	52	32	47	39	51	42	549			

Total number of men employed 1905 - - - - - - - - 2,899
" " 1906 - - - - - - - - 2,872
" " 1907 - - - - - - - - 2,825 } Average 2,799.
" " 1908 - - - - - - - - 2,708
" " 1909 - - - - - - - - 2,694

* Year 1907. Average per 100 on number employed to June 30th, 5·8 per cent.
" " " " from July 1st to December 31st, 10·7 per cent.
" " on hand cases out of 164 (June), 49·4 per cent.
" " " out of 304 (July to December), 57·2 per cent.

APPENDIX H.

Tables put in by the Witness. See Qs. 9634 and 9989.

SCOTLAND (No. 1) INSPECTION DISTRICT.

METALLIFEROUS MINES.

The minerals worked at these mines are:—Barytes, Ganister, Graphite, Lead Ore, Limestone, Sandstone, Oil Shale, Quartz, Red Marl and Zinc Ore.

Year.	No. of Mines at Work.	No. of Persons employed.		Output of Minerals.	Deaths.		Death Rate per 1,000 Persons employed.		
		Underground.	Surface.		Underground.	Surface.	Underground.	Surface.	U. + S.
1900 - -	31	620	383	345,390	2	1	3·226	·383	2·991
1901 - -	31	631	416	280,373	2	—	3·169	—	1·910
1902 - -	30	647	394	288,799	4	—	6·182	—	3·842
1903 - -	31	669	376	366,607	1	—	·669	—	·957
1904 - -	32	672	383	334,223	3	—	4·464	—	2·844
1905 - -	32	609	365	327,836	1	—	·609	—	1·027
1906 - -	32	667	373	620,095	1	—	·667	—	·961
1907 - -	31	706	428	343,883	—	—	—	—	—
1908 - -	30	670	396	418,389	4	—	5·925	—	3·752
1909 - -	32	668	406	298,295	2	1	2·994	·406	2·793
Total -	—	6,559	3,899	3,623,890	20	2	—	—	—
Average -	31·2	655·9	389·9	362,389	—	—	3·049	·051	2·104

U. + S. = Underground plus Surface.

Scotland (No. 1) Inspection District.

Quarries.

The minerals worked are :—Brickearth, Ganister, Granite, Gravel and Sand, Igneous Rocks, Limestone, Oil Shale, Sandstone, and Slate.

Year.	No. of Quarries at Work.	No. of Persons employed.		Output of Minerals.	Deaths.		Death Rate per 1,000 Persons employed.		
		Inside.	Outside.		Inside.	Outside.	Inside.	Outside.	I. + O.
1900 - -	944	7,590	5,086	3,209,583	20	2	2·635	·393	1·736
1901 - -	982	8,021	5,183	3,452,895	9	6	1·222	1·158	1·136
1902 - -	1,016	8,149	5,485	4,073,532	14	2	1·718	·365	1·173
1903 - -	1,027	7,786	5,191	3,920,367	10	2	1·284	·385	·925
1904 - -	1,102	7,602	5,116	3,744,405	8	—	1·052	—	·629
1905 - -	1,127	7,390	4,797	3,601,735	9	4	1·218	·834	1·067
1906 - -	1,074	6,594	4,665	3,638,896	8	2	1·213	·429	·888
1907 - -	1,027	5,864	4,173	3,312,110	6	2	1·023	·479	·797
1908 - -	1,036	5,912	3,917	3,377,437	8	1	1·353	·255	·916
1909 - -	1,023	5,445	3,745	3,057,087	5	1	·918	·264	·653
Total - -	—	70,353	47,358	35,388,047	97	22	—	—	—
Average -	1,035·8	7,035·3	4,735·8	3,538,804·7	—	—	1·379	·465	1·11

I. + O = Inside plus outside.

INDICES.

I. General Index.
II. The Evidence of each Witness indexed separately.

INDEX I.: GENERAL INDEX.

NOTE A.—*The general references in this index are almost exclusively to general evidence given by Mr. Delevingne of the Home Office and by H.M. Inspectors. Quarries are dealt with under that title. All references to particular classes of Mines are given under the titles of those classes—Iron Ore under Iron Ore, &c., &c., with the exception of references to Phthisis, which are given under that title.*

NOTE B.—*Where a series of questions refer to the same subject, the number of the opening question only is given.*

INDEX II.—(The evidence of each witness indexed separately.)

ATKINSON, Mr. John Boland, H.M. Inspector of Mines for the Newcastle District. (*See Questions* 2048–2399.)

ATKINSON, Mr. G., Miner employed at Kelton Mine, Rowrah *(Cumberland Iron Ore Miners' and Kindred Trades' Association).* *See* **DIXON, Mr. John.**

BEWSHAR, Mr. G., Miner employed at Postlethwaite's Mines, Moor Row *(Cumberland Iron Ore Miners' and Kindred Trades' Association).* *(See Questions* 4430*a*–4477.*)*

BRAGG, Mr. G. H., Managing Director of the Threlkeld Granite Company, Limited, Keswick *(United Kingdom Granite and Whinstone Quarry-Masters' Association.) (See Questions* 9281–9416.*)*

BRAITHWAITE, Mr. J., Miner employed by Cleator Iron Ore Company, Frizington (*Cumberland Iron Ore Miners' and Kindred Trades' Association*). *See* **DIXON, Mr. John.**

BRIGGS, Mr. John, Miner (*Furness Iron Miners' and Quarrymen's Union*). (*See Questions* 5172–5226.)

BURNS, Mr. Michael, Miner (*National Iron Ore Miners' Association*). (*See Questions* 5897; 5923.)

BYERS, Mr. H. S., M.B. DURHAM, M.R.C.S. ENG., and L.R.C.P. LONDON, in practice at Cleator, Cumberland. (*See Questions* 7209–7235.)

CALDERWOOD, Mr. G., M.D., Medical Officer of Health for Egremont District, Cumberland. (*See Questions* 6224–6249.)

COWEN, Mr. W., Secretary of the *Cumberland Limestone Quarrymen's Association.* (*See Questions* 5712–5737.)

CRAMOND, Mr. A., Miner employed at Ullbank Mine, Egremont (*Cumberland Iron Ore Miners' and Kindred Trades' Association*), *See Tidyman, Mr. D.*

DANIELS, Mr. Mark, *see* **DAVY, Mr. R.**

DARBISHIRE, Mr. C. H., Owner and Manager of Darbishire's Granite Quarries, Penmaenmawr. (*See Questions* 8878–9076.)

DIXON, Mr. J., Shiftman employed at Montreal Mine, Cleator Moor (*Cumberland Iron Ore Miners' and Kindred Trades' Association*). (*See Questions* 4137*a*–4282.)

DIXON, Mr. John, Miner employed at the Lonsdale Mine, Frizington; **ATKINSON, Mr. J.,** Miner, Kelton Mine, Rowrah; and **BRAITHWAITE, Mr. J.,** Miner, Margaret Mine, Frizington (Iron Ore) (*Cumberland Iron Ore Miners' and Kindred Trades' Association*). (*See Questions* 4478–4614.)

DIXON, Mr. W., Mining Engineer (*Iron Ore Proprietors of West Cumberland*). (*See Questions* 6622, 6646*a*–6655, 6659–6661.)

DOBIE, Mr. J., Engineman (*National Iron Ore Miners' Association*). (*See* Questions 5897, 5950–5994, 6019–6036, 6039–6073.)

EDMONDS, Mr. Charles, Labourer employed underground (*Cumberland Iron Ore Miners' and Kindred Trades' Association*). (*See Questions* 4892–4967.)

FORDYCE, Mr. J., President of the Kemnay Branch of the Sett-makers' Union. (*See Questions* 8797–8877.)

FYFE, Mr. J., Managing Director of Messrs. John Fyfe, Limited, Aberdeen (*United Kingdom Granite and Whinstone Quarry-Masters' Association.* (*See Questions* 9417–9490.)

GILL, Mr. D., representing the Bigrigg Mining Company, Workington, Cumberland. (*See Questions* 7236–7248.)

HADDEN, Mr. J. A., Secretary of the United Kingdom Granite and Whinstone Quarrymasters' Association. (*See Questions* 9077–9162.)

HALDANE, Dr. John Scott, M.D., F.R.S., Reader in Physiology in the University of Oxford. (*See Questions* 264–453.)

HALL, Sir Henry, I.S.O., late Inspector of Mines for the Liverpool and North Wales District. (*See Questions* 454–860.)

HARRIS, Mr. T. *See* PLUMMER, Mr.

HOGG, Mr. T., Miner (*National Iron Ore Miners' Association*).
(*See Questions* 5897–5918, 5924–5938, 5947–5949, 5995–6018.)

IRVING, Mr. R., Miner employed at Hodbarrow Mine, Cumberland.
(*See Questions* 5827, 5829, 5832, 5835.)

JONES, Mr. William Morris, Slate Quarryman employed at the Alexandra Slate Quarry (*North Wales Quarrymen's Union*). (*See Questions* 3187, 3264–3276.)

JORDAN, Mr. Marshall, Quarryman employed at Threlkeld Granite Quarry, Keswick (*National Union of Quarrymen, Cumberland Branch*). (*See Questions* 5674–5711.)

KAY-MENZIES, Mr. A. W., Managing Director of the Alexandra Slate Company, Limited, the Llanberis Slate Company, Limited, the New Braich Slate Quarries, Limited, Chief Manager and Director of the Talysarn Slate Quarries, Limited, Managing Director of the South Dorothea Slate Quarry, Limited, also Consulting Engineer to other Quarry Companies (*Carnarvon Quarry Owners' Association*). (Slate Quarries.) (*See Questions* 7249–7597.)

LANG, Mr. A. A. R., Quarry-Master of Gourock (*United Kingdom Granite and Whinstone Quarry-Masters' Association*). (*See Questions* 9163–9280.)

LECK, Mr. W., H.M. Junior Inspector of Metalliferous Mines and Quarries. (*See Questions* 2400–2584.)

McCUSKER, John, Miner employed at Lord Leconfield's Mine, Bigrigg (*Cumberland Iron Ore Miners' and Kindred Trades' Association*). (*See Questions* 4391*a*–4430.)

McKENZIE, Mr. J., Secretary of the Ballachulish Quarriers' Union. (*See Questions* 7908–8049.)

MATHEWS, Mr. James, Miner employed at Moss Bay (Combine) Mine (*Cumberland Iron Ore Miners' and Kindred Trades' Association*). *See* **DAVY, Mr.**

NELSON, Mr. James, Miner, Longlands Mine, Egremont (*Cumberland Iron Ore Miners' and Kindred Trades' Association*). (*See Questions* 4797, 4842–4867, and 4876–4891.)

NOON, Mr. J. W., Sett-maker, employed at Threlkeld Granite Quarry, Keswick (*Cumberland Branch of National Union of Quarrymen*). (*See Questions* 5395–5673.)

ORR, Mr. James, Miner (*Furness Iron Miners' and Quarrymen's Union*). (*See Questions 5227–5314.*)

SLEVIN, Mr. J., Secretary of the Sett-Makers' Union of Great Britain and Ireland. (*See Questions* 8549–8796; 8847.)

SMITH, Mr. James, Miner employed at the Sir John Walsh Mine, Bigrigg (*Cumberland Iron Ore Miners' and Kindred Trades' Association*). (*See Questions* 4677, 4721–4796.)

THOMAS, Mr. G., Miner employed at Parkhouse (Combine) Mines (*Cumberland Iron Ore Miners' and Kindred Trades' Association*). (*See Questions* 4615, 4654–4676.)

TIDYMAN, Mr. D., Miner employed at Beckermet Mine (*Cumberland Iron Ore Miners' and Kindred Trades' Association*), and Cramond, Mr. A., Miner (*Ullbank Mine, Egremont*). (*See Questions* 4968–4980.)

TINNION, Mr. W., Miner employed by Parkside Mining Company, Frizington. (*Cumberland Iron Ore Miners' and Kindred Trades' Association*). (*See Questions* 4375*a*–4391.)

WALKER, Mr. I., Manager of the Parkhouse Mines, Bigrigg, Cumberland.
(*See Questions* 6982*a*–7003.)

WALKER, Mr. W., H.M. Divisional Inspector of Mines for Scotland.
(*See Questions* 9627–10,162.)

WALKER, Mr. W. E., Mining Engineer (*Iron Ore Proprietors of West Cumberland*). (*See Questions* 6622, 6629–6634, 6655*a*–6658.)

WATSON, Mr. I., Miner employed at Pallaflat Mine, Bigrigg, Cumberland (*Iron Ore Miners' and Kindred Trades' Association.* (*See Questions* 4797–4841 and 4867–4875.)

WILKINSON, Mr. R., Manager, Bigrigg Mining Company, Limited, Workington. (*See Questions* 6902–6982.)

WILLIAMS, Mr. W. R., Slate Quarryman employed at the Dorothea Slate Quarry (*North Wales Quarrymen's Union*). (*See Questions* 3185–3263.)

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