18140. *Witness.*] The rules were drafted at a conference of Managers, and they are the same rules at all the collieries.

18141. *Mr. Robertson.*] *Q.* I should like to know what your objections were? *A.* We objected to the defining of the Managers' powers and working the pit according to certain orders. You can tell a man to do a certain work purely for the purpose of taking advantage of him.

18142. *Q.* You do not say that a mine should not be worked in the way that the Manager directs? *A.* I am talking about a deputy coming round to a man and giving him certain orders, when the miner knows that it is done purely for the purpose of humbugging him. That is done repeatedly.

18143. *Mr. Ritchie.*] *Q.* I see under the Act it is provided in clause 51 that :—"The proposed Special Rules, together with a printed notice specifying that any objections to the rules on the ground of anything contained therein, or omitted therefrom, may be sent by any of the persons employed in the mine." Do you suggest any amendment to that section? *A.* Yes, we object to a printed notice. We think that a written notice should be sufficient.

18144. *Q.* Would the provision meet your case if the section were worded, "Together with a printed or written notice."? *A.* Yes.

18145. *Q.* If that had been the wording of the Act previously would your objections have been in time to be considered? *A.* Yes. I may say that I have had occasion, at a conference, to draw attention to the practice adopted by some Managers in keeping men in a constant state of irritation, almost verging on a strike. There is nothing hidden about what I am saying. I drew attention to the matter at a conference between the proprietors and the miners. They admitted it because the practice ceased considerably at the mine to which I refer after I had spoken about the matter.

18146. *Mr. Lysaght.*] I would like to know whether it is within the scope of the Commission to consider any suggestions for the amendment of Special Rules, because I know that in the Illawarra district there are a number of rules which are very objectionable in practice. Some of them have the effect of relieving the mining companies of all liability—that is of liability which they are not relieved of by Act of Parliament. There are a number of rules which require amendment. If the matter came within the scope of the Commission I would have the suggested amendments prepared and submit them to the Commission.

18147. *His Honor.*] If the amendment of the rules would be such as would conduce to the safety of a mine, directly or indirectly, the Commission might take the matter into consideration.

18148. *Mr. Lysaght.*] One Special Rule says "That every collier shall securely uphold the coal and shall prop up and secure the roof of the bord in which he may be employed, and if he should not be provided with a sufficient quantity of timber he shall cease working." It may happen that the Company may fail to provide sufficient timber, and you see that the question would be what was sufficient timbering. The miner may have thought that the mine was sufficiently timbered, and the Company would be relieved of responsibility under the law, because he did not cease working and leave his working place. The rule has a tendency to relieve the Company in a way it should not be relieved.

18149. *Mr. Robertson.*] Do you suggest that there should not be such a rule.

18150. *Mr. Lysaght.*] It should not be left to the management to say what is sufficient timber, and then if a man is injured to deprive him of his rights.

18151. *Mr. Wade.*] The rule states that: "That no man must incur any danger, and that he shall withdraw if there is danger."

18152. *Mr. Lysaght.*] There are a number of rules which operate harshly on the men, without advantage so far as the safety of the mine is concerned, and they appear to be so drafted as to relieve the management of liability which they would otherwise incur under the Coal-mines Regulation Act.

18153. *Mr. Robertson.*] I think your illustration is unfortunate, because a better rule for the safety of the men working in the mine could not be drawn up.

18154. *Mr. Lysaght.*] You see the miner may be trusting to the superior inspection of the roof by the deputy who has certified it to be safe. It turns out to be unsafe and the miner would be held to be guilty of contributory negligence because he did not quit the place. Again, there is a prohibition against a man leaving his own working place; but, in a recent action it was held that a miner had contributed to an accident because he had not gone into a waste working to see what the roof was like. Thus, a man is not to leave his working place, but if he is injured he is blamed because he did not go to an adjoining place to see whether or not it was dangerous. You therefore, see how these rules may be made to act so as to deprive a man of his right of action. These rules materially affect the statutory rights which these men have under the Act.

18155. *Mr. Ritchie..*] *Q.* Do you desire that the miners should be allowed to propose amendments to the Special Rules.

18156. *Mr. Lysaght.*] The Commission might suggest that the Special Rules should be amended from time to time or new rules made, as the various defects crop up, so that they can be remedied. If the Commission think that this is a matter that it could go into I would have the Special Rules submitted to the Delegate Board, and bring them before the Commission.

18157. *His Honor.*] What is your proposal.

18158. *Mr. Lysaght.*] If the Commission thinks that it has the power to suggest amendments in the Special Rules, where they relate to the safety of the mine, or otherwise, so as to bring them into such a condition that the men can carry them out, I would get the various amendments made and bring them before the Commission for consideration. Such rules, for instance, as might meet the case suggested by Mr. Bower.

18159. *Mr. Robertson.*] The miners can suggest amendments.

18160. *Mr. Lysaght.*] The men cannot always tell how a rule will work. They only know that some of the rules are impracticable after they have tried to work under them.

18161. *His Honor.*] What you wish the Commision to do is to propose some alteration of the law which deals with these Special Rules, so as to give the miners the right of suggesting amendments to a greater extent than they now have.

18162. *Mr. Lysaght.*] Would this Commission have the power to amend some of these rules if they were brought before it, or at any rate to suggest amendment. I am rather afraid that that does not come within the scope of the Commission.

18163. *His Honor.*] This is going too much into detail.

18164. *Mr. Lysaght.*] I think the Commission would have power to suggest an amendment of the law whereby any suggestion as to new rules or amendment of old rules might be taken from the Unions.
18165. *His Honor.*] That would be a general amendment of the Act which would come within the scope of the Commission.
18166. *Mr. Ritchie.*] According to section 53 of the Act, after the Special Rules have been established, the owner, agent, or manager of the mine may propose an amendment of the rules; but the miners have no right to make any such suggestions.
18167. *Mr. Bruce Smith.*] If you look at section 52 you will see that the Minister can object to any of the rules, and the miners have access to the Minister. If the miners object to the Minister the Minister will take notice of it.
18168. *Mr. Robertson.*] My own experience was that the miners objected to a rule and the matter was referred to arbitration, and the Minister came out all right.
18169. *Mr. Ritchie.*] Why not let the miners object without going to the Minister. The Minister may say "I will not take these objections into consideration."
18170. *Mr. Bruce Smith.*] It is not very likely.
18171. *Mr. Ritchie.*] He could do so.
18172. *Mr. Bruce Smith.*] It is possible, of course, but one would hardly think that the Minister would ignore suggestions by a large body of miners, and not send them on to the management of the mine concerned.
18173. *His Honor.*] Unless something happened like that related by Mr. Bower in his evidence when Mr. Estell sent objections in. I may say that I think it would be fair to allow the miners some *locus standi* in the matter, so that they should not have to ask someone else to gain the ear of the Minister for them.
18174. *Mr. Bruce Smith.*] I think that experience shows that a Minister of the Crown as the custodian of the rights of a large body of men, would see that their interests were consistent with those of the proprietors.
18175. *His Honor.*] That is generally speaking.
18176. *Mr. Robertson.*] According to the Act of Parliament there was no alternative but to reject the objections sent in by Mr. Bower because they were not in print.
18177. *Mr. Bruce Smith.*] The wording of the Act is—"The proposed Special Rules, together with a printed notice specifying that any objection to the rules on the ground of anything contained therein, or omitted therefrom, may be sent by any of the persons employed in the mine to the Inspector of the district." This may have been read that the objection ought to have been printed, but it is no such thing. It is the notice which has to be printed. The objections were handed to the Inspector, and they ought to have been forwarded on to the Minister.
18178. *Mr. Roberston.*] *Q.* Did you send a printed notice with the objections? *A.* We took copies of the rules which were posted up at the colliery. We wrote out our objections and sent them in to Mr. Dixon.
18179. *Q.* Apparently it was not necessary to have them printed? *A* That is the reply which we got back.
18180. *Q.* All you wanted was to have a printed notice sent with them? *A.* I think we have the letter to day which we received in reply.
18181. *Mr. Bruce Smith.*] *Q.* You will see that they have to be submitted to the Minister through the Inspector.
18182. *His Honor.*] The Commission having had its notice drawn to this matter of a proposed amendment in the Act, there is nothing to prevent them taking any suggestions into consideration; but the point which would have to be considered would be merely whether it is expedient that the Act should be amended.
18183. *Mr. Bruce Smith.*] If you consider that question, I shall have to go into it, and read up evidence on the point.
18184. *His Honor.*] We shall not go into details as to the Special Rules.
18185. *Mr. Bruce Smith.*] But you will consider the *modus operandi* by which the men can send in their objections to the rules without being stopped by red tapeism?
18186. *His Honor.*] Yes.
18187. *Mr. Bruce Smith.*] Let Mr. Lysaght think the matter out, and put it in a definite form. I will then submit it to the Chief Inspector, and see whether it is taken exception to, or to what extent we can fall in with it. Mr. Lysaght had better say in so many words how it is he proposes the Act shall be altered. It comes within the scope of the Commission, because it is one of those matters which come under the heading of the best means of avoiding conflicts in the future. All I ask is that the matter may be put into a definite shape so that the Department can have an opportunity of considering it.
18188. *Mr. Lysaght.*] What is done under Section 51 of the Act is that the owner or Manager must frame Special Rules for the mine within three months after the commencement of any working for the proposed opening of a new mine, or of renewing the working of an old mine, and if these special rules are not objected to within fourteen days they are approved, and they are binding as far as the men are concerned, for all time against them.
18189. *Mr. Bruce Smith.*] Would not this suggestion come better from Mr. Lysaght when he brings up his suggestions.
18190. *His Honor.*] Having discovered a defect in the Act, Mr. Lysaght can suggest, in something like specific form, in what way the Act can be amended.
18191. *Mr. Bruce Smith.*] And the matter will have to be followed up by future machinery to decide in cases where the men and proprietors do not agree. There may have to be arbitration.
18192. *Mr. Robertson.*] I would suggest a board.
18193. (The further examination of William Bower was then postponed.)
18194. *Mr. Bruce Smith* brought up the depositions taken at Broken Hill on the 19th of July, 1895, at an inquest upon the bodies of Frank Pearce and others who had died from the effects of injuries accidentally received by a rush of air caused by a fall of earth in the Broken Hill South Mine. *Mr. Bruce Smith* also produced three letters, two being from Mr. J. Hebbard, of the Broken Hill South Mine, to the Chief Inspector of Mines, and one a letter from Mr. S. Mayne, referring to the same matter.
18195. *His Honor.*] These depositions have already been referred to in the inquiry, and can now be put in.
18196. *Mr. Bruce Smith.*] It was suggested that there was some evidence of burning; but there was no evidence at all.

18197.

18197. *Mr Wade.*] There was a statement in a newspaper called the *Colliery Guardian*, which referred to the men's hair as being singed. The depositions are short, and the medical evidence is shorter still; but there is no reference to the condition of the men as to their being singed or not, and I am inquiring into this question now.

18198. *Mr. Bruce Smith.*] The article in the newspaper is an unsigned article. Mr. Atkinson instructs me to state that beyond these depositions and these letters the Department has no further information.

18199. *His Honor* remarked that it was rather strange how unfounded statements were recorded in supposed scientific newspapers. He knew of one statement which was printed in a scientific publication which really originated in a joke.

18200. (The depositions taken at coroner's inquest on the bodies of men killed by a fall of earth in the Broken Hill South Mine on the 18th July, 1895, were put in and marked Exhibit No. 32.)

18201. (Letter to Mr. A. A. Atkinson from Mr. James Hebbard, Central Mine, Broken Hill, 14th January, 1903; letter to Mr. A. A. Atkinson from Mr. James Hebbard, Central Mine, Broken Hill, 29th January, 1903; and letter to Mr. W. H. J. Slee from Mr. S. Mayne, Underground Manager, Broken Hill South Mine, *re* the fall of earth in that mine in 1895, were put in and marked Exhibit No. 33.)

(The Commission, at 4·15 p.m., adjourned until 10 o'clock the following morning.)

THURSDAY, 19 *FEBRUARY*, 1903, 10 a.m

[*The Commission met at the Land Appeal Court, Darlinghurst.*]

Present:—

C. E. R. MURRAY, Esq., D.C.J. (President).

D. A. W. ROBERTSON, Esq., Commissioner. | D. RITCHIE, Esq., Commissioner.

Mr. Bruce Smith, Barrister-at-Law, instructed by Mr. Wood, Crown Solicitor's Office, appeared on behalf of the Crown.

Mr. A. A. Atkinson, Chief Inspector of Coal-mines, assisted Mr. Bruce Smith.

Mr. A. A. Lysaght, Solicitor, appeared on behalf of—

(*a*) the representatives of deceased miners, wheelers, &c., (victims of the explosion);
(*b*) the employees of the Mount Kembla Colliery (miners, wheelers, &c.); and
(*c*) the Illawarra Colliery Employees' Association (the Southern Miners' Union).

Mr. C. G. Wade, Barrister-at-Law, instructed by Mr. G. J. Barry, appeared on behalf of the Mount Kembla Coal and Oil Company (Proprietors of the Mount Kembla Mine).

(Mr. J. Garlick, Secretary to the Commission, was present to take shorthand notes of the evidence and proceedings.)

18202. *His Honor.*] I might mention that we have this morning received an analysis, from the Government Analyst, of a specimen of coal taken from the No. 1 main level back heading, at the spot from which the supposed coked coal-dust was taken. This analysis does not throw very much light on the question of how far the volatile hydro-carbons were actually driven off from that dust. I think the amount of volatile hydro-carbons found in the coked dust was 23·54; and Mr. Hamlet finds in the coal itself, in that particular specimen, 24·3. Of course, the coal may vary slightly. It is a dangerous thing to compare two things like that, of course, for the purpose of arriving at anything like an accurate conclusion; but, so far as there is anything in the comparison, about one twenty-fourth, or 4 per cent., of the volatile hydro-carbons that were contained in the coal originally would appear to have been driven off by the explosion at that point. As I say, the comparison is a rough one, which does not indicate anything very certain. It indicates that a very small proportion, at any rate, of the volatile hydro-carbons in the coal were driven off, if any were driven off at all.

18203. The analysis received from the Government Analyst of the specimen of coal taken from the face of the No. 1 main back heading was put in and marked Exhibit No. 34.

18204. *Mr. Bruce Smith.*] The coal itself varies?

18205. *His Honor.*] Yes.

18206. *Mr. Robertson.*] You might take a sample from the same place again, and find a different proportion.

18207. *His Honor.*] Yes; but, so far as a comparison can be made, that is the only conclusion that can be drawn, that not more than about 4 per cent. of the volatile hydro-carbons actually contained in the coal-dust were driven off. That is a very small proportion indeed.

18208. I may mention that this morning the Commission have received, through their Secretary, from the Department of Mines, a letter which has been written by Mr. Ebenezer Vickery to the Premier, suggesting the calling of certain witnesses. Now, those would be witnesses for the management, called on behalf of the management; and I think the best thing the Commission can do with this letter is just to hand these names to Mr. Wade, in case the suggestion should come to him as of any service. Of course, Mr. Wade is appearing here for the management, and the management is properly represented. The peculiar circuity of action in the matter may be the result of no wish to ignore the Company, or to ignore anyone; it may be only a peculiar way of doing things. I will hand the list of witnesses to Mr. Wade for perusal.

18209. [The letter containing the list of witnesses was then handed to Mr. Wade.]

MR. WILLIAM BOWER, previously sworn, was further examined, as under:—

Examination-in-chief by Mr. Lysaght.

18210. *Q.* We were speaking of the 19th Recommendation; and I read you the legislation in America;—in what way do you think that legislation would operate, if adopted here? *A.* It should certainly act as a deterrent to Managers victimising the men: that is to say, a man might hesitate before he would make himself liable to prosecution for deliberately throwing a man out of work without sufficient reason.

18211. *Q.* And, in addition to that, would it have any effect in giving the men more confidence in reporting any defects they observed? *A.* That is a natural consequence. At the present time, there is no doubt, the majority of men are afraid to report; at least, that is my experience. They will hesitate to report anything about their work, for the simple reason that they might get either a snub, or something worse.

18212. *Q.* It has been suggested that the Managers welcome any reports as to the condition or defects of the mine;—what has been your experience? *A.* They are only the exceptions that prove the rule. There are some, I believe; but the majority are not so. I am satisfied of that, because we know of instances. I know myself of instances brought under my notice where a man has repeatedly reported gas—for instance, the lighting of gas in his place—and he has been told by the under-manager that he sees too much gas.

18213. Mr. Lysaght then asked the witness the name of the man to whom he referred. The witness gave the name of the mine, and the name of the under-manager, but declined to give the name of the miner.

18214. Mr. Robertson pressed the witness to give the name of the miner, in fairness, as he had given the name of the under-manager.

18215. Mr. Lysaght submitted that the name of the miner should not be pressed for, as he might be prejudicially affected if it became known. The evidence had been adduced merely to show that reports as to the occurrence of gas were not welcomed by Managers.

18216. Mr. Wade submitted that either the evidence was admissible or inadmissible. If it were admissible, he thought that the Managers were entitled to have the statement thoroughly investigated, and, therefore, the name of the miner should be disclosed. Technically speaking, he (Mr. Wade) thought the evidence, being purely hearsay, was inadmissible. If Mr. Bower would not disclose the miner's name, he (Mr. Wade) would ask that the whole of the evidence be struck out.

18217. The witness, questioned by His Honor, said that he had never spoken to the under-manager referred to, nor the under-manager to him, on this subject.

18218. Mr. Robertson said he would like this statement to be probed to the bottom. If it were true, he would like the facts to be known.

18219. Mr. Bruce Smith said that Mr. Atkinson would like the matter to be probed, because it would be just as well to know what managers or under-managers discourage the reporting of gas.

18220. Mr. Lysaght asked that the evidence should be allowed to remain on the depositions, and said that, perhaps, later in the day he might see his way to have the name of the miner disclosed.

18221. Mr. Bruce Smith said that the evidence, as given, was merely hearsay evidence, and such as would not be accepted by any Court in the world, except, perhaps, a Russian Court. He considered that Mr. Lysaght had no right to have it kept upon the minutes pending his consideration as to whether he would bring the evidence forward in a proper form. Mr. Lysaght could, by and bye, if necessary, give the evidence again in a proper way.

18222. *His Honor.*] You object to it, Mr. Bruce Smith, as not being evidence at all; and you say that that principle ought to apply in this Court which applies in every other Court, as a matter of fundamental justice, in relation to the rules of evidence. Certainly, I think, as the point has been taken, that that is a very good objection; and, therefore, I think that the evidence ought to be struck out. Then, if anyone interested in the matter wishes it to be reintroduced in a proper way, there is the knowledge of its having been tendered, which can be utilised for the purpose of reintroducing it, if it can be properly reintroduced.

18223. *Mr. Lysaght.*] Very well, Your Honor.

18224. *Q.* Can you give a personal illustration of that? *A.* Yes, in the Wallsend Mine. In this case I was one of the men myself; so that there is no hearsay about this. It was in a section of the mine where we were compelled to use locked lamps, We worked with locked lamps for two or three months; and the under-manager visited the place daily with a flare lamp, an open light.

18225. *Mr. Robertson.*] *Q.* Who was he? *A.* Mr. Thomas Bosfield. His father was under-manager; and he was acting as deputy for his father at the time—his father sometimes came in.

18226. *Mr. Bruce Smith.*] *A.* When was this? *A.* It is upwards of twelve years ago. Both the late Inspector, Mr. John Dixon, and the present Inspector, Mr. Bates, visited it at the same time with open lights; and we were not allowed to use an open light.

18227. *Mr. Ritchie.*] *Q.* The inspectors came in with open lights? *A.* The inspectors came in with open lights as well.

18228. *Mr. Bruce Smith.*] *Q.* Do you mean about the same time—was it within weeks or months? *A.* It was during the months that we were working with the locked lamps.

18229. *Mr. Robertson.*] *Q.* Of course, that has hardly any bearing upon this point of the men being afraid to report? *A.* No; I am only just showing what may be done.

11230. *Mr. Robertson.*] One thing at a time.

11231. *Mr. Lysaght.*] *Q.* Can you give a personal illustration of a report being made to the management, which they have seemingly objected to; that is to say, they did not want reports to be made to them? *A.* No, nothing of that kind was tried with me. Of course, there is any amount of the same sort of thing that I have used previously; there are rumours of the same kind that men were afraid to report.

18232. *Mr. Robertson.*] *Q.* Have you made reports? *A.* Yes, when I have found gas.

18233. *Q.* You had no hesitation in doing so? *A.* I never had at any time. I have always taken those risks.

18234. *Q.* And you have not suffered? *A.* I am not aware that I have.

18235. *Q.* So it just simply wants a little pluck? *A.* Exactly; I believe it does, you know. If the majority of the men would do it, I am satisfied that would cause all that sort of thing to cease; but, unfortunately, they are not all built on my lines.

18236. *Mr. Lysayht.*] *Q.* And, at the time that you were reporting, do I understand that you felt that you were taking a risk? *A.* Well, no, for the simple reason —— [*Interrupted.*]
18237. *Mr. Wade.*] He did not say so.
18238. *Mr. Bruce Smith.*] Your Honor, Mr. Lysaght cannot ask what the witness felt.
18239. *Mr. Lysaght.*] *Q.* You were saying that Managers and Inspectors came in with naked lights to a place where you were using locked lamps. Can you give any other instances, more recently, where to your knowledge Managers have come in with naked lights when the men were using safety-lamps? *A.* No, I could not bring any to my recollection.
18240. *Q.* Recommendation No. 20—"Safety-lamps not to be unlocked for shot-firing." What do you say on that?" *A.* That it is ridiculous, and not necessary.
18241. *Q.* Do you know whether it is done in practice? *A.* I have seen it myself. It has come under my own observation.
18242. *Q.* Has that been frequent? *A.* Yes. All the shots in Killingworth Mine were fired in that way. I saw that myself. I worked in it myself. I made one inspection of that mine before it stopped; and that is how the shots were lit.
18243. *Q.* Is the danger, in your opinion, from using an open safety-lamp to light a fuse equal to, or greater than, the danger from the actual explosion of the gunpowder? *A.* There is always a certain amount of risk, where naked lights are prohibited, in going and making a safety-lamp a naked light; it is always dangerous. I consider, if it is necessary to work with safety-lamps at all, that it must of necessity be dangerous to unlock the safety-lamp, even with any inspection that the shot-firer may make in the working place.
18244. *Q.* Which, in your opinion, affords the greater danger, the opening of the lamp or the actual firing of the gunpowder? *A.* I believe the open lamp would be more dangerous.
18245. *Q.* Speaking of the gunpowder, do you think it a safe explosive? *A.* The ordinary Hall's Pellets, or Curtiss and Harvey's, are the general explosives in use. There is always a danger of flame coming from them and igniting any gas that is about; in fact we have, I daresay, innumerable instances where fires have taken place through it.
18246. *Q.* Then, in your opinion, should the use of ordinary blasting powder be prohibited? *A.* Yes; where a mine is considered to be a gassy mine, I think there should be some other explosive found; in fact there are other explosives, any amount of them; although I do not believe in many of them. I think I recommended Hall's Bull-dog Powder for Dudley. It is said that there is no flame from it; and, of course, it must be considerably safer; and it is used in exactly the same way. I believe that is their (Hall's) substitute for their ordinary powder where mines are considered gassy. It is a trifle dearer; but it is used in exactly the same way. There is no prejudice against using it, except the price—there cannot be—and it is on the list of permitted explosives. There is another one which I am pleased to say is got up by Sydney people. It seems to me to have the attributes of a safe explosive. It has not got a name yet; and it is not patented. It will be cheap.
18247. *Q.* But you cannot give it a name yet? *A.* I cannot give it a name. I believe it has been tried on some of the Government works though. Perhaps Mr. Atkinson knows something about it.
18248. *Mr. Atkinson.*] I do not know which you refer to.
18249. *Mr. Robertson.*] *Q.* Would it not be safer to have an explosive which had stood the Woolwich test? *A.* Yes. Well, I expect they would be prepared to submit this; they only want to see its utility first. Of course, I have not tried it where any gas is known to exist at all.
18250. *Mr. Lysaght.*] *Q.* But you suggest that this Bull-dog powder is a safe explosive? *A.* I did recommend that at Dudley; and I believe it saved a strike at the time. The Proprietary there were attempting to introduce carbonite, which is a nitro-glycerine explosive; and the men objected, in fact they went so far as to say that if it were put in at the time the Manager intended to put it in, that is on the Monday—and this was on the Thursday—they would not go to work. I suggested Bull-dog; and it seemed to have a fair trial, and seemed to fill the bill all round; but it has turned out that it has never been used yet by the management. They seem to have some reason for putting carbonite in. The men have the idea that the firm are agents for carbonite, and want to get it into use.
18251. *Mr. Ritchie.*] *Q.* What are the objections to the carbonite? *A.* The fumes. It is the same with all nitro-glycerine explosives, the fumes.
18252. *Mr. Bruce Smith.*] This just shows the great care that needs to be exercised by the Commission before any hard and fast rules are laid down in these matters. Mr. Atkinson tells me that the colliery guardian says that the Bull-dog powder is about to be prohibited.
18253. *Witness*] Mr. Atkinson has published it in his annual report as a permitted explosive.
18254. *Mr. Ritchie.*] Mr. Bruce Smith, we had an instance yesterday showing that the *Colliery Guardian* could not always be relied upon.
18255. *Mr. Bruce Smith.*] Yes: but this is an announcement that the Home Office is about to condemn Bull-dog as a permitted explosive in two months. I do not say it is true; but it shows how careful the Commission will have to be in laying down any hard and fast rules.
18256. *Mr. Lysaght.*] *Q.* There is a new suggestion from the Newcastle District, No. 21—"That the miners of each district (should) have the power to recommend for appointment an Inspector for their respective districts." What have you to say on that? *A.* That it is simply a protest from our district, practically speaking, against the present method of appointing Inspectors. Inspectors are appointed primarily for the safety of the workmen; and the opinion of our district is that the present system of appointing the Inspectors is faulty, and that they should have the right to nominate experts for the position themselves.
18257. *Mr Robertson.*] *Q.* Would not that carry a corresponding right on the part of the proprietors to also nominate an Inspector? *A.* We are not disputing the right of the proprietors to have the right to nominate—they have that now—but we claim that we ought to have the right to nominate one, and to have it considered.
18258. *Q.* Do you consider it is right that any party should have the right to nominate anybody at all? *A.* Under the existing conditions they do have it.
18259. *Q.* I would like you to explain that? *A.* It is perfectly well-known that one of the late appointments was got through political influence pure and simple.

18260. *Q.* I hope you do not mean to say that there is any connection between the politicians and the proprietors—you said that the proprietors had the right to nominate? *A.* I did not mean to convey that meaning. I do not mean to say for a moment that the proprietors can pull the political strings any more than the men.
18261. *Q.* You just said that they had? *A.* I said that they had the same chance.
18262. *Q.* I said, if you claimed the right to nominate a man for the position of Inspector, that would carry the corresponding right for the owners to nominate a man; and you said that they had got the right now? *A.* No; I said we had no objection to their having the same right. That is what I intended to convey. I said they have got the same right as we have at present.
18263. *Mr. Lysaght.*] What I understood, was that the proprietors have the same right as the men have now to get an appointment made; not that they were exercising a right that the men had not got, in any recent appointment.
18264. *Mr. Bruce Smith.*] I do not know what Mr. Bower meant to say; but he distinctly said, "They have it now."
18265. *Witness.*] I want to convey by that that we have power to recommend now, but no power to have our recommendations considered. I take it that the Managers have the same rights—they have power to recommend; but I do not see how their recommendation can be considered, any more than that of the miners.
18266. *Mr. Robertson.*] *Q.* You want to be sure that your recommendation will be given effect to? *A.* Yes, unless good reasons are shown why it should not be.
18267. *Q.* On the other hand, the proprietors should have the same right to say that their recommendations should be given effect to—so where would you be?
18268. *Mr. Ritchie.*] *Q.* What you mean is that the proprietors and the employees should have the right to nominate, and from those nominations the appointment should be made? *A.* Yes.
18269. *Mr. Lysaght.*] Perhaps the wording of this suggestion should go a little further, your Honor. It only says: "That the miners of each district have the power to recommend for appointment an Inspector for their respective districts."
18270. *Q.* I understand now, from you, that you want a power to have that recommendation carried into effect if no good reason is shown against it? *A.* Yes.
18271. *His Honor.*] *Q.* How is that possible; because, if two sets of people nominate different persons, and there is no substantial objection shown to either nomination, it is clear that they cannot both be appointed? *A.* Our side are limiting it purely to experts. They are not asking for any of themselves to be nominated.
18272. *Mr. Lysaght.*] Answering that, it would get over the difficulty of political influence if some third party, not representing either of the parties, should be appointed.
18273. *Mr. Robertson.*] *Q.* You are aware that appointments, at present, are ministerial; would it meet your view if the appointments were made by the Public Service Board;—the Public Service Board is supposed to be non-political? *A.* It might be better, even, that way.
18274. *Q.* Do you think it should be taken out of the possibility of political influence? *A.* We do, decidedly.
18275. *Mr. Robertson.*] I quite agree with you.
18276 *Witness.*] Mind you, I do not want this to reflect upon any of the late appointments at all; but it is a well-known fact that one of them, at any rate, never had any experience worth talking about—that is, I never knew him to have any experience, and I have known him myself all his life. He was simply a flatman, looking after the sets on the flat. Of course he was a mining student; but he could have had very little practical experience.
18277. *Q.* What is his name? *A.* Mr. Watson.
18278. *Mr. Bruce Smith.*] *Q.* But he had a splendid letter from Mr. May? *A.* It could only be on theory.
18279. *Q.* Was it not on practical experience? *A.* Where could he have had practical experience? I have known him all his life.
18280. *Mr. Ritchie.*] *Q.* You have said that your recommendation does not mean that your body of men intend to recommend any of themselves, but they intend to recommend experts? *A.* Yes.
18281. *Q.* Is it not the case that among your men using the pick there may be experts? *A.* Yes.
18282. *Q.* Then I am not correct in forming the opinion that you mean that they should be debarred entirely? *A.* I mean to say that men should hold certificates of competency as Managers before they are nominated.
18283. *Q.* The Act says that must be so? *A.* Yes; it does not matter what they are working at.
18284. *Q.* If the law were so altered as to allow the two parties to nominate Inspectors—the employees and the employers—in the event of a deadlock taking place, what would you suggest as a way out of the difficulty? *A.* Mr. Robertson made a very good suggestion—that the Public Service Board should make the appointment, if they are free from political influence.
18285. *Mr. Ritchie.*] Mr. Robertson did not mean that at all. He meant that you should not have the right to nominate at all.
18286. *Mr. Robertson.*] Yes, I think it is absurd—as at present.
18287. *Witness.*] This is put more as a protest against the existing system. You must admit that the Government Inspectors should have the confidence of the workmen, if possible.
18288. *Mr. Ritchie.*] They should have the confidence of both parties, if possible.
18289. *Witness.*] Well, then, the last two men appointed have started away exactly the opposite. No workman has got any confidence in them at all. They may be the best men in the service; but they are in that position that men doubt them all the time, and if there is no confidence in them the effect of their reports is not worth anything. Practically speaking, that is the reason for my appointment. If the men had confidence in the Government Inspectors, it would not have been necessary to appoint me.
18290. *Mr. Robertson.*] *Q.* You do not suggest that the proprietors had any influence whatever in the appointment of the Inspectors you referred to? *A.* I do not suggest that—that never crossed my mind.
18291. *Mr. Ritchie.*] *Q.* If you agree with Mr. Robertson's suggestion to pass the matter over to the Public Service Board entirely, the same results may be obtained from that Board as you get from ministerial appointments? *A.* They may.
18292. *Q.* Let us understand what your ultimate recommendation is: is it that you prefer the matter to be passed into the hands of the Public Service Board without either party having the right to nominate

or to recommend ; or that you desire to have the right of recommending, giving the same right to the employers, and to allow the Public Service Board to make a choice from the recommendations as sent in ? *A.* Our position is just briefly this, that we claim that, if we had the right to have our recommendation considered by the Minister, and if the Minister gave a sufficient reason why the appointment we recommended should not be made, we would be satisfied. But, under the present conditions, the workmen have no confidence in the ministerial appointments.

18293. *Q.* Would it meet your view if the law were so framed as to prevent any Member of Parliament from making a nomination ? *A.* Yes ; but how are you going to prevent it ?

18294. *His Honor.*] *Q.* Do not you think it would meet the case if it were the practice to give full notice beforehand, say a month's notice, of the intention to appoint a certain person as Inspector ; so that the miners, or any persons interested, might have an opportunity of objecting ? *A.* Yes, that would meet it in a way—the right of objecting in a body to any appointment, or any nomination.

18295. *His Honor.*] Yes ; the appointment being with the Public Service Board.

18296. *Mr. Robertson.*] It would be rather an invidious position for the man to be put in.

18297. *Mr. Lysaght.*] I can quite see that they might object to a man, and his whole career would be blasted. The unions, knowing that one had objected, would probably all take the same line, and act in concert.

18298. *Mr. Bruce Smith.*] Your Honor will take notice of the fact that many practical men, eminently fitted for the position, would not think of going for a nomination, touting for a nomination ; and you would exclude all of those from competing.

18299. *Witness.*] I do not see the difference between touting to the workmen and touting to Members of Parliament.

18300. *Mr. Robertson.*] Yes ; but what professional man of standing or self-respect would do such a thing ?

18301. *Witness.*] If the appointments had been men of that description, there would probably have been no objection.

18302. *Mr. Robertson.*] *Q.* Do you mean to say that any professional man would tout for his appointment, any man of any standing or self-respect ? *A.* I know I never do anything of the kind myself ; but I do not know what other people would do.

18303. *His Honor.*] There is no doubt that touting strikes many people as one of the lowest forms of human operation.

18304. *Witness.*] It brings me to this ; why should not the appointments be made by competitive examination, and the best men get them ?

18305. *Mr. Ritchie.*] That is what I was going to suggest to you.

18306. *Witness.*] Let the best man get the position. That should clear away all doubt.

18307. *Mr. Robertson.*] But unfortunately examinations are not a test as to the qualities of the men to be appointed as Inspectors.

18308. *Witness.*] You can add to that the amount of practical experience they have had.

18309. *Mr. Robertson.*] Even that would be objectionable, because a man might have the practical experience and the scientific knowledge, and yet be absolutely devoid of tact ; so that ructions would probably arise a day or two after his appointment.

18310. *Mr Ritchie.*] *Q.* I gather from your expressions of opinion, Mr. Bower, that you think it would be better to have a man who is selected by a body of experts after they have tested his qualifications in every way they possibly can, in preference to some person appointed by the Minister, who, perhaps, has no knowledge of mining, and has made a mere guess, as it were, in picking the man ?

18311. *Mr. Bruce Smith.*] Then I am afraid the next difficulty you come to is the composition of the Board of Experts, and the representation of the different interests upon it. This very Mr. Watson has passed the best examination a man could pass ; yet Mr. Bower says he lacks practical experience.

18312. *Mr. Robertson.*] I may say that the system of appointment of Inspectors in the British coal-fields was, first, that the appointments were made by the Home Secretary. Then examinations were tried ; and then that was abandoned : and now they have reverted to appointments by the Home Secretary. Of course, political influence, which Mr. Bower takes exception to, is not so rampant there as here.

18313. *Mr. Lysaght.*] I want the Commission to know that I do not wish to depart from this recommendation, which is made by the Newcastle Delegate Board, even though Mr. Bower may, to some extent, want to depart from it.

18314. *Q.* I ask you, Mr. Bower, do you still ask for the power to recommend persons to the Minister, and for the appointment to be made if no sufficient reason to the contrary is given ? *A.* I do, unless a better method is pointed out.

18315. *Mr. Bruce Smith.*] You might add—who is to determine the sufficiency of the reason.

18316. *Mr. Lysaght.*] I mean that I go the whole length of this recommendation, that the miners should have the right to suggest the man ; and that, unless there is some valid reason given against the appointment, he should be the Inspector for their district ; because it is their safety, primarily, that is to be considered ; and, if their safety generally is considered, the safety of the property generally is concerned—but primarily it is their safety ; and the miners do say that they have the right to make a nomination and to get the person nominated appointed, unless some valid reason is given against it.

18317. *Mr. Robertson.*] So that, virtually, the miners should have the appointment of the Inspectors.

18318. *Mr. Lysaght.*] No. If a valid reason were given against a nomination, that nomination would lapse.

18319. *Mr. Bruce Smith.*] Who is to be the judge of the sufficiency of the reason ?

18320. *Mr. Lysaght.*] I take it that the Minister is to be the judge of the sufficiency of the reason.

18321. *Mr. Robertson.*] Do you think the Minister could resist the influence of 6,000 or 7,000 miners in a case like that ?

18322. *Mr. Lysaght.*] Certainly, on a sufficient reason.

18323. *Mr. Wade.*] Then, why cannot he act in the first instance, as now ?

18324. *Mr. Lysagnt.*] Because he might put in a person, as in the case of this Mr. Watson, whom the men have no confidence in at all, and who, seemingly, had no practical knowledge. If the miners' union were to nominate a man who is an expert, why should he not be appointed, if there is no sufficient reason against him.

18325. *Mr. Bruce Smith.*] I think, as Mr. Watson's name has been dragged in here, I may state that Mr. Atkinson authorises me to say that he has the most perfect confidence in Mr. Watson's practical ability and personal knowledge.
18326. *Mr. Ritchie.*] *Q.* How would it do if a conference, composed of representatives of the miners and representatives of the owners, were to meet, and nominate three or five men, and send the names on to the Minister to make a choice—nominate a sufficient number, so that he could make a choice, among those persons mutually nominated? *A.* That would be a way out of the difficulty. I should say it would be better than the present system, at any rate. We would be prepared to take almost any amendment of the present system. As I told you originally, this recommendation is inserted principally as a protest against the present system; and, with regard to Mr. Watson's theoretical ability, nobody disputes that at all; as a teacher of mining, he should be very expert as a theorist, but his practical knowledge must be very limited.
18327. *Mr. Lysaght.*] *Q.* Under our proposition, an objection might be sent to the Minister by any of the proprietors, and the Minister would be bound to consider an objection, from whatever source it might come, and if it were a good objection, the nomination would be at once defeated.
18328. *Mr. Ritchie.*] Supposing the employees sent on a nomination, and objection was taken to that nomination, according to your way of putting it, the party nominated would have to stand aside.
18329. *Mr. Lysaght.*] No, not unless it was a good objection.
18330. *Mr. Ritchie.*] Then what would follow?
18331. *Mr. Lysaght.*] It would have to be referred back to the union, to see if the union could get over the objection, and, if the union could not get over the objection, the nomination would be defeated.
18332. *Mr. Ritchie.*] What would follow then?
18333. *Mr. Lysaght.*] It would be in the hands of the Minister to call for nominations.
18334. *Mr. Ritchie.*] The same objection might be made to every subsequent nomination.
18335. *Mr. Lysaght.*] I do submit that you are assuming a state of things that would be most improbable, because you are assuming that the union might nominate some man to whom there would be a valid objection. I think it is a fair assumption that, having regard to their own safety, the miners would not nominate any man to whom there could be any solid objection.
18336. *Mr Ritchie.*] That might be so, in their opinion; but other people might have a solid objection to him.
18337. *Mr. Lysaght.*] But we would leave it to the Minister as to whether the objection was solid or not. I submit to the Commission that it would certainly defeat the present practice, which is very objectionable.
18338. *His. Honor.*] Does the present practice of appointing Inspectors differ from the practice followed in appointing other public officers?
18339. *Mr Lysaght.*] Yes; other public officers are appointed by the Public Service Board.
18340. *His Honor.*] Why should not the appointment of colliery Inspectors be under the Public Service Board?
18341. *Mr. Lysaght.*] I can see that it would be an improvement if it were under the Public Service Board; but that does not carry out the recommendation that is sent to me by the Northern Miners' Union. I am representing them here, and I do not wish to depart from their recommendation. They seek to have the right to nominate a person, who shall be appointed as the Inspector in their district, unless some valid reason is shown against it.
18342. *Mr. Robertson.*] But Mr. Bower says it is simply a protest; and if any feasible suggestion can be made for a way out of the difficulty, he would accept it. I take it that he is representing the miners.
18343. *Q.* I ask you, Mr. Bower, if you would accept appointments by the Public Service Board, as meeting the views of your constituents. The Public Service Board is supposed not to be under any political influence, and to be perfectly unbiassed, and would probably have better opportunities of ascertaining the qualifications of candidates than the Minister? *A.* Then they would have to have some examination of some kind to get at the qualifications of the candidates.
18344. *His Honor.*] I understand that in all cases where the Public Service Board have the duty of appointing any officer for any particular work they always do hold examinations to find out who is best qualified.
18345. *Witness.*] I would prefer a competitive examination.
18346. *Mr. Ritchie.*] *Q.* You would prefer a special Board of men with a knowledge of mining? *A.* Yes; then you could take into consideration a candidate's status and his practical knowledge, besides his theoretical knowledge.
18347. *Mr. Bruce Smith.*] I think it ought to be remembered, in speaking of the Minister's making a choice, that he always has the Chief Inspector of Mines at his elbow; who is supposed, at least, to be the best man amongst the officers chosen from England for that position.
18348. *Mr. Lysaght.*] It is known, also, that the Minister always has half-a-dozen Members of Parliament at his elbow.
18349. *Mr. Robertson.*] I am fain to say that I have no confidence in Ministerial appointments.
18350. *Mr. Lysaght.*] We are trying to get over the same difficulty. If the men send in a recommendation, I submit that, in their own interests, they would not make any but the best recommendation.
18351. *Mr. Robertson.*] That is tantamount to an appointment.
18352. *His Honor.*] That is tantamount to an appointment following generally, or very likely to follow, the most strenuous canvassing; which is very likely to be one of the worst appointments that can be made.
18353. *Mr. Lysaght.*] Perhaps Mr. Bower might adopt this: that if there were a Board for the purpose of examining these candidates for the office of Inspector, and that Board were to receive nominations —— [*Interrupted.*]
18354. *Mr. Bruce Smith.*] I think, your Honor, we are drifting into rather a peculiar position. I understand Mr. Bower comes here as, practically, the representative of a number of other men, like himself, with practical knowledge. He has come here with a definite proposal, and only a few moments ago Mr. Lysaght stated that he could not depart in any way from the exact form of that recommendation. If we embark on a more lengthy discussion as to what Mr. Bower might individually accept, it is quite possible that, not only would Mr. Bower be placed in an embarrassing position by having consented, as a representative witness, to a proposal that his constituents might not agree to, but we should be departing from the object of the Commission, which is merely to take evidence as to what individuals think. I would

suggest that we take his evidence as to what he individually is prepared to recommend. Then other evidence will be forthcoming, because you may depend upon it that Mr. Atkinson may have something to say upon this proposal, and the Managers, too.

18355. *Mr. Lysaght.*] *Q.* Do I understand that you support the proposal, "That the miners of each district have the power to recommend for appointment an Inspector for their respective districts"? *A.* I support it, unless there is a more efficient proposal substituted. Of course, if there is, I am prepared to give way. I am here to support that.

18356. *Q.* And you say that this recommendation implies that, in the absence of a valid reason against the recommendation, the appointment should be confirmed? *A.* Yes.

18357. *Mr. Ritchie.*] I take it, then, that that leaves the final power of appointment in the power of the Minister, as at present, and you do not propose any change?

18358. *Mr. Lysaght.*] Yes.

18359. *Q.* Recommendation No. 22—"That a red light be carried on the front of trains or sets on engine planes or other self-acting inclines";—what have you to say about that? *A.* There have been fatal accidents owing to the want of something of the kind. In most mines, more or less, where the haulage is by main and tail, the sets travel at a very high rate of speed, and the noise of the rollers and of the rope hinders the men hearing when they are travelling out against the air, and the men sometimes have to get very close up to the side, and have not time to find a manhole to get into out of the way. The sets sometimes travel at 10 or 12 miles an hour, and there is nothing to guide a man at all. Very often, if the man is pushing his way out against the air, he does not hear the sound until the set is almost on him, through the noise of the ropes and the rollers; and we think there should be some light to distinguish a set coming like that.

18360. *Q.* Do you know whether that is the practice in any colliery? *A.* No; I have not seen it in practice.

18361. *Mr. Robertson.*] I have had many years' experience, and I never had any trouble in getting out of the way of sets.

18362. *Witness.*] I have had, though, sometimes.

18363. *Mr. Robertson.*] If you cut it too fine.

18364. *Witness.*] It may be that; but I do not suppose you have been in the habit of putting two or three picks on your shoulder, and hurrying to get out as quick as you could, and taking no notice. A Manager is generally on the look-out.

18365. *Mr. Robertson.*] But a man with two or three picks on his shoulder should take notice.

18366. *Witness.*] But I can tell you that very often sets come very close, indeed, before you notice them, and it makes a man jump to the side, and not look for a manhole either.

18367. *Mr. Robertson.*] *Q.* Your recommendation applies only to the main and tail rope system? *A.* It does not apply to the endless rope.

18368. *Q.* And it would only apply to haulage roads, where persons travel ordinarily? *A.* Yes, that is so; and there are a good many of them in the Newcastle district.

18369. *Mr. Lysaght.*] I think the recommendation is confined to "Trains or sets on engine-planes, or other self-acting inclines."

18370. *Mr. Robertson.*] *Q.* But there are engine-planes worked by endless ropes. He narrows it down, now, to where the main and tail rope is in operation; and not even then, unless the road is used as a travelling road in the ordinary sense? *A.* Then it is not required.

18371. *Mr. Lysaght.*] *Q.* Do you see any practical difficulty in having this recommendation carried out? *A.* The expense must be nominal. It would be only the first cost of the lamps and the oil.

18372. *Q.* Recommendation No. 23—"That a clause be inserted in the Act whereby better sanitary arrangements should be adopted in all mines where workmen are employed." What would you suggest under that? *A.* I am not prepared to suggest anything; because the reasons given at the time did not meet with my approval, and I did not trouble about it. There are times in a mine, especially when it is opening up new sections, when a nuisance may be created; but, as a rule, it does not necessarily follow. But they do not make any necessary arrangements then. For instance, a pit might have ten or twelve narrow places going away and no sanitary arrangements whatever in the mine; and it is too much trouble to haul men to the surface; I think, under those conditions, there should be some arrangements made.

18373. *Mr. Robertson.*] *Q.* But is it not a fact that, when the men have the opportunity of abating the nuisance, plenty of slack and dust about, they refuse, and will not take the trouble; and they have it on the windward side of them, and work away contentedly. They do not even make little holes and cover it up? *A.* I have seen instances of that kind.

18374. *Q.* In nine cases out of ten it is within the power of the miner to abate the nuisance I refer to? *A.* Not in the places I refer to. I think, generally speaking, he could; but, in a new mine, arrangements of some kind should be made. I think you will admit that yourself.

18375. *Q.* Well, it is a nuisance, I admit, in a new mine; but the question is how is it to be done; it is a very difficult thing to arrange? *A.* I know it is.

18376. *Mr. Lysaght.*] *Q.* You have no suggestion to make on that? *A.* I have none whatever. The others may.

18377. *Q.* Recommendation No. 24—"That, in our opinion, the management of a mine should not interfere with the right of an employee to go out of a mine when he deems fit"? *A.* That is a very necessary thing. I believe, legally, the miner has a right to claim it now. In a good many mines, the men are restricted by regulations from getting up (to the surface) except at a certain time of the day. Now, there are cases continually cropping up where men would like to get home, and they cannot. I can give you an illustration. I had occasion to travel up in the cage in one mine—there were only myself and the check inspector. Six other men got in the cage with us to go up; but they were ordered out, although the same drawing would have carried the whole of them to the pit top. In many cases I have heard of men being stopped from going home when there was no necessity for them to be in the pit. I believe it will be admitted by Mr. Robertson that, even in the best regulated collieries, the pit gets in a fix sometimes, and the men do not get their work away; two men work in a place, and there is no necessity for the two of them there; perhaps, in a particular heading, one man could go away from each place; and they have done it, and have been refused the right to go to the surface. Even if, by the men going home, they interfered with the output of the colliery, the Manager has a legal remedy against them now, and can prosecute them and make them pay for it; and I do not see why a man's right should be interfered with, his right to go home at any time.

18378. *Mr. Robertson.*] *Q.* You claim that the men ought to be a law to themselves as to how long they will work; that they ought to have the power to ascend in the middle of the winding, no matter whether for a reasonable cause or not? *A.* Yes. I claim that, if the cage will carry ten men, they ought to be allowed to go. I consider that the few seconds it takes to run ten, or twelve, or twenty men to the surface is a mere nothing to the day's output, in comparison with keeping the men there when they have nothing to do and are not paid for the time they are kept there.
18379. *Q.* I understand that it is the practice to allow men to ascend when they can show some reasonable cause: sickness goes without saying? *A.* I came across a colliery the other day where a man was prepared to go down to work for half a day; he had business that, practically speaking, compelled him to be at home in the afternoon; and he asked the Manager if he could get up at a certain time; and the Manager said "No, you cannot"; and the man had to go home again. He had to lose his day's work, because, if he had been in, he and his mate would have managed to get the day's work out between them.
18380. *Q.* I have certainly had no experience of a case of that kind, of a man having made a reasonable request and been refused; but I certainly would object to the men being allowed to come up the shaft whenever they thought fit. It would end all discipline if they were to be a law to themselves? *A.* Then you evidently assume that men will go down the pit and knock off any time to come out.
18381. *Q.* They will? *A.* A man is there to get his livelihood; and, unless he has a good reason, he will not come out.
18382. *Mr. Robertson.*] They will come out for a very trivial cause sometimes.
18383. *Mr. Bruce Smith.*] Your Honor, is not this a condition of labour of the miners that should be settled by the Arbitration Court?
18384. *His Honor.*] It hardly touches the question of safety.
18385. *Mr. Lysaght.*] I am putting it in that way. The men should not be kept down a mine where there is a danger.
18386. *Mr. Robertson.*] Do you mean to say that a man would be kept where there was any danger?
18387. *Mr. Lysaght.*] I do not say any conscious danger. There is always danger in a mine; and it is quite unreasonable to keep a man there. I quite agree with what Mr. Bruce Smith says, that this is scarcely a matter for the Commission; but I put that as a recommendation conducive to the general safety of the workmen.
18388. *Mr. Bruce Smith.*] Your Honor sees that the Southern miners have not suggested this at all; and, with regard to the Northern miners, the Arbitration Court is about to sit there for some time, and this question may be raised there. The same thing applies to the sanitary arrangements.
18389. *Mr. Wade.*] This question has been dealt with by the Arbitration Court in the Southern mines; and it has been decided that a man cannot leave his work without reasonable cause.
18390. *Witness.*] It is a remarkable thing that in places where the men can walk out of the mine there is no trouble at all.
18391. *Mr. Wade.*] You cannot catch them.
18392. *Witness.*] A man cannot walk by his station without being seen. And there is that case which I referred to, where it went even beyond discipline, and might be put down as petty tyranny. We had got into the cage, which would carry ten men; and there was enough time wasted to get those men out debating the business to have run two or three more runs of coal; but those men had to get out and stay in the mine.
18393. *Mr. Robertson.*] *Q.* When the men walk out of a tunnel there is no danger; that is to say, they do not come into contact with the hauling arrangements, the winding arrangements? *A.* Certainly.
18394. *Q.* And they do not interrupt the winding or the hauling? *A.* No.
18395. *Q.* When you ascend the shaft it is probably working at high pressure, and you do interfere with the output? *A.* It is so immaterial that it makes no difference.
18396. *Q.* That is a matter of opinion. A colliery may be working at high pressure, and if the men may ride up and down whenever they think fit, it may considerably influence the output. Surely you can say whether it would or would not reduce the output? *A.* I cannot imagine the conditions when it would.
18397. *Q.* Is not every stage a loss of output when the mine is working at high pressure? *A.* Yes; but it is so nominal that it can hardly affect it.
18398. *Q.* It depends how often it is used. Will you admit that when one cage is winding men a cage of coal is lost? *A.* Yes.
18399. *Q.* And if there are twenty, there would be twenty cages of coal lost? *A.* Yes, if you could keep the pit working at that rate.
18400. *Q.* Then if the men come out during the working hours they, to a certain extent, incur more danger than when they come up the shaft when the hauling and winding arrangements are suspended? *A.* I do not see that that necessarily follows.
18401. *Q.* Does not it necessarily follow that, when men come up to the shaft, and there is no hauling on, and the cage is prepared for winding men, there is very much less danger than when they come out during winding hours? *A.* I never saw a mine yet where the men were not at the pit bottom before she ceased to wind coal. In the majority of mines that does not apply at all.
18402. *Q.* Do not you see that there is extra danger when the men come out during winding hours? *A.* It is done every day.
18403. *Q.* At all events, you want to be a law to yourselves? *A.* No. The conditions you assume are almost impossible, because the men do not come out in the way you say, for a matter of twenty cages to be used; but it is certainly possible that two or three cages might be used in the day, and that the difference in the output would be only nominal—nothing at all. It will, in all probability, cause a lot of friction in the State; because the men are determined to enforce their right if it is legal, and they have got an opinion to the effect that they cannot be stopped at all; and, if it comes to extremes, the chances are that you will have to run the cage up for one man. You have no right to keep a man down there.
18404. *Mr. Robertson.*] *Q.* Then, according to that, if a man were sick we would have the right to refuse him the power to come up unless there were ten men who wanted to come up? *A.* You could refuse that power if you could refuse it reasonably; but a man who would refuse a sick man the right to come up would not do it the second time.

18405. *Q.* Is it not reasonable that the men should only have the right to ascend if they have reasonable cause? *A.* I am assuming all the time that the men have reasonable cause. I cannot see that the men would come up in the way you put it. I cannot imagine a condition of things like that.
18406. *Q.* Unfortunately, we have occasion to look at things from a different point of view from that of the miner; and we do find that the miners do come up without any reasonable cause at all? *A.* You are talking about 1 per cent. of the total number. You would not get ten men like that; and you could refuse him if you think he has not reasonable cause. If the men find they have a legal claim, they will push it to an extreme.
18407. *Mr. Bruce Smith.*] Does not your Honor think it would be better to limit this question, as far as this Commission is concerned, to the right of the men to come up to the surface if they have the right to come out of the mine, and leave that to the Arbitration Court.
18408. *His Honor.*] As far as that goes, a miner must have his personal right to be in any place that he wishes to be in. If he break his contract by ceasing work, when, by contract, he ought to be working, then he may be punished, by statute, or he may be sued for that breach of contract; but his personal right to be where he wishes to be cannot be interfered with.
18409. *Mr. Bruce Smith.*] But I submit that this Court will not go into the question as to whether it is desirable for men to leave work at any time.
18410. *His Honor.*] No.
18411. *Mr. Bruce Smith.*] But that question is being discussed between Mr. Robertson and the witness; and, if Your Honor will look at the wording of the Commission, neither the question of providing sanitary arrangements in the mine, nor that of whether the men have the right to come out of the mine at any time, when there is nothing abnormal in the condition of the mine to render it necessary, comes under the Commission. This has nothing to do with the safety of the men.
18412. *His Honor.*] I think you are right there.
18413. *Mr. Bruce Smith.*] If the Commission deal with it, it will mean that, by-and-bye, the attention of other witnesses will have to be directed to Mr. Bower's reasoning. His evidence on these two questions has occupied nearly three-quarters of an hour; and if those two matters are to be drawn in, and the evidence has to be answered by the Managers, it will mean many more hours. I suggest, therefore, as we are all desirous of cutting this down to reasonable limits, that the Commission will not go into any questions that really do not come within its purview.

This is the scope of the Commission, as read by Mr. Garlick on the opening day:—

> Know ye that we . . . do . . . authorise and appoint you . . . to make a diligent and full inquiry into the causes of the explosion that recently occurred at the Mount Kembla Colliery . . . . and also to investigate all the surrounding circumstances, in order to ascertain whether blame attaches to any persons or persons . . . . and, further, to make any recommendation affecting the general management, especially the ventilation, of collieries; and to offer any suggestions which you may deem advisable for the amendment of the law relating to the working of coal-mines; especially with regard to the treatment of coal-dust, the prevention of the accumulation of dangerous gases, and the use of safety-lamps and explosives.

18414. *His Honor.*] You suggest, and I think you are right in suggesting, that that does not cast upon the Commission the duty, nor give the Commission the right incidental to the duty, of inquiring into everything that may in any way possibly affect the coal-mine; but it tends to limit the scope of the inquiry to those questions which deal with physical safety in relation to coal-mines, and more especially in relation to the danger from explosions. I think, therefore, that we must draw the line there.
18415. *Mr. Bruce Smith.*] I think that argument is accentuated by the fact that another tribunal is in existence at the present time which was specially created by Act of Parliament to enter into the consideration of all these conditions of labour, a specially-qualified tribunal: and that the miners of Newcastle, who are bringing this up, now have kindred questions before that Court, to which they might make an addition, and have these matters discussed there.
18416. *Mr. Lysaght.*] I have already said that I do not propose to carry the matter any further. I would not propose to ask the subsequent witnesses any questions regarding the last recommendation, No. 24. I quite expected that, except on the principle that there might be a danger always present in a mine, I could not bring this within the scope of the Commission.
18417. *His Honor.*] It is too remote.
18418. *Mr. Bruce Smith.*] I take it, Your Honor, that the Commission will not go further into those two questions; so that it will not be necessary to prepare any evidence upon them?
18419. *His Honor.*] It appears to me and my colleagues that they are just beyond the edge of the scope of the Commission.
18420. *Mr. Lysaght.*] *Q.* I understand you want to say something regarding the practice of stowing refuse in the working bords, as being an objectionable practice? *A.* There is a practice in existence in some mines that, I think, should be prohibited, if possible; that is, in narrow work, winning work, prospecting places, they have a habit of stowing the refuse behind the brattice in the airway; and it has a tendency to interfere with the ventilation considerably. I think that should be strictly prohibited in narrow work. I do not think it needs many reasons to be advanced why; because, I think, that the fact that it interferes with the ventilation should be a sufficient reason to get a prohibition against any Manager who allows it.
18421. *Q.* Have you observed that during your check inspections? *A.* Yes, in many places.
18422. *Q.* And, in your opinion, had that an effect on the air circulating? *A.* Yes, it made considerable friction and interfered with the power of the air-current altogether.
18423. *Q.* Would there be any practical difficulties in having this refuse removed? *A.* None whatever; because it is generally removed altogether after a time.
18424. *Mr. Robertson.*] *Q.* There is the expense? *A.* I do not see where it saves expense very much; because when a man has a skip of refuse he might as well fill it, as the Manager sends in a body of men to fill it after they have run in a cut-through.
18425. *Q.* Just so; but sometimes it is not necessary to fill it? *A.* My experience leads me to believe that, where it is stowed behind brattice, it must always have a bad effect on the ventilation.
18426. *Q.* Assuming that is so, if sufficient ventilation is got at the face notwithstanding that obstruction, how does it concern the miner? *A.* I see. Well, it does affect it in places that I know; at least, I believe that it does. For instance, if there is a pair of winning headings, and one of these headings is the main

main intake split for the men, and you take the air up the solid heading, and you find it pinned tight with refuse and brattice, will not that have an effect on the air current?

18427. *Q.* It does not require any argument to show that refuse is an obstruction to the air; but is not that a matter for the discretion of the Manager, if sufficient ventilation is secured, notwithstanding that obstruction—if that is so, how does it concern the miner? *A.* Yes, in some cases, though, it would improve the ventilation. I do not see why you should limit yourself altogether to the necessary amount that is required, when the same power, with a little bit of trouble, would give better ventilation. Why is it necessary that a miner should only breathe the exact quantity, or the minimum quantity, when you can give him 200 or 300 feet extra?

18428. *Q.* But it does not follow that, even with the obstruction you refer to, you will get only the necessary quantity. You might get ten times the necessary quantity.

18429. *Mr. Lysaght.*] There is another reason—the danger that might arise from this rubbish.

18430. *Mr. Robertson.*] What danger?

18431. *Mr. Lysaght.*] There might be a risk of fire or of gas arising from that rubbish, or slack.

18432. *Mr. Robertson.*] Then do you suggest that all refuse should be taken out of the mine?

18433. *Mr. Lysaght.*] Not impracticably. Mr. Bower says the refuse is allowed to stop there, and men are sent in afterwards to take it out.

18434. *Mr. Robertson.*] Is not that a matter for the Manager, and, if he complies with the general rule of the Act which says that full ventilation shall be provided, how does it concern the miner?

18435. *Mr. Lysaght.*] That is a matter, with all respect, for the Commission to consider. I am putting the suggestion before them from Mr. Bower.

18436. *Q.* Do you consider there is a danger latent in having this accumulation of refuse? *A.* It is possible; admitting that the air travelled the other way to the way I illustrated, these places would be getting the last of the air, and the places might be dangerous; but Mr. Robertson claims that it should be left to the Manager's discretion. Well, I claim that I have a perfect right to complain about it; and I have complained about it, too, in my reports. Of course, I have not seen the Government Inspectors' reports, and I do not know whether they complained about it.

18437. *Mr. Robertson.*] *Q.* Did you complain about the ventilation? *A.* I complained about its interfering with the ventilation.

18438. *Q.* At the place you complained of, was the ventilation sufficient? *A.* There was sufficient to comply with the minimum quantity at the last of the split.

18439. *Q.* Apart from the minimum quantity, was there any defect in the ventilation? *A.* I have found fault with the place that I refer to, that the ventilation was not adequate, in my opinion; but I am not allowed to express my opinion—that is for the Government Inspector to do.

18440. *Q.* If you thought that the ventilation was defective, and that the ventilation could have been improved by the removal of this refuse, you had a perfect right to say so; but if the ventilation supplied is in compliance with this Act, even though there may be an obstruction of refuse behind the brattice, I really do not see that it has anything to do with the miner? *A.* I see.

18441. *Mr. Lysaght.*] *Q.* Do I understand that you think that the Manager should not have the right to allow any refuse to accumulate and cause danger any more than he should have the right to allow anything else to accumulate? *A.* Yes, in narrow work.

18442. *Q.* Now, I understand you desire to say something about General Managers interfering with the Managers of the mines, who are responsible? *A.* I am afraid it will hardly come within the scope of this Commission either.

18443. *Q.* Well, the Commission have to make recommendations for the better management of collieries, if possible? *A.* It is a case that came under my notice, to this effect. There was one General Manager controlling three Colliery Managers direct. These three certificated men were, certainly, the men responsible under the Act for carrying out their duties; but, in this particular case, they had to take their instructions directly from the General Manager as to the working of their mines; and, in one in particular, it came under my notice that, although a fan was lying on the ground—[*Interrupted*].

18444. *Mr. Wade.*] *Q.* Might I ask if Mr. Bower got this from the General Manager, or from one of the Managers of the mines? *A.* I had this information from one of the Managers in question. The only reason that I bring this up is that a fan that should have been erected some six or seven months ago, to ventilate that mine, is not erected yet; and the Manager's complaint is that he could not get the money to erect it, or could not get the orders to put it up. I believe it is in course of erection now.

18445. *Mr. Ritchie.*] *Q.* Do I understand that the Manager considered that the fan should be erected? *A.* He expressed strongly to me the wish to get the fan erected. The only ventilation they had was natural ventilation, assisted by a steam jet in the upcast shaft; and, during the last six months, a considerable number more of men have been employed; and, the last time I was in, I found the mine anything but adequately ventilated.

18446. *Q.* And I understand you to say that you were informed that the General Manager had——? *A.* Had stood in the way of getting the fan erected all this time.

18447. *Mr. Robertson.*] *Q.* The General Manager did? *A.* Yes.

18448. *Q.* Have you any proof that he did?

18449. *His Honor.*] I do not see that this is a matter which this Commission could take cognisance of; because, after all, the Manager might have a strong opinion with regard to any improvement, and the owner of the colliery, or the directors of the Company, might block him just as much as an intermediate General Manager would block him.

18450. *Mr. Bruce Smith.*] This question came up at the inquest; and it appeared to me then to be very important, because it was shown that, although Mr. Rogers was the Manager of Mount Kembla Mine, he really had no power whatever of spending money without consulting somebody else who was over him, and who was less responsible than he was. He said he had no power to spend money without referring to somebody else. It seemed to me to become a very important thing to clearly ascertain how far a Manager's operations, as a responsible person, are to be curtailed by somebody else in the background called an agent or a general manager, who may not have the direct responsibility upon him, and yet may possess the power of checking the free play of the Manager's own ideas upon management, and thus throw responsibility upon the Manager. I think Mr. Rogers was examined with regard to the provision of sufficient safety-lamps for the mine; and I think he said he had no power to buy them without the permission of some person.

18451. *Mr. Wade.*] No. I think he said that he could use his own discretion in spending money for ordinary purposes, but for extraordinary purposes he had to consult someone.
18452. *His Honor.*] Is it suggested then that it comes to this, that the Manager appointed within the provisions of the Act is practically a dummy in some cases?
18453. *Mr. Lysaght.*] That is it.
18454. *Mr. Bruce Smith.*] I do not indulge in any such extreme language as that at all.
18455. *His Honor.*] Is that what is suggested by the question?
18456. *Mr. Bruce Smith.*] That may be suggested; but what I want to put is that this is a matter which the Commission might take into consideration—whether a Manager, being made responsible for some act of commission or omission, should be under the direct control in expenditure of somebody outside who does not share his responsibility.
18457. *His Honor.*] The difficulty is that he always must be under the control of the proprietor, surely.
18458. *Mr. Bruce Smith.*] I am not submitting this as a proposition; but all I am contending for is that it is a question that it might be important for the Commission to take into consideration, if anybody is prepared to offer evidence on it. Your Honor sees that the Manager has a certificate; the agent need not have a certificate at all. Therefore, the Manager who is directly responsible for a disaster of this kind may have taken from him his only means of livelihood, his certificate. At the same time he may have been in the position—I do not suggest he was—of a man who is called upon to do something, but says, "I am handcuffed; I have no power of expenditure." It might be that the Manager saw a certain thing to be necessary, but had not the power to incur the expenditure, and did not like, lest he should incur the displeasure of the man immediately over him, to make the suggestion that the expenditure should be incurred. It is a suggestion that I think the Commission cannot shut its eyes to, in order to see how these two parties stand one towards the other. Here is Mr. Rogers, who may be deprived of his certificate; and yet there may have been omissions contributing in some way towards this disaster which, really, indirectly, were brought about by other people. I am making no suggestion that it is a fact at all.
18459. *His Honor.*] It may be suggested that legislation should be brought to bear to prevent the real Manager of the mine from being somebody else than the men who may be called the legal manager.
18460. *Mr. Wade.*] That is so now. It is so under the Act at the present moment. He is responsible, and nobody else. He is liable to prosecution.
18461. *Mr. Bruce Smith.*] Yes; but the Manager himself may lose his certificate, which is his means of livelihood; the other has no certificate to lose. I only suggest that the Commission should consider the relative positions of these two persons, if any evidence is offered.
18462. *His Honor.*] It all comes back to this, that it is a suggestion of dummying to a certain extent.
18463. *Mr. Robertson.*] It seems to me to be a suggestion that the Manager should have the uncontrolled expenditure of the mine.
18464. *Mr. Bruce Smith.*] It only shows the difficulty of putting it into words, to express the exact Liberty shade of meaning desired. Words give the general colour; but it is very difficult to express the exact shade of meaning. What I mean to say is that the agent need not necessarily have a certificate at all; and, therefore, though he may be equally liable with the Manager for some gross act of omission or commission, the Manager may, in addition to that, lose his certificate. If you look at the Act, section 3 says: "An agent, when used in relation to any mine, means any person appointed as the representative of the owner in respect of any mine or any part thereof, and, as such, superior to a Manager appointed in pursuance of this Act"; and it may happen that a disaster may be directly or indirectly contributed to by the omission to do something which would have involved expenditure.
18465. *Mr. Robertson.*] By whom?
18466. *Mr. Bruce Smith.*] By the omission of the proprietor; and yet the Manager, personally, though he sees this want, might not be able, of his own account, although he might think it absolutely necessary, to incur that expenditure without consulting his superior, the agent.
18467. *Mr. Robertson.*] But, supposing there is no General Manager and no agent, he has his Board of Directors to go to.
18468. *Mr. Bruce Smith.*] Then he would go to his Board; and as long as he pointed out to his Board in plain language, "Here is a thing which I consider necessary for the safety of the mine," and he is refused, he has always got that to fall back upon.
18469. *Mr. Robertson.*] Is not that the same with the agent? The agent is only the representative of the Board.
18470. *Mr. Bruce Smith.*] I hope you do not think I am suggesting any new relation.
18471. *Mr. Ritchie.*] There was some suggestion of that kind put forward at the inquest in connection with the Mount Kembla Colliery.
18472. *Mr. Bruce Smith.*] I am told that Mr. May, in his evidence before this Commission, drew attention to some provision that was put into the Coal Mines Bill, and cut out by the Royal Commission, which provision bore upon the relationship of the agent to the Manager. It is a relationship that the Commission, I am quite sure, cannot afford to pass over.
18473. *Mr. Robertson.*] That was a proposal that the agent should give written instructions to his Manager; a most absurd thing, a preposterous idea.
18474. *Mr. Wade.*] I object to this question being gone into at all; for this reason, that we are not here to enter into visionary ideas, and bring forward evidence to meet supposed possibilities, unless the evidence is disclosed either here or at the Coroner's Court. With all respect to Mr. Bruce Smith, he is entirely mistaken with regard to what took place at the Coroner's Court. What took place was that the question of the relationship between the Manager and the agent was introduced; I took objection to it; and it was not pursued any further. Then, Mr. Bruce Smith said, with regard to the question of safety-lamps, that Mr. Rogers said he had not the power to order them when he wanted them. Now, it so happens that it is the very opposite. He said that the safety-lamps came down to Mount Kembla, he did not ask for them, and he did not think they wanted them; he was surprised to see them. The question was asked, "Do you think there is any question of expense arising in this question of safety-lamps and flare-lights?" and he said, "There is this difference: the safety-lamps would cost about 10s., and the flare-lights 1s." "I suppose if safety-lamps were used the expense would fall on the Company; the Company supplied the dozen or eighteen safety-lamps we had before the disaster; they had not been used;

used; they were sent up by Dr. Robertson, and I was surprised to see them, because we did not require them." So that, so far as that goes, he made no request for safety-lamps, and he had not been refused them I have read through this as far as I could, and I say that Mr. Rogers gave no evidence of that kind. I take the general objection on these grounds, that the mine Manager is there for one purpose—to manage the colliery, with regard to the safety of the workmen employed, with regard to the interests of his employers, and to get the best output possible. He has the responsibility cast upon him by the Act, which says that he shall be responsible for the safety of the men, and which provides penalties for the breach by him of the general rules and special rules provided for his guidance. I suppose, in every commercial enterprise, there is somebody in command of the purse over and above the Manager; there is always a Board, or somebody who holds the purse-strings, and is independent, and in that sense must control the management of the colliery itself. It seems to me that the inquiry is absolutely futile on these lines, because, whatever Mr. Rogers may wish, no matter whether it is an agent above him, or a Board of Directors, or a Managing Director, if he wants money for the ordinary purposes of the mine he has the right to spend it; but if he wants money for extraordinary purposes he has to consult the person who holds the purse; and nothing brought before this Commission would, I submit, cause them to alter the position between ths person who manages the mine and the person who holds the money.

18475. *Mr. Bruce Smith.*] I do not know whether that question is before the Commission now.

18476. *His Honor.*] It is doubtful whether it is within the scope of the Commission, or whether, in the suggestion itself, there is anything so tangible that the Commission can get hold of it.

18477. *Mr. Bruce Smith.*] These are two totally different propositions. I can understand Mr. Wade's saying that the evidence which a witness is seeking to give is so flimsy that it really cannot be considered as evidence.

18478. *Mr. Wade.*] I did not say that.

18479. *His Honor.*] That is not what I meant by saying, "whether there is anything to get hold of": I did not mean to allude to that. I meant to allude to the suggestion itself, which is, that the Legislature should be asked to come in in some peculiar way between the Manager of a mine and the proprietor, to prevent the proprietor's having the right to interpose between himself and the Manager any other intermediary.

18480. *Mr. Bruce Smith.*] I do not put that proposition.

18481. *His Honor.*] Well, what is it, then?

18482. *Mr. Bruce Smith.*] All I am contending for at the present time is that, not only have the Commission power to consider the relationship between the agent and the Manager, but that it is directly within the scope of the Commission under these words: "Further, to make any recommendation affecting the general management of the mine." Suppose the evidence that may be forthcoming went to show that the relationship between the agent and the Manager was such that the Manager had not the freedom of action that he ought to have, as a responsible person, surely it would be within the scope of the Commission to consider the relationship, as to whether it ought not to be altered; because, whilst the Manager is the Manager, there is a man over him who has a greater power of management than he has; and, therefore, it distinctly comes in, as part of the administrative machinery of the mine which the Commission might think is so ordered as to conduce towards the possibility of danger. That is so much, as to the general proposition. Now, with regard to Mr. Wade, I have some recollection of asking a question in cross-examination. Mr. Wade has not read anything from cross-examination at all. He has read something from the examination by the Coroner.

18483. *Mr. Wade.*] That is all I could find.

18484. *Mr. Bruce Smith.*] I have found something else. The Coroner asked some questions in re-examination on my cross-examination which I have not found yet; but I find, at the foot of the page, this, that the Manager said: "I can act at all times for the safety of the mine without consulting Dr. Robertson; I always consult Dr. Robertson before I purchase anything required at the mine." It was that answer which suggested to me that there might be a condition of things under which the Manager, who was primarily responsible, was curtailed where a question was a matter of urgency; because an agent very often is the agent for several mines. Take the case of Dr. Robertson: he is the agent for mines in Newcastle, and he is the agent for mines on the South Coast. He may be up in Newcastle busily employed, and some great emergency may arise in the Kembla Mine which will involve expenditure. Well, it surely is an element in the safe management of a mine that in a case of that sort the Manager should not have to consult the agent, where an emergency arises. All I am contending for at present—and I reiterate it—is that it is a question of which the Commission cannot say, "We will not go into it."

18485 *Mr. Lysaght.*] I tender this evidence on this, that the Commission may see fit to suggest to the Legislature that such persons as viewers or agents should be prohibited from giving any directions to the Manager which may at all result in precautions, which the Manager deems necessary to take, not being taken; and it should be made a penal offence for either a viewer or agent to give such a direction. And, further, all directions given by these agents, viewers, or General Managers regarding the safety conditions of the mine, which may affect the safety of the workmen, should be put in writing, so that they would be on record to fix the responsibility if anything should happen.

18486. *Q.* I think that is what you suggest, Mr. Bower? *A.* Yes.

18487. *Mr. Lysaght.*] The suggestion is that the directions which the agent, or General Manager, or viewer may give should be put in writing to his Manager, and thereafter be available; and that such an absolutely irresponsible person should be prohibited directly from giving directions which may affect the safety of the mine or of the workmen. I might point out that on page 42 of the evidence (Inquest) Mr. Rodgers admitted this:—

> I do not know who is the agent for the Mount Kembla Colliery; I believe there is an agent; I have never heard who the agent is; I have never inquired; if I wanted to know whether I could incur certain expenditure, I would communicate first of all with Dr. Robertson.

Now, he did not know who the agent was; and apparently Dr. Robertson is some person, as far as the Mount Kembla Company is concerned, absolutely irresponsible; but Mr. Rogers had to refer to him.

18488. *Mr. Wade.*] That is not the evidence at all. The evidence is that he acts on his own responsibility if he thinks it necessary.

18489. *His Honor.*] It is not a question of the relation in which Mr. Rogers stood to Dr. Robertson or anybody else.

18490. *Mr. Lysaght.*] With that illustration before the Commission, and with the illustration given by Mr. Bower, where the Manager was prevented from putting up a fan, although he thought it necessary, by the General Manager, who was not responsible, I submit that it is a matter for the serious consideration of the Commission, as to whether they shall suggest to the Legislature some limitation as to the directions which may be given by these people; and that any direction that they may give should be put in writing.
18491. *Mr. Robertson.*] Do you mean to say that, if a Manager thought necessary to incur certain expenditure, that expenditure must be incurred whether the directors thought it necessary or not?
18492. *Mr. Lysaght.*] Yes.
18493. *Mr. Robertson.*] But, if the Manager does not feel satisfied with his position, under those circumstances he should resign.
18494. *Mr. Lysaght.*] Yes; but that does not help the men, Mr. Robertson.
18495. *Mr. Robertson.*] He could withdraw the men if he thought the mine was dangerous.
18496. *Mr. Lysaght.*] Yes; but I submit that, if the directors prevented the Manager from carrying out a recommendation for the safety of the workmen, it would be a criminal action on the part of the directors.
18497. *Mr. Robertson.*] Then you would make the Manager superior to his directors.
18498. *Mr. Lysaght.*] Superior, so far as the safety of his workmen is concerned, because he knows the danger and they do not. I submit with all respect that it is a matter in which the Manager should be absolute; and that the directors should either adopt his suggestions, where they are essential to the safety of the mine and the men, or not attempt to carry on the mine at all.
18499. *His Honor.*] After all, it all comes back to this, whether or not the Legislature ought to be asked to interfere, in the interests of the miners, between the Manager and the proprietor, and to give the Manager some specific powers which may over-ride or ignore the primary rights of the proprietor. That really seems to be the simplest form of the question that I can think of; because it cannot possibly be suggested, as a matter of common sense, that it is possible to limit the right of a proprietor to employ an agent, and for that agent to deal immediately with the Manager. From the nature of the case it cannot be suggested that that right can be limited. Take an instance: the proprietor may be an old lady living in England. Well, surely she has got a right, and no legislature would think of interfering with her right, to appoint a Manager for the whole of her property in New South Wales, and to give that Manager any unlimited powers which she thinks proper to give in connection with the management of her property. So that the intervention of the agent cannot be dealt with: but, when it comes to the question of the protection of the miners, then the question is whether or not the Legislature ought to protect in some way the real Manager of the mine, the Manager dealt with by the Act, in relation to his management, no matter whether it is against the proprietor, or against the agent, or against any other person who happens to be a person who has the disposal of the money with which the mine is to be managed. Well, that does seem to me to be a question, which, probably, this Commission would have the right to entertain.
18500. *Mr. Lysaght.*] There are what are called "viewers." Seemingly, that is all Dr. Robertson was at Kembla, a viewer, not an agent; but, under the present Act, there is no recognition of the office of viewer; and, therefore, apparently, at Kembla, Dr. Robertson was an absolutely irresponsible person.
18501. *His Honor.*] There is no definition of the position of an agent, except a suggestion that there may be, and probably will be, a person standing in the position of agent of the owner of the property.
18502. *Mr. Lysaght.*] But, in the case of a viewer, his opinion may over-ride the opinion of the Manager, and it may not be even the wish of his Board of Directors. I suggest that the Legislature would provide that any directions given by him to the Manager should be placed in writing; and any such direction which was opposed to the Manager's idea of what was required for the safety of the mine should be brought under a penalty.
18503. *His Honor.*] I am dealing with the broad question of whether the position of the Manager in relation to the proprietor, whether the proprietor acts through an agent or not, shall be dealt with by the Legislature.
18504. *Mr. Bruce Smith.*] There would be nothing very novel in that, as stated by your Honor, because the ordering by the Legislature of the safety-lamps into a mine, if the Manager wishes it, is an interference with the rights of the proprietor.
18505. *His Honor.*] It does appear to me that, looked at in that light, this is a question which the Commission may properly go into.
18507. *Mr. Wade.*] He has the power now. If he thinks a thing is necessary for safety, and the directors will not give it to him, he can say "The men must not work there."
18508. *His Honor.*] Then comes in the peculiar question that there are intermediaries who stand in a rather unusual position to the proprietor. It is not the mere existence of an agent which would entitle the Commission to go into the question; it is the position of the Manager in relation to anyone having control over him that seems to be material.
18509. *Mr. Lysaght.*] *Q.* Mr. Bower, the objection which you have stated to the Court as to the power of the General Manager over his Manager would be met by the suggestion I have made that all directions from a General Manager or other irresponsible person to a mine Manager should be put in writing? 18510. *His Honor.*] Here is one of your adjectives, which are coming in continually. You say "irresponsible." But I take it that the agent is responsible to somebody.
18511. *Mr Lysaght.*] But I have in mind the viewer.
18512. *Mr. Bruce Smith.*] I admitted that he was equally responsible, criminally, with the Manager; but the Manager has a certificate to lose as well.
18513. *Mr. Lysaght.*] *Q.* Any person other than the Manager giving directions to the Manager should put those directions in writing? *A.* Yes, it would be a safeguard to the miners; there is no doubt about that.
18514. *Q.* And any direction given contrary to what the Manager thought essential to the safety of the mine should be made an offence? *A.* If it was carried out by order, yes. If it was only a direction, and the Manager refused to carry it out, which he might do, then there would be no necessity to write it.
18515. *Q.* Is there anything else you wish to say upon that point? *A.* No, it is quite sufficiently ventilated.
18516. *Q.* Then, I understand, you also desire to suggest an amendment in General Rule 39, regarding the appointment of the check-inspector; and you desire the words "not being mining engineers" struck out, and the word "working" before the word "mining" struck out? *A.* Yes. 18517.

18517. *Q.* What do you say in support of that? *A.* Well, the words in brackets there, "not being mining engineers," were objected to by the Northern Employees' Federation when the Act was passing through the House They claim that they should have the right, if they think fit, to employ an expert in their interests. I think it is only reasonable that they should. And, as far as the person himself is concerned, according to legal opinion, I, myself, during the time of the election, have got to look for work, and to be actually mining at the time, pending the election. In fact, I was engaged six weeks at the colliery last year.
18518. *Q.* You think those words, "not being mining engineers," and the word "working," before the word "miner," should be struck out? *A.* Yes.
18519. *Q.* Is there anything else you want to say? *A.* No; I think I have fairly covered the ground.

Cross-examination by Mr. Wade:—

18520. *Q.* Yesterday afternoon, when you were talking about the black-list, you referred to men being dismissed at East Greta. Those men were not deprived of employment elsewhere. That is what the black-list means? *A.* They got the reinstatement before they had occasion to go and look for work.
18521. *Q.* And the same Manager took those men back? *A.* Yes, under certain conditions.
18522. *Q.* But he took them back? *A.* Yes.
18523. *Q.* It does not matter what the conditions were. You said those men were dismissed because they were unionists? *A.* I said distinctly that it was remarkable that they happened to be the three officers and the committee of the newly-formed lodge.
18524. *Q.* That is the suggestion you wanted to convey? *A.* Yes.
18525. *Q.* Has not it come to your knowledge that those men were working under an agreement not to join the Newcastle Union? *A.* Yes, I know it; at least, I have been told it.
18526. *Q.* It has come to you officially, has it not? Did you also know this, that they were allowed, if they thought fit, to join the local union? *A.* Exactly; I suppose they were. I do not know whether they were or not.
18527. *Q.* You went up there to inquire into it? *A.* Yes, but hearsay has been objected to all along. I do not know it officially.
18528. *Q.* Do you know there was a local union there? *A.* No, I do not.
18529. *Q.* Was not this the trouble, that these men, behind the back of the Manager, formed a branch of the Newcastle Union? *A.* Yes.
18530. *Q.* And that is why they were dismissed? *A.* Yes; but will you allow me to give the reasons? Why did the Manager select eleven men out of some hundreds he had there, and allow the others to go to work, and not these certain men?
18531. *Q.* Did not exactly the same question arise at South Greta? *A.* No.
18532. *Q.* The introduction of a branch of the Newcastle Union? *A.* Not that I am aware of.
18533. *Q.* Are you prepared to say that question did not arise? *A.* I am prepared to say that I am not aware that the men were discharged for the same thing.
18534. *Q.* It was for the formation of a branch of the Newcastle Union there? *A.* There was one formed, I believe; but the Manager discharged the men, he said, because he did not want them, not because they joined the union. I know that.
18535. *Q.* Were you in Newcastle last week, or the week before, and did not you hear Mr. Curley say, in the Arbitration Court, that the reason that they were discharged was because they were unionists? *A.* I was not there.
18536. *Q.* You said to Mr. Lysaght that Mr. Azarian Thomas said that the mine was not safe, and he could not get a fan? *A.* I did not say that. I say there was a fan lying on the ground there for twelve months, and it could have been built in any time during that time; and it is not finished yet.
18537. *Q.* But you did not suggest that there was a danger? *A.* I do suggest in my last report that the ventilation is totally inadequate for the mine.
18538. *Q.* Do you suggest there is a danger at the present time? *A.* I suggest that the men are working in inadequate ventilation.
18539. *Q.* Is there a danger? *A.* It is dangerous to health.
18540. *Q.* If they live long enough? *A.* They will live as long as they have fresh air.
18541. *Q.* With regard to the appointment of Inspectors, do you wish, under any circumstances, that the miners should have the power to recommend? *A.* Yes; I do not see how there could be any harm in it.
18542. *Q.* And would you give them the power to insist on the recommendation, to press it home? *A.* I would give them all the power possible to get their nominees appointed, or sufficient cause shown why an appointment should not be made on the recommendation.
18543. *Q.* Then, if an objection is made to the recommendation, you would give the miners power to still press their recommendation? *A.* If the objection taken was a reasonable one, I would not ask to go any further.
18544. *Q.* If the miners thought the objection was not reasonable, would you still give them the power to press it further? *A.* Yes; to press it as far as they could.
18545. *Q.* Whom would they press? *A.* They would ask the Minister for his reasons.
18546. *Q.* Still to press the Minister? *A.* Yes.
18547. *Q.* And if the Minister declines to yield to the pressing? *A.* We would have to take a back seat or else go to the Government.
18548. *Q.* What are you going to do if the owners recommend a man? *A.* We have no objection whatever; they can use their power and influence too.
18549. *Q.* If their recommendation of their man does not suit the miners? *A.* The miners are in this position, that they have got to nominate experts. They cannot be said to be very selfish in the business. It is not like appointing one of their own number.
18550. *Q.* I did not say a word about selfishness. If you found that the owners' recommendation was distasteful to you? *A.* We would object to it.
18551. *Q.* You would bring pressure to bear on the Minister to over-ride the owners' recommendation? *A.* If the owners' recommendation was a nomination that I approved of, in preference to one nominated by the miners, I would go for the owners' nominee; I am speaking personally now.
18552. *Q.* But I am taking the case where you disapprove of the owners' recommendation? *A.* I would do everything I could to stop its going further.

18553. *Q.* And you would use any influence you could to carry your point? *A.* Yes; why should not I?
18554. *Q.* Although the Minister may, in all good faith, have a difference of opinion with you? *A.* Well, then, if he gives his reasons for his opinion, I would not do it. If I were satisfied that the Minister's reasons were reasonable I would not oppose it.
18555. *Q.* You want two things: you want to be satisfied yourself of the validity of his objection and of his *bonâ fides* too? *A.* Yes; if the proprietors were satisfied, I would be satisfied. They could use the same means that I could use.
18556. *Q.* You would not be content with the Minister's disagreeing with you, although you knew his disagreement was in absolutely good faith? *A.* No; I do not say that. If the Minister gave good reasons for his objections to our nominee, as far as I was concerned, I would absolutely fall in.
18557. *Q.* That is not the question I asked you? *A.* But I am going to express myself in the way I think fit.
18558. *Q.* I ask you this: if you do not agree with the Minister's objection, but you are satisfied in your own mind that it is perfectly *bonâ-fide*, you would still force him to take your view? *A.* If it was *bonâ-fide*, I would not; if I disapproved of his reasons, I would certainly use all the influence I could to get my nominee pushed forward.
18559. *Q.* Whether the Minister was acting in good faith or not? *A.* Yes; although an alternative idea has been suggested here that I approve of; and, to go further into the matter, I would tell you that in the beginning, when that recommendation was made, I believed in a competitive examination.
18560. *Q.* Would you confine it to an examination on paper alone? *A.* Of course, the amount of experience a man had should be taken into consideration beyond that. You do not want the examiners to travel round the mine with a man to see what his practical knowledge is, surely.
18561. *Q.* Then you are content to have it removed entirely from political influence? *A.* That is what I would like to see.
18562. *Q.* In that case you would not ask for the right to recommend your own man? *A.* I do not suppose they would press it if it were entirely free from political influence, although I do not see any harm in their having the power to nominate, because their health is, practically speaking, in the hands of those men.
18563. *Q.* What is the good of the power of nomination if you cannot enforce it? *A.* You cannot enforce any nomination, as far as I know.
18564. *Q.* You said you would try? *A.* I said I would try; but there is a difference between trying and being able to.
18565. *Q.* But if it is put in the hands of a non-political Board, would you still claim the right to try and force on that Board your nominee? *A.* No.
18566. *Q.* Now, with regard to these manholes; in the first place, how many collieries are there in the Newcastle District that are working with a main rope on a road which is also the travelling road? *A.* A dozen or more, perhaps twenty.
18567. *Q.* They have the main road for haulage, and the haulage road is also the travelling road? *A.* I daresay there are twenty. I could not name them from memory.
18568. *Q.* How far apart are these manholes in these haulage roads? *A.* I think they comply with the Act; 10 yards.
18569. *Q.* Do you mean to say that a man coming out of a mine and looking for a refuge would not be able to find a hole within 10 yards? *A.* He would be able to find a hole under 10 yards.
18570. *Q.* Without any trouble at all? *A.* That is a different thing; where they are whitewashed, he would have no trouble.
18571. *Q.* The farthest distance he would be away from a manhole would be 5 yards? *A.* Yes.
18572. *Q.* And yet you would want the whitewash to enable him to find the manhole? *A.* Yes; he might go right past it.
18573. *Q.* If it is a dusty road, it would probably destroy the marks of the whitewash? *A.* No.
18574. *Q.* If the road was dusty, how long do you think the whitewash would show? *A.* For two or three years it would leave a distinctive mark.
18575. *Q.* Although it is dusty—although the dust is so thick that you could not see the manhole without the whitewash? *A.* No, I do not say he could not see without the whitewash; but the difficulty is that a man carrying a naked flare in a mine like that could not see it, because all his attention is being taken by the light.
18576. *Q.* You say, although he was only 5 yards away, he could not see it? *A.* He could not see it unless he was right opposite it, and watching for it.
18577. *Q.* And you say that the whitewash in a main road would stand for years? *A.* Yes, they do stand it; I have seen them stand it.
18578. *Q.* On a dusty road? *A.* Yes, on a dusty road.
18579. *Q.* What do you want the travelling road 6 feet high for? *A.* For comfort; and, as it is generally used as an airway, it is all the better for being a bit high.
18580. *Q.* Do you think the difference between 4 feet 6 inches and 6 feet would make much difference in the ventilation? *A.* Yes, it makes a great difference.
18581. *Q.* And could not that be remedied by having sufficient appliances—cannot you ventilate a mine just as well if it is 4 feet 6 inches in the airways as if it is 6 feet? *A.* I will tell you what it is —— [*Interrupted*].
18582. *Q.* Can you do it? *A.* You can air it with width as well as height.
18583. *Q.* Then, whatever the height is, or whatever the width is, does not the ventilation depend on the power you apply to it? *A.* I suppose it does. Do not ask me expert questions.
18584. *Q.* You can answer that, can you not? *A.* It depends on the pressure, certainly.
18585. *Q.* So that what you want the extra height for is for convenience in walking? *A.* Yes, it would be more comfortable to walk.
18586. *Q.* Have you any idea what it would cost to brush down the stone? *A.* I do not know that it is done in the district.
18587. *Q.* I ask you if you know what the cost is? *A.* No.
18588. *Q.* You have no idea what the cost per yard of brushing down the stone is? *A.* If I had to put in a contract for it, I daresay I could work out the cost.

18589. *Q.* Can you give us now any idea what the cost is? *A.* I could not tell you; it would depend upon the conditions.
18590. *Q.* Take an ordinary roof in the Newcastle District? *A.* Well, I know some of them that it would pay very well to brush. They would get profit out of it. The most difficult mine to brush in the Newcastle District is done 6 feet.
18591. *Q.* Can you tell me the price? *A.* It would depend on what the roof was composed of, and whatever the stone was.
18592. *Q.* Then what you want the road 6 feet high for is for convenience in getting to your work? *A.* Yes; and for getting coal out, and for the horses. But I believe it pays to do that.
18593. *Q.* But you have no figures, and you have made no calculations? *A.* No; but I can contrast some collieries with others.
18594. *Q.* But you have no idea of the figures in connection with Minmi? *A.* I do not know what it costs. I could easily find out.
18595. *Q.* You said that cut-throughs 30 yards apart save the brattice, and you cannot make the brattice air-tight, as the men have not time;—is that correct? *A.* I mean to say that, if you put the cut-throughs every 30 yards, it would not take as much brattice to take the air.
18596. *Q.* Did you say that the men have not time to put the brattice up properly? *A.* I think under the present conditions they have not time to put it up absolutely air-tight.
18597. *Q.* Do you think, as a practical man, it should be air-tight? *A.* I think it would be unreasonable to expect it to be air-tight.
18598. *Q* Do you think, as a practical man, it should be air-tight? *A.* It would be better if it were air-tight.
18599. *Q.* Do you think it would be an advantage to have a certain amount of air scaling about the mine? *A.* You do not brattice a mine, generally speaking.
18600–1. *Q.* I am taking the mine, generally, first of all;—is it desirable or not to have the air passages absolutely air-tight, or to allow some air to scale away—to leak, if you like? *A.* Well, generally speaking, taking a split of air with old workings behind it, it is generally better to have enough air to scale a little off it to keep the old workings sweet. But we are speaking of two different things. You are asking me now about the questions that were asked about the working-places.
18602. *Q.* You used the expression that the men have not time to make the brattice air-tight;—do you think it is necessary to make it air-tight in the working-places? *A.* As air-tight as possible.
18603. *Q.* Do you mean that they have not time to make it as air-tight as possible? *A.* I mean to say that, under the ordinary conditions, brattice, in most cases, is hung, and it is not air-tight. It would be a very expensive thing to make brattice entirely air-tight.
18604. *Q.* Did you ever hear of any man who ever tried to make it air-tight? *A.* Yes.
18605. *Q.* Where is he now? *A.* The brattice is put up, and made as near as possible air-tight, where it is necessary for special work.
18606. *Q.* What is the special work? *A.* Well, in some cases, like this—I will try and explain it to you; although I do not know what you are driving at at all. They might have occasion to put in a heading blind to the boundary, and three or four, or, perhaps, five bords; and the whole of those bords would depend upon one single brattice to carry the current in. In those cases they have to make it as nearly as possible air-tight.
18607. *Q.* Is that an exceptional case? *A.* Not so exceptional as you might think.
18608. *Q.* Is it an exceptional case from ordinary mining? *A.* No; you will find it in nearly every mine.
18609. *Q.* You may find it in any mine. Is it an exceptional thing to have it in any mine? *A.* No, it is not exceptional; of course, it is not general.
18610. *Q.* Now, I understand you to say that, under ordinary conditions, you cannot measure with the anemometer the current of air at the face; is that so? *A.* Under the ordinary method of bratticing working places, the current is not strong enough in the air to move the anemometer.
18611. *Q.* That is under the ordinary conditions of a mine? *A.* Generally speaking, that is so.
18612. *Q.* So that you would want either some instrument very delicate, or some special arrangement of the brattice, to get sufficient current to measure it at the face? *A.* Well, you could, in all probability, do it by making the brattice tight at the bord end, and by making a small enough area with the brattice.
18613. *Q.* As things are at present you can get quite sufficient indication from the deflection of the light as to the nature of the current at the face? *A.* Where naked lights are in use. At least I satisfy myself. I do not know whether it would satisfy some of them.
18614. *Q.* Is not that a common way of doing it? *A.* No.
18615. *Q.* Have not you seen deputies come in over and over again and put the light behind the brattice? *A.* No; it is very rare.
18616. *Q.* Have not you seen it done? *A.* I do not think I recollect even a specific instance where I have seen a deputy do even that.
18617. *Q.* You have not a good word to say for the deputies? *A.* I have some good friends deputies.
18618. *Q.* And yet they would not take the trouble to do even that; they were too lazy to do their work? *A.* I never said so, and never intended to convey it.
18619. *Q.* Then, with regard to the escape shaft, I understand you want a cage big enough to carry how many men, as a minimum? *A.* It would depend upon the number of men in the mine. They are to be got out in an hour.
18620. *Q.* I am asking you for information? *A.* I cannot give it to you; because, if there were only twenty men in the mine, it would require a cage to draw one man; but in a colliery with 500 men it would take a larger cage.
18621. *Q.* What would you ask for in that case? *A.* They are asking there that the plant be large enough to lift the men in an hour.
18622. *Q.* Then you would want a cage to carry ten men? *A.* Yes.
18623. *Q.* And you would also want corresponding machinery to haul it up, a correspondingly strong rope, and corresponding power on top? *A.* Yes.
18624. *Q.* Have you any idea of the extra cost involved in equipping an escape shaft in that way? *A.* No; and I have not an idea of the cost of keeping these men down for five or six hours, and they cannot get out.

18625. *Q.* Have you any idea whether it costs £20 or £1,000? *A.* It might cost £1,000, and it might not cost more than £20.
18626. *Q.* And you are not content with the cages that they do have in many collieries in the upcast shaft? *A.* No; the appliances are very primitive in many of them.
18627. *Q.* They have appliances there for getting men out? *A.* They are compelled to have them by law; but they are so primitive in many cases that I dare say, if there had been reasonable machinery there, the men would not have thought of asking for more.
18628. *Q.* You do say that the appliances there do not satisfy you, because they are not sufficiently fast in winding? *A.* I think they are simply an evasion of the law.
18629. *Q.* And you want these appliances displaced, and expensive ones put in their place? *A.* They should have more expensive ones than they have got, at any rate, better means of getting the men out of the mine.
18630. *Q.* Now, you have made some reference to Seaham, and the safety-lamps; is not it a fact that the men refused to have those safety-lamps introduced? *A.* I said so, yesterday, that they objected to use them, but did not refuse them; because they had not the opportunity of refusing them. They were not asked to take them in.
18631. *Q.* They were given the opportunity of saying whether they would consent to it? *A.* They had nothing whatever to do with it. The men took them as soon as ever they were given to them.
18632. *Q.* Do you mean to say the men made no objection to it? *A.* They objected; but they did not refuse.
18633. *Q.* They made an objection to using them? *A.* They said they did not think they were necessary.
18634. *Q.* And, in consequence, the Manager did not force them upon them for the time-being? *A.* The Manager, as soon as he got the lamps and the lamp-rooms ready, gave them to the miners, and they took them.
18635. *Q.* And did not the Manager of Seaham put to the miners a proposition as to whether they would have safety-lamps some considerable time before they were introduced? *A.* I do not think so.
18636. *Q.* Did he give them no notice? *A.* The Manager simply gave the men the lamps when he was ready to give them to them; and the men took them.
18637. *Q.* Do you mean to say the men did not get notice? *A.* I mean to say it was common talk that they were going to be introduced; they saw the lamps there, and they knew they were going to be used; but I do say that the Manager did not say to them, "Will you take the lamps if I get them?"
18638. *Q.* I did not say he put it in that way? *A.* Which way did he put it?
18639. *Q.* Did he tell them he was going to get the lamps? *A.* I do not know whether he made an official statement.
18640. *Q.* Did he make a statement, official or unofficial? *A.* He told me.
18641. *Q.* Did he tell the miners? *A.* I do not know; he told me.
18642. *Q.* Did the men object to it? *A.* I say they carried a resolution that there was no necessity for the use of the lamps.
18643. *Mr. Robertson.*] *Q.* Was this resolution carried prior to the Kembla accident? *A.* Considerably.
18644. *Q.* And the consent to use them was after the Kembla accident? *A.* I do not think I would put it that way. They consented after a certain incident had taken place in that mine; but, mind you, there was a notice put on the pit top that the lamps had to go in on Monday. It was a question with the men as to whether they would go to work on the Monday or not; but a certain incident took place in the mine on the Thursday before the Monday, I think; and, at a meeting that night, the pit had to knock off; and the men had a meeting, and they altered their previous opinion.
18645. *Q.* What was the accident—an explosion? *A.* It was a slight explosion.
18646. *Q.* What I want to get from you is this: The objection to the lamps by the miners was raised some time prior to the Kembla explosion? *A.* Yes. It was common talk for a couple of years that the lamps had to go into Seaham; and the men said there was no necessity for it.
18647. *Q.* Then their consent to use the lamps was not until after the Kembla accident, and after an explosion at Seaham? *A.* I think, somehow or other, that the Kembla accident had not happened when the lamps went into Seaham.
18648. *Q.* You must know different? *A.* I am just trying to remember. At any rate, it was the incident that happened in Seaham mine that perhaps caused an alteration in the opinions of many men; but I say this, that the men in no case absolutely refused to take the lamps in Seaham, because the Manager put a notice up at the pit mouth that they had to take lamps in on the Monday morning, and when the Monday morning came they took the lamps in.
18649. *Q.* But would they have done so two years ago? *A.* I cannot tell you.
18650. *Mr. Wade.*] *Q.* They meant to refuse on the Monday morning; and it so happened that, in the interval, an explosion took place? *A.* I told you that the men said there was no necessity for the lamps in their opinion. They did not say that they would not use them. They never said at any time that they would not use them.
18651. *Q.* Did not you say the lamps were about to be put in on the Monday morning, and the men had decided not to work with them? *A.* I say they might have decided to refuse them; there were many talking that way at the meeting, but the only resolution that was ever carried was that the lamps were not necessary; and subsequently to that there was a conference with Mr. Humble and the local check-inspector and myself and the Manager, and Mr. Humble absolutely refused to discuss the question as to the necessity of the lamps at all. He said that the Chief Inspector and himself had thoroughly made up their minds that it was necessary for lamps to go into Seaham, and he advised us to go and advise the men to accept without any protest. That is what took place; but, as regards the men refusing, I will tell you that the notice was put up at the pit mouth, and the men went to work and accepted the lamps.
18652. *Q.* That was after the explosion? *A.* That was after that slight explosion. It may have modified their opinions a bit.
18653. *Q.* It was said yesterday that if a roof is about to fall the men should be withdrawn inbye. What do you mean by inbye? Do you mean every single soul on the inbye side of the mine, or inbye of that split, or what? *A.* If it is a fall of an acreage like this [*pointing to the 35-acre goaf on the plan*] every man in the mine should have been out of it; there should not have been a single man in the mine if that area of 35 acres was——[*interrupted*].

18654. *Q.* You think the fall was 35 acres? *A.* I say if a piece of ground of that size was working, every man in the mine should have been out.
18655. *A.* Did you ever hear of 35 acres falling all in one piece? *A.* No, but it might fall in thousands of pieces, and all at once.
18656. *Q.* Did you ever hear of 35 acres falling all at the one time? *A.* Why should it not? It is quite possible that a piece of ground that size may have been working for some considerable time, and would come away right to the grass roots all at once.
18657. *Mr. Robertson.*] *Q.* Did you ever hear of 35 acres of ground standing from which the pillars were extracted? *A.* No.
18658. *Mr. Wade.*] *Q.* If there were only 1 acre falling, should the men have been withdrawn? *A.* No; the men from that section should have been withdrawn.
18659. *Q.* If the men from that section had been withdrawn, would not all have been done that was necessary? *A.* It might have been so.
18660. *Q.* What would you suggest besides withdrawing the men? *A.* Get out of the way till she fell.
18661. *Q.* That is, withdrawing the men? *A.* That is what I say.
18662. *Q.* What else would you do? *A.* I do not know that you could do anything else when ground like that was working but get away from it.

Examination by Mr. Bruce Smith:—

18663. *Q.* When these twenty-five or twenty-six propositions were put before your Delegate Board, I suppose you spent some time in considering them? *A.* Yes, we were about six hours there that day.
18664. *Q.* There are a good many of them which you will admit now, after having considered them, involve a good deal of expenditure? *A.* Possibly.
18665. *Q.* I will just name one or two; there is a general proposal that fans shall be put into all mines—do you know what amount of money may be involved in the substitution of the fan for the furnace method of ventilation? *A.* It would cost a considerable amount.
18666. *Q.* That is too vague;—have you any idea how many hundreds or thousands it may involve? *A.* It would depend upon the fan, and the size of it, and the machinery.
18667. *Q.* Do you know what the cost might go up to? *A.* It might go up to £5,000 or £6,000.
18668. *Q.* It might go up to £10,000? *A.* It might be as many hundreds.
18669. *Q.* Now, with regard to this brushing of the roof—that might extend over many miles? *A.* It does extend over many miles.
18670. *Q.* Had you any figures before you, as a body of men recommending these things, as to what would be the probable cost of them? *A.* We know the general cost of brushing under ordinary conditions.
18671. *Q.* What is it? *A.* At Wallsend it is costing 2s. per yard at the present time.
18672. *Q.* A superficial yard? *A.* A lineal yard of the roof or bottom.
18673. *Q.* Did you go into that to consider what would be the effect upon some of the smaller mines by requiring that to be done universally? *A.* Would you describe to me what you mean by the smaller mines?
18674. *Q.* Are you aware that there are no less than forty mines in this country in which less than twenty men are employed? *A.* I would exempt them.
18675. *Q.* You did not say so? *A.* It never struck me about as many mines being in the Colony.
18676. *Q.* But the recommendations which you come down here to make before this Court, include no reservations whatever? *A.* Well, I put it this way, you can hardly recognise a mine as being a mine until it is in a condition to employ more than twenty men.
18677. *Q.* But do not you know that those small mines come under the Mining Act? *A.* I suppose they do.
18678. *Q.* But, in your resolutions you have come down here to recommend to this Commission, you have made no reservations whatever? *A.* I am prepared to make a reservation.
18679. *Q.* But did you come here without any reservations attached to these recommendations? *A.* We did not consider any mines such as those you have described.
18680. *Q.* Then I understand you did not really go into the possible cost of the recommendations that you were making? *A.* No; but we find it very necessary. We find plenty of companies changing the furnace for the fan, now; and I do not think the furnace is a safe thing.
18681. *Q.* I want the Commission to know whether you gentlemen, sitting down there deliberately as a body of men, making proposals to regulate other people's property, seriously considered any other point of view than your own, as miners? *A.* I will answer you this way; we considered the lives and the health of the miners only.
18682. *Q.* As long as we know that, the Commission will know what other sides they may have to look at? *A.* Yes.
18683. *Q.* Now, you have made a bald recommendation that all coal-mines be required to have a fan. Well, I suppose this thought, although it may have entered your minds, really did not come up before you, that, in requiring that, under certain conditions you might involve the mine in an expenditure which would so increase the cost of coal as to incapacitate the mine from being worked at a profit? *A.* Yes; that question has been dealt with in every aspect; and we know perfectly well that, if there was not the eternal competition, there would be no difficulty.
18684. *Q.* Did you know, or consider, that in asking this bald recommendation in regard to fans, there were these forty mines in existence with only an infinitesimal capital to go on with? *A.* No, we did not consider those mines.

[At 1 p.m. the Commission adjourned until 2 p.m.]

AFTERNOON.

(On resuming, at 2 p.m., Mr. W. R. Pratt attended to take shorthand notes of the evidence and proceedings).

WILLIAM BOWER, previously sworn, was further examined, as under:—

18685. *Mr. Bruce Smith.*] *Q.* Regarding what you told Mr. Robertson just now, did not the men, before they agreed to take the safety-lamps, pass a resolution adverse to them? *A.* They said that they did not think they were necesary.

18686. *Q.* Did you not encourage them? *A.* Yes, that was my opinion, but my opinion was qualified.
18687. *Q.* Did you not encourage the men in taking up that attitude—that you did not think the safety-lamps were necessary? *A.* With a qualification, I did. I think I had a right to give that. If certain things were done—if you brushed the roof high enough—I believe the men would be safe. I have always advocated in Seaham that they should brush the main roads at least another foot or another 18 inches higher.
18688. *Q.* Speaking about taking out the pillars, you said something about some gas coming out of the roof; where did the gas come from;—you spoke about an accumulation in a goaf? *A.* The goaf itself may have given off little or no gas. It may have come from the air traversing the goaf from the working places. You may put it this way—that if the atmosphere of the mine carries ½ per cent. of gas, and a little of that leaves the air, where there are cavities above the level of the seam, it will accumulate.
18689. *Q.* I wanted to know where the gas came from, whether it accumulated in the goaf? *A.* It came from the general atmosphere of the air.
18690. *Q.* I think you will admit that it is impossible to lay down any practical rule with regard to the visits of the Manager to a mine? *A.* It would be difficult to lay down any definite rule.
18691. When you spoke of requiring a larger supply of air for the men, I suppose you do not know yourself how much either a man, or a boy, or a horse consumes? *A.* No; I know the general rule.
18692. *Q.* What is it? *A.* It is stated that 100 cubic feet of air per man, boy, and horse would be sufficient under ordinary circumstances.
18693. *Q.* But do you know what the consumption is? *A.* It could be found.
18694. *Q.* I want to know what factor operated in your mind when you gave your evidence. You do not know what the consumption is of either? *A.* It would vary.
18695. *Q.* Between what amounts? *A.* I am satisfied that in some places it would require 500 cubic feet per minute.
18696. *Q.* I am asking you about the consumption? *A.* I have seen it in print.
18697. *Q.* You did not remember when you were telling us? *A.* No.
18698. *Q.* I want to know what your extent of knowledge was? I am not an expert.

Examined by Mr. Robertson:—

18699. *Q.* Your experience has been chiefly confined to the Newcastle district? *A.* I had a little experience at Home as a boy, and for a short time I was in the North-western district.
18700. *Q.* When you state that pillars of 30 yards square would be sufficient to meet all requirements, you are referring to the Newcastle district? *A.* I do not think I said 30 yards square; I said 30 yards long. You can put in any width necessary to carry the roof.
18701. *Q.* What width would you say? *A.* Any width necessary to carry the strata above them.
18702. *Q.* Supposing it were necessary to have 100 yards as the width? *A.* If it were necessary to have 100 yards, I suppose you would have to leave them 100 yards wide.
18703. *Q.* What about the cover? *A.* It does not interfere with what I said about the cover. Cut-throughs every 30 yards are enough to carry the air to the working faces.
18704. *Q.* But do you not see that the fact of having cut-throughs every 30 yards would be to limit the size of the pillars to 30 yards? *A.* You could put in any width you thought necessary.
18705. *Q.* Do you admit that it might be necessary to have 100-yard pillars? *A.* Do you mean in width? You assume that 100-yard pillars are necessary. I have never seen the conditions where they would be necessary.
18706. *Q.* If you were shown the conditions where 100-yard pillars are necessary, would it modify your opinion? *A.* It would modify my opinion; but if you had to put 100 yards or 200 yards on to 30 yards, then you would have to carry 130 or 230 yards.
18707. *Q.* What I want to know is, will not the recommendation have the effect of limiting the size of the pillars to 30 yards? *A.* In all the conditions that ever I knew of I never knew of a case which required pillars to be 100 yards without cut-throughs.
18708. *Q.* With the conditions that I speak of, cut-throughs every 30 yards would be inadmissible? *A.* I think that 30 yards is far enough to carry brattice. If you had to carry it 100 or 200 yards you would require it to be put up very carefully.
18709. *Q.* I want to assure you that there are mines where it is necessary to have brattice 100 or 200 yards in length, in order that the roof may be carried properly. You depend on the size of the pillars for carrying the roof. If it is necessary to have pillars 100 yards or 200 yards in length, cut-throughs every 30 yards would be out of the question? *A.* I think you are assuming something that is hardly likely to come into existence. I have never yet heard of conditions where it is necessary to have 100-yard pillars.
18710. *Q.* I am showing you conditions which exist at present, and you can easily see them to-morrow if you like? *A.* I would like to have the time to see them, because the conditions are so extraordinary that they would not apply to coal-mining generally. I was talking about ordinary conditions.
18711. *Q.* You are asking for legislation which affects all possible conditions? *A.* I do not agree with that, because there are exceptions in every mine. I gave an illustration of one this morning, when I said, that when you are taking coal from the boundary, it is necessary to carry air for a long way with brattice, but in that case a brattice is specially put up.
18712. *Q.* You will agree that if you have 100-yard pillars, you cannot have 30-yard cut-throughs? *A.* No, you cannot.
18713. *Q.* They would have the effect of weakening the pillars? *A.* I admit that, if the conditions were such as to make it necessary to have 100-yard pillars, the idea of having cut-throughs every 30 yards would be impracticable. I meant that the recommendation was to apply to ordinary mining conditions, and I cannot imagine conditions in which 100-yard pillars would be looked upon as ordinary ones.
18714. *Q.* Do you admit that the size of the pillars is governed by the depth of the strata above? *A.* Do you mean by the cover over the seam?
18715. *Q.* Yes? *A.* Yes, and by the nature of it.
18716. *Q.* And the greater the depth? *A.* Then the larger the pressure.
18717. *Q.* And the larger the pillar must be to resist it? *A.* Yes; I suppose that is a scientific fact.
18718. *Q.* You have had a great deal of experience in firing gunpowder shots? *A.* I have assisted in the process all the time I have been mining.
18719. *Q.* Have you ever known a fuse from a gunpowder shot to light with a naked light? It is a doubtful thing in my experience, although I have had a case of my own where gas was never seen or noticed where it actually lit. What it was, or whether it was the actual gas, I do not know. I had fired

a shot in a high seam of coal, and it opened up 6 inches. I then went round to look at it, and I put my light near it, and it went off.

18720. *Q.* Where did this happen? *A.* In the Magpie district of Wallsend. I think it has happened many times.

18721. *Q.* Is not Wallsend known to be gassy? *A.* Gas has never been seen there before. That block of coal had been worked round many years before, and it had been left until the return working came that way.

18722. *Q.* This was some years ago? *A.* Yes; but if my memory serves me right I have seen it happen more than once.

18723. *Q.* Do you think that there was any suspicion of gas being there, and of your not being able to detect it with the ordinary lamp? *A.* I never met it with the open light, or ever heard of any symptoms of it being there.

18724. *Q.* And this has only happened after a shot? *A.* It has only happened after a shot; but it is not so long ago since there was a fire in the Wallsend Colliery just previous to the men knocking off work. The deputy went in and found the coal on fire.

18725. *Q.* Did the man return to the place? *A.* Of course, the place was full of smoke, but after the shot had done its work all right he went away. They have a system at that colliery of travelling round to see that all the men are out of the mine, and that all the places are right. When the deputy arrived at this bord, he found a fine healthy fire there.

18726. *Q.* Do you think that the miner might have put his light there upon his return after firing the shot? *A.* He might, and he might not have noticed it. My own opinion is that the shot lit a small blower of gas.

18727. *Q.* Do you think it was gas, or do you think it was fumes from the shot which lit the coal? *A.* I think it may have been a mixture of fine dust; but, perhaps, there were some of the fumes from the shot there; and there may have been a little gas. I do not know.

Examined by Mr. Ritchie :—

18728. *Q.* You put before the Commission a proposal that cut-throughs generally should not be more than 30 yards apart? *A.* Under ordinary conditions I think this is necessary.

18729. *Q.* You said that if conditions arose under which it would be necessary to have them a greater length apart, that they would have to be so? *A.* It would be impossible under the circumstances to have them any other way.

18730. *Q.* Who do you think should be the determining party to decide whether it is necessary to have cut-throughs more than 30 yards apart? *A.* I do not say that cut-throughs should be more than 30 yards apart, but you could not drive through 100 or 200-yard pillars.

18731. *Q.* But who should be the determining body to judge of the length of the pillar? *A.* I do not know of anybody except the Manager of the colliery; he would be the best judge of whether or not the pillars are able to carry the weight.

18732. *Q.* Do you think that the Inspector might be called on to give a report? *A.* If the Inspector was called on, I do not see how he could be as good a judge in the matter as the management of the mine. For another thing, I cannot imagine the management leaving pillars of that size unless it was necessary.

18733. *Q.* What is the practice in your district? *Q.* The pillars are from 8 to 12 yards.

18734. *Q.* And the cut-throughs? *A.* The cut-throughs are generally 35 yards. The only exception is the case of the Dudley Colliery, where in one or two sections they drive 70 yards. My own experience was that this had a tendency to increase the temperature of the district.

18735. *Q.* How many places are there in the north where the cut-throughs are of a greater length than 30 yards? *A.* I said that they were 35 yards, generally speaking. I know of odd cases where they go to 40 yards.

18736. *Q.* Is there any colliery where it is the custom to have a greater length? *A.* There is no colliery where it is the general custom to have a greater length than 35 yards.

18737. *Q.* What is about the thickness of your superincumbent strata? *A.* Taking the Borehole district, it varies from nothing up to 700 or 800 feet. West Wallsend and the Seaham Colliery are exceptions, because they are working under mountains which add several hundred feet more cover.

18738. *Q.* Do covers of 800 feet affect the mines? *A.* There is no appearance of any crush.

18739. *Mr. Robertson.*] *Q.* Can you tell me the size of the pillars at the West Wallsend Colliery? *A.* They are 12 yards, but at an adjoining colliery, under the same strata, they are working with 8-yard pillars.

18740. *Q.* Have they started to take out the pillars? *A.* They have started to take them out, but I must admit that I am somewhat doubtful of them.

18741. *Mr. Ritchie.*] *Q.* Doubtful of what? *A.* I am doubtful about the thickness of the cover, and I should not be surprised if they lose some of them.

18742. *Q.* Where the Manager of a mine wishes to have cut-throughs at a longer distance than 30 yards, should he be permitted to have them? *A.* I do not know who else you can bring in to decide the matter. The Inspector is not there all the time to watch how the pillars carry, and he could only form an opinion by going there occasionally. The Manager is there all the time. The Manager will hardly risk leaving these large pillars in if he can help it, because they lose so much by them.

18743. *Mr. Robertson.*] *Q.* Who suffers the loss? *A.* Generally speaking, the owners—in that particular case.

18744. *Q.* If a Manager had orders to pursue a system of working with pillars too small for the mine, who would suffer the loss? *A.* The proprietors.

18745. *Mr. Ritchie.*] *Q.* The idea is that the cut-throughs should not be more than 30 yards apart? *A.* Under ordinary conditions, I think that would be enough.

18746. *Q.* Supposing a Manager differed with you, and said that he thought the cut-throughs should be 60 yards apart, what would you do? *A.* I would oppose it for all that I was worth.

18747. *Q.* Should he have the power to say that they should be 60 yards apart? *A.* Mr. Robertson has put an extreme case before us. Under ordinary conditions, the system of having cut-throughs at every 30 yards could be carried out without any trouble as far as I know. I have been in a great number of mines,

mines, and it seems to me that small pillars are doing their work all right. The extraordinary proposal of Mr. Robertson would have to be met by another method.

18748. *Q.* I am putting to you a case where, in the opinion of the management, it would be necessary to have greater lengths. If the miners were not of the same opinion, who is to be the determining factor—who is absolutely to decide the question? *A.* If I could imagine a state of conditions that would compel us to have more than 30-yard pillars then I could understand it. But I am under the impression that it would be an extreme case which would call for the pillars being any thicker.

18749. *Mr Robertson.*] *Q.* You must admit that your experience is confined to shallow mines? *A.* I have read about the way in which they work very deep mines, and I do not know that I have ever heard of, or read of, pillars which are more than 40 yards in length.

18750. *Mr. Ritchie.*] *Q.* If the question should arise, do you not think that the matter might be referred to a conference of representatives of the Manager, the miners, and the Inspectors to decide what the length of the pillars should actually be? *A.* It is always a good idea to have a conference to solve a difficulty. It is a standard maxim of mine, and it would be preferable to dispose of the matter in that way.

18751. *Q.* You would agree to that? *Q.* Yes; but I fancy that the proposal to have cut-throughs of the distance apart mentioned by Mr. Robertson would not be necessary except in extraordinary cases.

18752. *Q.* You made some qualifications as to the matter? *A.* That was only with reference to the extraordinary conditions that I have mentioned. I cannot imagine a condition of things where the management would leave 100-yard pillars except for the purpose of a barrier, or something like that.

18753. *Q.* Mr. Robertson told you that he could show you a mine where they considered it necessary to have these large pillars? *A.* I expect they would be pillars left for some extraordinary purpose, perhaps to form barriers between one section and another.

18754. *Mr. Robertson.*] *Q.* They are not; they are simply pillars of the ordinary size used in the mine—sometimes they may be 100 x 50 and sometimes 100 yards square? *A.* Yes.

18755. *Mr. Ritchie.*] *Q.* There was some report which you spoke of as having been submitted by you, where the ventilation was deficient. Can you give me particulars as to whether that report showed that the miners were getting more or less air than the minimum quantity required by law? *A.* In one or two of the mines which I have visited I have found that they have been receiving less than the minimum quantity.

18756. *Q.* In this particular case which you are referring to, where the question of a fan was raised, do you remember whether the colliery was receiving the minimum quantity of air required by law? *A.* I do not think there was the minimum quantity of air there. At any rate we found it inadequate for the ordinary purposes of ventilation. I would not be sure on the matter.

18757. *Q.* I recognise that the minimum quantity of air may not in your opinion be sufficient, very often. You say you are not sure about the matter. How long is it since the report was submitted? *A.* About two months ago.

18758. *Q.* Do you know whether the report was brought under the notice of the Inspector? *A.* I do not know. My experience is that the Inspector generally initials my report in any inspections which he subsequently makes.

18759. *Q.* Where you report as check-inspector that the supply of air is not adequate, do you know whether the method of ventilation is brought under the notice of the Inspector? *A.* I do not know. I have no means of ascertaining.

18760. *Q.* You never take any steps to find out whether the Inspector has had his attention drawn to the matter? *A.* I conclude that the Inspectors have the matter in their own hands. If we draw attention to any danger the Manager is supposed to inform the Inspector about it. A copy of the report is kept at the office, and when he comes to the mine he has his remedy against the Manager.

18761. *Q.* I want to know whether you have ever brought such a matter under the notice of the authorities? *A.* I have no knowledge whether it is brought under their notice or not. I only once called Mr. Atkinson's attention to a matter by letter, and the answer which I got back made me cease to have anything more to do with Inspectors.

18762. *Q.* What was that? *A.* The reply which I got caused me to leave the Inspectors alone. It was in this way: I drew attention to a danger at a mine. The man with me, the local Inspector, specially requested me not to put the matter into the report about the mine. I would not have agreed to that, only I knew that it was an old and long standing danger. He said that he was sure to get the sack if it were mentioned in the report.

18763. *Q.* He was your colleague? *A.* Yes. And I said that I would write to Mr. Atkinson about the matter myself. So I drew his attention to it. He thanked me for drawing his attention to it, but he said that by my not having given a true report in the colliery book I had made myself liable to prosecution, and I was to take good care not to do it again.

18764. *Q.* Have you got that letter? *A.* I have got it at home.

18765. *Q.* If you can get that letter can you send it to me? *A.* I think so.

18766. *Q.* You might send me both letters, a copy of your letter and Mr. Atkinson's reply? *A.* I will send them to you when I get back.

18767. *Q.* Do I understand that the subject of Mr. Atkinson's letter was a complaint of your action in not having reported a danger which you had seen when you were making your inspection? *A.* He drew my attention to the fact that I had not complied with the Act of Parliament, inasmuch as we had not written out and signed a true report of our inspection. I did not lay stress on the danger because I knew it had been a long-standing one in the mine. The man with me knew the position of affairs at the colliery, and he knew that they would find some means of ousting him if we reported it. I had a talk with the Manager about it, and reported the condition of affairs to Mr. Atkinson. The reply was as I have told you, not to do it again, and that I had made myself liable to a penalty. To prove that I was right the rains recently filled the mine up, and it has not worked since—since last December, I think.

18768. *Q.* What was the danger? *A.* It was a large fall in the bed of the creek.

18769. *Q.* It was not sufficiently secured? *A.* Yes.

18770. *Q.* The fall did severe damage? *A.* The mine has filled up since.

18771. *Q.* With water? *Q.* It depended on the surface drainage. I do not think the pit has worked since.

18772. *Q.* What colliery was it? *A.* South Wallsend.

18773. *Q.* Is there a feeling of that kind amongst the men—that if they report any danger in a mine they are liable to dismissal? *A.* Not generally speaking; but there is in two or three mines. In fact one man got sacked, as I told you yesterday.
18774. *Q.* Why did your mate want you not to mention the matter? *A.* He said that he was sure to get the run if the matter was mentioned in the report.
18775. *Q.* Do you think that a check-inspection is of any service if the men go round the mine in dread, and will not report any danger if they do see it? *A.* The check-inspections are not of much good because of that fear on the part of the men.
18776. *Q.* It is no good going round to report all the good things; the object is to discover the faults, if any? *A.* That is right.
18777. *Q.* Can you describe the method by which the deputies, in your district, examine the waste workings? *A.* Under the new special rule they have to make weekly inspections.
18778. *Q.* When was that rule adopted? *A.* It was the Minister's proposition; it was not objected to, and it is law now.
18779. *Q.* How long ago? *A.* I think within the last few weeks. Mr. Atkinson can tell you.
18780. *Q.* Do I understand that prior to this new Regulation no examination was made? *A.* Most of them made an examination monthly.
18781. *Q.* Have you any idea how the examinations were carried out? *A.* I have gone into the mine with the deputies and the under-manager. The examinations were as effective as we could make them. I have found initials and figures in different parts of the wastes, showing that the men must have gone over dangerous ground to write them.
18782. *Q.* You are speaking of what you have discovered in making check-inspections? *A.* Yes.
18783. *Q.* Did you find that state of affairs prior to the issue of this new Regulation? *A.* Yes. The names and dates show that there was always someone travelling the wastes. I found the initials of men in strange corners in pits.
18784. *Q.* We have had the suggestion made here, that in the north no examination was made in the waste workings? *A.* That does not apply to our case. Take the Seaham Colliery for instance. That is the only place where the men go in pairs. There are four pairs of them, and they take a certain day and make an inspection. It is generally on a Sunday, too. They used to choose Sunday for the monthly inspection, and I do not know whether there have been any alterations since. I know that in most of the northern mines the examining deputies travel all the waste workings.
18785. *Q.* When the men put their initials they put down the dates also;—you have noticed the dates? *A.* Yes; and I frequently left my own there too.
18786. *Q.* I want to ask you about safety lamps. You know that the proposal from the southern miners is to vest the power with the Inspector of saying whether or not it is necessary to use safety lamps. You disagree with that? *A.* Yes.
18787. *Q.* You say that if the parties interested in the question disagree matters should be referred to arbitration under the Act? *A.* Yes.
18788 You think that the arbitration clauses should be made applicable to matters of that kind? *A.* Yes.
18789. *Q.* In the event of the Inspector for the district stating that it is necessary to use safety-lamps for the safety of the mine, that they should be put in? *A.* Yes; and I think the miners would agree to them being put in pending arbitration, because they never hesitate to express an opinion about the management of a mine.
18790. *Q.* But you said that the body of men would require to be moved by some one person, and the names of those who move in such a matter are generally known? *A.* Those are workmen's risks. I do not know how we can get over that. You know that at the Delegate Meetings you must not publish the names of the movers and seconders of resolutions. The names are never given. The men never disclose their names because of the fear of consequences.
18791. *Q.* It is said that the miners in the south are very close with regard to all that they do? *A.* We have nothing to conceal in the north. We do not care who knows our business, as a rule.

MR. MICHAEL GRAY was sworn, and examined, as under:—

Examination-in-chief by Mr. Lysaght:—

18792. *Q.* What is your name? *A.* Michael Gray.
18793. *Q.* Are you a member of the Delegate Board of the Colliery Employees' Federation of the Northern District? *A.* Yes.
18794. *Q.* Are you a miner working there? *A.* I am working at the South Burwood Colliery, now known as the Dudley Colliery.
18795. *Q.* You have been deputed to come here and give evidence with regard to certain recommendations which it is desired to make to this Commission? *A.* Yes.
18796. *Q.* Take the first recommendation, which is: "Managers, under-managers, deputies, and shot-firers to hold certificates of competency by examination, and to have had five years' practical mining experience before being eligible for their respective positions." To this your Board require to add: "All the examinations to be passed in the State of New South Wales." Do you approve of that? *A.* Yes.
18797. *Q.* Do you know of any cases where shot-firers have been appointed who are incompetent? *A.* Yes.
18798. *Q.* Where? *A.* At the colliery where I am working.
18799. *Q.* When? *A.* Before I went to the colliery.
18800. *Q.* Why was the man incompetent? *A.* Because he had not passed an examination, the same as the examining deputy.
18801. *Q.* In addition to that, in what sense was he incompetent? *A.* Because in my opinion he was one of the examining deputies. He made the middle examination in the mine.
18802. *Q.* In addition to being a shot-firer he was also an examining deputy? *A.* In the second portion of the round.
18803. *Q.* What else can you say about him? *A.* In my opinion, he did not know sufficient about the gases to be met with in a mine.

18804. *Q.* You see that the recommendation of the Northern District is, that all examinations shall be passed in New South Wales;—why is this made? *A.* Seeing that the men have to serve in the State of New South Wales, we think it is only right that they should pass their examination here. Also, we know of one person that underwent an examination here and failed, and he afterwards went to England and got his certificate there, showing that the examination in England, to my mind, is not so severe as that in the Colonies.

18805. *His Honor.*] Perhaps he read hard all the way Home.

18806. *Mr. Robertson.*] *Q.* Did you ever know of anyone here who went up for an examination and failed and then went up again and passed? *A.* Yes.

18807. *Mr. Lysaght.*] *Q.* Is there anything further you desire to say on this matter? *A.* Another reason why the examination should be held in this State is, that if a Manager passed here and went to the old country he would have to pass another examination there before they would allow him to practice. We allow them to fetch a certificate out from England, and to use that certificate without passing another examination.

18808. *Q.* Recommendation No. 2 is—"Inspectors to be vested with absolute power to order the use of safety-lamps." Your Northern District opposes this recommendation as it stands, but makes the following suggestion:—"That where a doubt exists about safety-lamps going into a mine the Inspector and district check-inspector appoint a third party, the three persons named to be an Arbitration Court to settle the question whether safety-lamps are to go into the mine or not." Chief Inspector Atkinson has made the suggestion that the matter shall be referred to arbitration, and that pending arbitration the Inspector shall have the power to order the Manager to put the lamps in. Do you agree with any of those recommendations? *A.* Provided we had a hand in appointing the Arbitration Board, I should say yes.

18809. *Q.* Recommendation No. 3 is—"Ventilation by furnace prohibited and fans substituted"? *A.* I believe ventilation by fans is the better system, and, according to Farley, it is the cheapest system. Furnaces are becoming dangerous.

18810. *Q.* Do you know of any case where furnace ventilation has been inadequate? *A.* Yes; what took place indicates in the clearest way that the furnace was inadequate.

18811. *Q.* Where? *A.* At South Waratah. They have a furnace going now as formerly, but in addition they have a fan, which shows to me clearly that the furnace was not sufficient in the first case.

18812. *Mr. Bruce Smith.*] It also shows that the fan is not sufficient without the furnace.

18813. *Mr. Lysaght.*] No.

18814. *Mr. Bruce Smith.*] The same rule applies.

18815. *His Honor.*] Perhaps the mine grew too large for the furnace.

18816. *Witness.*] It is only a small fan.

18817. *Mr. Robertson.*] Not a small furnace.

18817½. *Witness.*] It is a large furnace.

18818. *Mr. Robertson.*] *Q.* What is the depth of the mine? *A.* The South Waratah Mine is 650 feet deep, or thereabouts.

18819. *Mr. Lysaght.*] *Q.* How many men are employed there? *A.* About 210 miners.

18820. *Q.* Recommendation No. 4 is—"Waste workings to be absolutely sealed off and surrounded by return airways for fear of emissions, such return airways not to come in contact with the intake." Your district opposes this recommendation owing, as they say, to it being impracticable? *A.* I prefer the air to go through a waste working and to go direct to the return airway, and not to come into contact with the intake. If you block the waste workings up there may be a sudden outburst of gas, which would knock the stoppings down.

18821. *Q.* If the intake airway should pass a waste working, the waste ought to be sealed off? *A.* Yes.

18822. *Q.* Is it good mining practice to allow the intake airway to pass a waste working? *A.* The intake airway ought not to pass a waste unless the waste is sealed off, but you have to have a certain quantity of air going through the waste.

18823. *Q.* Would you have an independent split? *A.* Yes; an independent split.

18824. *Q.* Recommendation No. 5 is—"All places except prospecting drives to have cut-throughs not more than 30 yards apart"? *A.* I believe that formerly the distance used to be 35 yards. The men at that time wanted 20 yards. Since the new Act came into force, under which brattice has to be put up, cut-throughs are 70 or 80 yards apart. Brattice does not carry sufficient air to the men, and the men require a better supply of air to go to the face. With brattice the air is not conducted to the face, because a certain portion of it escapes. The quantity may be in the headings, but not in the face of the working.

18825. *Q.* Do you know of any pit where the minimum quantity of air does not go to the workings? *A.* Not by actual measurement; but we have complained, and the deputies have brought the brattice further on. A miner has not the opportunity of measuring. He may judge that the quantity of air is not there, but he has no machine to test the current with.

18826. *Mr. Robertson.*] *Q.* The fault has been that the brattice has been too far back? *A.* No; the air has escaped in coming along.

18827. *Q.* You just stated that when you complained they put the brattice further up? *A.* It was not because the brattice was not there.

18828. *Q.* Perhaps there was not sufficient brattice? *A.* Even when it was closer it did not remedy the evil.

18829. *Q.* I understood that you had sufficient air? *A.* I never said that we had sufficient air.

18830. *Mr. Lysaght.*] *Q.* Would cut-throughs at 30 yards apart have any effect upon the security of the roof;—would they be likely to tend to bring on creeps? *A.* Certainly not.

18831. *Q.* I suppose you have heard of some creeps in mines in your districts? *A.* Yes; but not because there were cut-throughs there.

18832. *Q.* What was the cause? *A.* It was on account of the pillars in some instances being only 2 or 3 yards long.

18833. *Q.* I will not trouble about Recommendation No. 6, which refers to inspections being made with a locked safety-lamp, and we will now come to Recommendation No. 7, which is—"Monthly examination and report by deputies and District Inspector with the hydrogen flame," which has been altered by the insertion of the words: "By the Manager or under-manager"? *A.* I think the recommendation is a reasonable one. One of the officials should do it, and it does not matter who so long as it is done.

Witness—M. Gray, 19 February, 1903.

18834. *Q.* Have you ever used the hydrogen lamp? *A.* No.
18835. *Q.* Have you ever seen it? *A.* No; but I know by reading that it is the best lamp to detect gas with, and I am in favour of it.
18836. *Q.* You only suggest it in cases where the ordinary safety-lamp will not detect gas? *A.* Certainly. It is not required if the other lamp will detect gas.
18837. *Q.* Recommendation No. 8 is—"A minimum of 500 cubic feet of air per minute to be provided for every horse, instead of 100 feet as at present." To this the Northern District desires to add: "Not less than 200 cubic feet of air per minute for each man and boy"? *A.* I am in favour of that. A workman cannot have too much air. Farley states that it is necessary that each man and boy should have 150 cubic feet of air, and that a horse should have five times as much, which would make it 750 feet of air for the horse.
18838. *Q.* Do you know any mines where the supply of air is inadequate, and yet the supplies are over the minimum amount required by law? *A.* Yes.
18839. *Q.* Where? *A.* At Lambton Colliery, at the South Waratah Colliery, and in a portion of the Dudley Colliery.
18840. *Q.* Has there been complaint that the supply was inadequate? *A.* Yes; at South Waratah, and also in connection with Lambton.
18841. *Q.* What was the answer given? *A.* That they would try to remedy it. At South Waratah they did their utmost to remedy it.
18842. *Q.* In each case were they supplying the minimum amount of air? *A.* As far as my opinion goes, they were.
18843. *Q.* Recommendations Nos. 9 and 10, taken together, are—"All doors erected so as to close and remain closed of their own motion. Double doors on drives between main intakes and returns, and main headings." Can you tell me whether you know of any disaster resulting from a single door having been deranged? *A.* Yes.
18844. *Q.* What is the name of the colliery where the disaster resulted? *A.* It was the Burwood Colliery. It was single canvas acting instead of a door, according to the evidence given, and the reports in the Press.
18845. *Q.* Recommendation No. 11 is—"Weekly measurement of air in each section, and report thereof sent to Inspector." To which the Northern District requires to be added: "Instead of monthly, as at present"? *A.* I am in favour of that. I would have inspections as often as possible, because from one month to another various things may happen to derange the air.
18846. *Q.* How would you have the measurements taken? *A.* As near the face as possible.
18847. *Q.* Where are the measurements taken now—in practice? *A.* In the cut-throughs; and in some instances the places are 70 to 80 yards from the working faces.
18848. *Q.* Is the amount of air there any indication of the amount of air going to the face? *A.* No.
18849. *Q.* Recommendation No. 12 is—"Extra supply of safety-lamps and their requisites equal to one-third of the number of persons employed below ground to be kept constantly in good order, and ready to use." Mr. Bower has suggested that there should be a fixed minimum of twenty lamps in all cases, and twenty lamps for every 100 men employed at a mine in addition. Will that meet your idea as to the surplus quantity of lamps which ought to be kept? *A.* I think it is a good suggestion, and quite up to the mark.
18850. *Q.* The Chief Inspector has suggested that there should be a fifth extra in cases where the naked light is used, and a tenth extra where the safety-lamp is used; that would be equal to one-fifth or one-third of the number of persons employed below ground. Would that be an adequate supply? *A.* He has not given any minimum.
18851. *Q.* No? *A.* I do not think it would be such a good suggestion as the other.
18852. *Mr. Robertson.*] *Q.* What do you mean by the other? *A.* The suggestion by Mr. Bower.
18853. *Mr. Lysaght.*] *Q.* Recommendation No. 13 is—"Travelling and haulage roads, and other places necessary, to be properly watered." To which the Northern District desires to add: "All travelling, main, and horse roads to be 6 feet high"? *A.* I think that all the roads should be watered—both the roof, the sides, and the travelling road underfoot. In some cases it is done now.
18854. *Q.* Was it done before the Kembla disaster? *A.* At one mine it was, but it was not done at all the others. At South Waratah it was not done, but at Dudley it was.
18855. *Q.* Did they use sprays? *A.* They had water laid on, and a short length of hose.
18856. *Q.* With regard to the travelling roads being made 6 feet high, do you know whether that is put into practice in your district? *A.* I know of one mine where it is done, but at other mines it is not done.
18857. *Q.* What is the height in that mine which you speak of? *A.* It varies from 4 ft. 6 in. to 7 ft. 6 in. In other mines, where the height is only 5 feet, nothing is brushed down. The roads stop at that.
18858. *Q.* In your opinion, the roads should be brushed? *A.* They should be where a man has to carry a heavy load and travel 2½ miles—they ought to be brushed. A man has to carry 4 lb. of powder, two picks, and his tucker; and to walk that distance it is very uncomfortable.
18859. *Q.* Will it assist the ventilation if the roads are 6 feet high? *A.* Yes.
18860. *Q.* Recommendation No. 14 is—"Managers should be compelled to give more personal time and attention to the management of the colliery." Can you say anything about that matter? *A.* Yes; I have known the Manager to be away fully a week. I have known them not to go down the pit for a fortnight.
18861. *Q.* In your opinion, how often should a Manager visit the underground workings? *A.* He should visit each portion of the mine once a week.
18862. *Q.* I will pass over Recommendation No. 15, and come to No 16, which recommends that the size of the manholes be enlarged. The Newcastle Delegate Board desired to add to this recommendation that the manholes be "Not less than 6 feet high, 6 feet deep, and 3 feet wide, and to be whitewashed." Do you know anything about the smallness of manholes causing injury? *A.* Yes; in the Lambton Colliery, because they were insufficient and there was an obstruction in front. This is more particularly wanted where the men have to travel where the skips are going; and the manholes ought to be only 3 feet wide, so that the skips cannot run into them.
18863. *Q.* You want them deep but narrow? *A.* Yes.
18864. *Mr. Robertson.*] *Q.* Do you say that a man was injured because the manholes were insufficient? *A.* There was an obstruction at the entrance.

18865. *Q.* The obstruction ought not to have been there? *A.* It was not a manhole at all if there was an obstruction there, and a man could not go into it.
18866. *Q.* If there was an obstruction there it would make no difference if the manhole was 10 feet square? *A.* That was the case. It would be insufficient, and there was an obstruction in it.
18867. *Q.* You are asked to give an instance of someone being injured, and you give an instance which, upon being investigated, proves not that the manhole was of insufficient size, but that the accident happened because there was an obstruction in front of one of them ——
18868. *Mr. Barry.*] *Q.* Did the witness say that he was there?
18869. *Mr. Robertson.*] I take it that he knows about the case.
18870. *Mr. Ritchie.*] *Q.* I suppose the case is common property? *A.* Yes.
18871. *Mr. Robertson.*] *Q.* Do you know of any other case where a man has been injured? *A.* No.
18872. *Q.* You know of no case where a man has been injured owing to the insufficient size of the manholes? *A.* No, I cannot say that I do, only that case.
18873. *Q.* Have you in your mind the case where the haulage road is also used as the travelling way? *A.* Where there is an incline, and also where it is used by the engine for haulage purposes.
18874. *Q.* Does it apply to mines where the endless rope is used, where the speed is very slow? *A.* There should be proper manholes there, because if the skips are going up an incline there is very great danger.
18875. *Q.* There is a difference between skips travelling at the rate of 2 or 3 miles an hour and others travelling at the rate of 10 miles an hour, because one exceeds the running pace of a man and the other does not come up to his walking pace? *Q.* I can refer to a colliery where the skips broke away and I could not run fast enough, because I tried.
18876. *Q.* I do not suppose you could in the case of a runaway? *A.* As long as they keep the rails it does not much matter, because there is very little danger with an endless rope.
18877. *Q.* You must vary the danger between the speed of 1 or 2 miles an hour and 10 miles an hour? *A.* But if an accident should happen in connection with an endless rope one system becomes as dangerous as another. I know where some skips broke away going down a steep place, when they landed against some other skips they broke those skips too, and put them all over the road.
18878. *Mr. Lysaght.*] *Q.* They did not put you in the manhole? *A.* No; I was behind the skips when they broke away.
18879. *Q.* You want these manholes to be whitewashed;—do you think they would require whitewashing very often? *A.* No, one whitewash lasts a long time underground.
18880. *Q.* I will pass over Recommendation No. 17, and come to No. 18—"Instruction to employees regularly on the means of escape." To which the Northern District requires to be added: "That proper machinery be kept at the second shaft outlet to lift all employees to the surface within one hour." What have you to say to that Recommendation;—in what way would you have the men instructed? *A.* They could be instructed by the Manager or the deputies.
18881. *Q.* How often should they be instructed? *A.* It all depends how the men are working. If they are not new starters it would not be so necessary as with new starters.
18882. *Q.* Once every cavil? *A.* I think that would do.
18883. *Q.* There has been a suggestion that the turns in the road should be whitewashed, with an arrow pointing in the direction of the outlet ——
18884. *Mr. Robertson.*] That was an alternative suggestion.
18885. *Mr. Lysaght.*] *Q.* I am including it now in the general recommendation? *A.* The men would know which way to travel if there were an indication on the wall.
18886. *Q.* Regarding the second portion of the recommendation, that machinery should be kept at the second shaft outlet? *A.* I think that is nothing but right and proper, and the Act provides for it now to some extent.
18887. *Q.* What experience have you had with regard to delay in getting back to the surface? *A.* I have known three instances where men have been detained longer than a reasonable time in the mine through defects in the haulage.
18888. *Q.* Recommendation No. 19 is—"Coal Mines Act to forbid a black-list of employees being kept and penalising improper prevention of discharged persons obtaining employment." Can you say anything in support of that recommendation? *A.* As far as the district in which I am is concerned, there is not any proof that there is a black-list, but many men are of opinion that there is such a thing. They have no actual proof, because they would have to go to the Manager to get it, and they cannot get any proof from the Manager. I can give you a case of great suspicion that only happened within the last month, that causes men to think that there is something in it.
18889. *Q.* Yes? *A.* Two men were sent to a Manager to ask for employment, and the Manager recommended them to go to another Manager. This second Manager gave them a start, and they actually started; but at 2 o'clock the following day the Manager told them there was some mistake, and that they could not start there, and they had to go to another colliery. When they asked for work at this other colliery the Manager said, "Oh, I am not the Manager, you had better see my brother." That was after having been told that they could start at that colliery. It was thought that there was a black mark against them, and that that was the reason why they could not get work.
18890. *Q.* Had they taken any prominent part in trades-unionism? *A.* I cannot say that. But I can give you another reason. I had occasion to go to the Referee Court to give evidence against a company. Since that time they have never given me work. I asked them the reason why, but they would not tell me; but I am only victimised at the three collieries belonging to that company.
18891. *Q.* Do you think that a provision like that they have in America would have any good effect? *A.* I should certainly say that a provision like that you have read to me from the Mining Law of Iowa, upon page 271 of Abel, would be of great service.
18892. *Q.* Would it conduce to men taking a freer hand in reporting defects in management, and enable them to feel that they could do so with some security? *A.* Certainly it would give men more liberty in reporting particulars of any cases which they might meet with.
18893. *Q.* Do you know as a fact that men are afraid to report dangers which they observe for fear of dismissal? *A.* Well, I would not like to say.
18894. *Q.* Is there anything else you can say on this matter? *A.* No.
18895. *Q.* Recommendation No. 20 is—"That safety-lamps not to be unlocked for shot-firing"? *A.* That provision is carried out at our colliery. I know that the practice is a dangerous one. 18896.

18896. *Q.* I now come to the recommendation which has been specially framed by the Delegate Board of the Northern District, it is No. 21, and is as follows:—"That the miners of this district have the power to recommend for appointment an Inspector for their respective districts"? *A.* We are of opinion, seeing that our lives depend upon the Inspector, we should have a right to recommend the appointment of that Inspector. We have practically to work under him, and the safety of our lives depends upon a practical man being appointed.
18897. *Q.* Do you know of any person who, in your opinion, was not a practical man who has been appointed? *A.* No, I do not.
18898. *Q.* I take it that this suggestion implies, in addition to recommending the appointment, that the appointment should be confirmed, in the absence of some valid reason against it? *A.* Unless there is some valid reason that the Inspector we recommended should not be appointed we consider that he ought to be appointed. We consider that we ought to have the right in the interests of the mining community.
18899. *Q.* Recommendation No 22 is—"That a red light be carried on the front of trains or set on engine planes, or other self-acting inclines"? *A.* I am in favour of that, as it is wanted to denote danger to travelling miners, so that if skips are coming they can get out of the road.
18900. *Q.* Recommendation No. 23 is—"That a clause be inserted in the Act whereby better sanitary arrangements should be adopted in all mines where workmen are employed"? *A.* I am in favour of that. The sanitary arrangements above ground are very good, but underground, where 200 or 300 men are employed, there are no arrangements at all, and matters are extremely unsatisfactory.
18901. *Q.* Do you suggest any remedy? *A.* In some coal-mines they have certain places which the men can use, for the purpose, and the matter is brought out of the mine.
18902. *Q.* With regard to Recommendation No. 24—"That in our opinion the management of a mine should not interfere with the right of an employee to go out of the mine when he deems fit." The President has ruled that this does not come within the scope of the inquiry; but are there any other matters which you desire to mention? *A.* No.

JOHN PATERSON was sworn, and examined, as under:—

Examination-in-chief by Mr. Lysaght:—

18903. *Q.* What is your name? *A.* John Paterson.
18904. *Q.* What are you? *A.* A miner, working at the Seaham Colliery.
18905. *Q.* Are you a member of the Delegate Board of the Colliery Employees Federation of the Northern District? *A.* Yes.
18906. *Q.* You have considered these recommendations, and are prepared to give evidence upon them? *A.* Yes.
18907. *Q.* With regard to Recommendation No. 1—"That Managers, under-managers, deputies, and shot-firers should hold certificates of competency by examination, and have five years' practical mining experience before being eligible for their respective positions." To this the Newcastle District desires to add: "And all examinations to be in the State of New South Wales." Can you say anything in support of that? *A.* In support of that statement I would say that the safety of the men and also the safety of the mine is to a large extent dependent upon the Manager, and it is therefore necessary to have certificated men in charge. I may add that it is known in connection with examinations that one man left this Colony and went Home and gained a first-class certificate after he had failed here.
18908. *Mr. Bruce Smith.*] *Q.* A first-class certificate as Manager? *A.* Yes.
18909. *Mr. Robertson.*] *Q.* Have you any doubt of the fact that a man may not be able to gain sufficient knowledge here, but might be able to obtain that experience in the British coal-fields, and pass an examination there? *A.* It may appear that way, but why should we have any connection with the British coal-fields, and why should a certificate granted in England have anything to do with the coal-fields here.
18910. *Q.* Have you had any experience in the British coal-fields? *A.* I have worked a good many years there.
18911. *Q.* There are a good many systems of working coal there, and a good many defects which we do not meet with here, and, therefore, men studying there, or following their profession in the British coal-fields, will be better qualified than if they are confined to a study of the coal-fields in this Colony? *A.* The fact to my mind is—he could not pass an examination here—if he could why had he any need to go Home.
18912. *Q.* Because probably he could not gain sufficient experience here? *A.* He may have gone Home to gain experience. It may appear in that way.
18913. *Mr. Lysaght.*] *Q.* Do you wish to say anything further in support of this recommendation? *A.* No, nothing further than I have already said—because the safety of the men and of the mine depend upon the Manager, a certificated man ought to be in charge of the mine.
18914. *Q.* Do you know of any cases where, in your opinion, deputies or shot-firers have been appointed who are incompetent? *A.* Incompetent—it is a very difficult matter to say. So far as I am aware, I am not in a position to say whether men are incompetent or not. If you mean that a competent man must hold a certificate, then I do know of men who are acting as deputies who do not hold a certificate.
18915. *Q.* Apart from the holding certificates, do you know of men who are incompetent, through lack of experience or otherwise? *A.* No.
18916. *Q.* Recommendation No. 2 is—"Inspectors be vested with absolute power to order the use of safety-lamps." This is opposed by your Northern District as it stands, but it is suggested: "That where a doubt exists about safety-lamps going into a mine, that the Inspector and District Inspector appoint a third party, the three persons named to be an Arbitration Court to settle the question whether safety-lamps are to go into the mine or not." The Chief Inspector has suggested that the matter should be referred to arbitration; and that, pending arbitration, the Inspector should have power to order the Manager to put safety-lamps into the mine;—would that meet with your approval? *A.* Yes.
18917. *Q.* Recommendation No. 3—"Ventilation by furnace prohibited, and fans substituted"? *A.* Yes, I believe in that.
18918. *Q.* Do you know of any place where a furnace has proved inadequate to ventilate a mine? *A.* No, I do not know of any case personally.

18919. *Q.* You base your recommendation on general knowledge? *A.* Yes.
18920. *Q.* Recommendation No. 4—"Waste workings to be absolutely sealed off, and surrounded by return airways, for fear of emissions; such return airway not to come in contact with intake." Your Board opposes this, owing, as they say, to it being impracticable;—what do you suggest? *A.* I suggest that these workings, as far as practicable, ought to be aired by a supply of their own, so that no emissions would be carried away to any other part of the mine. The split ought to be quite separate, and have no connection with the intake current.
18921. *Q.* In case of the intake airway passing a goaf, would you have that side of the goaf sealed off? *A.* Certainly.
18922. *Q.* Recommendation No. 5 is—"All places except prospecting drives to have cut-throughs not more than 30 yards apart"? *A.* Yes, I am in favour of that.
18923. *Q.* It has been suggested that cut-throughs at distances of 30 yards apart would weaken the roof and conduce to creeps? *A.* Where I am working there are 35-yard cut-throughs, and there is not a stick of timber in the mine; and there is no sign of a creep there.
18924. *Q.* What is the depth of the strata over the mine? *A.* Between 500 and 600 feet.
18925. *Q.* Do you think that cut-throughs would have any effect in bringing on creeps? *A.* None, in my opinion.
18926. *Q.* Do you find in brattieing, if, in the absence of cut-throughs, long lengths of brattice are used, that the ventilation is deficient? *A.* I believe so, for the simple reason that brattice cannot be put up so as to make the air go straight to that particular part of the mine where it is wanted. We ought to have the current on the face where is intended to go, but, owing to defects in the brattice, it is difficult to get it there.
18927. *Q.* In practice, it has been found to lead to deficient ventilation? *A.* Yes.
18928. *Q.* I pass over Recommendation No. 6, and come to Recommendation No. 7, which is—"Monthly examination and report by deputies and District Inspectors with the hydrogen flame"; to which I am adding the words, "by the Manager or under-manager." Do you approve of that? *A.* I do.
18929. *Q.* Do you intend that the hydrogen lamp shall be used only in cases where the safety-lamp has been unable to detect gas? *A.* Yes.
18930. *Q.* Recommendation No. 8 is—"A minimum of 500 cubic feet of air per minute to be provided for every horse, instead of 100 as at present;" to which the Northern District Board desires to add, "Not less than 200 cubic feet of air per minute for each man and boy." In practice, have you found the minimum provided by the present Act sufficient? *A.* So far as my opinion goes, it is insufficient.
18931. *Q.* Recommendations Nos. 9 and 10 are passed over. Recommendation No. 11 is—"Weekly measurements of air in each section, and report thereon sent to Inspector"; to which your Board desires to add, "instead of monthly, as at present." Now, where should the measurement be taken? *A.* At the working faces.
18932. *Q.* Supposing the anemometer will not record at the working face, what would you say? *A.* I should say that the men were not getting sufficient air.
18953. *Q.* I understand that the instrument used to test the air will not record at the face;—do you want the register taken as near to the face as the anemometer will take it? *A.* Yes.
18934. *Q.* Is taking the air at the split any indication of the air that is circulating at the working faces? *A.* No.
18935. *Q.* Recommendation No. 12 is—"An extra supply of safety-lamps and their requisites, equal to one-third of the number of persons employed below ground, to be kept constantly in order and ready for use." Mr. Bower has suggested that there should be a minimum of twenty lamps kept at each mine, and that an additional twenty lamps should be kept for each 100 men employed below ground. Does that meet with your idea as being a suitable provision? *A.* Yes.
18936. *Q.* Recommendation No. 13 is—"Travelling and haulage roads and other places necessary to be properly watered"; to which the Northern District Board desires to add, "All travelling, main, and horse roads to be 6 feet high." As regards watering, what do you say? *A.* I say that wherever watering is required it should take place all over—the sides and the roof, and not on the floor alone.
18937. *Q.* Has it been the practice in your colliery to water the sides and the roof? *A.* No.
18938. Was it the practice before the Kembla disaster to water the travelling road in your colliery? *A.* Not generally.
18939. *Q.* With regard to the travelling roads being 6 feet high, what have you to say? *A.* I say that that is a matter which I look upon as being a necessity. Where I am working now, taking the average, on the engine plane, it will not average over 5 feet in height; and a man travelling along that road, carrying tools to work with, and tucker and bottle, it is a burden to him to get to work. In fact, men are almost knocked out when they get to their work. That is the reason why men should have a proper road to walk along.
18940. *Q.* In addition, would it not also assist the ventilation if the main roads are 6 feet high? *A.* Yes.
18941. *Q.* Recommendation No. 14 is—"Managers should be compelled to give more personal time and attention to the management of the colliery." What, in your experience, has been the attention given by the Manager to your colliery? *A.* I am sure that it is very seldom I see the Manager down at the colliery where I am working at present. I believe that the Manager ought to visit the mine often, and in so doing he would see many things that would be of advantage to him as Manager, and also to the Company. Many little matters also would be brought under his personal observation, and there will be less friction in connection with the working of the mine from time to time.
18942. *Q.* How often do you think the Manager ought to go into the mine to make inspection? *A.* Two or three times a week.
18943. *Q.* What has been your experience? *A.* Oh, I only see him two or three times a year.
18944. *Q.* What is the name of that colliery? *A.* The Seaham Colliery.
18945. *Q.* Recommendation No. 16 is—"Size of manholes to be enlarged"? *A.* With regard to this matter I think that on engine planes where ropes are running it is necessary that there should be greater precautions taken to prevent accidents. The present manholes are not far enough back nor yet high enough. I would have them 6 feet high, 6 feet deep, and 3 feet wide. They should not be too wide, or else it would allow the skips to get into them.

18946. *Q.* The Northern District recommends that they should also be whitewashed. How often would it be required that that whitewash should be renewed? *A.* I do not know; but if it is required once a week I would renew it.

18947. *Q.* Recommendation No. 18 is—"Instruction to employees regularly on means of escape." The Northern District Board has added the following: "That proper machinery be kept at the second shaft outlet to lift all the employees to the surface within one hour." In what way would you have the employees instructed on the means of escape? *A.* In the event of any disturbance of the ventilation, or any more explosions taking place, my own experience is that the men will always rush back the way which they have been used to walk. It might be that if the men were instructed in the different outlets that they would be able to break through any trouble which occurred and escape, and in that way life would be saved in many instances.

18948. *Q.* Who would you have to give them the instruction? *A.* I think men who can go thoroughly into the matter.

18949. *Q.* Who do you say, the deputies? *A.* Yes.

18950. *A.* How often would you have them instructed? *A.* Once a month.

18951. *Q.* In addition to instruction by deputies, do you think that it would be well to have the outlets marked with whitewash, so that the men would be able to distinguish the road out? *A.* You mean marks indicating the way out? I may say that we have approached our Manager in connection with that very matter.

18952. *Q.* What answer did he give you? *A.* He said that he would think the matter over, and see if he could approve of it.

18953. *Q.* With regard to the recommendation of machinery? *A.* With regard to the recommendation that machinery should be kept at the second shaft for the purpose of helping employees out of the mine, cases have come under my notice where men have been kept in the main shaft for a couple of hours waiting to be taken up. If there was machinery which could lift them up in an hour, the men would be out of the mine an hour sooner, and that, in the case of a serious explosion, would mean that we should have a better chance of our lives.

18954. *Q.* Recommendation No. 19 is—"The Coal-mines Act to forbid a black-list of employees being kept, and penalising the improper prevention of discharged persons obtaining employment." Do you know of any instance of a black-list in your district? *A.* Well, it is a peculiar thing, but there is something equal to it, call it what you like.

18955. *Q.* What is the effect of it? *A.* Not wanted.

18956. *Q.* You know that something prevents men from getting employment if they are objectionable to the proprietors? *A.* Yes.

18957. *Q.* Do you think that if it were provided that the management should be compelled to state in writing the reasons for dismissing a man, that would tend partly to get over the evil? *A.* I believe it would if they would be honest.

18958. *Q.* Do you know of any cases where persons have been victimised in your district? *A.* Yes; I know of cases where it is believed persons have been victimised. You may call it what you like. The difficulty is to get at the bottom of the matter. I know on the occasion of one strike there was a little bit of trouble, and when the matter subsided and the men went through the office, the word was pass on, pass on, and no one knew until the cavil-sheet came out whether they were on it or not. I was working with a mate—he got on and I did not. I went to the Manager, and asked him why I was not put on, and told him I was a good citizen and had always done my work properly, but he never told me why it was. He declined to give a reason—he closed up.

18959. *Q.* Do you think that a provision in the law requiring the management to state in writing the reasons for dismissing a man would be efficient? *A.* Yes.

18960. *Q.* If such a provision were in force you think it would give men more courage to report what they see in mines? *A.* Yes.

18961. *Q.* You know that there is a fear of reporting now, because of a fear of ulterior consequences? *A.* Yes.

18962. *Q.* That fear does exist? *A.* Yes.

18963. *Q.* Now, I will take the new suggestions. The Northern miners have suggested that the miners should have the power to recommend the appointment of Inspectors for their respective districts? *A.* That is a good recommendation, and should meet the wants of both the Managers and the men in this district.

18964. *Q.* Your recommendation infers that in the absence of any valid reason the recommendation should be confirmed? *A.* Yes.

18965. *Q.* I suppose you agree with recommendation No. 22—that red lights ought to be carried on the front of trains? *A.* Yes, I approve of that.

18966. *Q.* And Recommendation No. 23 Recommends that better sanitary arrangements should be made in connection with mines? *A.* I can certainly say that better sanitary arrangements are very badly needed.

18967. *His Honor.*] I think that this latter matter comes within the scope of the Commission, and I think it is a matter which certainly requires attention. New South Wales generally is in a very horrible state as regards sanitary arrangements, and as an instance of this we have this great outbreak of typhoid fever at Coonamble.

18968. *Mr. Lysaght.*] *Q.* I may say that with regard to Recommendation No. 24 that the management should not interfere with the right of an employee to leave the mine, the Commission is of opinion that this is a matter which does not come before them.

18969. Mr. Bruce Smith handed in the papers in connection with the creep in the Hamilton Mine, and the papers were marked *Exhibit No.* 34.

[The Commission at 4·10 p.m adjourned until 11 o'clock on the following Monday.]

MONDAY

MONDAY, 23 *FEBRUARY*, 1903.

[*The Commission met at the Treasury, Macquarie-street, Sydney.*]

Present:—

C. E. R. MURRAY, Esq., D.C.J. (President).

D. A. W. ROBERTSON, Esq., Commissioner. | D. RITCHIE, Esq., Commissioner.

Mr. Bruce Smith, Barrister-at-Law, instructed by Mr. Wood, Crown Solicitor's Office, appeared on behalf of the Crown.

Mr. A. A. Atkinson, Chief Inspector of Coal-mines, assisted Mr. Bruce Smith.

Mr. C. G. Wade, Barrister-at-Law, instructed by Mr. G. J. Barry, appeared on behalf of the Mount Kembla Coal and Oil Company (Proprietors of the Mount Kembla Mine).

(Mr. J. Garlick, Secretary to the Commission, was present to take shorthand notes of the evidence and proceedings.)

Mr. A. E. O. SELLERS was sworn, and examined, as under:—

Examination-in-chief by Mr. Wade:—

18970. *Q.* What is your full name? *A.* Alfred Ernest Oswald Sellers.
18971. *Q.* What are you at present? *A.* Manager, South Bulli and Bellambi Mines.
18972. *Q.* How long have you been there? *A.* Since the beginning of this year.
18973. *Q.* Have you been Manager elsewhere besides South Bulli? *A.* Yes, at Corrimal, for four years, less six weeks.
18974. *Q.* Do you know anything about the Metropolitan Mine? *A.* Yes; I was there also for eight years and a-half, I think.
18975. *Q.* What position did you occupy then? *A.* Surveyor and general assistant to Mr. Robertson.
18976. *Q.* How many years' experience have you had of coal-mining altogether? *A.* I have been connected with mines for nearly nineteen years, I think.
18977. *Q.* How long have you known Mount Kembla Mine? *A.* I saw Mount Kembla, first of all, in 1890; but I have been there three times since then.
18978. *Q.* From what you knew of Mount Kembla, was there anything that would lead you to say it was a gassy mine—I am speaking now of the time anterior to the 31st of July, 1902? *A.* No; my impressions about Mount Kembla were that it was not a gassy mine.
18979. *Q.* And, as to its being a dusty mine or not, could you say anything about that? *A.* I could not say it was a dusty mine, because Mount Kembla is one of the wettest mines in the district. It had a fair amount of water, and they had a lot of drainage schemes there to get rid of the surplus water; and those facts, and the number of pumps they had working, indicated to me that it was in a fair condition of damp; it had an excess of water. I had only been in Mount Kembla once before the explosion; that was in the beginning of 1900; and that visit would indicate to me that it was not a dusty mine; you could not call it a dusty mine what I saw of it then.
18980. *Q.* You said just now you had been to Mount Kembla several times? *A.* Yes.
18981. *Q.* Do you mean you had only been inside the mine once? *A.* Only been inside the mine once.
18982. *Q.* But you had been to the mine? *A.* I had been to the mine several times.
18983. *Q.* You have had an opportunity of seeing the general equipment and working of the mine? *A.* Yes, the day I went there I went to look into that matter particularly, with the idea of adopting at Corrimal some of the systems in operation there.
18984. *Q.* What do you say of the equipment? *A.* Speaking generally, I was very well satisfied with what I saw there on that visit.
18985. *Q.* When did you first go inside the mine after the disaster? *A.* We went straight there from the Arbitration Court.
18986. *Q.* By "we" you mean a lot of Colliery Managers? *A.* Yes, a lot of us went together; and we went fairly quickly, as quickly as we could go, and got in with as little delay as possible.
18987. *Q.* You were more or less engaged in the work of rescuing? *A.* Yes; we went on exploration work first of all.
18988. *Q.* What parts of the mine were you in on that first night—Thursday night? *A.* The late Mr. Kater and I, first of all, went into the left-hand travelling road to the main straight, to where that bridge was.
18989. *Q.* To the junction of the No. 1 Right? *A.* And the travelling road. We went down that hill, and went along then as far as the junction of No. 1 haulage road with the main straight haulage road. Then we came back and got on the other side of this drop, where this bridge was, on to the travelling road leading to the No. 1 district; and we went down and came across Mr. Robertson, who had Inspector Bates and Mr. Nelson; but before we got to Mr. Robertson we met a man whom I have found out since to have been named Smith; and we went on and came across Mr. Robertson, who had Mr. Bates and the under-manager, Mr. Johnson, and Mr. Ritchie were with him, I think.
18990. *Q.* I do not want the details. That was in the early part of the afternoon, before dusk? *A.* That was before dark.
18991. *Q.* I only want to know generally what sections of the mine you were in? *A.* Then we came out, and went out with Bates a certain distance. I had telephoned for pit clothes from Corrimal; and I went out and got these clothes, and went in with Kater again. We went down that travelling road and got on to the engine road somewhere near the 4th Right; and we went on as far as the 4th Left. I did not feel too well then, and came back and went out that travelling road that leads to Purcell's Daylight, and had

had a rest out there. I then went in again on what they call the cross-cut rope road, back down the 5th Right, and from that point crossed out again down the travelling road way.

18992. *Q.* No. 1 travelling road? *A.* Yes, out.

18993. *Q.* Did anything strike you as noticeable at that stage? *A.* In what way do you mean?

18994. *Q.* As to temperature? *A.* The mine was fairly warm, but the air was not very bad. We could get along fairly well. The worst part of the air was down on that engine road, somewhere opposite the 4th Right. The 4th Right was very hot. We went up there. Some of the people who were with us wanted us to go up to look for bodies. I came to the conclusion that if we went up there we could not get back; so we did not pursue it.

18995. *Q.* How far did you go up the 4th Right? *A.* We were in the travelling road then; and we went up 4 or 5 yards from it; and it was too strong then.

18996. *Q.* Four or 5 yards up the 4th Right from the No. 1 main travelling road? *A.* Yes.

18997. *Q.* What was the heat like there? *A.* It was very oppressive, burnt your eyes and that sort of thing. I returned then from that place and got on to the engine road, where there was more air. It was hot, you know. The whole mine was in a state of—the moisture, and that sort of thing about, made the heat very oppressive

18998. *Q.* Do you remember any of the men you helped to bring out, or found? *A.* That night we came across one man who was sitting on the travelling road some good distance inside; I do not know the distance exactly.

18999. *Q.* What travelling road? *A.* The No. 1 travelling road. He was sitting there; he was dead. We came across him after somebody else had seen him, I think. His name, I understand, was Purcell. I heard that afterwards.

19000. *Q.* That would be in the travelling road somewhere near the 2nd Right? *A.* That would be the position, I suppose; about that position. Somewhere about there. I did not see any more bodies that night. We went home about 10·30, I think; I hurt my foot. The next morning we went into the left-hand circular haulage district; and came across a good number of bodies there.

19001. *Q.* Do you know a young fellow called Kembla Stafford? *A.* I did not know him, but his body, when we found it, was identified by some of the party with me.

19002. *Q.* Where was he? *A.* He was sitting down in a fairly natural position on the first flat to the inbye of the flat he was working in; he was sitting alongside two other men.

19003. *Q.* Where would that be? *A.* I forget the name now, whether it was Price's or Powell's Flat, but it was the first flat inbye of Stafford's Flat (Price's Flat).

19004. *Q.* Would that be Powell's or Price's Flat? *A.* I do not know; I get confused in those two names.

19005. *Q.* He was sitting down, you say? *A.* Yes; alongside two others, just clear of the road—sitting down quite naturally.

19006. *Q.* Did you notice any marks about him? *A.* Yes; there was a mark on him.

19007. *Q.* What was that? *A.* A skin abrasion on the inside of the wrist, and his face was all black; he was very black. The lower parts of his body were exposed, and he was quite black and covered thickly with coal-dust.

19008. *Q.* Was he wearing a coat or a shirt? *A.* I forget; his arms were bare. I know there were some portion of his arms exposed; his face was all black also.

19009. *Q.* Was the skin on the wrist, where the abrasion was, detached? *A.* No; it was like as if it were pulled off there, and you could see it quite red underneath.

19010. *Q.* Did you see any skin detached anywhere else on his body? *A.* No.

19011. *Q.* Did you notice his hair? *A.* I did not notice it very particularly.

19012. *Q.* Did you see anything about his hair to indicate that he had been burnt or singed? *A.* I could not say; I never noticed that. He was sitting down beside two other men who had practically no marks on them whatever. They were not even dirty; they were not peppered. Their faces were clean compared with Stafford's.

19013. *Q.* You subsequently made an inspection of the mine;—was it on the 4th of August? *A.* On the Monday we went round to ascertain the cause of the disaster.

19014. *Mr. Bruce Smith.*] *Q.* What date was that? *A.* The 4th, probably; I forget the date.

19015. *Mr. Wade.*] *Q.* You were with Mr. Jones and Dr. Robertson? *A.* Mr. Jones, Dr. Robertson, Mr. Cook, and, I think, Mr. Rogers, I am not quite sure.

19016. *Q.* Morrison? *A.* Yes; Morrison also.

19017. *Q.* Did you make any examinations for fire-damp that day? *A.* We did.

19018. *Q.* Do you remember where? *A.* We went to the face at Nees' and Stafford's headings. There was a doubt about what was discovered there; some could get nothing, but my impressions were that there was a trace of gas of some sort there.

19019. *Mr. Robertson.*] *Q.* What lamp were you using? *A.* I had an ordinary Ashworth-Hebblewhite-Gray.

19020. *Q.* Then it was the ordinary safety-lamp you were testing with? *A.* Yes. We made an examination in Stafford's gannon bord also, No. 79 Place; and with the ordinary lamp we could discover nothing, but Mr. McGeachie had told some of the party that on the Saturday night he had found ¼ per cent. to ½ per cent. there with the hydrogen lamp.

19021. *Q.* Saturday night would be the 2nd of August? *A.* Yes.

19022. *Q.* But you got nothing that day? *A.* We got nothing.

19023. *Q.* Did you examine anywhere else for gas? *A.* We went to Gill's gannon bord—Nos. 83, 84, 85, and 86 pillars—and we were stopped by an old fall at Gill's bord, opposite the first cut-through. Mr. J. C. Jones and I together tested, and we could get nothing with the ordinary oil safety-lamp.

19024. *Q.* Do you mean that you tried something else? *A.* No; we had not the hydrogen lamp with us. My cylinder was exhausted.

19025. *Q.* Did you try elsewhere for gas that day? *A.* At the Jig headings; I think the Inspectors operated there.

19026. *Q.* The No. 1 main headings? *A.* The Jig headings.

19027. *Q.* The face of No. 1? *A.* They reported that there was gas at the top of the first cut-through.

19028. *Mr. Bruce Smith.*] *Q.* Whom do you mean? *A.* Mr. McGeachie told us that the Inspector's party had discovered gas.

19029. *Q.* Would you mind naming the Inspectors? *A.* Mr. Atkinson and Mr. Humble. There were two parties in. We met them at that point, and they told us about it.
19030. *Mr. Robertson.*] The Inspectors told you? *A.* Yes.
19031. *Q.* But you said that Mr. McGeachie told you? *A.* No; it was the Inspector's party we met, and McGeachie told us. I have got it noted here that McGeachie told us.
19032. *Mr. Wade.*] *Q.* Did you go up there? *A.* No.
19033. *Q.* Have you been and made a further examination to ascertain the cause of this disaster? *A.* I have been there twice since.
19034. *Q.* What were the dates? *A.* One date was 18th or 19th September; but I forget what the other one was. I have a note of it here [*looked at a note-book*]—27th of August.
19035. *Q.* You have been all over the mine, have you not? *A.* I have been all over the mine to the north of a straight line connecting the shaft with the tunnel mouth; but I have not been on that part of the mine south of the shaft.
19036. *Q.* That is where the long-wall workings are? *A.* I have not been there.
19037. *Q.* Speaking generally—I do not want to go into the details at the present time—in what direction were the indications of force between the 4th Right and the 5th Right? *A.* Immediately inbye the junction of the 4th Right with the main engine road there is a piece of brattice gone.
19038. *Q.* I do not want to go into details now. Speaking generally, what do you say the indications of force were between the 4th Right and the 5th Right? *A.* Going in
19039. *Mr. Wade.*] Your Honor, I have a plan here which I cannot formally prove at the present time; but I am going to prove it by and bye. It has been prepared on the same lines as the departmental plan was; but it takes in the whole of the faces of the No. 1 Right, which the departmental plan does not. If Your Honor will allow me to give evidence about that now, I will prove it afterwards.
19040. *His Honor.*] By whom was the plan made?
19041. *Mr. Wade.*] By Mr. Warburton.
19042. *His Honor.*] When?
19043. *Mr. Wade.*] About the same time as the Government officials were making the other plans. I am going to call Mr. Warburton.
19044. *His Honor.*] Meantime, there is no objection, I understand, to that plan being used?
19045. *Mr. Bruce Smith.*] No.
19046. *Mr. Wade.*] Mr. Sellers can verify the information on that plan from his own observation. Perhaps I might tender these, your Honor?
19047. *His Honor.*] They are admitted, subject to Mr. Warburton's being called.
19048. [A plan of the No. 1 Right, between the 4th Right and the 5th Right, was put in and marked *Exhibit No.* 37, prepared by Mr. Warburton, Surveyor, Mount Kembla Mine.]
19049. [A plan of the 5th Right rope road, showing the No. 1 heading and the adjoining workings of Mount Kembla Mine, prepared by Mr. Warburton, was put in and marked *Exhibit No.* 38.]
19050. [A plan of the No. 1 Right main level, outbye from the 4th Right rope road, prepared by Mr. Warburton, was put in and marked *Exhibit No.* 39.]
19051. *Mr. Wade.*] *Q.* Take *Exhibit No.* 38, showing the No. 1 headings and the adjoining workings, what indications of force did you see in the locality near Morris' cut-through? *A.* There is a heap of canvas at the north-east corner of the intersection of Morris' working place with the back heading; and there is canvas there whirled round the props, showing that the force went inbye.
19052. *Q.* Taking the canvas in the cut-through itself, what did you notice there? *A.* I will have to get my notes to see that. [*Witness referred to a note-book.*] The canvas was intact on the north side of Morris' working place. The props were blackened on the side towards the heading.
19053. *Q.* Do you remember the condition of the faces of No. 1? *A.* There is no sign of any heat at all in the canvas inside the last cut-through but one; but inside that cut-through, in the back heading, there is a water-bottle that is strapped around the prop. The water-bottle is inbye. The canvas of the screen at the south-west intersection of the last cut-through and the back heading showed that it had been subjected to very great heat, a strip about 1 foot wide.
19054. *Mr. Robertson.*] *Q.* Was not it burnt? *A.* No, it was not destroyed; but it was very hard baked.
19055. *Q.* Was not it in tatters? *A.* No; but horses going through would fray it. It was frayed like that.
19056. *Q.* There were no horses going through there? *A.* But when horses go through headings the canvas is hung in sheets.
19057. *His Honor.*] *Q.* Was it charred? *A.* It was charred. All the substance was not burnt out of it; but it was highly charred.
19058. *Mr. Robertson.*] *Q.* It was frayed, anyhow? *A.* I do not remember it being frayed (by burning).
19059. *Q.* Was it not hanging in tatters? *A.* That is not my impression.
19060. *His Honor.*] *Q.* Which side had the heat come from? *A.* From outbye. That is my impression. There was some dust and other material on the props south of the last cut-through that had been melted, forming coke.
19061. *Mr. Wade.*] *Q.* Which side was that melted dust on? *A.* On the south side, and sometimes on the north side.
19062. *Q.* Was there much of it? *A.* It was not very prominent.
19063. *Q.* Could you say whether that had been subjected to heat or not; and, if it had, was it a great amount? *A.* It was subjected to a certain amount of heat—how much I cannot tell you.
19064. *His Honor.*] *Q.* Perhaps you might be able to tell whether it was something short of or up to red heat? *A.* I should say it would be at least a red heat.
19065. *Mr. Wade.*] *Q.* Can you speak of heat as distinct from actual flame? *A.* No; I do not think you can at all. I do not pretend to be able to discriminate between heat and actual flame in that respect; although the burning of the bark of the props was only skin deep, as it were. There was a lot of bark on them, and the burning was not deep in. If there had been much heat, the burning would have extended deeper into the props, I think.
19066. *His Honor.*] *Q.* Did the bark of the props actually seem to have been partially burnt? *A.* Yes; the skin of them was burnt, an imperceptible skin.
19067. *Mr. Wade.*] *Q.* A skin of what? *A.* The outer skin of the bark.

19068. *Q.* You say an imperceptible skin—does it go any depth at all? *A.* No; I took a knife and pared some of it; with the slightest cut you could get into the unburnt portion of the timber. Some of the splinters, just like the frays of the timber, were burnt. It was more burnt there, where the timber was splintering.
19069. *Q.* In how many places did you see that? *A.* On these props between the two last cut-throughs.
19070. *Q.* Do you mean all the props? *A.* No; only some of them. It was at certain levels on the props.
19071. *Mr. Robertson.*] *Q.* What levels do you mean? *A.* Well, it did not extend from the floor to the roof.
19072. *Mr. Wade.*] *Q.* Where would it be? *A.* Nearer the top—I think within about 3 feet of the top.
19073. *Q.* Did you see anything you could recognise as coked dust anywhere up there? *A.* There was that melted dust. My impression of the props in the front heading was that there was more burning on this side, going up, than on the opposite side, coming down; that is to say, more heat and more deposited material.
19074. *His Honor.*] *Q.* That is on the east side, on the eastern row of props? *A.* Yes.
19075. *Q.* There was more sign of burning, or of heat, on the south side of those props in the front heading? *A.* Yes.
19076. *Q.* And on the other props, on the other side, it was reversed? *A.* That was my impression.
19077. *Mr. Bruce Smith.*] *Q.* There was more sign of burning? *A.* No, not burning; more deposited melted dust.
19078. *Mr. Wade.*] *Q.* Take this first cut-through, immediately off the front of No. 1 main heading.
19079. *His Honor.*] *Q.* Is not that really the northernmost of the line of cut-throughs? *A.* Yes.
19080. *Mr. Wade.*] It is the line of cut-throughs between Purcell's and Aitken's working places.
19081. *His Honor.*] *Q.* It is really describable as the northernmost line of cut-throughs? *A.* Yes.
19082. *Mr. Wade.*] *Q.* There had been a canvas screen across the front heading near the opening of this cut-through? *A.* Yes; and we found that at the north-east corner of the western rib.
19083. *His Honor.*] *Q.* Or at the south-western corner of the intersection of that line of cut-throughs with the No. 1 front heading? *A.* And that was dragged down towards the west.
19084. *Mr. Robertson.*] *Q.* Was not that found round a prop? *A.* It had gone round the corner to the north-west.
19085. *Mr. Wade.*] *Q.* Was that inbye or outbye? *A.* That would be inbye.
19086. *Q.* Now, coming to the first cut-through to the first working place, Purcell's—how was the ventilation carried up to the face? *A.* By brattice cloth across the cut-through; the air would go to the west.
19087. *Q.* The brattice would be across the cut-through, so as to take the air up to the face; did you notice how the brattice was which had been across the cut-through taking the air up into bord No. 105? *A.* The canvas that had been across the cut-through we found round a post and a prop that had been driven inbye; and then the canvas in the actual working place, which had been only at the back of the props on the west side, had been moved bodily to the east side of the next line of props.
19088. *Q.* Can you remember anything else there? *A.* No.
19089. *Q.* Any signs of flame? *A.* I cannot say one way or the other.
19090. *Q.* The next bord is No. 88, Tost and Bunn; what did you notice in regard to that? *A.* A piece of canvas was driven also west. That was fastened in the same way; and a portion was found further west down the cut-through.
19091. *His Honor.*] *Q.* Was it brought up against props? *A.* Yes, around props.
19092. *Q.* The southernmost one round a prop that was lying down? *Q.* Yes.
19093. *Q.* And the northernmost piece round a prop standing? *A.* Yes.
19094. *Mr. Wade.*] *Q.* Do you remember seeing anything of a shirt down there? *A.* Yes; we did come across a shirt down there.
19095. *Q.* Do you remember where it was? *A.* Not particularly.
19096. *Q.* Taking the place as you go further in towards Aitken's pillar, what are the directions of force there? *A.* West.
19097. *Mr. Bruce Smith.*] They are all in the direction of west?
19098. *His Honor.*] *Q.* From east to west? *A.* Yes.
19099. *Mr. Wade.*] *Q.* Do you know where the fire was seen, bord 87? *A.* All we saw was the ash there, that is all.
19100. *Q.* Was anything else left intact there, unburnt, in that locality? *A.* There was distilled dust just about this point, in No. 87, on the western rib, immediately opposite the cut-through to the east, near the pigsties.
19101. *Q.* Did you see any things there that were not burnt? [*Witness did not answer.*]
19102. *Q.* There is another line of cut-throughs to the west of No. 1, the first cut-throughs inbye of the 5th Right? *A.* Yes; the first line of cut-throughs to the left inbye of the 5th Right.
19103. *Q.* What are the indications of force in those? *A.* To the west.
19104. *Q.* You know the boy Morrison was found somewhere near the 4th Left? *A.* Yes, I have heard that.
19105. *Q.* It has been said that the ignition may have taken place somewhere near there—near where he was found;—now, supposing a volume of air was being driven out from the 4th Right towards the 4th Left, and that that volume of air coming out contained explosive gas, what do you think would be the effect on Morrison's light if this volume of air was driven up? *A.* I should imagine, if the air was driven from the 4th Right with anything like force, it would blow his light out. The light would have been blown out before the gaseous mixture reached it.
19106. *Q.* From what? *A.* From the force of the wind preceding the mixture that was ejected from the 4th Right.
19107. *Q.* You mean the light would have been blown out by the air in advance of that which came from the 4th Right? *A.* Yes.
19108. *Q.* Adam Frost said that he was half a mile away, near the head of the 2nd Right rope road; he said he was partly blown off his feet, and his light was blown out, but nothing else happened;—what do you think would be the cause of that? *A.* Does he say whether his light was blown out before he heard the explosion, or was it afterwards?

19109. *Q.* His evidence was that he then walked 100 yards towards the main road, and then saw smoke and dust? *A.* I should say that, if the same force put out his light at that point, up there, it would have blown out Morrison's light.
19110. *Mr. Robertson.*] *Q.* But at that point there was supposed to have been an explosion—at the point referred to by Mr. Wade the explosion seems to have reached its maximum effect;—at Morrison's light the explosion had not started? *A.* That is what I say. If you presuppose a force coming that would put out Frost's light at the 2nd Right, it would also put out Morrison's light.
19111. *Q.* Why; do not you see that we are assuming that the ignition took place at Morrison's light;—well, there was no explosion up to that moment? *A.* Well, of course, if you assume that —— [*Interrupted*].
19112. *Q.* We must assume that? *A.* If you assume that, of course Frost's light would be put out by the force of the explosion.
19113. *Mr. Wade.*] *Q.* But that is not what I said; Frost's light is outbye, and Morrison's light is inbye. Supposing a great force came out of the 4th Right and divided, some of it going to Morrison's place, and some of it going outbye and up the 2nd Right to where Frost was ——[*Interrupted*].
19114. *His Honor.*] If it was "some of it."
19115. *Mr. Robertson.*] I understood, Mr. Wade, that you were going on the assumption that the ignition did take place at Morrison's light.
19116. *Mr. Wade.*] I am taking the theory put forward that there was an ignition at Morrison's light. What I want to argue is that there was a displacement of air which would put Morrison's light out before the explosive mixture reached it at all, and I want to show that Frost's light was put out in the same way. Whether it was an explosion or a rush of air, it went through a confined space; and it would tend to drive the air in front of it as a cushion or pad of air; and that cushion of fresh air would put out the light in each case.
19117. *Mr. Robertson.*] But then we have no evidence to show the force of the blast that came out of the 4th Right. It might have been very mild, and have dissipated itself.
19118. *Mr. Wade.*] I am assuming now that there was a strong blast. I will try afterwards to prove that there was. I will admit that that is an assumption.
19119. *Q.* If the gas had ignited anywhere near the 4th Left, where Morrison was found, what would you expect with regard to the 4th Left travelling road or rope road? *A.* I should expect that where there was an inflammation of gas there would be a radiation of forces.
19120. *Q.* Did you see any sign of that anywhere near where Morrison was found? *A.* Very little force went down that left heading near the 5th Right.
19121. *Q.* That is inbye? *A.* Yes, compared with the forces on the main road. There were some forces went that way; but, speaking relatively to the forces that went in the main road, I should say that the force that went to the 4th Left was much smaller.
19122. *Q.* What did you see in the 4th Left? *A.* There were some debris and other material, speaking from memory, scattered, from the junction of the 4th Left with the main road, to the west. But that did not extend very far; it may be only 20 yards, perhaps, where the evidence is visible.
19123. *Q.* In the 4th Left? *A.* In the 4th Left.
19124. *Q.* Did you see any canvas at the 4th Left openings? *A.* There were some empty skips tossed about on the junction—that is, near the 4th Left junction with the No. 1.
19125. *Q.* That was going inbye? *A.* Yes.
19126. *Q.* Did you see any canvas? *A.* I have no notes of any canvas.
19127. *Q.* Now, go to the Morris' place—you know where their bodies were found, inbye of their working-place? *A.* That is right.
19128. *Q.* Do you think there could have been an ignition of gas at that point where they were found? *A.* No.
19129. *Q.* Do you think it is at all consistent with the evidence of forces which you saw? *A.* No, I do not.
19130. *Q.* Do you know anything that would take them inside a danger-board, in the ordinary course of things? *A.* No; they have no right to go through a danger-board. I do not see why they should go there. Their place was in fair working order; there were rails there, and materials of that description; and I do not see why they should go up there.
19131. *Q.* Do you know how far their bodies were found from the actual face of the No. 1? *A.* No, but a good distance. The position is on that plan [*Exhibit* 38]. [*Witness looked at the plan.*] About 160 feet, I think.
19132. *Q.* If there was an explosive mixture of gas at the point where their bodies were found, how many cut-throughs from the face would that overlap? *A.* One, and nearly two—nearly back to the second cut-through.
19133. *Q.* If there were that quantity of gas back from the face of the back heading, what would you expect to be the condition of affairs in Purcell's bord, No. 105? *A.* I should imagine that, if those places were foul to that point, it would be foul also in Purcell's place, which was supplied by the same air-current. There would be gas in Purcell's place, and in those places to the left as well.
19134. *Q.* Do you mean to the left, west of Purcell's? *A.* To the west of Purcell's.
19135. *Q.* Let us come to the 4th Right for a moment. Do you know, or have you ever heard, of any fire-damp being found in the roof of any of the southern collieries in the strata above the coal? *A.* Emanating from the strata?
19136. *Q.* Yes? *A.* No.
19137. *Q.* Take the 35-goaf. I suppose the ordinary method of working is, first of all, to drive the headings, and then to drive the bords, and finally to extract the pillars? *A.* That is so.
19138. *Q.* Supposing there was gas given off when you first opened the headings, what do you think, in the ordinary course of mining experience, would be the likelihood of gas being found when you came to the pillars? *A.* It would be usually less. The first openings in the virgin coal drain the major portion of the gas out; and the bords that follow keep on draining it; and what is left in the pillars is infinitely less. The pillars themselves would not give off gas. In a seam like Kembla, I should say that, even supposing there had been gas in the headings in small quantities, there would not be gas in the pillars, because the drainage was going on all the time.

19139. *Q.* And, if the roof fell in the ordinary way, would that have any further tendency to drain the gas away? *A.* No, I cannot say that. I do not think it would have any bearing on the drainage of gas. I do not think it would make any difference.
19140. *Q.* Well, if this place, the 35-acre goaf, had been four years in the course of working, even supposing there was gas in the coal, would you expect it to be well drained at the end of four years? *A.* Yes, I should expect it to be fairly well drained by the time the pillars were being taken out, if not completely drained.
19141. *Q.* From your examinations, which you have made from time to time, of the 4th Right, could you say whether it was giving off black-damp? *A.* All ever I got at the 4th Right was black-damp—extinctive gas.
19142. *Q.* That was after the disaster? *A.* Yes; and I made it my business to ask some of the men who used to come round to Corrimal; and worked at Kembla; and they said they had never seen any explosive gas there, but it was black-damp that they saw; and that supported my observation.
19143. *Q.* Now we come to that part of No. 1 which was outbye of the 4th Right;—did you see any sign of force between the 4th Left and the 4th Right going outbye? *A.* No; the forces went from the 4th Right inbye.
19144. *Q.* Was there any indication of any kind of any force going outbye between the 4th Left and the 4th Right? *A.* No, not that I saw. The dirt was driven against a number of rollers, showing that the blast proceeded from the 4th Right inbye; and the positions of the rollers from some of their frames gave the same indication to my mind. The skips also, near the 4th Left, showed that they went in.
19145. *Q.* Can you say whether there was any division of forces, any splitting of them; and, if so, where? *A.* There was no splitting of forces from the 4th right inbye.
19146. *Q.* Where did you see any split? *A.* From that point outbye. From the 4th Right the forces were outbye to the tunnel mouth.
19147. *Q.* Can you say whether the indications of force were great or mild outbye of the 4th Right? *A.* They were pretty great, I should imagine. A great number of the rails, the bars to carry the roof, were bent and thrown down.
19148. *Q.* How far from the 4th Right could you trace those bent rails? *A.* We could trace them a considerable distance—several hundred yards. Then, the roof was down in some places on top of its supports. There were falls that occurred subsequently to the explosion, I suppose, that covered a lot of the evidences.
19149. *Q.* You are speaking of rails that were standing? *A.* Rails that were visible. And there was a chock at the 3rd Left which showed force; it was driven in a westerly direction.
19150. *Q.* Do you know the size of these rails? *A.* Yes; I suppose they are about 60 lb. to the yard.
19151. *Q.* The length of them? *A.* 11 feet long and 4½ inches broad, and about the same height.
19152. *Q.* Have you any idea what the pressure would be that would be sufficient to bend those rails? *A.* No, I have no idea, but I should imagine it would be very great indeed. I never worked that out.
19153. *Mr. Robertson.*] *Q.* You said something just now about a chock being driven to the west. Are you quite sure about that; have you got your directions right? *A.* [*After looking at the plan*] I should have said south-west; and there is a heap of muck that was blown inbye there.
19154. *Mr. Wade.*] *Q.* Did you see any canvas near the 4th Right? *A.* Yes, we got some canvas on the engine-road near the 4th Right.
19155. *Q.* On the ground or on a skip? *A.* On the ground.
19156. *Q.* Did you see any other canvas? Did you see any cracks in the rib? *A.* On the western rib of No. 1, outbye from the 4th Right, we came across a crevice in the coal with a piece of canvas jambed in.
49157. *Q.* Will you mark that on the plan, to show where it is? *A.* I think it is on the plan.
19158. (Witness pointed out where the position was marked on Exhibit No. 38).
19159. *Q.* Slightly outbye of the 4th Right, in the western rib, in the corner of a manhole? *A.* Yes. Morrison, who was with us, explained that there had been canvas across the 4th Right and the cut-through to the south of it.
19160. *Q.* Can you say whether it would require force to plant that canvas in the crack in the rib? *A.* It was jambed very tight.
19161. *Q.* Then it would require force? *A.* Yes.
19162. *Q.* Great force? *A.* Yes; I would imagine the force would be very considerable.
19163. *Q.* How do you account for the indications of force you saw outbye of the 4th Right, as to where the motive power came from? *A.* From the 4th Right, I think.
19164. *Q.* Can you account for it in any other way than by its coming from the 4th Right? *A.* No; I have been thinking the thing out, and that is the conclusion I have come to, that it must have come from there. That is clearly a divisional point between the two forces; one lot goes in and the other lot goes out from the junction of the 4th Right with the main No. 1 engine road.
19165. *Q.* Do you know whether, in the case of a gas explosion—from your reading, of course—if the timber is displaced for any great distance from the point of origin? *A.* My impressions of a gas explosion, from my reading, are that the burning is much more intense than I saw it in Kembla, and that the forces are more of a shattering nature, stronger, more rending.
19166. *Mr. Ritchie.*] *Q.* That is your impression from reading? *A.* Yes.
19167. *Mr. Wade.*] *Q.* That is not quite the question I asked you. The question I asked you was this: When timber is disturbed by a gas explosion, do you find that disturbance any great distance from the point of origin? *A.* That would depend upon the amount of gas ignited, and upon the initial force; but a gas explosion develops more energy than, say, a coal-dust explosion; and the force would be greater.
19168. *Q.* On page 115 of Atkinsons' book on "Explosions in Coal Mines," speaking about some theory advanced, of a blast passing over long distances from the point of origin along a road, not in an explosive condition, it is said:

> It appears to the writers that the resilient properties of columns of air in the narrow passages of a mine are such that no great force can be exerted at any considerable distance away from where actual expansion due to combustion takes place. A moderate force may be exerted some distance away; but violence sufficient to cause death or displace timbering does not appear to extend many yards from the actual explosion.

Assuming that that statement is correct, can you account for this bending of the iron bars hundreds of yards away as being consistent with a gas explosion? *A.* Oh, no.

19169. *Q.* You say you have come to the conclusion that the force came out of the 4th Right, and that it was a strong force? *A.* Yes.
19170. *Q.* Can you say whether a fall of roof in the 4th Right would tend to set up a great force, or tend to drive out air from the 4th Right at a great speed? *A.* It would, if the fall was large enough.
19171. *Q.* Assuming that there was a space of about 4 feet between the roof and the floor for the time being, and there was about 40 yards square of roof coming down, have you any approximate statement of what velocity would be developed? *A.* You could get velocity up to 700 miles an hour, after making an allowance for air escaping to the surrounding goaf.
19172. *Q.* Supposing the whole of the air which was displaced by a fall of the roof had been driven out by the 4th Right road, have you made any calculation at all as to what velocity would be obtained under those conditions? *A.* Of course there is a lot of speculation about calculations of that sort.
19173. *Q.* Have you done that? *A.* Yes.
19174. *Q.* You say the element of speculation will come in, and you are assuming that a certain amount of air will escape into the goaf, and not be driven out? *A.* Exactly.
19175. *Q.* What allowance do you make for that possibility? *A.* Fifty per cent. of the whole.
19176. *Q.* Do you know what pressure that would give in the 4th Right? *A.* You get a pressure of a good many pounds to the square inch.
19177. *Q.* How many? *A.* Thirty odd—thirty-five, or something like that.
19178. *Q.* Have you worked that out? *A.* Yes. Of course, as I say, you know it is quite speculative.
19179. *Mr. Bruce Smith.*] This all depends, Your Honor, on how it falls; it may dribble down.
19180. *Witness.*] My calculation is not based on the roof dribbling, but on its falling solidly.
19181. *Mr. Wade.*] *Q.* What is your assumption with regard to the way the roof falls? *A.* That depends a lot upon the conditions of the roof. I noticed in Kembla that the roof is a very strong roof in that particular part of the mine, and with falls as great big slabs, or great big flakes; and I should imagine it would fall very heavily, from what I saw of the falls not far off that place.
19182. *Q.* Is there any other way you can account for force that was shown as coming out of the 4th Right except by a force caused by a fall of the roof? *A.* No. The position appears to me in this way—a force came out of there which split. That force in itself has had a great propulsive power, and has shifted and moved and left evidences of its track; and I think that, with sufficient power to move those stoppages, the force of the wind would have blown out all lights in the vicinity.
19183. *Mr. Ritchie.*] *Q.* Where do you say it split? *A.* At the 4th Right.
19184. *Mr. Wade.*] Did you see any evidence, or have you heard of any evidence, of there being a gas explosion which initiated at the 4th Right? *A.* No, I cannot say that I have. No bodies were got near there, so far as I heard. There was nobody working there, so far as I know.
19185. *Q.* That being so, you see no other alternative than a gas explosion at the 4th Right to cause the indications of forces, or the displacement of air without an explosion? *A.* No; I should say that one (the displacement of air) appears to me, from the evidence that I have seen, to be the correct conclusion.
19186. *Q.* Take the appearance you saw against the seatings of the rollers—the dust heaped up. What does that indicate to your mind? *A.* It would indicate the track of a blast in that direction.
19187. *Q.* What kind of blast? *A.* A shower of debris—earth, and coal, and slack and stuff.
19188. *Q.* By what force? *A.* By this propulsive force out of the 4th Right, afterwards augmented by the explosion of the coal-dust.
19189. *Q.* Did you find any indication of that same sweeping of the dust against the roller seats outbye as well as inbye? *A.* Yes; it gathered force as it went outbye.
19190. *Q.* You say you worked out that your draught at 700 miles an hour would produce a pressure of how much? *A.* 35 lb. per square inch.
19191. *Mr. Robertson.*] *Q.* Is that so? *A.* Yes; assuming it falls about 44 yards square, 4 ft. 6 in. high, and 50 per cent. escape, and with that orifice of passage from the edge of the goaf to the return airway, there is a sufficient pressure to give that velocity—700 miles an hour.
19192. *Q.* What is the time factor? *A.* Well, I took the roof falling 4 feet. I found the time it would fall from the formula, that the time equals the square root of the distance of falling divided by 16·1 in seconds.
19193. *Q.* Practically less than instantaneous? *A.* Yes; it comes to ·5 of a second. Well, in that period there is a certain displacement; and, assuming 50 per cent. of that to go back and 50 per cent. to come out, you get a body of air propelled out at a certain velocity of feet per minute through an air-passage of a certain area.
19194. *Q.* What area did you take? *A.* 72 square feet.
19195. *Q.* Twelve by six? *A.* Yes.
19196. *His Honor.*] *Q.* Do not you see that that body of air, starting in that way, being projected by this—what you may call a jerk—from behind, has an immediate tendency to be blocked in front, and to cease to operate forward? *A.* No.
19197. *Q.* Do not you see that it is not like a solid projectile; its operation in a straight line forward would die out in a very short distance if not reinforced by something else? *A.* Yes; and the reinforcement comes in.
19198. *Q.* Where does it come from, except from a dust explosion? *A.* Yes; that pressure gives a certain temperature, which would ignite dust spontaneously.
19199. *Q.* So you believe in the dust explosion? *A.* Oh, certainly, from those conditions.
19200. *Mr. Wade.*] *Q.* Now we come to the temperature of the goaf. You know those investigations by Professor Bedson with regard to the ignition of coal-dust at a temperature of 291 degrees? *A.* Yes; the figures are something like that. I have it here [*reading from a book*]: "From the coal-dust alone the ignition took place at a temperature of 291 degrees Fahrenheit, and the mass finally glowed with a dull red heat."
19201. *Q.* From what point is that taken? *A.* They do not give the initial temperature; but that is the total temperature, 291 degrees.
19202. *Mr. Robertson.*] *Q.* At what pressure? *A.* That is equal to a pressure of 36·7 lbs. per square inch.
19203. *Mr. Wade.*] *Q.* That is an increase of temperature from the starting-point of how much? *A.* An increase of 228 degrees.
19204. *Q.* Above what point? *A.* The starting-point is not given here.

19205. *His Honor.*] *Q.* That is the increment of temperature due to the increment of pressure from 15 lb. per square inch to 38·7 lbs. per square inch? *A.* Yes, from atmospheric pressure.
19206. *Mr. Wade.*] *Q.* Are not they taken from 60 degrees? *A.* Yes; it is about 60 degrees; but I do not seem to be able to find it in this book. I think that may be about the temperature of Professor Bedson's laboratory.
19207. *Q.* It is an increase of 228 degrees? *A.* Yes.
19208. *Q.* What would you say was the starting temperature in the 4th Right on the day of the explosion? *A.* I suppose between 60 and 70 degrees—say 70 degrees.
19209. *Q.* How would you fix upon that? *A.* I assume that because, to my mind, it seems to me a fair temperature for a goaf—about 70 degrees. It may have been less in Kembla.
19210. *Q.* Would the goaf be cooler or hotter than the ordinary parts of the mine? *A.* The heat would be more apparent in the goaf. It would be about the rock temperature—about the same temperature as the rocks around it—about 70 degrees.
19211. *Q.* Would the presence of carbonic acid gas have any effect on it? *A.* I did not take that into account in these experiments.
19212. *Q.* Your calculations were made on the assumption that the carbonic acid gas makes no difference? *A.* Yes.
19213. *Q.* You say that a blast of 700 miles an hour would give a pressure of 36·7 lbs. per square inch, which gives an increase of temperature of 228 degrees Fahrenheit; and, adding that to the starting-point, the temperature of the goaf, 70 degrees, you get sufficient to reach the 291 degrees Fahrenheit? *A.* Yes.
19214. *Q.* Supposing you have the air driven along, either at that temperature, 291 degrees, or, say, slightly below it, what would be the effect on the air when it got to the dead ends at the face of No. 1 Right? *A.* There would be a certain amount of air driven in front of the blast, and that would be compressed, I presume.
19215. *Mr. Robertson.*] *Q.* May I ask at what point you calculate that the 291 degrees temperature would be reached;—at the orifice from No. 4 Right? *A.* Yes.
19216. *Q.* Between that and the travelling road? *A.* Yes.
19217. *Mr. Wade.*] *Q.* Let us come to the face of No. 1 Right again for a moment:—supposing the dust was driven forward at a great temperature up to the face of No. 1 Right, the air in front would be compressed? *A.* Yes.
19218. *Q.* Would that help the matter at all? *A.* It would help the oxidation of the dust, and the yielding of more flame and more heat; and there would be an increase in the intensity of the glowing mass.
19219. *Q.* Do you think that would account for what you saw in the way of distilled or partially-coked dust in the face of No. 1 heading? *A.* Yes, I should say so.
19220. *Q.* And what about the brattice which you saw at the last cut-through in the No. 1 back heading? *A.* It would account for the evidence of heat on that brattice-cloth, too, I should say.
19221. *Q.* You say you saw some coked dust near the locality of that fire in bord No. 87? *A.* There was some coked dust spattered on the ribs in that vicinity; I cannot say the exact spot. There were some globules of coked dust there; that is the best evidence of coking I saw in the whole of Kembla.
19222. *Mr. Robertson.*] *Q.* What do you understand by coking? *A.* That the dust melted.
19223. *Q.* That is not coking? *A.* It was porous, the same as coke.
19224. *Q.* Can you describe what coke is? *A.* Coke is coal that has been subjected to great heat; and from which gas has been driven.
19225. *Q.* The volatile constituents have all been driven off? *A.* Yes.
19226. *Q.* But if the volatile constituents have not been driven off? *A.* I do not suppose it would be coke, technically speaking; and I do not know that all the volatile matter was driven off from what I call coke that I saw in this place. It looked more like coke than anything I saw in Kembla; and the pieces were about as big as small peas.

(At 1 p.m. the Commission adjourned until 2·10 p.m.)

AFTERNOON.

(On resuming, at 2 p.m., Mr. W. R. Pratt attended to take shorthand notes of the evidence and proceedings.)

ALFRED ERNEST OSWALD SELLERS, previously sworn, was further examined, as under:—

Examination-in-Chief by Mr. Wade.

19227. *Q.* I will ask you to consider the outbye side of the 4th Right. I want to ask you, if the force came out of the 4th Right at 700 miles an hour, would it be sufficient to bend the iron bar there? *A.* I could not say. The iron bars are some distance from the 4th Right. My theory presupposes that the force would be carried on as the blast proceeded outbye; and the blast at the rails might have been greater or less.
19228. *Mr. Robertson.*] *Q.* Greater or less than the initial force? *A.* Yes.
19229. *Q.* Under what conditions would you get it greater, going outbye from the 4th Right? *A.* It might be sweeping out and catch up more dust; and this dust, in conjunction with the other, might create more force.
19230. *Mr. Wade.*] *Q.* You mean that increased supply of oxygen might increase the force? *A.* Yes.
19231. *Q.* Where is the first point you get a supply of air from? *A.* From the various cut-throughs; and there is the No. 2 heading.
19232. *Q.* Between the 4th Right and the junction of No. 2 Right are there any openings that would increase the supply of oxygen? *A.* There may be some.
19233. *Q.* Even supposing there was only 36 lbs. of force to the square inch, do you think that would be sufficient to bend the bar? *A.* I have not thought the matter out.
19234. *Mr. Bruce Smith.*] *Q.* There might be greater force than that? *A.* There might be greater or less force.

19235. *Q.* You do not know? *A.* I do not know.
19236. *Mr. Wade.*] *Q.* There was evidence that a man was found in the telephone cabin, who had a drill through his thigh, and his trousers were torn. Do you think that that would be consistent with force in which an air-blast was the primary factor? *A.* It may have been.
19237. *Q.* Now with regard to the witness Hammon. He stated that he was in the 5th Right rope road, at the flat close to No. 1 back heading? *A.* Yes.
19238. *Q.* And he said that a blast of hot air came along and blew his light out. Do you know how far that would be from the 4th Left—how many yards? *A.* Perhaps twenty.
19239. *Q.* From the 4th Left it would be 20 yards or less? *A.* About 20 yards, I should say.
19240. *Q.* Would you expect that the wind which blew Hammon's light out would also blow Morrison's out? *A.* Oh, decidedly—I should think so.
19241. *Q.* Have you any knowledge of the effect on the skin by it being peppered with hot coal-dust? *A.* I have read Dr. Haldane on the matter; but I have had no personal experience.
19242. *Q.* What does he say? *A.* He says that burning might occur—a man's skin might be burnt in that way—but it would only affect the outer skin.
19243. *His Honor.*] The matter has been referred to before here. The Commission can derive its information from the report as well as from the witness, unless he is an expert.
19244. *Mr. Wade.*] I will not take that matter any further.
19245. *Q.* Do you know of your own experience whether a man's hair can be singed without a flame? *A.* If you hold hair over a candle a certain distance away from the flame, the hair is singed by the heat from the candle. That is obvious.
19246. *Q.* You do not agree that if the hair has bulbous ends it must be caused by flame? *A.* I do not know anything about it; I am not an expert.
19247. *Q.* If there is a blast of hot coal-dust up No 1 heading, do you think that would account for the appearance of singeing on the men's hair? *A.* Perhaps it would.
19248. *Q.* Coming back to the 4th Right for a moment, did you notice any props in the roadway? *A.* What part of the 4th Right?
19249. *Q.* On the goaf side of the travelling road? *A.* There were some props there.
19250. *Q.* Did you see any coal-dust or slack there? *A.* There was some coal or slack there on the inside towards the goaf.
19251. *Q.* How were the props which had the coal-dust on them? *A.* If my memory serves me right, it was the props on the eastern end.
19252. *Q.* Which is the eastern end—the one nearest the goaf? *A.* Yes.
19253. *Q.* Can you explain that? *A.* That might be explained by the fact that I ascertained that these props were taken out of the pillars and stacked there; and my opinion was that the blast carried with it a certain amount of coal and grit matter, and it was thrown over the props.
19254. *Mr. Ritchie.*] *Q.* You say a certain amount of coal and matter? *A.* I mean small coal and refuse.
19255. *Mr. Wade.*] *Q.* Would what you saw on the props be consistent with the force coming outbye? *A.* I consider so.
19256. *Q.* Now I want to ask you—do you say that the temperature at which the air-blast came out of the 4th Right was necessarily as high as 291 degrees Fah., or was it less? *A.* It is a difficult thing to say that it was necessarily at that heat. The point which I took was to assume that temperature at that point would give ignition. There might be a set of circumstances more favourable to that condition, and perhaps under those conditions it would be lower.
19257. *Q.* Do you mean to say that it may have been below 291 degrees as it came out, and that the temperature increased as it went further along? *A.* I think it was necessary that the temperature should get to ignition point.
19258. *Q.* If you got an increased supply of oxygen as it got towards No. 1 level, do you think that would increase the temperature? *A.* I do not think I am competent to give an opinion about that.
19259. *Q.* One witness named Stafford states that in Price's flat he saw a body of fire coming down the airway towards him—what do you think that might have been? *A.* Decidedly the gas travelling or the reflection from it.
19260. *Q.* If he was able to get away from it and outpace it, do you think it could have been the flame of the explosion? No, it must have been the reflection under those circumstances, or it would have overtaken him.
19261. *Q.* Do you know at what pace the flame of an explosion travels? *A.* It has been variously estimated.
19262. *Q.* As fast as a man can travel, at all events? *A.* Oh, yes.
19263. *Q.* If you knew that gas had been discovered in the 4th Right, say, within twelve months of the 31st of July last, and it was known that the roof was likely to fall, is there anything that should have been done besides withdrawing the men from there? *A.* Not that I am aware of.
19264. *Mr Ritchie*] Withdraw the men from the 4th Right?
19265. *Mr. Wade.*] Yes.
19266. *Mr. Ritchie*] There was no one working there.
19267. *Mr. Wade.*] *Q.* Supposing the men have finished their work, and the timber is about to be withdrawn, is there anything more to be done? *A.* No; it is a common practice to withdraw the men when you expect a fall.
19268. *Mr. Ritchie.*] *Q.* Would you withdraw them on the inbye or the outbye side of where the fall takes place, or from any area round the fall? *A.* You would withdraw them from anywhere where it is likely they would be affected—they would be affected, probably, some little distance from the fall.
19269. *Q.* Do you mean affected by the effects of the fall? *A.* Supposing this room was a piece of ground with the props drawn out and you expected a fall—then you would not allow the men to work close up to it.
19270. *Q.* What you mean is that the fall might cover a larger area than you expected? *A.* Yes.
19271. *Q.* There is danger of a fall extending? *A.* Yes.
19272. *Q.* It would not be because of any other risk arising from the fall? *A.* No.
19273. *Mr. Wade.*] *Q.* A fall is a common thing in a mine? *A.* Yes.
19274. *Q.* It is part and parcel of the working of a coal-mine? *A.* Yes.

Witness—A. E. O. Sellers. 23 February, 1903.

19275. *Q.* Have you ever known of a case where a fall of roof has caused very much damage? *A.* No; I have not. I have had experience as to falls at Corrimal, where some doors 25 chains away have been banged about, and where the vibration has caused the stoppings to be thrown down. That is the largest I have seen.
19276. *Q.* Is that the only case? *A.* That is a special case which I noticed. Other falls have taken place at night, when I have not been there.
19277. *Q.* Ordinary falls of roof take place, and no trouble follows from it? *A.* No; they withdraw the timber and the roof falls in, in fairly small sections; and you get no bother.
19278 *Q.* If you have a large surface of roof—take the ceiling of a room as the roof—can you describe how it comes away? *A.* It depends on the condition of the roof, and the conditions vary; when it is a hard roof it falls in big masses, but if it is a jointed roof it falls in small pieces.
19279. *Q.* In a jointed roof, does it fall piece by piece? *A.* Sometimes it comes off and falls in the goaf, and then another fall takes place, and so on like that.
19280. *Q.* We had some evidence given here by different people about a lighting up of something which takes place when a miner goes up to the face of the coal after what has been described as a "hanging shot"? *A.* I have heard of that.
19281. *Q.* Do you know whether that can take place quite apart from there being fire-damp in the coal? *A.* Chemically speaking, I believe that it is the gunpowder. In the case you speak of the shot was fired; the coal hangs, and the gunpowder does not get proper relief; and the gases—the carbon-monoxide—in the crack or the corner will give a flame.
19282. *Mr Robertson.*] *Q.* Have you had any cases of this kind in your own experience? *A.* No.
19283. *Q.* Have you heard of them? *A.* Mr. Humble was speaking about the matter to me some years ago, and we discussed the question, and I thought it over afterwards.
19284. *Q.* Have you ever heard any reports of cases of this kind having occurred in mines under your charge—reports made by your own officials or workmen? *A.* No.
19285. *Mr. Wade.*] *Q.* I now want to ask you about these recommendations. The first is that Managers, under-managers, deputies, and shot-firers should hold certificates by examination. Now, supposing that examination was made compulsory, and that certain men did pass it, do you think that before appointing them they ought also to be examined by the mine Manager? *A.* I think that I should like to satisfy myself as to a man's competency, in addition to any certificate which he might hold, and I say this although I am a member of the Board of Examiners.
19286. *Q.* For what purpose would you examine him? *A.* To find out whether he was a good practical man and understood shot-firing. Matters of that description are best found out by oneself.
19287. *His Honor.*] No one has suggested that this examination should be anything but a preliminary one; and it would only give a man the right to accept an appointment.
19288. *Mr. Wade.*] I understand that the object is that a mining Manager should only be allowed to pick those who have passed such an examination.
19289. *His Honor.*] Just as a solicitor must pass an examination before the public can ask him to come into Court and muddle up a case or otherwise
19290. *Mr. Robertson.*] It means that the Manager must be bound down to employ a man as shot-firer who has passed such an examination.
19291 *The Witness.*] I may say that, I have appointed shot-firers because they have been practical men. We get a list and talk over the names, and see what they know about gas. I then send for a man and talk to him; if I am satisfied a man is competent, I appoint him.
19292. *Mr. Ritchie.*] *Q.* Is that the way in which you appoint deputies? *A.* Yes; that is the practice.
19293. *Q.* What do you do? *A.* I talk to them and make them demonstrate practically how they should do their work, in order to satisfy myself that a man would do it correctly. That is the practice that I have carried out at South Bulli
19294. *Mr. Wade.*] *Q.* There are various qualifications which a man should have? *A.* Yes; a man should have a mind of his own, and should not be unduly influenced.
19295. *Q.* And should he not have tact? *A.* Yes; and it is also a question of a man's having reserve force. If he is confronted with a difficulty, he should be able to face it and to do the best he can under the circumstances.
19296. *Mr. Robertson.*] *Q.* You can only find out those things by knowing a man and talking with him yourself? *A.* Yes; you get to know a man best when you are in a mine along with him.
19297. *Mr. Wade.*] *Q.* Suppose a case arises of taking an official from an adjoining mine? *A.* Then I write to the Manager and get the history of the man, and satisfy myself whether he is competent or not. I appointed a deputy at Corrimal who could hardly write a report, and who certainly could not pass a written examination, but he could do good, honest, practical work.
19298. *Q.* At what age do men generally become deputies? *A.* The deputies at Corrimal were generally middle-aged men. The youngest shot-firer we had was 38 years old.
19299. *Mr. Ritchie.*] Did you have a deputy who could not write? *A.* He could write, but he used to spell badly.
19300. *Q.* You know the deputies have to write? *A.* This man could write his report, but he used to spell phonetically, but I placed a lot of reliance on him because he was a man with a great deal of experience.
19301. *Mr. Wade.*] *Q.* Do you think he would be able to do anything in an examination where pen, ink, and paper are concerned? *A.* I do not think he had sufficient education to say what he knows.
19302. *Q.* If the examination in writing was compulsory, would it shut out many men who would otherwise be fit for all practical requirements? *A.* At the present the operation of the Act is such that not many middle-aged men go up, because they know that they have not got the educational ability. Although the examination is only a simple one—as simple as possible—yet these men get frightened, and many of them are really estimable men, who know all about gas and timbering, and how to keep things right and safe in a mine.
19303. *Mr. Robertson.*] *Q.* By the way, you are one of the Examiners for the State? *A.* Yes.
19304. *Q.* And you speak from the point of view of an Examiner as well as of a mine Manager? *A.* My experience as an Examiner is very little. I have only had one examination so far.
19305. *Q.* You are no more competent to find out the qualifications of a man in you capacity as an Examiner than you are in your capacity of a Manager? *A.* No.

19306. *Q.* Do you think you are as good in your capacity as an Examiner? *A.* If I wanted a deputy to do work in a mine, I should use my own judgment about the matter, and should like to see him personally and find out what he is worth.
19307. *Q.* As a matter of fact, as an Examiner, you could only ascertain to a certain extent his practical knowledge? *A.* To some extent there is an oral examination by which we try to find out the reserve force of a man. We give him questions about which he has to think.
19308. *His Honor.*] *Q.* You very properly adopt an oral examination? *A.* Yes.
19309. *Mr. Wade.*] *Q.* Is the element of trustworthiness a very serious one in making an appointment? *A.* Yes; you want to know a man—and to know whether he will tell you the truth.
19310. *Q.* Supposing you took charge of a colliery, and did not know the men, and wanted to make some appointments at once, what would you do? *A.* I should simply interview them and talk the matter over.
19311. *Q.* Would it not be a guide to know that you had certain people at the mine, and that these men had already satisfied these people as to their knowledge? *A.* One of the deputies at South Bulli had a second-class certificate. The senior deputy was something like the man I was speaking of before—a man with a limited amount of book knowledge; but you could depend on him to know gas. He could not satisfy anyone in a written examination; yet in an oral examination you would see that he understood his work practically; although he might shrink from it, and not be able to tell all that he did know.
19312. *Mr. Ritchie.*] *Q.* Would he not also shrink in a time of danger? *A.* No; some men can brace themselves up for danger. I do not want to discount the utility of examinations, but a Manager has a better right to say from his own personal knowledge whether a man is competent.
19313. *Q.* Do you not think the same argument would apply with equal force to the case of a Manager; that you should not take a Manager on his certificate, but should write to an employer about him? *A.* No.
19314. *Q.* Why? *A.* Because the man who has control of the mine has the right to satisfy an independent tribunal that he knows his business. The Directors who employ him have not any technical knowledge of the work which the man is going to do; and so he must own a certificate. When he is appointed he is responsible; and if he is an honest man he will see that the men who are appointed under him are competent. He knows exactly what the men have to do; he knows the technical part of his work; and his judgment ought to be sufficient.
19315. *Mr. Robertson.*] *Q.* If they fail, he suffers? *A.* Yes.
19316. *Mr. Ritchie.*] *Q.* And other people may suffer with their lives? *A.* That is so. I do not think that you will increase the safety of a mine by having such examinations.
19317. *Q.* Will the fact of their having to submit to an examination make them less competent? *A.* I would not like to say that. But I say that, sometimes, when people get certificates they rely on them; they cannot be taught.
19318. *Q.* The suggestion is that the examination for deputies and shot-firers should be merely an oral one? *A.* Why not let the Manager examine them?
19319. *Q.* It is suggested that sometimes the Manager has his favourites? *A.* Oh, that is an old suggestion of yours.
19320. *Q.* Did you ever hear me advance it? *A.* You advanced it at the Arbitration Court.
19321. *Q.* You never heard me advance it? *A.* I beg your pardon if I am mistaken.
19322. *Mr. Wade.*] I heard it made in the Arbitration Court.
19323. *Mr. Ritchie.*] Not by me. I do not want any personal element introduced into the matter. If I ask the witness a question, I hope that he will answer it without introducing any personal element into the answer.
19324. *The Witness.*] There is no personal element in what I am speaking about.
19325. *Mr. Ritchie.*] *Q.* Do you think that it is an old suggestion of mine? *A.* If I made a mistake I apologise; I did think it was you that said it.
19326. *Mr. Wade.*] *Q.* Did you ever know a Manager who did appoint friends of his who were not competent, and who endangered the safety of the mine? *A.* I have never done it myself and I have never known of its being done.
19327. *Mr. Ritchie.*] *Q.* Let me ask you this;—you had a deputy who, a fortnight ago, ordered a miner, who was a wheeler, to go out of a section where he was using a flare light to a section where safety-lamps were used, to do some work? *A.* That statement is not true. A wheeler was told to go from No. 3 flat to No. 4 flat, and that a man would be there to put him right. We have a large caution board there about 2 ft. 4 in. x 2 ft. 6 in.; and it states that no naked light is allowed to pass that point under any pretext whatever. The boy who went up there could read; and he had no right to pass that point.
19328. *Q.* Supposing the boy could not read? *A.* Then the conditions would be different from what they were.
19329. *Q.* Did the deputy who ordered him to go do so without a word of caution? *A.* We do not caution men for everything at South Bulli. We do not caution a man when he goes into a mine to mind that he does not bump his head. He knows his work. We look upon it that they, as far as their ability will allow them, should keep themselves safe.
19330. *Q.* Do you not think that, if a boy was using a flare light before that, he should have been warned; you admit that the wheeler went with a flare light to another section? *A.* The wheeler got the sack; and union men came and asked the reason why. They know the reason why, and they have no right to assist the miners to break the rules.
19331. *Q.* You say that they knew the reason why? *A.* It was known over the whole of the district.
19332. *Q.* Might it not have been a mere cock-and-bull story? *A.* Yes; but I am not going to stand any interference in such matters.
19333. *Q.* Did you ask the deputy anything about that? *A.* He told the boy that a man would be there to see that things were done right.
19334. *Q.* I want to know whether you asked the deputy to give you any statement about the matter? *A.* I had a written statement from him about it.
19335. *His Honor.*] Has this matter anything to do with the Commission?
19336. *Mr. Ritchie.*] It is a question about the competency of a deputy.
19337. *His Honor.*] This raises the question merely of the competency of one particular man.

19338. *Witness.*] This deputy whom you are speaking of, and to whom Mr. Ritchie objects, on one occasion acted with a great deal of courage in keeping things safe where an unexpected movement happened. That indicated to me that he was a man with a considerable amount of reserve force, and a man who knew his business. We cannot tell every man every morning small details of his work.
19339. *Mr. Ritchie.*] *Q.* There is more reason to advise people about the use of safety-lamps? *A.* I took steps, as I have said, to have danger-boards printed in legible characters and put in prominent positions so that anyone could see them.
19340. *Mr. Wade.*] *Q.* Suppose it was ordered that there should simply be an oral examination. Do you think that you, as Manager, would still insist upon an examination yourself? *A.* Inasmuch as I should be personally responsible, I should exercise my own judgment as well.
19341. *Q.* Can you say whether amongst men who are not fully educated there is a certain amount of nervousness when they are before Examiners? *A.* Yes, there is.
19342. *Q.* As distinct from their manner when before their own Managers? *A.* Yes, that is true.
19343. *Q.* It has been proposed that the holders of Service Certificates should pass an examination within a limited time, or their certificates should be cancelled. Would that work fairly in the interests of the holders of such certificates? *A.* No; I know several men whose opinion on practical subjects I value, and I can go to them and talk over matters with them, learn their opinions, and listen to what they have to say. These men may not have had the advantages of education in their early days; they are aged men now—nearly 50 years old—and I do not think that at that time of life a man is fit to study a lot of technicalities, such as might form part of his education in early life.
19344. *Q.* Are there men in this country who hold certificates of service from England? *A.* Yes.
19345. *Q.* Do you think that certificates of service gained by experience in England are worth more than those gained by experience in New South Wales? *A.* I should say that they are probably worth more, because the mines in Britain are deeper and the conditions are more variable.
19346. *Q.* You know that there is a provision in the Mining Act here that a Manager's certificate can be cancelled on proof of incompetency? *A.* Yes.
19347. *Q.* Do you think that a sufficient protection to the mining community? *A.* I think so.
19348. *Q.* Now I come to Recommendation No. 2, which proposes that the Inspectors shall be vested with absolute power to order the use of safety-lamps. Would you place any limitation on the powers of Inspectors in this matter? *A.* That is rather a difficult question.
19349. *Q.* Take the case of whether you would agree with them? *A.* I know that Inspectors would not as a rule order them if they thought they were unnecessary. In any event I think a reference to arbitration in the case of a dispute would be sufficient.
19350. *Q.* You think it would be a fair thing to bring the question of the introduction of safety-lamps within the arbitration clauses of the Act? *A.* Yes; and I think that the Manager would take a great responsibility upon himself who would ignore the recommendation of a Government Inspector on the matter.
19351. *Q.* There is a recommendation that while the matter is before the Arbitration Court the men should be withdrawn? *A.* That would act harshly on the miners, and probably on the owners also.
19352. *Q.* Then, again, what would be the difficulty if you were compelled to put safety-lamps in a mine temporarily before the order was made? *A.* There would be the first cost.
19353. *Q.* Would that be a serious thing? *A.* The expense would depend on the size of the mine.
19354. *Q.* Do you think that it would be a fair expense to put the mine to, if it should turn out that the lamps were not necessary? *A.* It would be hardly fair, I think.
19355. *Q.* The suggestion has been made that perhaps the Government might supply the lamps for the time-being? *A.* I think the Government supplies too much now.
19356. *Q.* You think it is a fair burden to put on a mine-owner before the order is made? *A.* Not unless it is provided that, in the event of no order being made for lamps to be put in, the Government should pay the cost.
19357. *Mr. Bruce Smith.*] *Q.* You have not put before the witness the proposal that the Government should have on hand a stock of lamps and hire them to a mine until the Arbitration Court had given its award? *A.* That would be a fair thing.
19358. *Q.* You would have to pay for the use of them? *A.* Yes, that would be a fair thing.
19359. *Mr. Wade.*] *Q.* The third recommendation is about the substitution of fans for furnace ventilation. If you found a furnace giving adequate ventilation, do you see any reason why it should be changed, and a fan substituted? *A.* No, I think that is a matter that ought to be left to the owners. If you have furnace ventilation at a mine doing adequate work, I do not see why you should put a fan in; but we all know that the fans afford the better system of ventilation.
19360. *Q.* A witness named Wynn suggested something about the measurement of air at the Corrimal Colliery being wrong upon one occasion. Did you see that statement? *A.* I saw it in the press. I thought that statement was disposed of some years ago.
19361. *Q.* Do you remember what the statement was, and what the facts were? *A.* In the spring of 1900 our fan arrived, and we were doing all we could to get it built. I was paying bricklayers £1 a day on Sundays to do the work. We had the statutory amount of air coming into the mine, but I thought that the air ought to be better; and I was doing all I could to get the fan erected. Mr. Wynn and Mr. Vardy were appointed check-inspectors; and they went into the mine. I did not accompany them; but they had the under-manager with them; he returned to me and said that they only got a certain quantity of air in a certain district. He said that the anemometer stopped when they were measuring the main south road, and they said that the instrument was out of order, and he did not think their measurement would be a record under the circumstances. He also said, "Shall I lend them our anemometer to-morrow morning?" They put this in the book.
19362. *Mr. Bruce Smith.*] *Q.* Put what in the book—the statement about the anemometer? *A.* No, the report. They said that they had examined a certain district, and had only found a certain quantity of air. They sent the report to the Government, and Mr. Rowan was sent up to investigate the matter. Mr. Rowan measured more air than I had got. We went to the dip; and his anemometer would not work. I sent out and got ours, and we got sufficient air. He told me, "I am glad you have got sufficient air—I will report to the Department." I thought nothing more about it; and a little time after I got a letter drawing my attention to Mr. Wynn's inspection. I felt annoyed about this, because when Mr. Rowan found it right they ought not to have said anything about it. We got the fan going. It was Mr. Wynn's defective anemometer that caused the difficulty.

19363. *Mr. Ritchie.*] *Q.* Did you see it? *A.* No.
19364. *Q.* How do you know it was defective? *A.* The under-manager told me; and Mr. Vardy told me.
19365. *Q.* Do you know that Mr. Wynn said it was not wrong? *A.* No. It could not have been right, or it would not have stopped.
19366. *Q.* Did you say that the Government Inspector found a sufficient quantity of air? *A.* Yes.
19367. *Q.* I thought the Government Inspector said he did not find it? *A.* No.
19368. *Q.* He said that your machine was wrong, and his was right? *A.* Afterwards Mr. Rowan got his machine regulated in Sydney; I tested it with mine, and found there was no difference between the two anemometers.
19369. *Q.* You never saw Mr. Wynn's machine at all? *A.* No; but I know what Mr. Vardy told me.
19370. *Q.* He told you that it had stopped? *Q.* Yes.
19371. *Q.* You do not know anything about the machine? *A.* I did not take it to pieces to examine it.
19372. *Q.* Do you admit the possibility of getting a greater quantity of air on the second occasion than on the first? *A.* No; because was no alteration in the mine.
19373. *Q.* Did you see the furnace the first day—how it was working? *A.* The furnace runs every day.
19374. *Q.* The furnace may be lower, or it may be on full steam? *A.* The furnace is inspected three times a day. If there had been any variation, I should have heard about it.
19375. *Q.* Do you not know that the regulating of the air is varied with the furnace power? *A.* There is a constant current with a furnace.
19376. *Q.* You admit that it is quite possible to get a certain register to-day, and another one to-morrow? *A.* Yes, under different circumstances.
19377. *Mr. Wade.*] *Q.* Mr. Wynn says, "The Government Inspector was instructed to immediately go and test the accuracy of this report. He went, and he took round with him the man that was with me (Robert Vardy); he showed the Government Inspector where we measured the air, and the Government Inspector's measurement agreed with ours"? *A.* I think, if the records of the Department were taken, you would find that the matter would be different.
19378. *Q.* Recommendation No. 4 has reference to waste workings. You do not believe in waste workings being sealed off? *A.* No.
19379. *Q.* There is a recommendation that all cut-throughs should not be more than 30 yards apart (No. 5). Do you agree with that? *A.* I think that would be very arbitrary. The principle in a mine is to make your pillars as large as you can. You avoid crushes and creeps and other troubles that come on by the use of narrow pillars.
19380. *Q.* Recommendation No. 7 is that there should be a periodical inspection with the hydrogen flame—one fortnight by the mining people, and the other fortnight by the Government Inspector. Now, what I want to ask you is, first, if you think it is necessary; and, in the next place, is it desirable? *A.* A lamp with a hydrogen flame is not a very safe thing, unless the person who is using it possesses the necessary skill and experience with regard to it.
19381. *Q.* In regard to the time that it takes to make tests? *A.* It takes some time to make tests.
19382. *Q.* Does it take longer than with the ordinary safety-lamp? *A.* Yes; you have more manipulations to perform.
19383. *Q.* If you had to go through that process in each place in the Colliery, how long would it take you? *A.* It would take over a week to make tests of any value.
19384. *Q.* As to the mode of obtaining the hydrogen? *A.* You have to order the stores from England; and sometimes the cylinders land here with all the hydrogen out of them.
19385. *Q.* Do you know that the shipping companies refuse to carry these stores for fear of their explosion? *A.* The lamps which I had at South Bulli came here broken.
19386. *Q.* Can you say whether the ordinary safety-lamp is sufficient as a gas tester to provide for the safety of the men in the mine? *A.* Up to a certain point it is. It is under a certain set of conditions that it would take a long time to explain. But if the mine was not safe the Manager would know. I would not be satisfied always to rely on the test of the ordinary lamp. I want to make a finer test sometimes; but I know how to make those tests, and when they should be made. Those persons connected with the work know when these tests have to be made.
19387. *Q.* You would leave it with the Managers to make tests from time to time? *A.* Yes.
19388. *Q.* The ordinary examination of the mine by the night foreman, with the ordinary lamp, is sufficient to guard against risk? *A.* Yes. Of course, that is guided by the knowledge and assistance he gets from the Manager. I carry a hydrogen lamp; and the observations which I get are taken in conjunction with those which the foreman finds in his work.
19389. *Q.* How many examinations are made of working places in the course of twenty-four hours, in South Bulli? *A.* We examine three times at least in one section, and four times in the other.
19390. *Q.* In the twenty-four hours? *A.* Yes.
19391. *Q.* In addition, there is the Check Inspector's examination? *A.* Yes.
19392. *Q.* And the examination by the Government Inspector? *A.* Yes.
19393. *Q.* Do you think these are ample for the purpose? *A.* Yes.
19394. *Q.* It is suggested that an ordinary safety-lamp cannot find the 1 per cent. of fire-damp which is dangerous in conjunction with coal-dust? *A.* The Manager or the under-manager should have a hydrogen lamp; and, if they knew that there was any fire-damp, the place would either be watered or no shot at all fired.
19395. *Q.* Do I understand that 1 per cent. of fire-damp is only dangerous in conjunction with coal-dust? *A.* Yes.
19396. *Q.* If it is dusty, you water the mine, and you thus get all the protection you want? *A.* Yes; and by exercising judgment in the kind of explosives which you use.
19397. *Q.* You water to keep the dust down? *A.* We water in the place where the shot is fired.
19398. *Q.* And, if you found 1 per cent. of gas with the hydrogen flame, it would still be necessary to water a dusty place? *A.* Yes.
19399. *Q.* There is a recommendation (No. 8) that a minimum of 500 cubic feet of air should be provided for every horse instead of 100 as at present? *A.* There is a reservation that the Inspector has power to order an additional quantity of air if in his opinion it is necessary.

19400. *Q.* Recommendations Nos. 9 and 10 deal with the questions of doors—and double doors are recommended on drives between main intakes and main headings and returns? *A.* I have no objection to them on roads where double doors would be erected for the purpose of protection, where the roads are travelled by horses and by skips; but it is hardly necessary to put double doors between main intakes and returns, where the doors are only kept for the purpose of examining old workings.
19401. *Q.* You would use double doors when the roads are used for haulage purposes? *A.* Yes; where they are used regularly.
19402. *Q.* Would there be any difficulty in the main road where you have the main rope travelling?
19403. *Mr. Robertson.*] I do not think they should be there at all.
19404. *The Witness.*] I think I would avoid them altogether under those conditions.
19405. *Mr. Wade.*] *Q.* There is a recommendation (No. 11) for a weekly measurement of air in each section. What about this? *A.* I do not know what the object is. We measure the air once a month now. The ventilation is pretty well the same every month. It does not vary very much, in case of any variance the matter is reported, and we check it.
19406. *Q.* How do you take the air in the working face;—can you use the anemometer there? *A.* You have to work it in the commencement or middle of a split.
19407. *Q.* Can you tell the current of the air by the deflection of the light? *A.* If you have a naked light you can.
19408. *Q.* If you have a safety-lamp? *A.* You can tell by the dust—by taking up a handful of dust and letting the wind carry it.
19409. *Q.* It is suggested in recommendation No. 12 that there should be an extra supply of safety-lamps at each mine. Mr. Atkinson has suggested that there should be a supply equal to one-fifth of the number of persons below ground in a case where naked lights are used, and of one-tenth in cases where safety-lamps are used? *A.* I agree with that.
19410. *Q.* Something has been said about safety-lamps at the Mount Kembla Mine. How long after you arrived was it that you got a lamp? *A.* The men were getting them ready.
19411. *Q.* How long did you wait? *A.* We waited for about ten minutes, until some others came up, because we wanted to have a consultation.
19412. *Q.* Did you get a lamp then? *A.* Oh, yes.
19413. *Q.* I may take it that they were not in the condition which lamps would be in at the Metropolitan Mine. *A.* No; lamps improve by use.
19414. *Q.* From what you saw at Mount Kembla previously did you think that there was any likelihood of having to use safety-lamps? *A.* Candidly, I did not. I looked upon the Mount Kembla Mine as the safest in the district.
19415. *Q.* It is suggested that oil should be kept in these lamps? *A.* If you keep oil in lamps it forms verdigris, and the oil goes thick.
19416. *Q.* Do you know whether any lamps came from South Bulli? *A.* I wired to Corrimal, asking them to send lamps. There were some lamps from South Bulli as well.
19417. *Q.* Now with regard to recommendation No. 13 that the travelling and haulage roads should be watered—what do you say about that? *A.* Well, it is desirable, if you can do that without interfering with the roof. We water some of the travelling roads in South Bulli on the bottom and on part of the sides. We are seeing how it would do to water the roof; but I am afraid it will break it up. If the roof gets water on it, it swells and splits. All the places where we fire shots are watered. In the haulage road there is a big current of air, and the roof would be alternately wet and dry, and would crack.
19418. *Q.* Do you know of any cases where wet places, or lengths in a mine, have failed to check explosion? *A.* I have read of instances where that has been the case.
19419. *Q.* Do you mean the Pen-y-craig case? *A.* I think that is it. If you water where the shots are fired, you reduce the danger to a very small degree.
19420. *Q.* What is the length which you would water? *A.* Twenty yards all round, and instead of gunpowder I would use safety explosives. The difficulty is to get safety explosives. We are so far away from England, and they are taken off the list of permitted explosives from time to time.
19421. *Mr. Robertson.*] *Q.* Several have not been taken off? *A.* Several have been; and, besides, some of them break up the coal when you use them.
19422. *Q.* You mean some of the permitted explosives? *A.* I have had some tests in Corrimal with the "Bull Dog" explosive. There is a slight glow—it looks like about a dozen glow-worms.
19423. *Q.* Did you hear that it was to be removed off the list? *A.* I hear that the makers are withdrawing it, and are adding sulphur and other chemicals to make less flame. One's choice is limited in the matter of explosives. You must have something to get the coal down in marketable condition, and with no danger to the mine. With Roburite you have to store it, and it becomes deteriorated.
19424. *Q.* That applies to the new explosives, as well as to the others. I have had an experience with Roburite for thirteen years, and we did not find it deteriorate very much. We found it uncertain in the results, due to some defect in manufacture. Some part of it explodes; and some part of it is left in the hole? *A.* I have seen some of it left.
19425. *Mr. Ritchie.*] *Q.* You had some tests made last week? *A.* We had the electric wire; that was the only difference.
19426. *Mr. Robertson.*] *Q.* You find that a detonator is indispensable? *A.* You can fire the "Bull Dog" explosive with a safety-fuse. All that is required is a small initial flash to start it going. You can fire it with a fuse or a wire. The fuses are so weak that you can hold them in your hand and let them off like a cracker.
19427. *Q.* There is a flame? *A.* Yes; but it is neutralised by some compound which reduces danger to a minimum.
19428. *Q.* Do you approve of the use of a fuse in a gassy mine? *A.* Of course, it would be better if you did not shoot at all; but that would mean such an increase of expense to the mines that they would be unpayable, and you could not work them. It would be much better, however, if you could get the coal down without any shots. I do not see any danger in firing a shot with electricity.
19429. *Q.* I think that the danger remains whilst you light a shot with a fuse—but I do not say that it is safe to fire anything in gas? *A.* If you make a test, and find that there is no gas present, and water for about 20 yards, I do not think there is much danger in firing with a fuse, although it is better to fire with electricity.

19430. *Mr. Wade.*] *Q.* You have known fire to travel over large lengths, and in order to make a mine safe you have to water perfectly? *A.* As I have said, if watering is done where you fire a shot, I think that is sufficient.
19431. *Q.* The suggestion in the recommendation is that the haulage roads should be watered? *A.* I do not think that is necessary.
19432. *Q.* If it is done at all, is there any protection in doing it in isolated parts, with a view of protection from an explosion? *A.* No; the watering must be complete.
19433. *Q.* If you have to water, to make it efficient in the matter of protection you have to water all over the mine;—as it uses 5,000 gallons of water per mile, would you be able to supply that at South Bulli? *A.* We were buying water last year; we have big dams, too. The attitude of the Water and Sewerage Board is such that, if we encroach on their area and make larger dams, they will interfere. We cannot dam water unless we dam it behind the mountain.
19434. *Q.* What is the system of haulage in the South Bulli Mine? *A.* The endless-rope system.
19435. *Q.* Is the accumulation of dust anything appreciable? *A.* No; the haulage roads are fairly damp. We water the floor, but the travelling roads become dry, and in some places they are dusty; but, generally speaking, the dusty area is only a short one, and it is mostly bottom dirt which is broken up.
19436. *Q.* Recommendation No. 14 suggests that Managers ought to be compelled to give more time to the management of the colliery;—I suppose you have other business to attend to as Managers besides going underground? *A.* Yes.
19437. *Q.* Take your own case—are you called away from your colliery? *A.* I was at the Arbitration Court goodness knows how many weeks; and I have necessary work to do outside to keep the place going—work which you cannot delegate to other persons.
19438. *Q.* You are called away to Sydney on business? *A.* Yes, and all that sort of thing.
19439. *Q.* Do you think that any definite rule could be laid down as to how often a Manager should go underground? *A.* I could not work under any rule. I go underground as often as I can. I use my own discretion; and I go to see matters underground as often as I can. I could not do any better, no matter what rule was made.
19440. *Q.* Is there an underground manager there? *A.* Yes; he is underground every day.
19441. *Q.* Recommendation No. 16 is that the size of manholes should be enlarged;—is there any occasion to enlarge the manholes in South Bulli, where you use an endless rope; and are the men allowed to travel on the haulage road? *A.* No, they have separate roads for haulage roads; but the men have to cross over the rope road at a couple of places. There is a separate travelling road provided in nearly every instance, and we have manholes made on the haulage roads in addition.
19442. *Q.* Are the manholes ample to provide every means of safety? *A.* I think we are over-provided in that respect.
19443. *Q.* Recommendation No. 18 is that instructions should be given to employees on the means of escape;—can you say how this would work in a large mine, with many roads and many openings? *A.* It would be very difficult. Take South Bulli. Our working face is 1½ mile long, and we would have to trail these men to the south-west district by devious roads. I do not think the instruction is necessary. We have the cavil system, the men working in sections; and they get to know by working in different districts where the outlets are. Finger-boards could be put up to indicate the way out of the mine—although they pass these things sometimes and do not see them.
19444. *Q.* Do you see any objection to providing finger boards or posts? *A.* I suppose that could be done, if required.
19445. *Mr. Robertson.*] *Q.* Would finger-boards be likely to be blown away in the event of an explosion? *A.* Yes.
19446. *Q.* The simple suggestion has been made that the corners of the different turnings should be whitewashed? *A.* But we have so many different turnings in our mine.
19447. *Q.* When once it was done, it would be there? *A.* No; the dust would cover it over. It would require to be done once a fortnight.
19448. *Q.* I have tried whitewashing, and I found that it lasted, not for weeks, but for years. I think that at the Metropolitan Colliery the matter of dust is an element there? *A.* We have damp ribs, and the dust will catch on the moisture and hide the whitewash.
19449. *Mr. Wade.*] *Q.* Recommendation No. 19 is that a black list of employees should be forbidden;—you have heard of that cry before? *A.* I have got no black list. I will be candid, and say that there are some men I will not give work to; but all the same I have got no black list. Good men have no need to fear a black list. If people do silly things, they cannot say that these are only known in the mine they work at, because they get known all over the district.
19450. *Q.* Do you know of men being kept out of work because they belong to a Union? *A.* I have kept no men out of work because they belonged to a Union.
19451. *Q.* Recommendation No. 21 suggests that the miners of each district should have power to recommend the appointment of an Inspector, and that, unless there is good reason shown to the contrary, he should be appointed? *A.* I think we ought to be spared that kind of selection in these days, anyhow. That would be a very unfair thing. A person who occupies the position of an Inspector should get there by his own merit alone.
19452. *Q.* There is also a suggestion (No. 26) that the General Manager should be prohibited from interfering with the management of the mine;—are there not some matters in connection with which the Manager must be subject to the management of a mine? *A.* The management must have some control. The Manager does not own the mine. For the General Manager to write all his instructions down would not be advisable, although some matters might be written down. If there is any active interference with the mine, they might be written down—where they affect the internal economy of the mine.
19453. *Q.* Take the ordinary financial relationship between the Manager and the Directors;—can interference of that kind be avoided? *A.* No.
19454. *Q.* I suppose that any reasonable thing you ask for you get? *A.* Yes.
19455. *Q.* And any unreasonable things you do not get? *A.* No; but I think that no one curtails the expense so as to endanger the safety of the mine.
19456. *Q.* With reference to the Kembla Mine;—do you remember the condition of No. 1, as to dampness, after the disaster? *A.* It was dusty afterwards.

19457. *Q.* Can you account for that? *A.* I suppose that, when the explosion took place, the blast forced a lot of dust and all sorts of dry material from the stoppings, and other material from where it stood, and scattered it all over the roads.
19458. Did you notice the 4th Right? *A.* That was not very dry.
19459. *Q.* Was there any water there? *A.* There was moisture there.
19460. *Q.* Did you notice the floor? *A.* It was damp. I remember being there afterwards; and there was water dripping from the roof.

Examined by Mr. Bruce Smith:—

19461. *Q.* I understand from the beginning of your examination that upon two occasions you found a small quantity of gas in Stafford's place and in No. 79? *A.* Yes, a trace.
19462. *Q.* A trace in Stafford's place, and ¼ per cent. in No. 79? *A.* Yes, but I did not find the ¼ per cent.
19463. *Q.* Where did the gas come from? *A.* The ventilation was destroyed by the explosion.
19464. *Q.* Then it was when the ventilation was deranged? *A.* Yes.
19465. *Q.* It had not been restored? *A.* No; I understood the gas to be present in the mine, and to get to the high places.
19466 *Q.* You could not say whether it came from the point at which it was found, or came from the other levels? *A.* My impression was that it came from the other levels.
19467. *Q.* When you were examining as to the effect on the canvas at the back heading, you used various terms—you talked of the canvas being charred and of the dust being melted. Was not the canvas burnt; was it not destroyed? *A.* A portion appeared as though it had suffered great heat, and the loose fibre was off it. What remained was the hard fibre, and that was crisp and brittle.
19468. *Q.* If anything of that character had been submitted to you, would you not say that it had been burnt? *A.* It is a wide application to say that it was burnt.
19469. *Q.* Would you not say it? *A.* If it was burnt, you see it might be gone; it might be burnt altogether.
19470. *Q.* I do not mean destroyed. Had it been affected by burning? *A.* You can have it that way if you like.
19471. *Q.* What remained was black and chippy, and you could break it up in your hands? *A.* Yes.
19472. *Q.* Was it not like what could be produced by exposing a piece of canvas to a flame? *A.* I have not tried it, but you might get those results.
19473. *Q.* You say that the fibre was burnt off the props. I presume that is the impression that is on your mind? *A.* Yes, they were burnt slightly; they were singed.
19474. *Q.* You mean that portions of the finer parts of the wood were shrivelled up? *A.* Yes.
19475. *Q.* The little chips sticking out from the props were burnt? Yes.
19476. *Q.* Could not that be produced by flame? *A.* Either by flame or by great heat. The skin of the bark was undoubtedly burnt.
19477. *Mr Wade.*] *Q.* You said the imperceptible skin? *A.* The imperceptible skin.
19478. *Mr. Robertson.*] *Q.* Will you explain what you mean by the melting of the dust. Do you mean that the volatile matter was destroyed? *A.* It might be destroyed by flame or heat.
19479. *Mr. Bruce Smith.*] Can you tell me whether there were any phenomena to lead you to doubt whether there had been a flame;—was there anything about it to lead you to doubt the existence of flame? *A.* I do not say flame; I say heat.
19480. *Q.* Can you name anything about the phenomena to lead you to doubt that there had been flame. I do not say you cannot account for it otherwise? *A.* I think you should say heat instead of flame.
19481. *Q.* Suppose you were told that there was flame, can you tell me anything to negative that? *A.* The burning was not intense enough.
19482. *Q.* Even supposing it had passed there actually? *A.* I do not think the results were great enough to say that.
19483. *Q.* Because of the want of evidence of intensity. Looking at the matter scientifically, and apart from the information which you are now giving us, is your opinion at all fixed on that question? *A.* I think so; because I saw a lot of light stuff in the track of the explosion, which would have been lapped up by a flame; but the same thing could not be said of intense heat.
19484. *Q.* Yet you found fibre burnt? *A.* Yes.
19485. *Q.* At a great distance from the outlet through which this force came? *A.* Yes.
19486. *Q.* Speaking of Morrison's light, you said, "I believe it would be blown out before the gaseous mixture reached it." What gaseous mixture? *A.* Mr. Wade put a hypothetical case.
19487. *Q.* And you were referring to that case? *A.* Yes.
19488. *Q.* Do you consider it probable, in that goaf which is worked out, that gas was still accumulating? *A.* I do not think so; there was no evidence there was any.
19489. *Q.* There is no evidence that any was found; but it was not practicable for men to go into the middle of it. The chances are that the apex of the vacuum is generally the highest ——
19490. *Mr. Wade.*] I object to that question.
19491. *His Honor.*] I do not know whether in a vacuum there can be an apex; but, if Mr. Bruce Smith means the highest point, the gas would get there.
19492. *The Witness.*] You want to look at that goaf in another way. The highest point is close up to the cross-cut rope road. Where the fall occurred is the lowest point in the goaf.
19493. *Mr. Bruce Smith.*] *Q.* What is the difference in the levels? *A.* Twenty feet.
19494. *Q.* Generally speaking, the highest point of any place is near the centre;—you do not know how it was? *A.* I have an idea.
19495. *Q.* Where do you think it was? *A.* I intimated that the highest point would be contiguous to a point 5 chains to the west of the cross-cut rope road.
19496. *Q.* I mean the highest point where the falls have taken place? *A.* Then the highest point would be several chains to the east of the centre of the goaf.
19497. *Q.* Is it not probable that gas had accumulated there from the first fall? *A.* I was never in there.
19498. *Q.* I am asking from what you know of the position. You know there was coal there from two pillars? *A.* I do not know.
18499. *Mr Robertson.*] *Q.* There is no evidence of that. 19500.

19500. *Mr. Bruce Smith.*] *Q.* We have evidence of it. It amounts to thousands of tons. Supposing two pillars were left there, and not taken out, would that alter your conclusions? *A.* No.
19501. *Q.* What is your reason for saying that you do not think there was any gas in the mixture that came out of the goaf? *A.* I will tell you—take your theory ——
19502. *Q.* I have no theory at all—tell me what you have to say against it. What reason is there to say that this disaster was produced by an abnormal escape of air with nothing in it? *A.* Because the evidences of force support it.
19503. *Q.* Simply the evidences of force? *A.* Yes.
19504. *Q.* You do not think the evidences of force are compatible with the presence of gas in addition to air? *A.* No, I do not.
19505. *Q.* This elaborate calculation—about 700 miles an hour—that is based entirely on the assumption that the 40 yards square —— ? *A.* Forty-four yards square.
19506. *Q.* Had fallen in one piece simultaneously? *A.* Yes.
19507. *Q.* You have no reason for saying that? *A.* No; it is a matter of speculation.
19508. *Q.* May not the fall of this 44 yards square have dribbled down in such small quantities as to have extended over a considerable period? *A.* I think the evidence is opposed to that.
19509. *Q.* Why? *A.* Because the roof immediately near shows big frames, and a roof of that nature would simply fall in one block.
19510. *Q.* There is no evidence of any mathematical shape in those portions of the roof which have fallen? *A.* After it falls to the ground it breaks up.
19511. *Q.* Have you any other reasons for supposing that it fell all at once? *A.* No.
19512. *Q.* Have you ever known a fall of that extent to fall simultaneously? *A.* I have seen falls after taking out the pillars.
19513. *Q.* As large as that? *A.* Conditions have never existed similar to that.
19514. *Q.* The whole of your theory depends on your assumption that the fall took place simultaneously? *A.* There is one word there which I did not catch.
19515. *Q.* The whole of your calculations of force depend on the idea that the fall took place simultaneously—in one block practically? *A.* Yes.
19516. *Q.* I think that from what you have seen you will admit that coal-dust has been an element in that explosion? *A.* Yes; a big element. I think it has been *the* element.
19517. *Mr. Wade.*] I notice that Mr. Bruce Smith used the word "explosion."
19518. *His Honor.*] I understand from the witness that he did assume, whatever was the primary cause of the trouble, supposing that it was a fall, that it was followed by an explosion of coal-dust. As I understand, he said, in answer to a question of mine, that the force could not have continued from this initial outburst, and have done the damage it caused, without being reinforced.
19519. *The Witness.*] It is a speculation as to what was the ignition point of the coal-dust. Directly that blast left its confines, it went along other roads and rose in intensity. You have the initial force, and, if other forces are met on the road, the outburst gathers additional force.
19520. *His Honor.*] You do take it for granted that there must have been, following on the original outburst, as the result of the fall, an explosion or explosions of coal-dust—the coal-dust in the air being accounted for by the wind caused by the explosion, and the heat by the compression of air due to the fall? *A.* That is my theory.
19521. *Mr. Bruce Smith.*] *Q.* Your theory is that the wind from the fall raised the dust, and that the force from the explosion subsequently may have been greater than the initial force? *A.* I said that there is evidence of that.
19522. *Q.* You saw evidences of a greater force than would be produced by the outburst of the air? *A.* No.
19523. *Q.* Did you not say that an iron bar was bent, and that you saw more force than you calculated? *A.* I think I said more or less.
19524. *Q.* You consider that the force which came out was sufficient to bend the iron? *A.* I did not say that.
19525. *Q.* Then you do not consider that the iron was bent by the force which came out of the goaf? *A.* I do not say that.
19526. *Q.* Then what was the cause of the iron bending? *A.* You get an initial ignition of coal-dust; and that travels up like a wave and gathers up the dust in the air. It may increase as it travels along.
19527. *Q.* You formed the opinion that the iron was bent by subsequent forces and not by the initial one? *A.* Yes.
19528. *Q.* Do you think that air only came out from it, and that a subsequent explosion of coal-dust produced the flame? *A.* No, I do not. I do not say flame, I say heat.
19529. *Q.* Do you doubt that coal-dust explosions involve flame? *A.* I say heat. I do not doubt it, although I have no evidence.
19530. *Q.* As to the flame in the 87 bord. You are not prepared to say that there was no flame at that fire? *A.* You want to bind me down to something.
19531. *Q.* Will you undertake to say that there was no flame in connection with the fire in No. 87 bord? *A.* No; I think there was no flame.

[The further examination of the witness was then adjourned.]

19532. Mr. Bruce Smith handed in to the Commission "A Short History of the Mount Kembla Colliery," by Mr. A. A. Atkinson, Chief Inspector of Coal Mines, and it was marked *Exhibit No.* 40.
19533. Mr. Bruce Smith handed to the Commission for their information a printed report of the Court of Inquiry in connection with the Newcastle Coal Mining Company's "A" Pit. Also a report by Mr. C. G. Wade on inquiries into the working of the Newcastle Colliery Company's "A" Pit.

[The Commission, at 4·25 p.m., adjourned until 10 a.m. the following day.]

TUESDAY,

TUESDAY, 24 FEBRUARY, 1903, 10 *a.m.*

[*The Commission met at the Supreme Court, King-street, Sydney.*]

Present:—

C. E. R. MURRAY, Esq., D.C.J. (President).

D. A. W. ROBERTSON, Esq., Commissioner. | D. RITCHIE, Esq., Commissioner.

Mr. Bruce Smith, Barrister-at-Law, instructed by Mr. Wood, Crown Solicitor's Office, appeared on behalf of the Crown.

Mr. A. A. Atkinson, Chief Inspector of Coal-mines, assisted Mr. Bruce Smith.

Mr. A. A. Lysaght, Solicitor, appeared on behalf of—

(*a*) the representatives of deceased miners, wheelers, &c., (victims of the explosion);

(*b*) the employees of the Mount Kembla Colliery (miners, wheelers, &c.); and

(*c*) the Illawarra Colliery Employees' Association (the Southern Miners' Union).

Mr. C. G. Wade, Barrister-at-Law, instructed by Mr. F. Curtiss, appeared on behalf of the Mount Kembla Coal and Oil Company (Proprietors of Mount Kembla Mine).

(Mr. J. Garlick, Secretary to the Commission, was present to take shorthand notes of the evidence and proceedings.)

19534. *Mr. Bruce Smith.*] I think there was a request made by a member of the Commission that the Company should supply one of these lithographs with the ventilation of the mine shown on it.

19535. *Mr. Wade.*] I could not have been here when the Commission asked for it; I only heard Mr. Bruce Smith ask for it. It can easily be got.

19536. *His Honor.*] Mr. Curtiss, if you will kindly communicate with your clients, perhaps you will find it ready. I hope you will; and then it can come up at once.

Mr. A. E. O. SELLERS, previously sworn, was further examined as under:—

Examination by Mr. Bruce Smith (*continued*):—

19537. *Q.* This theory which you have propounded to the Commission, with regard to this explosion, is of a character that might take place in that mine without any men being in the mine at all? *A.* Yes.

19538. *Q.* I mean the mine could have been absolutely empty and idle? *A.* Absolutely idle.

19539. *Q.* You know the literature of coal-mining quite as well as anybody, I suppose? *A.* In a certain degree.

19540. *Q.* Can you tell the Commission of any single instance in which anything of the kind has taken place in a mine in which there were no workmen? *A.* No, I do not think I can.

19541. *Q.* I mean such a thing as you have described? *A.* No, I do not think I can.

19542. *Q.* You know something of the Broken Hill disaster, do you not? *A.* There was a disaster at Broken Hill.

19543. *Q.* Do you know anything about that? *A.* Not very particularly; but, generally, there was a great rush of wind, I understand, due to a fall; and the men were knocked over.

19544. *Q.* Which do you attach most importance to as causing this great force—the height from which the stone fell or the area over which it fell? *A.* To both collectively. I do not think that I can exactly discriminate finally. The two are necessary to that set of conditions—a certain height and a certain area.

19545. *Q.* What height do you think was necessary? *A.* Of course, as I said before, the calculation is speculative. I assumed a height of 4 feet 6 inches for the fall.

19546. *Q.* That would give a total height of 7 feet before the first fall; because, you know, the evidence is that it was 5 feet 6 inches or 6 feet? *A.* But, you understand, your conclusions are wrong from my evidence. I assumed that what did fall fell 4 feet 6 inches.

19547. *Q.* Suppose the evidence were, and you were satisfied that it was correct, that the first fall out of the total fall of 5 feet 6 inches or 6 feet was 2 feet 6 inches, leaving a maximum balance of 3 feet 6 inches, and perhaps only 3 feet, would your conclusions be the same? *A.* I think the hypothetical case you draw would not follow as a natural sequence to your supposition.

19548. *Q.* You mean to say that, if the height I had mentioned had been the real height, you would not form the same conclusions on it? *A.* Not exactly that.

19549. *Q.* I want you to take another hypothetical case? *A.* Allow me; I understand you to say that the 2 feet 6 inches fell first.

19550. *Q.* I want you to suppose that; and that it left a balance of 3 feet or 3 feet 6 inches? *A.* It would still have that height; it would still have 4 feet 6 inches to fall.

19551. *Q.* That depends on your hypothesis? *A.* But if you get a fall, whether a second or a third fall, it would fall 4 feet 6 inches.

19552. *Q.* Does not the case you have put to the Commission assume that you have a perfectly flat bottom, and you have a flat roof 4 feet 6 inches high, and that a solid block of the roof comes down like that [*indicating*]? *A.* Yes.

19553. *Q.* That is your hypothesis? *A.* Yes.

19554. *Q.* Suppose, instead of that, that this 2 feet 6 inches had fallen roughly and irregularly, as is your experience?

19555. *His Honor.*] Perhaps what the witness wishes to explain is this: that the height of the fall is only reduced by the expansion of the falling matter; if you take from the roof and add to the bottom, and there is no expansion, you still get exactly the same interval between the roof and the floor, and that would go on for ever. If in falling, however, the mass expands by breaking up, then of course it keeps reducing and reducing. That is how, I understand, these mines finally close.

19556. *Mr. Bruce Smith.*] I want to see what this hypothesis is. I am asking him now to take it as he knows it to take place.
19557. *His Honor.*] I think the calculation which you are making in your mind will have reduced the amount of the fall due to the fact of there having been a first fall, not by 2 feet 6 inches or 3 feet, but by 6 inches, which, I think, you were taking in your mind as the limit possibly of what we may call the expansion.
19558. *Mr. Bruce Smith.*] *Q.* What is your experience generally as to the space which a fall of 2 feet 6 inches out of a roof would occupy after it reached the floor? *A.* That depends entirely upon the character of the roof.
19559. *Q.* I am asking you to take into consideration the character of that roof? *A.* I should say it would be pretty massive.
19560. *Q.* Do you mean to say it would occupy no more after it had fallen than before? *A.* Very slightly more.
19561. *Q.* What would you say—would it occupy 3 feet? *A.* About 3 feet.
19562. *Q.* Then, if the total height originally had been 6 feet, it would leave 5 feet 6 inches to fall? *A.* Yes, something like that.
19563. *Q.* And your hypothesis is a fall of 4 feet? *A.* 4 feet 6 inches.
19564. *Q.* And you have assumed that it came down, as I say, in a solid body all over? Yes.
19565. *Q.* You say you do not know much about the Broken Hill fall? *A.* No, only what I have read, some considerable time ago.
19566. *Q.* You cannot tell me of any case yourself in which the circumstances you have put took place? *A.* Not personally.
19567. *Q.* Take the Broken Hill case: you may assume that the fall was 30 feet or 40 feet, over an area of, I think, 40 ft. x 60 ft.? *A.* That is the horizontal space?
19568. *Q.* Yes, laterally 40 ft. x 60 ft., and a fall of from 30 feet to 40 feet, would you expect that to produce the same result as this did in a greater or less degree? *A.* Well, I should expect, if the conditions were. —— [*Interrupted*].
19569. *Q.* Would you expect it to produce the same result in a greater or less degree? *A.* That would depend upon the conditions of the two forces.
19570. *Q.* Supposing it had fallen the same as you suppose it to be here? *A.* I cannot suppose, because I do not know the conditions of the roof.
19571. *Q.* But you can, as a hypothesis. That is the best way for it to fall, to produce the result, to fall in a solid mass. Supposing it fell 30 feet to 40 feet over an area 40 ft. x 60 ft., would you expect it to produce a similar result, quite apart from coal-dust, a similar result in a lesser or greater degree? *A.* I should expect, by reason of that having fallen from a greater height, that the force of the wind from that would be greater—that would be estimating roughly the area from which it fell.
19572. *Q.* Would you expect it to produce the same result, so far as the air pressure is concerned, in a lesser or greater degree? *A.* The air pressure would be greater.
19573. *Q.* Would you expect it to produce the same result as far as the force of the air was concerned? *A.* I do not follow that.
19574. *Q.* As regards heat? *A.* No, I do not think so; but there is an element missing in the Broken Hill fall.
19575. *Q.* I am asking you to leave out coal-dust altogether.
19576. *His Honor.*] There is one datum you have not given. I do not know whether it is given in the report. That is the outlet.
19577. *Mr. Robertson.*] Is there any evidence in that report about the area of the outlet at Broken Hill? I take it that it would be very much smaller than this one. There are no twelve by sevens in metalliferous mines.
19578. *Mr. Wade.*] No, but I think in those stopes you have openings 60 feet wide.
19579. *Mr. Robertson.*] Most of them are mere rat holes.
19580. *Mr. Bruce Smith.*] *Q.* Would you expect, from that area and that fall, to get a greater force than you have got here? *A.* Yes.
19581. *Q.* You attribute the ignition of the coal-dust to the great heat which was produced by this force? *A.* Yes, by the force being contracted through that narrow outlet.
19582. *Q.* And through the great forces that resulted? *A.* The force created the heat.
19583. *Q.* You attribute the ignition of coal-dust to the great force that was produced by this fall? *A.* No.
19584. *His Honor.*] To the compression of air.
19585. *Mr. Bruce Smith.*] *Q.* Instead of "force" any "pressure" if you like? *A.* Yes.
19586. *Q.* You say that the heat which ultimately ignited the coal dust was the result of this pressure? *A.* That is so.
19587. *Q.* And, if the pressure were greater in Broken Hill, that also would produce this great heat? *A.* Not necessarily.
19588. *Q.* Why not? If it is a greater force why should not it produce a greater heat?
19589. (His Honor pointed out that there was apparently not much use in continuing this cross-examination, as the data in both the cases which Mr. Bruce Smith was comparing were so very uncertain, and no datum was produced as to the size of the outlet in the case of the accident at Broken Hill.
19590. Mr. Bruce Smith said that the witness had come here with his mind absolutely free and open with regard to experience on this subject, and had propounded a theory as to the ignition of coal-dust. Mr. Bruce Smith was putting to the witness hypothetically a case in which a greater amount of force or pressure was supposed to have been produced; and he proposed to see if the experience at Broken Hill would not affect the conclusion to which the witness had come. He, Mr. Bruce Smith, proposed to produce evidence as to the size of the outlet later on.)
19591. *His Honor.*] Is it known whether the accident at Broken Hill was a fall of the country rock or of the lode?
19592. *Mr. Wade.*] I understand it was a subsidence of part of the mullock that was packed in square sets. I would not like to say so definitely; but I think it was a subsidence, a sliding down, not a collapse of the roof.

19593. *Mr. Bruce Smith.*] *Q.* This fall in Broken Hill was 40 ft. x 60 ft. in area, with a height of 30 feet or 40 feet; and it produced a great rush or outlet of air which banged men against the other side and killed some of them. Would not you expect that to produce heat which would have the effect of burning anything inflammable with which it came in contact?
19594. *Mr. Wade.*] I take objection to this, unless Mr. Bruce Smith will define what he means by "fall."
19595. *Mr. Bruce Smith.*] *Q.* I am talking of a fall similar to the one which you are assuming in this mine under similar conditions? *A.* I cannot say that, because the conditions were quite different. At Broken Hill there was no coal-dust.
19596. *Q.* Have not I asked you to exclude coal-dust from your consideration? *A.* But I cannot exclude coal-dust?
19597. *Q.* Have not you told the Commission that sufficient heat was produced before ever the coal-dust was ignited? *A.* I do not think so.
19598. *Mr. Bruce Smith.*] That is the whole theory.
19599. *His Honor.*] *Q.* The heat which first began the mischief was sufficient heat, I understand you to say, to ignite the coal-dust? *A.* Yes, at the orifice of discharge.
19600. *Q.* What Mr. Bruce is asking you to do is to compare the effect of these two falls at Broken Hill and at Mount Kembla in relation to the production of that amount of heat, which would be 291 degrees?
19601. *Mr. Bruce Smith.*] Yes, that is it.
19602. *His Honor.*] Of course, if you leave out coal-dust, you must go only into the question of the production of heat; assuming, as Mr. Sellers does, that 291 degrees is sufficient to cause the combustion of coal-dust. Whether it is or is not sufficient is another question.
19603. *Mr. Bruce Smith.*] What he told us is that this air was driven out from this goaf at such a rate as to ignite the coal-dust.
19604. *His Honor.*] Or rather at such a temperature. I understand Mr. Sellers to say that the compression of the air by the fall raised the temperature of the air which it drove out to such a high point that, when it was driven out, it was hot enough to start the combustion of finely divided coal-dust. I quite confess, with you, that I thought at first that Mr. Sellers said that the rate at which the air was driven out caused the air in front to be compressed, and that that compression evolved heat enough to ignite coal-dust; but I understand that to be rather far-fetched, because the primary compression must have been the compression due to the fall of the roof.
19605. *Mr. Bruce Smith.*] *Q.* I am not concerned now with the consideration of the chemical question of the actual production of the heat; but what I want to get from you is whether you believe that this fall produced such an alteration in the atmosphere as to ignite coal-dust? *A.* That is so.
19606. *Q.* Without the action of any other body? *A.* Yes.
19607. *Q.* That is the initial cause of this explosion, air pressure?
19608. *His Honor.*] More properly called air compression.
19609. *A.* Let me explain myself. When this fall occurred down at the goaf there was air driven out, and with it also débris and stuff, which was whirled out from underneath the fall.
19610. *Mr. Bruce Smith.*] *Q.* What do you mean by débris? *A.* Coal-dust. It was inflammable. Now you understand me.
19611. *Q.* Of course. What I want to get from you is this simple proposition which you have propounded that, with no other element than air, the coal-dust which is in the air, is ignited? *A.* Yes.
19612. *Q.* And then the coal-dust went on, and continued the explosion? *A.* Certainly.
19613. *Q.* Coal-dust, I suppose, is only one form of inflammable matter that may come in contact with air under this pressure—suppose a man's hair came in contact with it, what would you expect to take place? *A.* I have not thought that out.
19614. *Q.* Will you think it out now? *A.* Coal dust is highly inflammable; it is all carbonaceous matter, containing carbon and volatile gases.
19615. *Q.* Supposing men's skins had come in contact with this great heat that you suppose was produced, without any coal-dust at all, do you think they would have been burnt? *A.* I should imagine they would have shown some signs of it.
19616. *Q.* You would expect their hair to be burnt? *A.* I would not say that.
19617. *Q.* What effect would you expect to find upon a man's hair and skin from that great heat, in the absence of coal-dust? *A.* I really have not thought that out.
19618. *Q.* Think it out now? *A.* There would be some heat, I should imagine.
19619. *Q.* But what do you think would be the effect upon hair or skin? *A.* I am really not competent to answer.
19620. *Q.* You cannot think it out on the spot? *A.* No.
19621. *Q.* Suppose you had to think it out—suppose you had a day to think it out, what would you do? *A.* I would try to get some data of the effect of temperatures on skin, and a lot of things like that.
19622. *Q.* Supposing your theory to be correct, that this sort of thing may take place in a mine without the presence of any gas at all, what proposal have you to offer the Commission to prevent a recurrence? *A.* The only thing I can suggest would be to have the goafs arranged with a multitude of openings, so that the air would not be confined to one orifice of discharge.
19623. Is that the practical suggestion which you have to make to the Commission? *A.* That is all I can think of for the moment.
19624. *Q.* You admitted yesterday that, once the coal-dust was ignited, it is quite possible that the whole of that part of the mine was, at some time or other, subject to flame? *A.* Yes, in the way that we were talking of it yesterday afternoon.
19625. *Q.* I mean to say that that is one of the conclusions you come to, that, after once the coal-dust had been ignited, and had exploded, flame passed over many parts of that portion of the mine? *A.* Yes, in sectional parts of the mine. It may not have been all over; but it may have been in parts, I dare say.
19626. *Q.* And you do not pretend to distinguish now between the things which were subjected to the actual flame of the coal-dust and those which were subjected to the great heat of the air only without the coal-dust? *A.* No, I cannot distinguish.
19627. *Q.* And therefore you have no hesitation in supposing that these things which were burnt in the way you describe were burnt by flame? *A.* As I described that to you yesterday.
19628. *Q.* Burnt by flame? *A.* Or great heat, as I said yesterday. 19629.

19629. *Q.* But you cannot tell which. You admit there was flame there passing over that part of the mine? *A.* Yes.
19630. *Mr. Wade.*] I have got a plan, addressed to Your Honor, which Mr. Curtiss has just brought in. It shows the air-courses of the mine; and that is the one, I suppose, which Your Honor has asked for.
19631. *His Honor* said it would be necessary to call somebody to prove the plan.
19632. *Mr. Robertson* and *Mr. Ritchie* said that, to their knowledge, the plan appeared to be inaccurate.
19633. *Mr. Wade* said he would call Mr. Warburton, the surveyor who had prepared the plan, to-morrow.
19634. *Mr. Bruce Smith.*] *Q.* I want to ask you about two stoppings. Did you take any notes of the different evidences of force that you saw in the mine when you examined it? *A.* Yes.
19635. *Q.* Have you those notes here? *A.* I have some of them; and the others I have lost.
19636. *Q.* Will you turn up those, if you have them, which record what you saw with regard to those two stoppings inbye of No. 5 Right? *A.* I have no note of those at all.
19637. *Q.* Will your memory serve you accurately with regard to this? *A.* No. I have been trying to bring my memory to bear on those stoppings; but I cannot say definitely.
19638. *Q.* Can you say whether the force at those doors was from the intake to the return or from the return to the intake? *A.* My impressions about the forces at that junction were that the forces were towards the intake to the right, that is to the east, and the other way to the left, or the west.
19639. *Q.* You have no note about these stoppings; you cannot express an opinion upon that? *A.* No.
19640. *Mr. Bruce Smith.*] The stoppings are shown on this plan (Ex. 38) as being driven in the opposite direction to that given in Morrison's evidence. Morrison's evidence is that they were driven from the back heading to the intake. This plan shows them as being driven the other way.
19641. *Mr. Lysaght.*] Perhaps Your Honor would allow me to examine after the members of the Commission. I have not quite finished reading over Mr. Seller's evidence; and you see the disadvantage that I would be under.
19642. *His Honor.*] Very well.

Examination by Mr. Robertson :—

19643. *Q.* I think you have described the condition of the entrance to the 4th Right, that is from the back heading to the waste, as being wet and damp? *A.* Yes, I examined that critically the last time.
19644. *Q.* With water dripping from the roof? *A.* Yes.
19645. *Q.* Now, did you go up to the fall? *A.* Went to the edge of the fall.
19646. *Q.* Did you notice near to the edge of the fall a space of about five yards square on the side of the road: did you notice a chock? *A.* There was a chock partly deranged; I remember that.
19647. *Q.* Did you notice some props standing up in the slack? *A.* I do not remember particularly that. I remember some props lying with their ends loose, and some slack at the bottom.
19648. *Q.* That is what I am referring to. The props I am referring to were props that were half buried in slack, with their tops nearest the waste? *A.* No, I do not remember that.
19649. *Q.* Anyhow, you noticed the chock deranged? *A.* Yes.
19650. *Q.* Did you notice the direction of the force? *A.* Well, it appeared to me, taking all the evidence I saw, that it came out.
19651. *Q.* That is very singular to me, because a number of people were there when I was there a few days afterwards, and we all came to the conclusion that that chock was driven in. Now, if there were half-a-dozen props standing up half-way up in the slack, with their top ends leaning towards the waste, what conclusion would you draw from that? *A.* I should imagine it would be the opposite way, the force, in that case. The force would be the way that the tops of the props pointed.
19652. *Q.* The force would be in towards the waste? *A.* Yes.
19653. *Q.* Did you notice the character of the fall: did it consist of very large pieces or of ordinary sized stones? *A.* Of fairly large stones, it struck me.
19654. *Q.* Was there anything different from any other fall? *A.* Most falls I have seen are smaller than that. And then, I take into account the nature of the roof which I had seen fallen on the haulage roads—some of those tremendous big slabs.
19655. What I want to know is this: from your examination of that fall, can you say if it differed in any material respect from any other fall. *A.* The stones were a bit bigger, I think, Mr. Robertson.
19656. *Q.* Do you think the blocks were as large as that fall at Corrimal where the fire took place? *A.* Larger than that.
19657. *Q.* Did you go up on the top of the fall? *A.* No, only to the edge of it.
19658. *Q.* Did you not try to get up, to test for gas? *A.* I climbed up on the edges, to look for it that way.
19659. *Q.* How far did you get up? *A.* Perhaps a yard high, or something like that. I could not tell you from memory.
19660. *Q.* I myself got up fully 8 or 9 feet. Is it not a fact that along the edges of every fall there is usually a space which you can wriggle up? *A.* Yes, that is so.
19661. *Q.* Did you see above the edge of the fall and round about that chock a lot of small coal and dust? *A.* No, I cannot remember that.
19662. *Q.* Did you see a lot of small coal? *A.* There was a lot of small coal close to the fall; I remember that.
19663. *Q.* But there was no dust, because it was all damp? *A.* Yes, it was damp. It was dripping the last day I saw it: but the first day I saw it it was not damp, I think. It was fairly dry in there the first day I saw it. I attributed a lot of that moisture to the condensation.
19664. *Q.* Was it not sloppy under the feet? *A.* It was wet to the feet afterwards.
19665. *Q.* Now, we have it in evidence that there was a fall of 2½ feet? *A.* Yes.
19666. *Q.* And you believe that fall fell as a block, more or less? *A.* I think it would be more correct to say that it did not break up very much. I told Mr. Bruce Smith that it might occupy 3 feet.
19667. *Q.* That would cover any dust, if there was any dust? *A.* Yes, it would.
19668. *Q.* If the dust in this area, where the fall is said to have occurred, was covered up, and the outlet was damp, another fall, occurring subsequently, would have no dust to operate on until it reached the main haulage road, would it? *A.* I would not altogether like to say that; because, although the bottom dust would be covered up, as you say, by the first fall, there would be dust in suspension in the atmosphere.

Witness—A. E. O. Sellers, 24 February, 1903.

19669. *Q.* There could not be any dust in suspension in an atmosphere where working had been suspended for some weeks: what was to stir it up? There were no men working there. Would it not be a reasonable assumption that no dust could possibly be in suspension there? *A.* There would not be a great deal of dust.
19670. *Q.* Would there be any, if there was nobody there to stir it up? *A.* I would not like to say that.
19671. *Q.* But there was nobody there? *A.* But still you get dust in these places sometimes; it is light and floating: and the haulage roads are there, and all that sort of thing.
19672. *Q.* But there is nothing to conduct the air from the haulage road into that place? *A.* Yes; but air is going past.
19673. *Q.* Not from the haulage road? *A.* But from the return.
19674. *Q.* But there was nothing to conduct the return air into this place. On reflection, do you think it is reasonable to suppose there would be dust in suspension in the air in that goaf? *A.* I should not say there would be a lot of dust; but there would be some.
19675. *Q.* The place was damp: the slack, or whatever was left there, would be covered up by this fall: where would the dust come from? [*Witness did not answer.*]
19676. *Q.* Then we may take it that there was no dust to operate on until the blast reached the main haulage road? *A.* I cannot say that.
19677. *Q.* But you said the place was wet, damp, and water was dripping from the roof? *A.* Yes; but there could have been dust on the sides.
12678. *Q.* If the place was damp, sloppy underfoot, and water dripping from the roof, do you think it is feasible that there could be any dust on the sides? *A.* You see it takes so little dust to cause a disaster, a very small quantity.
19679. *Q.* Assuming that there was no dust for this blast to operate on until it reached the main heading: the moment this air current, which you suppose was brought up to 291 degrees temperature by compression, reached the return airway, there would be a sudden expansion and a very sudden drop in temperature; and I take it that anything very much less than 36·7 lbs. per square inch would reduce the temperature enormously? *A.* Yes; but the damage might be done before you reached the point of reduction.
19680. *Q.* Yes, but I assume there is no dust? *A.* Well, of course, if you assume that there is no dust, the theory will not operate; you cannot apply the theory.
19681. *Q.* The experiments by Dr. Bedson were made with an air compressor? *A.* They were made in connection with the testing of air compressors.
19682. *Q.* And, of course, to reach that temperature and that pressure, the air compressor would naturally have to work against a certain pressure? *A.* Not necessarily.
19683. *Q.* Do you think, if that air compressor had been working against the atmosphere, that the mere velocity would ever create that temperature? *A.* But you would not have the pressure if the air compressor were working against the atmosphere.
19684. *Q.* Quite so: that is what I say. If the air compressor pumped the air against the atmosphere, do you think that any velocity would ever bring the temperature up to 291 degrees? *A.* I think so. For instance, supposing the air compressor was exhausting air at that pressure, at the point of discharge there would be that temperature.
19685. *Q.* But the air compressor cannot bring the temperature of the air up to 291 degrees unless there was a certain pressure? *A.* Say you get your initial pressure in the air compressor, and that air compressor is discharging its air at that pressure to the atmosphere.
19686. *Q.* You could not get that temperature? *A.* At the point of discharge there would be that pressure.
19687. *Q.* If you started your air compressor against the atmosphere, how could you get that temperature? *A.* You do not follow me; and I do not follow you. Say you had your air compressed to that temperature and that pressure, and you opened a small cock at the end of your receiver, or admitted coal-dust into the receiver; or say you had the receiver full at that pressure, and you opened the cock and applied the dust; then, if the temperature of that air is up to that height, you have the possibility of an explosion.
19688. *Q.* I take it that you are taking a parallel experiment, as it were: that is to say, the fall in the 35-acre goaf is the piston, the space in the goaf is the clylinder, and the outlet from the No. 4 Right is the pipe leading away from the air compressor? *A.* Yes, that is so.
19689. *Q.* Well, if your air compressor started, as in this instance, as in this fall, to pump against the atmospheric pressure, how could you get the temperature? *A.* Because the pressure gives the temperature.
19690. *Q.* How are you going to get the pressure if you are pumping against the atmosphere? *A.* Because you are discharging a large volume of air through a small orifice.
19691. *Q.* Is it the friction? *A.* Yes, the friction of the air through that small outlet gives the pressure.
19692. *Q.* An air compressor, leaving out the power to drive it, consists essentially of a cylinder with a tight-fitting piston? *A.* That is so.
19693. *Q.* And if that piston was not tight, but had, say, a space of $\frac{1}{4}$ in. round about it, would you get any pressure at all? *A.* You might get an increase of temperature without much pressure simply by the friction of the air being confined in it; for instance, there is such an arrangement, as you are aware, in a hydraulic brake, where the water is allowed to pass through small orifices; and these orifices make the water quite hot.
19694. *Q.* Could you get any pressure at all to speak of in an air compressor without the piston being tightly packed? *A.* You could not get much.
19695. *Q.* Supposing Dr. Bedson had made his experiments with a piston not tight, but with a $\frac{1}{4}$ in. space about it, could he have got that temperature? *A.* I do not suppose he could.
19696. *Q.* Could he have got it with a space of 1-16th of an inch? *A.* He could not have got as much as he did.
19697. *Q.* Then, to get this pressure in the air coming out of the 4th Right, you must assume a tight piston? *A.* Not necessarily.
19698. *Q.* But you have already said that, in order to obtain a certain pressure, you must have a tight piston? *A.* The conditions are not quite parallel. You have a discharge there, but a certain portion comes through the slack piston; and I assume a certain portion to come through there (*referring to the allowance of 50 per cent of air which escaped around the fall*).
19699. *Q.* You have already said that Dr. Bedson could not have succeeded in obtaining a pressure of 36 lb. per square inch with a slack piston? *A.* No.

19700. *Q.* Then, if that is so, how could you get that pressure with this fall with a slack piston? *A.* The piston which you are thinking about, and which I am thinking about, is comparatively small, and the clearances at the sides are comparatively big; but the fall is a larger matter altogether.
19701. *Q.* I do not think it is. Take ¼ in. off a 36 in. piston, and, relatively, you will find that it is about the same slackness as a foot all round about the circumference of this 2-chain square goaf? *A.* No, it would be a lot less.
19702. *Q.* A quarter of an inch off a 36-inch piston would be 1–144th; and this piston, this fall, which you assume is a piston, is 132 feet across; so a foot off that would be 1–132nd. Now, as an engineer, you know, and I need not say to you, that you cannot secure any pressure to speak of without you have a tight piston; the piston is made as exact as mechanical science and practice can make it? *A.* But there you have an evidence where they have got a pressure by a fall, in the Broken Hill case.
19703. *Q.* There is no evidence at all about pressure in that case; we have evidence of a rush of air; but nobody has ever suggested for a moment that there was a pressure of 36 lbs. or even 10 lbs. per square inch? *A.* I do not think you understand me about that fall. You admit that it is possible, if you have a fall, that there is a discharge of air.
19704. *Q.* Yes? *A.* Well, assume half of it goes out somewhere, and the rest comes down the discharge. That goes through a certain orifice of discharge; and, in getting through that orifice of discharge, there is friction set up; and it is this friction which sets up the heat.
19705. *Q.* Quite so; but what I want to show is the impossibility of getting this pressure when your piston is working slack—1 foot slack all round about it? *A.* Supposing you had that cylinder which you spoke of, and you moved your piston forward, you would get a discharge would you not?
19706. *Q.* Yes? *A.* You get a discharge with the fall just the same.
19707. *Q.* You do not get a pressure by the discharge of air by the piston of an air-compressor unless it is tight? *A.* I do not see it.
19708. *Q.* Cannot you see that you cannot get any pressure in the air compressor if the piston is not quite tight? *A.* I do not think the conditions are parallel.
19709. *Mr. Robertson.*] But you want to draw a parallel between the two; you want to say that this is an air-compressor.
19710. *Mr. Wade.*] That was not my theory in putting this evidence before the Court.
19711. *Mr. Robertson.*] Then what is it you wish to convey: because it seems to me that you want to draw a parallel between this fall producing a certain pressure of air and Dr. Bedsen's experiments.
19712. *Mr. Wade.*] No. I only used Dr. Bedson's experiments for one purpose, to show the ignition point of coal-dust. Our argument has nothing whatever to do with the piston in Dr. Bedson's experiments. That piston worked slowly; perhaps it worked at the rate of a mile an hour, going forward; and the velocity was practically nothing. The evidence here is that the fall fell a certain depth, which gives a certain velocity; that fall, compressing the air out of this space, gives a certain velocity of some hundreds of miles an hour; and with that velocity you get the pressure.
19713. *Mr. Robertson.*] But you cannot get compression with a fall nor with velocity unless the piston is tight.
19714. *Mr. Wade.*] There is the fact that at Broken Hill, where it was not tight, there was an enormous velocity, which broke men's bones, and took the scalps off their heads.
19715. *Mr. Robertson.*] Yes, but it does not want 36 lbs. per square inch nor 2 lbs. per square inch, to knock men about and kill them.
19716. *Mr. Wade.*] That is so; but I only use that as one step in the argument. I say that the Broken Hill case shows that the velocity can be obtained by the displacement of air; and there are cases, which the Commission know of, where displacements of air by avalanches and glaciers have cut trees off.
19717. *His Honor.*] You cannot get heat without compression, and very instantaneous compression of the gas too, because the latent heat made sensible by the compression passes off very quickly.
19718. *Mr. Robertson.*] It seems to me that you want to throw off the fact of the pressure, and stick to the velocity.
19719. *Mr. Wade.*] No. We worked backwards. We had the evidence that a force had come out of the 4th Right, which split at the main air road, and came outbye and went inbye; and which caused the ignition of coal-dust. As there was no evidence of the presence of gas, how could that coal-dust have been ignited? Professor Bedson's experiments show that coal-dust will ignite at a temperature of 291 degrees. How could you arrive at that temperature? Well, you could get it in two ways. Professor Bedson puts it in his experiments with the air-compressor under conditions entirely different from what happened in the mine. He got the pressure in an air cylinder by a piston working slowly, showing that, even working slowly, compressed air will, in time, give you the heat. But you can get that same result of pressure by, as it were, a piston working at an enormously increased velocity. I do not put it here at all that the temperature was developed in the mine by the continual accumulation of steady pressure by a piston at a slow rate; but by the velocity at which the air would travel from that small orifice. Simply by calculation, you can get that pressure, quite apart from Professor Bedson's experiments. Then, if you can get the velocity sufficiently high to reach a pressure of 36·7 lbs. per square inch, you get the conditions which Professor Bedson says will set up the ignition of coal-dust. Once you get the pressure of 36·7 lbs. per square inch, it does not matter where you get it, then the ignition will result.
19720. *Mr. Robertson,*] Yes, but I want Mr. Sellers to show me where that pressure can be obtained.
19721. *Witness.*] Take an area 40 feet square, and falling 4 feet 6 inches; the time occupied would be ·5 of a second.
19722. *Mr. Robertson.*] *Q.* You assume that? *A.* I calculate that.
19723. *Q.* But how can you get this velocity of 700 miles per hour by those conditions? *A.* You get that body of air displaced in ·5 of a second.
19724. *Q.* Leave out that ·5 of a second? *A.* That is a mathematical fact. If that is not going to be admitted——[*Interrupted.*]
19725. *Q.* But, even assuming the time factor is ·5 of a second, and the fall is 4 ft. 6 in., you must allow for the piston, as it were, working in air? *A.* Half of it would go into the goaf.
19726. *Q.* Do not you allow for any of it going round the sides of the piston? *A.* That is what I allow. I allow one half of it for that.
19727. *Q.* Did you say it was ·5 of a second? *A.* Yes.
19728. *Q.* That is a half of a second? *A.* Yes.

19729. *Q.* Do you not think that is a far-fetched assumption, that a fall such as this would take place in half a second? *A.* That is the time it would take by the laws of gravity.
19730. *Q.* A free falling body? *A.* Yes.
19731. *Q.* Was this a free falling body? *A.* Well, I am assuming so.
19732. *Q.* Did you ever know, in your experience, of a fall occurring in the half of a second? *A.* The ground would fall that distance in half a second.
19733. *Q.* A free falling body? *A.* Yes.
19734. *Q.* I ask you again, in your experience as a practical Manager, did you ever know of an extensive fall occurring in the space of half a second? *A.* Well, candidly, there is the rending of the rocks, and a momentary hanging; but immediately it gets released it falls as a free falling body.
19735. *Q.* Would it not be nearer the mark to say that hardly any fall takes place under a space of time of ten or twenty seconds? *A.* That is right enough; you get a fall; and then there is the dribbling of the material above from the ground where it fell.
19736. And you think this space 2 chains square would fall flat all over? *A.* I had assumed that.
19737. *Q.* In half a second? *A.* Yes.
19738. *Mr. Wade.*] It is not our case that it did. Our case was this: I worked backwards to the dividing point, the junction of the 4th Right with the haulage road; and I said, "If you find evidences of immense force from that point going inbye and outbye, and if the theory of gas at Morrison's place will not account for it, and if the theory of the explosion travelling back from Morrison's place will not account for it, then something must have taken place between the junction of the 4th Right and the goaf." If there was an explosion of gas, it must have taken place there. The evidence will not support that theory. So we were driven back to the fall in the goaf, which we knew took place at that time. Then we took that fact alone, that a fall 40 yards square did happen at that time, practically in a solid body: that fell 4 ft. 6 in. If those were the exact conditions, that fall in itself could induce a velocity of air through the orifice of 700 miles an hour; and that, in itself, could give an air pressure through the orifice sufficient to cause a temperature which would ignite coal-dust. We do not say that did take place, at all: it may have been that a larger area of roof fell: it may have fallen in an extraordinary condition, and under extraordinary circumstances: but all I say here is that, if we are called upon to account for the condition of forces in that 4th Right, if that fall did take place at the time of the explosion, if the roof did fall under certain conditions, then those conditions would give the velocity we have spoken of before. In the first place there is this calculation that we have made in regard to it. We took 4 ft. 6 in. as the depth of the fall; and we only took 40 yards square as the area of the fall when it may have been more. It is just possible that the roof of the adjoining waste, where there had been a fall also, may have fallen at the same time. All we say is that it is physically possible, according to the laws of physics, that you could get a speed of air of 700 miles an hour from that goaf where this blast came from. Then, without going any further than the witness has gone himself, that would give this pressure sufficient to cause a temperature that would ignite coal-dust. We do not say it did happen: it is only a theory put forward. It is only to show that, if it cannot be accounted for by gas, or by gas plus coal-dust, at that point, then we put forward a theory based on those bare conditions. We do not say it did happen; we only say it could have happened. Taking those bare facts, those, in themselves, could give the results which we put forward.
19739. *His Honor.*] I might point out one error in the calculation; and that is the calculation of the time taken by the fall of the falling body depends upon the assumption that that body is falling in vacuo. Now, in this case, the assumption is that that body, in falling, put upon the air underneath it an enormous pressure; and, in point of fact, that very pressure, put by the falling body upon the air beneath it, would enormously retard the rate of falling of that body; and, therefore, that entirely upsets the whole calculation with regard to the time taken for that body to fall. The very fact that the falling body is exerting this extraordinary compression on the air, and is driving out the air at this extraordinary rate, is at variance with the conclusion that it fell at the assumed rate at which it would have fallen if it had fallen in a vacuum. That consideration at once seems to me, apart from all sorts of other considerations, to make it entirely an erroneous calculation.
19740. *Mr. Robertson.*] Then, if the portion of the roof that fell were 10 ft. in thickness, that would be 10 lb. to the square inch to ultimately meet a pressure of 36 lb. to the square inch.
19741. *His Honor.*] It would be eased down. The two hypotheses, the hypothesis of the conclusion, and the hypothesis of the cause, will not work together.
19742. *Mr. Robertson.*] *Q.* It would not be unreasonable to say that it might take a second? *A.* I should say that it might probably be the time I calculate.
19743. *Q.* But would it be at all unreasonable to assume that the fall might even take two seconds? *A.* I do not see why it should take two seconds.
19744. *Q.* That is not very long? *A* But it does not take very long for a stone to fall a few feet.
19745. *His Honor.*] If they drop quickly there is nothing to stop them; and if there is nothing to stop them there is nothing to be compressed; and if there is nothing to be compressed there is no pressure of air at the orifice.
19746. *Mr. Robertson.*] It might take a second; if it takes a second, this pressure and this velocity could not be got? *A.* Air pressures would be reduced proportionately to the increase in the time.
19747. *Q.* If it took a second, the pressure would be reduced by one-half? *A.* Yes.
19748. *Q.* And the temperature would be reduced to what? *A.* Not quite mathematically a half.
19749. *Q.* What would it be, just roughly? *A.* I would not like to say that. The temperature is not exactly in proportion to the pressure. It would be reduced, anyhow.
19750. *Q.* Would it be reduced to one-half?
19751. *His Honor.*] Mr. Wade, I presume you have not submitted this hypothesis to a real expert, like Professor Warren, have you.
19752. *Mr. Wade.*] No. The position is this, that, on the one hand, Mr. Atkinson has to adopt a hypothesis which there is no evidence at all to support —— [*Interrupted*].
19753. *His Honor.*] If Mr. Atkinson, you think, adopts a foolish hypothesis, we can only say that that does not justify you in adopting a still more foolish one.
19754. *Mr. Wade.*] I do not say that Mr. Atkinson's hypothesis is foolish; I would not be so disrespectful to him, nor to the Court. We say there is a theory put forward to account for it; and, having traced the evidences of the force, if the theory of a gas explosion fails, we put forward another theory to account for it.

19755. *His Honor.*] You assume as part of your negative theory that if you do light a body of inflammable gas at its less explosive edge, where it is over-diluted, you will not get a radiation of explosive forces from its actual centre.
19756. *Mr. Wade.*] There again Your Honor asks me to assent to a thing of which, so far as I know, there has been no proof in the past.
19757. *His Honor.*] I think the Commission are all agreed, as a point of fact, that you do get, under those circumstances, a radiation of forces from very nearly the mathematical centre of that body of explosive gas, and not from its edge; and, if Morrison's light did light that gas from its least inflammable edge, where it was over-diluted, there is nothing in that fact inconsistent with the fact that the final explosion took place in the centre of that body of gas, which would be, from the theory of its having been expelled from the 4th Right, very near the opening of the 4th Right at the time of the explosion; and the possibility of that you dispute.
19758. *Mr. Wade.*] Yes. All sides admit this, that those stoppings were apparently blown out at a very early stage, and there was some of this force going up the travelling road. That is shown by the evidence of the buildings of that door just inbye of the 4th Right in the travelling road; and there is no evidence at all of any explosive mixture or flame having travelled up the travelling road, or down it. The boy Hammon was in the travelling road near the 5th Right; and all he got was dust, and no flame at all. If the Commission think that this body of gas would tail out from the 4th Right to Morrison's light, there must have been an enormous conflagration—"flame" would be no word for it—the mine would be almost full of flame under those circumstances.
19759. *Mr. Robertson.*] Not necessarily.
19760. *Mr. Wade.*] His Honor put it this way that, if the initial point of the explosion was Morrison's light, where the air would contain the least proportion of explosive gas, the ignition would go back to the point where the centre of the body of gas was, I understand, and would radiate from that point; and that might account for the radiation going inbye and outbye from the 4th Right. If that is so, then we have a body of gas at least 200 yards long.
19761. *Mr. Robertson.*] No, you only have 1 or 2 per cent., with dust. You have not to consider that it would be pure gas.
19762. *Mr. Wade.*] If it were pure gas, there would be no explosion probably.
19763. *Mr. Robertson.*] You only want 2 per cent.
19764. *Mr. Wade.*] Two per cent. suits my purpose exactly. If there were 2 per cent. at Morrison's light, and going back to the junction of the 4th Right with the main haulage road, it would give an enormous volume of explosive mixture. If there is 2 per cent. at Morrison's light, and no more than 2 per cent. at the 4th Right, it will give the same explosion at the 4th Right. You have that large body of gas; and it is mixed up with coal-dust; and what you would expect from that under ordinary conditions would be a deposition of coked dust throughout the length and breadth of the mine, probably. If there were this enormous body of flame from the 4th Left to the 4th Right, it would immediately attack the 4th Left travelling road, or haulage road, which was a dusty road, and we would find it travelling right through the shaft district; but the only evidence of the effect of heat or flame to the left of the 4th Left turn is the abrasion of the skin of this boy, Kembla Stafford. He is the only one who had any indication of heat upon him who was to the left of the 4th Left travelling road. I am not speaking now of Aitken and Morris, who were in the faces, who were said to have been singed.
19765. *Mr. Robertson.*] I certainly saw some myself up on Stafford's Flat.
19766. *Mr. Wade.*] I am only speaking of the evidence. The only persons referred to from first to last as having been under the influence of flame or heat were Aitken and son, Morris and son, and Purcell, who were working in the faces of No. 1, and Kembla Stafford. They were all I knew of.
19767. *Mr. Robertson.*] *Q.* You have not given the temperature? *A.* 84 degrees.
19768. *Q.* That is to say, if the pressure were only one half, the temperature would be only 84 degrees? *A.* Yes.
19769. *Q.* Of course, it is not necessary to say that a temperature of 84 degrees would not ignite dust? *A.* That would be the increase of temperature.
19770. *Q.* Add that to the assumed temperature of the atmosphere, say 60 degrees? *A.* No, that is wrong. The total increase would be 34 degrees.
19771. *Q.* And what would be the total temperature? *A.* Ninety-four decimal eight (94·8) degrees.
19772. *Q.* Then, if the time factor was a second, and not half a second, the temperature would be only 94 degrees? *A.* Yes.
19773. *Q.* Even if it were three-quarters of a second only, still the temperature would be far below the ignition-point of dust? *A.* Yes, that is so.
19774. *Q.* So that, if we assume three-quarters of a second for the period of time of the fall, it is impossible to reach the igniting-point of coal dust? *A.* That is so. This has only been put forward as a hypothesis to account for the radiation of forces from the 4th Right forward, inbye and outbye.
19775. *Q.* Yes; but we only want to see whether the premises are reasonable. You have had a considerable experience of the working of pillars at the Metropolitan Colliery; and I dare say you have seen large areas hanging there, quite as large as this fall in question? *A.* Yes.
19776. *Q.* Did you ever hear of any trouble by falls? *A.* No, nothing to speak of.
19777. *Q.* And pillar-working is carried on very extensively there, is it not? *A.* That is so; but the conditions are hardly parallel, because in the Metropolitan you are leaving a lot of slack in to support the roof when it does fall. You have your gobs in your pillar workings.
19778. *Q.* Still, it is not packed up, and you can always look for an average fall of at least 5 feet? *A.* I would not say that—I should say less than that.
19779. *Q.* At all events, pillar-workings are carried on very extensively there; and larger areas than 40 yards square, the area of this supposed fall, are frequently hanging? *A.* That is so.
19780. *Q.* And in all these years there has never been any trouble? *A.* That is right. Then, you see, the conditions are not parallel, inasmuch as your roof falls upon the slack, and the distance it falls is less.
19781. *Q.* You assume 4 feet 6 inches, and there must be at least 4 feet 6 inches of an average fall at the Metropolitan Colliery, with all the slack in? *A.* Suppose you had that area hanging, it would not fall 4 feet 6 inches in the Metropolitan, because it would fall upon the slack that is in between your two roads

19782. *Q.* But there are many cases where there is very little slack to be found? *A.* In those cases it would be right.

19783. *Q.* But do not you think that, considering the extent to which pillar operations are carried on there, and the frequency with which the roof is hanging up after the timbers have been withdrawn, if such an inconceivable velocity as 700 miles per hour from orifices were possible at Kembla, it is also possible at the Metropolitan Colliery? *A.* But I think you mistake altogether the trend of my evidence. I mentioned that as a hypothetical case, as what could occur—I do not say it did occur. I do not say that the conditions were exactly as I have assumed them; but the result of the conditions I there assume would be the result which I approximate there. That was a hypothesis which would explain an ignition which I could not explain in any other way.

Examination by Mr. Ritchie:—

19784. *Q.* Have you made any calculation of the velocity of the expelled air caused by a fall 2 feet 6 inches in thickness? *A.* No.

19785. *Q.* Over the same area that you have been dealing with, where this subsequent fall occurred? *A.* That would be much less, because the time-factor would be shorter.

19786. *Mr. Robertson.*] *Q.* How is that? *A.* No, the time would be longer, would it not, relatively to the area. No, the time-factor would be shorter.

19787. *Mr. Ritchie.*] *Q.* How do you arrive at that conclusion? *A.* By considering the laws of gravity.

19788. *Q.* Do you mean to say that it has further to fall? *A.* I thought you meant 2 feet 6 inches of a fall.

19789. *Q.* The thickness of the strata falling would be 2 feet 6 inches? *A.* It would make no difference in my calculation, because the distance it fell would be the same, and it would occupy the same time.

19790. *Q.* Would the same quantity of air be expelled by a fall 2 feet 6 inches coming down in one solid body as a fall 4 feet 6 inches? *A.* The displacement would be the same.

19791. *Q.* Would you expect the same result if the air had come through the same orifice? *A.* I daresay you would—mathematically speaking, you would.

19792. *His Honor.*] Surely Mr. Sellers has got a wrong impression of what Mr. Ritchie means.

19793. *Mr. Ritchie.*] I am trying to get Mr. Sellers' attention on to the first fall. I am asking him to assume that the first fall covered the same area as the second fall, which is said to have caused the disaster.

19794. *Witness.*] In that case you cite the distance is only 2 feet 6 inches, and the time of fall would be less.

19795. *Mr. Ritchie.*] *Q.* The distance of the fall is the same; it would be greater, in fact, because you yourself have allowed 6 inches for expansion of the fall? *A.* Well, give me the distance.

19796. *Q.* This fall would have somewhere about 6 feet to fall? *A.* The amount of displacement would be greater if it had to fall 6 feet.

19797. *Q.* Would you expect that the result would be the same, or greater, from the point of view of the destruction caused? *A.* Mathematically, it would be greater.

19798. *Q.* Are not you surprised to know that a fall 2 feet 6 inches did take place over that area, and did no harm whatever? *A.* I am not in a position to dispute it; although I have only heard it in Court. I accept that.

19799. *Q.* If the evidence was so, that a fall of 2 feet 6 inches took place over that area, and did do harm, would you be surprised?

19800. *Mr. Wade.*] The evidence does not show how it fell. If you assume it fell in one solid piece —— [*Interrupted.*]

19801. *Mr. Ritchie.*] I am taking his own evidence for that He says that, from his own observation, he thinks it would fall solid.

19802. *Q.* Would you say that, Mr. Sellers? *A.* If it fell *en bloc.*

19803. *Q.* You assume that it has fallen solidly there? *A.* Yes, I expect it has fallen solid; and I am dealing with that set of conditions.

19804. *Q.* Now, I am taking this fall of 2 feet 6 inches in the same way that you say you expect it would fall; would you be surprised to hear that that fall did take place and caused no harm? *A.* I would not be surprised, because we have falls in the pits regularly.

19805. *Q.* Are your surprised at the result of the second one? *A.* I only put this case hypothetically. I assume that a certain area did fall a certain distance in a certain time. If it did so, it would give a certain temperature, which Professor Bedson says would ignite coal-dust. If you destroy those premises altogether there is no hypothesis.

19806. *Q.* If this 2 feet 6 inches of a fall did take place, you, in your evidence now, state that it would cause a greater displacement? *A.* I do not quite follow you altogether. You say it fell from the same height?

19807. *Q.* Or a greater height? *A.* Then you would have a greater displacement.

19808. *Q.* Then I suppose you would admit that the first fall after the pillars had been extracted would have a great deal more dust to operate on than the second fall? *A.* Yes, probably.

19809. *Q.* You also admit that, if there were gas there, it would have the gas to operate on? *A.* Yes; if there was gas there.

19810. *Q.* Are you now surprised to hear that no harm was done by that first fall, in view of your hypothetical case? *A.* No, I am not surprised at all; because my case is pure hypothesis.

19811. *Q.* You still hold the opinion that a fall of 2 feet 6 inches could take place, having 6 feet of space to fall through, having dust to operate on, having any other noxious gas that might be there to operate on, and it would do no possible harm whatever; and, subsequent to that, another fall might take place, having less space to fall through, and it would do all the harm here? *A.* I cannot answer that question. You put one at a time. You are mentioning two cases for which there is no parallel. It is a bit confusing.

19812. I have asked you, and you have answered me, that the first fall would cause the greater displacement of air? *A.* Yes, mathematically speaking.

19813. *Q.* And I have put it to you that the evidence goes to prove that no damage was done by that great displacement of air? *A.* Yes, that is right.

19814. *Q.* Now, I ask you what additional reason have you got for supposing that the second fall, which would have a less space to fall through—or, in other words, would cause a less displacement of air—would cause the damage you speak of. *A.* I have no reason whatever.

19815. *Q.* And is it quite consistent with your theory that the second fall would do this damage, but the first fall did none? *A.* It is consistent with my theory that either fall would do the damage. 19816.

19816. *Q.* But you have got the evidence that the first fall did no damage whatever? *A.* I have not got that evidence. It is only an assumption.
19817. *Q.* I put it to you now, that it is practically before us in that way now—does that alter your opinion as to the action of the second fall? *A.* I do not see that it alters it very much. The second fall is based on mathematical conditions. If the conditions depend on unknown factors, those conditions might have differed in the first fall from the conditions in the second.
19818. *Q.* Do not you think it would be better to take facts than hypotheses? *A.* Certainly, it would be better.
19819. *Q.* Do not you think you should rely upon them in your calculations? *A.* There are some things you have to demonstrate hypothetically.
19820. *Q.* Have you had any fall so extensive as that, under your management? *A.* We have had certain extensive falls.
19821. *Q.* And the only result was the banging of doors? *A.* Yes; but the conditions were not parallel, because where that fall was there were openings radiating on all sides.
19822. *Q.* You told us you made an inspection of Kembla Colliery about three years before the disaster? *A.* In the beginning of 1900.
19823. *Q.* Have you any recollection of what the state of the road leading into the 4th Right was at that time, with respect to dust? *A.* It did not occur to me that it was a dusty road at all, speaking practically, now. We went in that road; and it was not particularly dusty. It was not dusty in the same degree as we know dusty mines, like Helensburgh.
19824. *Q.* Was it damp? *A.* Portions of it were damp. There were several damp sections along there, I recollect.
19825. *Q.* That is the road leading past the 4th Right entrance, and the entrance to the 4th Right itself? *A.* I was not in the 4th Right itself. I went round that left-hand circuit.
19826. *Q.* And if this great current you speak of was caused through the expulsion of the air by this fall, where would you get the greatest compression—at the opening, at the orifice directly leading from the 4th Right, or out in the main heading? *A.* The greatest compression would be on the western edge of the cut-through leading from the 4th Right before it debouched on the travelling road.
19827. *Q.* That is, before it reached the back heading? *A.* Before it reached the back heading.
19828. *Q.* You would expect the greatest compression there? *A.* I should imagine so.
19829. *Q.* You would expect to have the highest temperature there? *A.* Yes, near that point.
19830. *Q.* Would not you expect, if the explosion was brought about by the high temperature, that the radiation of force would be from the back heading, instead of from the front heading? *A.* No.
19831. *Q.* You say here that the highest temperature was brought about by the compression of the air, and that it had reached its highest point by the time it reached the back heading; and you have also said that there would be dust coming out;—would it not then be reasonable to say that the explosion would take place from where the highest temperature was? *A.* Yes; but there was force behind it which would carry it to the western side of the main haulage road, and that would be the splitting point. The evidence, to my mind, shows that it did that.
19832. *Q.* Do not you know that we have evidence here which shows that there was force which came down that back heading on the inbye side of the 4th Right? *A.* I do not know of that.
19833. *Mr. Wade.*] I do not know that. The evidence was that that door was displaced by a force going from the outbye to the inbye.
19834. *Mr. Ritchie.*] There is evidence in Mr. Atkinson's evidence that there was force which came down that back heading.
19835. *Mr. Wade.*] Inbye of the 5th Right?
19836. *Mr. Ritchie.*] Yes.
19837. *Mr. Wade.*] Yes.
19838. *Mr. Ritchie.*] *Q.* Which was the dustiest part of that road? Where would it meet the greater amount of dust, in the back heading or the front heading? *A.* The front heading.
19839. *Q.* Are you quite sure of that? *A.* I did not inspect the place immediately before the disaster; but I should imagine that, from the condition that the return air is usually damper than the intake—it gathers moisture—and when you are hauling coal there is always an imperceptible dust that goes off the trams.
19840. *Q.* When you have large areas like that in collieries that you have to manage, what steps do you take to prevent accidents like that happening? Where you have large areas standing, and likely to fall any moment, what steps do you take to prevent accidents occurring? *A.* Withdraw the men.
19841. *Q.* Is that all you would do now, in view of the evidence you have given here about this disaster? *A.* I think so. I would withdraw the men that I should imagine would be effected.
19842. *Q.* I asked you yesterday about the men who would be likely to be affected; and I think you said the men who would be immediately under the falling mass? *A.* No, I do not say anything of the sort. I said, "The men who would be affected by the falling mass."
19843. *Q.* Take Mount Kembla; would you think it necessary to withdraw the men working in the 5th Right? *A.* No.
19844. *Q.* Not in view of your own hypothetical case in regard to this matter? *A.* In view of what has happened since, I would have probably.
19845. *Q.* I want to have clearly now what you think it would be necessary to do now, in view of what has happened? *A.* I should imagine, if you anticipate anything like that, you would certainly withdraw the whole of the miners.
19846. *Q.* Is that all you would think of doing? *A.* What more could you do? You might make an effort to uphold the roof; but I am afraid it would be an effort that would not be successful.
19847. *Q.* Is that all you could do besides simply withdrawing the men? If you were managing Mount Kembla at the present time, and had a goaf standing somewhat similar to that which has fallen in the 4th Right there, you say that now, in view of what has happened, you would withdraw the men;—is that all you would think of doing? *A.* I might have taken another step; but I would have to think that out.
19848. *Q.* It is the steps you would take now that I want to know? *A.* That is the principal step I would take.

19849. *Q.* Would not you keep men examining this place regularly, in order to report when it was likely to fall? *A.* It might have been unsafe to send the men in there. Presuming the place was safe, I should certainly say I would have it examined.
19850. *Q.* Have you put before the Commission the idea that the roof suddenly falls without any warning? *A.* When it is falling.
19851. *Q.* Have you seen much roof falling? *A.* I have seen it falling.
19852. *Q.* Have you been actually there? *A.* I have been pretty close to it.
19853. *Q.* And you seriously put it before the Commission that a large body of roof like this might fall without any warning at all? *A.* I do not put it that way. Of course, if you draw the timber out of the roof, you naturally anticipate a fall; and then you come to a certain stage when you have to take certain precautions; but if the roof is supported you do not need to take these precautions.
19854. *Q.* I am putting the case before you where you have drawn the timber, and you expect to see it fall? *A.* You go and see whether it has fallen.
19855. *Q.* If you had a goaf standing, your idea of management now is that you would withdraw the men until it had fallen? *A.* Yes, if the conditions were where one might anticipate a similar result [*meaning the Mount Kembla disaster*]. That would only depend on one's judgment; it would depend on the conditions surrounding the case, if they were similar.
19856. *Q.* I am going to take your own evidence to deal with the conditions. You said that in your opinion Mount Kembla was one of the safest mines in the Colony? *A.* Yes.
19857. *Q.* And it was not a dusty mine? *A.* Yes.
19858. *Q.* And that there was no gas? *A.* Yes, that is from my knowledge of the mine previously.
19859. *Q.* In your opinion now it would be necessary, in the safest mine in the Colony, if you anticipated a fall, to withdraw the men? *A.* No, that is absurd.
19860. *Q.* Then what conditions would you lay down as to when they should be withdrawn? *A.* That is a thing that would take a week to explain. I would have to indicate every little thing. It depends entirely on the conditions, as to whether the men should be withdrawn or not.
19861. *Q.* Surely you could give the Commission a general idea, without going into the matter in detail? *A.* Your question is so general that it could not be answered, except by a most detailed explanation.
19862. *Q.* I do not want to ask you all these details; if there was no gas and no dust, what would you do? I put it generally? *A.* I would say this: if, in my opinion, it was not necessary to withdraw them, I would not withdraw them. I would base my opinion on my judgment of all the circumstances surrounding it.
19863. *Q.* You have told us you would do it if the conditions were the same as at Kembla. What were the conditions at Kembla? *A.* There was an area of ground that fell.
19864. *Q.* We would anticipate that at any colliery. That is what I put to you? *A.* Under the same conditions.
19865. *Q.* What were the conditions? *A.* I cannot say. They were the same as all over the district, speaking generally.
19866. *Q.* If a large fall of that kind was expected at any colliery in the district, would you withdraw the men then? *A.* That would depend entirely upon my own judgment.
19867. *Q.* How do you mean? *A.* I cannot open my brain to you. That would depend entirely upon my discretion and judgment, founded upon practical knowledge.
19868. Then your previous answer cannot be any use to the Commission—when you said that, if the conditions were similar, you would withdraw the whole of the men from the whole of the places. What is the use of that answer, if now you tell us that it would depend entirely on your judgment? *A.* But you take that answer in quite a bald way—in a way in which it was never intended to be taken. I said, if I had anticipated a fall that in my opinion would give results similar to those at Kembla, then I would withdraw the men.
19869. *Q.* But you were asked what were the conditions. All we want to get, really, is some definite opinion from you, as an expert, to see what can be done to avoid these things in the future? *A.* A mine is a matter that you cannot lay down all rules and documents for—you cannot make rules for every contingency. A lot has to be left to experience, and discretion, and judgment, in the matter. If the Manager is competent, he has the knowledge of these things, and he is seized with his responsibility, and acts accordingly.
19870. *Q.* Then everything depends on having a competent Manager, in your opinion? *A.* I should say so.
19871. *Q.* What method of examining waste workings do you adopt at the collieries which you have charge of? *A.* We examine as far as practicable.
19872. *Q.* What does that mean? *A.* We go to all the dead ends and the edges of all fallen ground, and that sort of thing.
19873. *Q.* Supposing you have a fairly large area, with the timber drawn, and the roof standing intact, and no indications of a fall about to take place, what do you do then? *A.* You would satisfy yourself that there is no explosive gas there.
19874. *Q.* How do you satisfy yourself? *A.* In the usual way.
19875. *Q.* In what way? *A.* You go and examine, I suppose.
19876. *Q.* What method of examining do you adopt? *A.* You go and examine to see whether there is any gas there.
19877. *Q.* Do you go in with a safety-lamp; and go in beyond the edge; or stand at the outside? *A.* It entirely depends on the conditions. If it is a mine that is giving off explosive gas and is worked with a safety-lamp, then you would go and examine with the safety-lamp; but, if it is a mine that is not giving off explosive gas, you would examine accordingly.
19878. *Q.* Then you tell us now that where no explosive gas is found you simply go to the edge of the place? *A.* No.
19879. *Q.* How far would you go? *A.* As far as is consistent with safety.
19880. *Q.* Is that the method you have adopted? *A.* Yes. Of course you cannot tell a man to go into a place where the roof may fall on his head and kill him.
19881. *Q.* I put it to you this way: the goaf is standing, with no indication of falling. Of course, if your idea is that it comes suddenly, and takes half a second to fall, then it would be unsafe to go anywhere? *A.* If I understand you to mean a place that is standing up then you could go to the face of that place.

19882. *Q.* No. There is a large area standing, with the timber drawn: you want it to fall, but there is no indication of its falling? *A.* Those indications are hardly safe. Would you expect a man to go into a place where you had drawn the timber and you expected the roof to fall?
19883. *Q.* As a matter of fact, I have gone? *A.* I would not send my officials in a place like that.
19884. *Q.* Would you be satisfied if it was examined at the edge of the standing pillars that supported this goaf? *A.* That would depend on the condition of the surrounding areas. You would probably get some indications of the state of this place at the other openings.
19885. *Q.* Is there any method you could suggest, some method of testing where it would not be safe for a man to go in to test the condition of the centre of these goafs? *A.* As a broad principle, I think this could be adopted: if you put the air through the waste, then, if you get the condition of the air that is coming from the centre of the goaf, you get the condition of the centre of the waste.
19886. *Q.* Is that always practicable? *A.* It is always practicable; and that is a very good principle to adopt.
19887. *Q.* Supposing you had a large area which was just like a gasometer, and you could not possibly put the ventilation through it to see what it contained, is there any suggestion you could put before the Commission whereby other means might be adopted of testing that place without the necessity for a man to go in? *A.* In the first place, I would never allow any of my old workings to remain in a gaseous condition. If I knew that any of my old workings were going to have gas in them, I would jolly soon put air through them.
19888. *Q.* They would want to be open for the air to go through? *A.* You could force air through over the top of the fall.
19889. *Q.* Your idea is to put ventilation into those standing goafs wherever you suspect an accumulation of gas? *A.* Yes, wherever it is practicable to do it.
19890. *Q.* You have had some fires in the mine of which you are Manager? *A.* Yes, we had a fire.
19891. *Q.* How were those fires brought about? *A.* The miners were working a pillar—I may mention that we made our goafs towards the end of our boundaries: we had no central goafs like these [*pointing to the Mount Kembla plan*]; and we allowed a portion of the return air to scale through the goaf. Well, at this particular place—I was there the day previously with the Inspector of Collieries; and on top of the fall we got ¾ per cent. of inflammable vapour with the hydrogen lamp—the men were working with naked lights in the face: the face was absolutely clear: we could not get a show (of gas) there.
19892. *Q.* How far was the face from the edge of the goaf? *A.* One side of the face went right on the goaf. So I got the under-manager and talked it over, and told him to put a bit more brattice in to drive that stuff out; and I told him to go there next morning and look at it; and I said, "You take a lamp too, and examine it"; and he made an examination, and got absolutely nothing. Then he went over the bottom of the place—it is bottom gas we are speaking of—and he made an examination with the naked light to see if he could find any cutters. The gas comes in cutters there—a bit of a squib. He found nothing at all. Then he went to put the canvas the way we had arranged the night before. Twenty minutes elapsed between the under-manager's coming away and the return of the deputy; and when the deputy got there the miners had knocked off work at the face and retired, and came back and threw their light off their cap on the floor; and their light was thrown close to one of these, cutters in the face; and it went, just like a squib, on to some bark that was under the falls, and lit the bark on a prop, and communicated the light to other pieces of broken props and into the goaf.
19893. *Q.* And that was the cause of the fire? *A.* That was the cause of the fire.
19894. *Q.* Do you say that you only discovered ¾ per cent. of gas there? *A.* That is all. And that was high up. We got in a big crack as high as we could get. This bottom gas at Corrimal seems to have this peculiarity, that, at the moment of its emission, it is heavy; and, if it is allowed to lie in a state of rest, it will lie on the bottom; but, if it is stirred up with an air current, the different gases in it are broken up, and the lighter gas rises; and it is that factor which causes these low percentages, seemingly, in the goaf.
19895. *Q.* In view of the fact that you did anticipate danger there, was it examined frequently by the officials? *A.* For gas?
19896. *Q.* Yes. *A.* Most decidedly. I had examined it there the day previously; and the Inspector had been there the day previously. It was examined regularly.
19897. *Q.* Was it examined frequently during the day-shift? *A.* It was examined twice during the day-shift, and always by the night deputy.
19898. *Q.* If you have places standing in your colliery which are abandoned for the time being, are they examined? *A.* All places are examined in South Bulli at the present time. We make it a point to get at the condition of every face. I do not mean the old workings: I mean the faces standing between places that are working.
19899. *Q.* Is it your practice to have an air current travelling round these places which may be temporarily abandoned? *A.* That is in accordance with ordinary practice.
19900. *Q.* You make it a practice to have that done always? *A.* Yes.
19901. *Q.* How often do you do your waste examinations? *A.* We examine wastes at South Bulli at the present time twice a week; we are only required to do it once a week, but we are doing it twice.
19902. s*Q.* Do they examine the whole of the wastes twice a week? *A.* As far as practicable.
19903. *Q.* They do not select a part during one week and another part next week? *A.* No; the whole of the waste workings. We go in as far as it is safe and as far as it is practicable.
19904. *Q.* I suppose you have got all reports in writing in regard to these examinations? *A.* Yes.

Further examination by Mr. Robertson:—

19905. *Q.* I think you said during your evidence that you considered Kembla, prior to the explosion, a safe mine? *A.* I did.
19906. *Q.* In view of what has occurred, do you think that a mine of that character should be worked with naked lights in future? *A.* No, I should say, in the light of what has happened there and the danger from pit fires with naked lights, that it is a wise thing to use safety-lamps under conditions where a mine gives off a small quantity of gas.
19907. *Q.* May I take it that Kembla accident has been a revelation to the most sceptical mining men of the dangers of a mine slightly gassy? *A.* Well, you may take that view of it, although——(*Interrupted*).

19908. *Q.* I am asking—do you take that view of it? *A.* Yes, I would say that any mine that gives off a small quantity of gas should work with safety-lamps.
19909. *Q.* Such a mine is what you may call potentially dangerous? *A.* Yes.
19910. *Q.* Of course you know there has been a great deal of difference of opinion among mining men as to when a mine should be worked with safety-lamps—with some men there is a difficulty in drawing the line? *A.* Yes.
19911. *Q.* Do not you think it is highly necessary that gassy mines should be clearly defined? *A.* Yes, I should say that any mine that gives off gas—any mine that you can get a detection of gas, say, up to a half per cent. with the hydrogen lamp.
19912. *Q.* Would you draw the line even at half per cent.? *A.* Yes, I mean half per cent. in the faces, not in the return. I would go as far as that, but not further.
19913. *Q.* But the probability is that, if you had examined Mount Kembla Mine in the faces, you might not have detected even a half per cent. Would it not be running on safe lines to define a gassy mine as "a mine that gives off gas"? *A.* Exactly. I had that in my mind when I was speaking about half per cent. That is a quantity which you could detect; and if you got that quantity I think you should use safety-lamps.

Further examination by Mr. Ritchie:—

19914. *Q.* Do you say that Kembla Mine was giving off gas? *A.* No.
19915. *Q.* Do you believe it was giving off gas? *A.* No, I cannot believe that; because I have got no evidence to support me in that.
19916. *Q.* Do you that it was not giving off any gas? *A.* So far as my knowledge goes, it gave off no gas.
19917. *Q.* Of course you know you have discovered gas in Kembla yourself? *A.* Yes, but that is under an exceptional condition.
19918. *Q.* But, if it was not giving it off, you could not get it? *A.* But that gas is explainable in some other way.
19919. *Q.* Would that be generated in some other way than the usual way? *A.* I should imagine that that was present by the distillation of the coal caused by heat by the explosion; and that would rise to the highest part of the mine, and be present there.
19920. *Q.* Then I take it the Kembla Mine did not give off gas? *A.* That is my impression.
19921. *Q.* And, in view of that serious disaster taking place at a mine which, in your opinion, did not give off gas, do you still think that there should be a report of gas before safety-lamps are used? *A.* That is rather hard to answer, because it is not a question of gas altogether. It is a question of the dryness of the mine, its temperature, and depth. For instance, I know a mine in Newcastle where it is damp, and where gas has never been seen, and the workings are very shallow; and, in that place, really, I think it would not be any safer with safety-lamps than with naked lights.
19922. *Q.* Then you hold this opinion, that it may be necessary to use safety lamps where no gas is being given off? *A.* You could use them where gas was not being given off.
19923. *Q.* Do you think it may be necessary? *A.* Yes, by reason of the danger of inflammation of the mine, the danger of bark and stuff.
19924. *Q.* You have told us that, in your opinion, Kembla was not a gassy mine; and yet we have this disaster there? *A.* Yes, but I should certainly say that it is right now to use safety-lamps in Kembla.
19925. *Q.* But there are other mines besides Kembla which may never have been regarded as as safe as Mount Kembla? *A.* I think that is a matter to be left. I think if a mine gives off gas, if you can detect gas, it is safe to put in safety-lamps; and if you cannot detect gas I think the conditions surrounding the mines are such that, if the Government Inspectors think safety-lamps should go in, they should say so, and then have arbitration, if the Manager thinks not.
19926. *Mr. Robertson.*] *Q.* I think you consider that it is safe to put safety-lamps into every mine that is not naturally wet, or that is dry and dusty? *A.* Yes.
19927. *Q.* Did you give some evidence on the effect of watering mines? *A.* We do water to a limited extent at South Bulli; and that is only a portion of the travelling road, and on some of the engine planes. We do not water the goaf.
19928. *Q.* Do you consider that there is a danger of injury to the roof or floor or sides by profuse watering? *A.* Yes, if you have a soft pavement. The water soaking into the pavement might cause the pavement to heat. Some of the roofs contain lime matter, and if you put water on them it would tend to make them fret away.
19929. *Q.* What do you think would be the effect of watering in a hot mine, a mine where the strata temperature is naturally 80 per cent.; what would be the effect of the watering on the timber? *A.* I should expect that it would increase timber expenses. The timber would not last so long; you would have to renew your timber more frequently.
19930. *Q.* In a dry and dusty mine, where gas is known, I take it you would think watering in the vicinity of shots necessary? *A.* Yes.
19931. *Q.* And, if the vicinity of a shot is watered, would you consider it necessary to water the roadways? *A.* No, I do not think so, not absolutely necessary. If you water in the vicinity of a shot—that is practically the most likely place for the inflammation of dust—if you water there, I think that would be sufficient.
19932. *Q.* If you water in the vicinity of a shot, and the mine is worked with safety-lamps entirely, what danger do you anticipate from dust in a roadway, a haulage road or a travelling road? *A.* Not very much.
19933. *Q.* Is there any? *A.* I cannot say there is much danger.
19934. *Q.* Would you consider it practicable to water all the roadways in some large mines? *A.* No, I do not think it is practicable. Where is the water to come from? We have not enough water.
19935. *Q.* Apart from the effect on the roof and the floor and so on, it would be very costly? *A.* Yes; and apart from the cost of the thing there is the difficulty of doing it, by reason of the shortage of water supply. There is first the cost to put it on; and then you cannot get the water. We have these droughts; and then even our big dams go dry in droughty seasons.
19936. *Q.* Do you consider it of very great service to water sections of a mine? *A.* I do not know whether sectional watering is of any good. There is one case I quoted yesterday. The idea is to prevent the travelling of an explosion.

19937. *Q.* We do not want to go any further than Kembla to prove that the explosion jumped long lengths of wet road? *A.* Yes.
19938. *Q.* Therefore, if watering is to be of any service, would you consider it necessary to have very long lengths of each district watered? *A.* Yes, they would have to be very lengthy.
19939. *Q.* That itself, even watering sections of a very extensive mine, would be costly? *A.* Yes; but it would not be so costly as watering the whole.
19940. *Q.* Not the first cost, but the maintenance? *A.* Yes.
19941. *Q.* Do you consider it is advisable to prohibit the use of gunpowder in mines worked with safety-lamps, or which are dry and dusty? *A.* Yes, I do; but the trouble is to get a substitute. I think, if we could get a stock of permitted explosives here, then I should say that any new regulations should require the use of permitted explosives in mines using safety-lamps, and dry and dusty.
19942. *Q.* There does not appear to be any difficulty in getting supplies of permitted explosives? *A.* That could be overcome, I suppose. It is in a sort of transition stage now. The merchants do not care about carrying big stocks; and the permitted list is being modified so frequently; and there is the deterioration that sets in in the explosives by storage, and the distance from the manufactory.
19943. *Q.* You are aware that a factory was established in New South Wales some years ago for the manufacture of roburite, and it came to grief through want of support; in point of fact only one colliery took supplies from that factory; but, assuming that a number of collieries required supplies of explosives, do you think there would be any difficulty in establishing a factory here? *A.* There should be no difficulty, although all of us are not married to that particular explosive—all of us are not disposed to roburite. There are other explosives which are equally as safe as roburite. Even roburite has a flash.
19944. *Q.* Of course the permitted explosives are only comparatively safe. They offer a greater degree of safety than gunpowder; and you are decidedly in favour of the use of permitted explosives? *A.* I am. I would hail with satisfaction the enforcement of that regulation.
19945. *Q.* And you are in favour of the shot firing being in the hands of officials specially appointed for the purpose? *A.* Yes, shot-firers.
19945½. *Q.* What method of firing do you approve of—electric blasting? *A.* So far as I see, there is no danger with electric blasting. The current is of low tension; and I have not seen anything to show that sufficient heat could be given off to ignite gas.
19946. *Q.* It is better than lighting with a fuse? *A.* If you anticipate conditions where the lighting of a fuse would be likely to cause the lighting of gas, then the lighting with electricity would be safer.
19947. *Q.* With reference to the type of safety-lamp, do you consider it necessary that there should be some control over the types of safety-lamps to be used? *A.* I do.
19948. *Q.* That is to say, it ought not to be in the power of any Manager or Company to use any lamp at all? *A.* There is a consensus of opinion as to which lamp should be used; and I do not see any reason, in expense or anything else, to depart from that consensus. I would never think, myself, of using an obsolete type.
19949. *Mr. Ritchie.*] *Q.* What lamps would you call obsolete? *A.* There are some lamps—the Davy lamp, and the Clanny lamp, unprotected. I should say that the lamps should be of the same class as the Cambrian lamp, and equally safe.
19950. *Mr. Robertson.*] *Q.* I would like to ask you about General Rule 12—have you ever been able to interpret General Rule 12 without sitting down and considering very hard? *A.* It is a very hard rule.
19951. *Q.* Do not you think it ought to be made simple enough for a man of ordinary education, even a shot-firer, to understand? *A.* The understanding is that if a set of conditions arises indicative of danger you should withdraw the workmen; and, to my mind, that intention appears to be simple enough to allow an ordinarily intelligent person to grasp it. The wording, no doubt, is very intricate.
19952. *Q.* It is very involved. I do not understand it to this day, and I have been reading it for years. There is no reason why the object of that rule could not be put into plain and simple language? *A.* I think it ought to be in a simpler form.
19953. *Q.* Would you be in favour of a Board, consisting of representatives of the different interests, to which matters in dispute, say, between the Inspectors and the management, or questions of new rules, or special rules, could be referred? *A.* I do not know. I think we have a better guide than that. In this country, you see, interests are so varied. I think it is a wiser thing to take the English regulations holus bolus.
19954. *Q.* But if we can improve, even on the English Act? *A.* We might be able to improve; but the question is whether the practical application would stand the same test as the English regulations.
19955. *Q.* There is no earthly reason why General Rule 12 should not be amended with advantage? *A.* Yes.
19956. *Q.* Then, in the matter of special rules, it is very desirable that representatives of districts, and the Government, and the miners, should have an opportunity of considering them before they are put in force? *A.* I think, regarding special rules, there should be a unified code for each district; and they should be drafted by representatives of the owners, miners, Managers, and Inspectors.
19957. *Q.* For particular districts? *A.* Yes.
19958. *Q.* Of course, even in particular districts the conditions may vary very considerably; for instance, there is a very wide difference between the Helensburgh Colliery and the Southern Collieries? *A.* I think some of the Helensburgh rules could be adopted.
19959. *Q.* Could not you adopt the whole 250 of them? *A.* Some of them are like General Rule 12. You want to condense the rules. We make our rules altogether too laboured. Our rules on the South Coast are too windy.
19960. *Q.* Is it not necessary to provide for all possible offences? *A.* There should be a code of the offences, and a scale—a schedule—so that it would take up less space.

Cross-examination by Mr. Lysaght:—

19961. *Q.* Your opinion that Kembla was a safe mine depended upon one visit inside it? *A.* Yes; one visit, plus a knowledge derived from conversation, &c., with the miners, Managers, and other people.
19962. *Q.* How long did this one visit inside last? *Q.* Somewhere about five or six hours. I forget the exact time I was in Kembla.

19963. *Q.* And on that occasion you did not go to inspect the safety of the mine, did you? *A.* Partly that, as well as other things.
19964. *Q.* And the conversations with the miners—did you mean the miners of Kembla? *A.* The miners in the district generally.
19965. *Q.* Do you refer to men who may not have been at Kembla at all? *A.* To men who may have been there; and to men who may not have been there.
19966. *Q.* Then it is on this one visit that you base that opinion? *A.* Yes.
19967. *Q.* Did you know that gas had ever been discovered in Kembla Mine? *A.* Well, I heard, I think, about twenty years ago, that some gas had been discovered.
19968. *Q.* However, you did know, then, that at some period Kembla Mine gave off gas, fire-damp? *A.* Well, if you can strain my recollection as far back as that, I did. I have heard that.
19969. *Q.* Did you hear that a man had been burnt by an explosion of fire-damp? *A.* I never heard that, until after the Inquest started in Wollongong.
19970. *Q.* So that your opinion with regard to the safety of the mine left out the fact that a man had been burnt in Kembla with fire-damp? *A.* I did not know that.
19971. *Q.* Knowing it now, does that alter your opinion regarding the safety of the mine? *A.* Not necessarily.
19972. *Q.* Do you know that Mr. Ronaldson, the Manager of Kembla Mine, stated seven years ago on oath that the mine gave off gas in all parts in small quantities? *A.* All mines do that, I suppose.
19973. *Q.* Did you know that? *A.* No, I did not know that.
19974. *Q.* Now, as a man had been burnt with gas, and the Manager had stated that the mine gave off gas in all places—you did not know those two facts when you gave your opinion—do they alter your opinion regarding the safety of the mine? *A.* No.
19975. *Q.* Then, may I take it that, when a mine is stated to have been giving off gas, and a man was burnt in it, you consider it safe to work in the mine with open lights.
19976. [*Mr. Wade objected to the question.*]
19977. *Mr. Lysaght.*] *Q.* Do I understand that, if you knew a mine had given off gas, and that a man had been burnt in it from an explosion of gas, would you still consider it safe to work that mine with naked lights? *A.* I did not say so. There is a set of conditions altogether apart from that. All mines give off gas—every mine, in quantities from imperceptibility to a maximum quantity. A set of circumstances may be such in some particular district that one particular place may give off gas from a fault—you may get a small quantity of gas lying there; and it might be that exceptional circumstance that would bring about that ignition that you speak about.
19978. *Q.* I put it to you that Mr. Ronaldson had sworn that the mine gave off gas in all places in small quantities? *A.* It is simply a question of quantity.
19979. *Q.* Then, if you had known that Kembla Mine had given off gas in small quantities in all places, and that a man had been burnt in it by an explosion of gas, in your opinion was it safe to work that mine with a naked light?
19980. *Mr. Wade.*] What time do you mean—a recent time?
19981. *A.* You are not exact enough. You want to make those conditions a little more definite. It is a question of degree. I want a degree. I form my opinion on a degree.
19982. *Mr. Lysaght.*] *Q.* You told Mr. Robertson that, if a mine was known to give off ½ per cent. of gas, you would have it worked with safety-lamps? *A.* Yes.
19983. *Mr. Wade.*] There should be another qualification in that question. It was in the light of what has taken place at Kembla.
19984. *Mr. Lysaght.*] *Q.* I ask you do you make that qualification that Mr. Wade now makes, that it is only in the light of what has taken place at Kembla? *A.* Yes, you take it that way.
19985. *Q.* You say so? *A.* Yes.
19986. *Q.* Will you tell me anything that happened at Kembla that at all altered the dangerous conditions that were there before the disaster? *A.* I have had an experience since Kembla, as well.
19987. *Q.* I am taking Kembla. You have adopted what Mr. Wade said, that it is in view of the experience you got from Kembla? *A.* It is since the Kembla disaster.
19988. *Q.* From somewhere else? *A.* Yes.
19989. *Q.* Do I understand then that it is not in view of the light you got from the Kembla disaster that you have given that opinion to Mr. Robertson? *A.* No, you must not understand that. It is by a collection of circumstances that have arisen since Kembla.
19990. *Q.* Tell me where, besides Kembla? *A.* In Corrimal, for instance.
19991. *Q.* Anywhere else? *A.* No, I do not see that I can say anywhere else.
19992. *Q.* Now, I have got you confined to the light you got from Kembla and Corrimal? *A.* Yes.
19993. *Q.* What light was it you got from those two places that forced you to this conclusion since the disaster? *A.* Take the Corrimal case, which certainly clinched my opinion about the matter. There was a place that was examined regularly, and it was known to be giving off infinitesimal quantities of gas. It was examined by myself the day before, in company with the Government Inspector; and, to all intents and purposes, was practically safe; and then there was this accidental ignition in the presence of dry material, which caused a considerable amount of anxiety and expense to overcome.
19994. *Q.* This accidental ignition was your new light? *A.* Yes.
19995. *Q.* What new light did you get from Kembla? *A.* Well, that was viewing the whole circumstances, one would say if these sort of things happen under certain circumstances certainly, as far as human judgment goes, safe, and in accordance with the practice that is pursued in the community, then we had better go a step further.
19996. *Q.* Had not you on record the accidental ignition in Kembla years before, and the continual emissions referred to in Mr. Ronaldson's evidence? *A.* I had never read Mr. Ronaldson's evidence.
19997. *Q.* Had not you read the evidence taken on the Commission on the Coal Mines Bill? *A.* I have read part of it, but not Mr. Ronaldson's evidence.
19998. *Q.* But do you not see that the two facts which you have put forward as changing your opinion you had already got in Kembla before? *A.* I do not say so; you say that.
19999. *Q.* Having been told of those two facts, Mr. Ronaldson's evidence, and the burning of this man, does that alter your mind as to the Kembla Mine being a safe mine just prior to the disaster? *A.* No, it does not.

20000. *Q.* If there is evidence on oath of various miners having reported to the deputies the ignition of fire-damp from time to time, does that alter your opinion regarding the safety of Kembla as a mine? *A.* No, it does not.
20001. *Mr. Ritchie.*] He might explain, when he speaks of Mount Kembla Mine being safe, whether he means safe at the time of his inspection, or when the disaster took place.
20002. *Mr. Lysaght.*] *Q.* Do you mean that it was safe when your inspection took place, or safe on the day of the disaster? *A.* On the day of the disaster.
20003. *Q.* And you tell me further, that the fact of various miners having reported to the deputies the existence of gas does not alter your opinion? *A.* The fact of the miners saying so. That would all depend entirely upon the quantity of gas. You have not given a quantity.
20004. *Q.* As a mining Manager, those three things do not alter your opinion regarding the safety of the mine? *A.* I do not say anything of the sort. You say that.
20005. *Q.* Then I ask you, do they alter your opinion? *A.* I told you once before that they did not alter my opinion.
20006. *Q.* Then, do they alter your opinion? [*Witness did not answer.*]
20007. *Q.* I ask you whether you, as a Manager, assert that these three things I have mentioned alter your opinion as to the safety of the mine?
20008. *Mr. Wade.*] Mr. Lysaght is not putting the question fairly to the witness; because the evidence is that the burning of the man took place fifteen years ago, and Mr. Ronaldson's evidence regarding the gas being given off was given over seven years ago; Mr. Sellers is asked as to his belief regarding the condition of the mine on the 21st of July last year. Mr. Lysaght should put the question separately.
20009. *His Honor.*] I think that if Mr. Lysaght put his questions more distinctly we should be able to get on better.

(The Commission then adjourned from 1 until 2 p m.)

AFTERNOON.

(On resuming at 2 p.m. Mr. W. R. Pratt attended to take shorthand notes of the evidence and proceedings.)

ALBERT ERNEST OSWALD SELLERS, previously sworn, was further examined, as under:—

20010. *Mr. Lysaght.*] *Q.* According to the evidence given here, that men have reported the presence of gas to the deputies within twelve months of the disaster, would you say that Kembla was a safe mine?
20011. *Mr. Wade.*] It is not in the evidence—the nearest approach is fifteen months.
20012. *Mr. Lysaght.*] *Q.* Would that alter your evidence that Kembla was a safe mine? *A.* Not altogether; it depends on the quantity of gas found.
20013. *Q.* Neither the fact of a man having been burnt by gas, nor the fact that a Manager stated seven years ago that the mine gave off gas, nor the fact that the deputies had reported gas within twelve months, would alter your opinion that it was a safe mine? *A.* No.
20014. *Q.* Now I come to the question of coal-dust. Do you agree with this statement by Donald Stuart in his work, "The Origin and Rationale of Colliery Explosions":—

> In the coal-dust that accumulates upon the floor of the mine passages, there is a peril of immense potentiality; which, once brought into action, is irresistible in its development throughout the mine, unless the temperature be broken down by wet lengths of road, or the chemical actions fail for want of oxygen.

A. I agree with that.
20015. *Q.* Do you agree with this:—

> The positiveness of this danger is disclosed in the fact that the small quantity of coal-dust necessary to a disaster is always present in roads through which coal has been conveyed.

A. I do not agree with that, because the coal-dust is not always present.
20016. *Q.* Do you agree with this statement:—

> When it is remembered that only 2 ozs. of coal-dust per square foot of floor surface was sufficient to yield the gas that caused the Camerton and Timsbury explosions, it will be recognised that there is an excessive quantity prevailing in mines, beyond the demands for the explosive phenomena under notice.

A. There are certain conditions there.
20017. *Mr. Wade.*] I ask that the witness be allowed to see the context. It was put to him as being a general principle relating to dust on roads; but it relates to shot-firing in the vicinity of dusty roads.
20018. *Mr. Lysaght.*] I am quoting from Mr. W. N. Atkinson's report in the Report of the Royal Commission on Explosions from Coal-dust. I ask the witness what he considers to be a dangerous condition in the mine?
20019. *Q.* You see it states that only 2 ozs. of coal-dust per square foot was sufficient to cause the Camerton explosion? *A.* It is under certain conditions that this is dangerous. Another set of conditions have to prevail before that condition arises.
20020. *Q.* They all affect the safety of the mine? *A.* In conjunction with other conditions you have not mentioned.
20021. *Q.* Gas is only dangerous in conjunction with air. Do you agree that 2 ozs. of coal-dust per square foot of surface is dangerous? *A.* Will you name the conditions.
20022. *Q.* Two ozs. of coal-dust and an exploded shot? *A.* I admit generally Mr. Stuart's conclusions. It may be greater or less.
20023. *Q.* You are not prepared to dispute it. *A.* I am not prepared to accept it.
20024. *Q.* Are you prepared to dispute? *A.* I am not prepared to dispute it.
20025. *Q.* Do you know whether the travelling roads at Kembla required watering? *A.* The mine did not want watering; there was too much water there for a start.
20026. *Q.* Did I ask you that—I asked you whether they wanted watering? *A.* They were watered by the natural flow of water.
20027. *Q.* Were they watered by other than the natural flow of water? *A.* Not so far as I know.
20028. *Q.* Do you know whether there was an accumulation of dust in the No. 1 main level haulage road? *A.* No.

20029.

20029. *Q.* Had such an accumulation been there, would the mine still have been safe? *A.* Yes, under the conditions I state.
20030. *Q.* Under what conditions? *A.* There being nothing to put the dust in a state of agitation to make it inflammable.
10031. *Q.* Do you assume that there was nothing to put it in a state of agitation to make it inflammable? *A.* You can put it in that way.
20032. *Q.* Your assumption assumes a condition not there? *A.* I do not say that.
20033. *Q.* You say the mine was safe if there was nothing to set the dust in motion; and now you say that something did set the dust in motion? *A.* Yes.
20034. *Q.* On your own showing the mine was dangerous? *A.* No, not before the disaster.
20035. *Q.* Not on your own theory? *A.* No.
20036. *Q.* I think, in this theory of yours, that you account for the propagation of the disaster by a series of coal-dust explosions? *A.* I did not say that.
20037. *Q.* That is what it amounted to, after the initial explosion? *A.* I do not know whether there was a series of explosions.
20038. *Q.* At least there were some explosions? *A.* I do not know whether it was singular or plural.
20039. *Q.* Then, do I understand that, in cases where men were burned, it was one continuing explosion; or was it a series of different explosions? *A.* The men subject to heat of that description may have been within the radius of one expansion of coal-dust.
20040. *Q.* Is that your opinion? *A.* It may be so.
20041. *Q.* Is that your opinion now? *A.* I say it may be so.
20042. *Q.* Do you proffer your opinion that there was a series of explosions? *A.* I do not know that I can say one thing or the other.
20043. *Q.* Do you not know that some men were burned on the top of No. 1, and that some men were burned near Powell's Flat——[*interrupted.*]
20044. *Mr. Ritchie.*] *Q.* And some in the tunnel mouth? *A.* I do not know whether they were burned.
20045. *Mr. Lysaght.*] *Q.* Do you know that the men were burnt at the back heading of No. 1, some on Powell's Flat, and some near the main tunnel? *A.* If you understand me correctly, I think there was a radiating force in the 4th Right.
20046. *Q.* I want to know whether you adhere to the opinion that an explosion in the 4th Left burnt men at Powell's Flat? *A.* I cannot say. It is a matter of conjecture.
20047. *Q.* Do you not see that it is untenable? *A.* It may be, or it may not be.
20048. *Q.* When did you adopt the theory of the fall in the goaf expelling the air? *A.* After the disaster.
20049. *Q.* Was it your own idea; or did somebody suggest it to you? *A.* It was my own idea. I had been thinking the whole thing out, and endeavouring to get the initial ignition. The theory seems tenable.
20050. *Q.* Were you in a great measure guided to this conclusion by the evidence of force which you observed? *A.* Mainly that.
20051. *Q.* And, apart from the evidences of force, what other foundation had you for the theory? *A.* To get the initial ignition there must be an igniting point.
20052. *Q.* The direction of force, and the difficulty of getting the igniting point, guided you to that theory? *A.* Yes.
20053. *Q.* Do you agree with this statement of Donald Stuart:—

> It is manifest, therefore, that the origin of the disaster cannot be discovered upon the evidences of directions of force, and that it would be working in a circle to pursue the inquiry in that direction.

A. Not altogether.
20054. *Q.* Do you disagree with it? *A.* Donald Stuart has one opinion; but there are other opinions.
20055. *Q.* Do you not see, if you cannot dispute it, that the basis upon which you have been working is unsound: *A.* Take it that Donald Stuart is right. His idea is —— [*Interrupted.*]
20056. *Q.* I am touching on his idea as a guide to the origin of the disaster? *A.* That is the sequence of another statement.
20057. *Q.* That sequence does not affect the statement? *A.* Pardon me; I have read the book.
20058. *Q.* Do you dispute it ——

> It is manifest, therefore, that the origin of the disaster cannot be discovered upon the evidences of directions of force, and that it would be working in a circle to pursue the inquiry in that direction ——

20059. *Mr. Wade.*] It refers to one disaster.
20060. *His Honor.*] Is it a reference to one disaster, or is it a general opinion?
20061. *Mr. Lysaght.*] It is a general opinion running through the whole of the book.
20062. *Q.* Give me your opinion. In coal-dust explosions do you consider the evidences of force are reliable? *A.* On certain points they are.
20063. *Q.* To what extent do they become unreliable? *A.* They are reliable after the coal-dust explosion. Donald Stuart lays it down that the explosions occur in a series, and there is a centre of disturbance. At the centre of each series he gets oxygen. At each of these initial points you have a force radiating from a different centre; and you travel from this centre and find the force going another way.
20064. *Q.* Is not that consistent with the force going in one direction? *A.* No.
20065. *Q.* Is there not a force on the track of the main explosion? *A.* I think it is a series of explosions, and that a radiation of force is made at these points.
20066. *Mr. Robertson.*] I gather that you mean that there is fresh oxygen at these points, and that, as more oxygen is developed, there is another explosion, and that the main explosion proceeds a different road with greater intensity and different force? *A.* Yes.
20067. *Q.* And the explosions will overlap one another. *A.* Yes.
20068. *Mr. Lysaght.*] *Q.* Perhaps you will tell me, if you were guided by evidences of force, what particular evidence of force directed you to No. 4 Right as the origin of the force? *A.* The main element of force. That point was a most distinct split.
20069. *Q.* Did you observe the conditions yourself, or were they furnished from maps or other sources? *A.* I saw them myself.
20070. *Q.* Did you see all the conditions? *A.* I saw all the conditions from that point forward.

20071. *Q.* I suppose you admit there were a number of evidences of force you did not see at all? *A.* I think I got on the track of the main explosion and followed it on : but I do not say that I saw them all.
20072. *Mr. Ritchie.*] *Q.* You do not quite agree with Donald Stuart on the coal-dust theory, but can you give any other authority? *A.* There is the Royal Commission on Coal-dust and Lushington's report. They have different opinions. Donald Stuart's opinion is not conclusive.
20073. *Mr. Robertson.*] *Q.* It is only one man's opinion.
20074. *Mr. Ritchie.*] *Q.* What is his authority? *A.* Donald Stuart has written some clever articles on the subject.
20075. *Mr. Robertson.*] *Q.* Is he not the only man who started the theory? *A.* I think I have seen it advanced somewhere else.
20076. *Q.* Is it not his pet theory. Is it not Donald Stuart's "own baby," so to speak? *A.* Yes, I suppose so.
20077. *Mr. Lysaght.*] *Q.* Regarding this particular point about the evidences of force being contradictory, can you give me one statement against it.—— [*Interrupted.*]
20078. *Mr. Wade.*] That is not the question you asked before.
20079. *Mr. Lysaght.*] *Q.* I ask it now. Can you name one authority who says that the evidences of force in a coal-dust explosion are not contradictory? *A.* No, I do not say that I can.
20080. *Q.* Is it not a fact that the evidences of force in the report of the Royal Commission you mention were contradictory, and that is why they are recognised? *A.* Pardon me ; I did not say so.
20081. *Q.* Can you give me no authority? *A.* I do not carry those things in my head.
20082. *Q.* Have you come to the conclusion that in a coal-dust explosion the evidences of force are contradictory? [*No answer.*]
20083. *Q.* Let me put this to you : Is it not characteristic of coal-dust explosions that the evidences of force are contradictory? *A.* Like in cases of gas explosions they are—there are some evidences that you cannot reconcile.
20084. *Q.* That being so, and you only having evidence of forces which were from the 4th Right, do I understand that it was on this evidence of force, observed only in the main level travelling road, that you based your opinion? *A.* I do not say that.
20085. *Q.* Then what did you say? *A.* I noticed all the places to the left-hand side of the jig, and also observed other places.
20086. *Q.* Do you know that at Price's Flat, which is a long way from the main level, there were seven skips blown off the rails? *A.* I saw some ; I do not know about seven.
20087. *Q.* What force did that indicate? *A.* That indicated a split on the places to the left towards these skips.
20088. *Q.* To the left of the main level? *A.* Yes.
20089. *Q.* Do you assume that the explosion travelled along the 4thLeft rope road and on to Price's Flat and upset the skips? *A.* No.
20090. *Q.* Do you say that there was an explosion in Price's Flat which blew the skips off? [*No answer.*]
20091. *Mr. Robertson.*] *Q.* Is not that what you do say. I understand you to say that the force split and that it travelled along the 4th Left and knocked off the skips? *A.* I said the force of the blast.
20092. *Q.* You mean the force itself ; but what you say is that the heat did not reach that point? *A.* Yes.
20093. *His Honor.*] Has Mr. Sellers spoken of one original blast ; or is he acting on the assumption that there was a second coal-dust explosion lit by the blast.
20094. *The Witness.*] You are assuming something which I did not say.
20095. *Mr. Lysaght.*] *Q.* I am not assuming anything. What do you say? *A.* I do not think there was any explosion at the flat. The skips were tumbled in that direction by the air displaced by the explosion.
20096. *Mr. Ritchie.*] *Q.* Can you account for the fact, that if the explosion took place at the main heading, the force all went to the left and did not get to the right? *A.* The absence of dust on the right road.
20097. *Mr. Robertson.*] *Q.* We have had it in evidence that that was a dusty part of the mine? *A.* The dust may not have been so inflammable as the other.
20098. *Q.* Would a wooden door interrupt it? *A.* I cannot understand why the door was not broken.
20099. *Q.* It was broken out altogether? *A.* I mean destroyed completely.
20100. *Mr. Ritchie.*] *Q.* Your reason is that the force did not go up the 5th Right because the dust was not so highly explosive? *A.* I should say that that may be the reason.
20101. *Mr. Lysaght.*] *Q.* Do you not know that a wooden door opposite the 5th Right was blown towards No. 1 main level and not towards the travelling road? *A.* I do not know.
20102. *Mr. Wade.*] That is not the evidence.
20103. *Mr. Robertson.*] I tried to put that matter right. My idea was that the door was left open. I found it open myself, and left it open.
20104. *Mr. Lysaght.*] *Q.* Mr. Robertson found the door open towards the No. 1 main level.
20105. *Mr Robertson.*] No ; I found it open ; but I cannot say which way.
20106. *Mr. Lysaght.*] *Q.* Take the stoppings in the two cut-throughs above the 5th Right. Do you know that these stoppings were blown towards No. 1 main level, and not towards the travelling road? *A.* I lost my notes about the stoppings. I do not know.
20107. *Q.* You had your notes—or did you not have your notes—on these two points when you came to the conclusion you did? *A.* I lost my notes subsequent to coming to the conclusion I did.
20108. *Q.* The absence of your notes will not bear on the soundness of your conclusions? *A.* No, I had them at the time.
20109. *Q.* Having your notes on that matter, did they say in which direction the stoppings were blown? *A.* I do not know ; I have lost my notes.
20110. *Q.* If you came to your conclusion, with a knowledge of the way they were blown, surely your conclusion will enable you to say which way they were blown? [*No answer.*]
20111. *His Honor.*] Mr. Sellers says that he has no recollection about them.
20112. *Mr. Bruce Smith.*] If he consulted his notes as to which way they were blown, that ought to help him to arrive at a conclusion.
20113. *Mr. Robertson.*] He may have come to a conclusion without having looked at them at all.
20114. *The Witness.*] I cannot recollect which way they were blown.

20115. *Mr. Lysaght.*] *Q.* Do you regard the way in which the stoppings were blown as being material? *A.* To some extent.
20116. *Q.* Can you tell me in which direction any stoppings were blown in that mine? *A.* Yes.
20117. *Q.* Can you tell me in what direction the stoppings were blown on the 4th Left rope road? *A.* I cannot remember. It is a road that goes off to the left short of the 5th Right.
20118. *Mr. Robertson.*] Were there any stoppings there at all?
20119. *Mr. Lysaght.*] I wanted to see what the witness said.
20120. *Q.* Coming back to where the skips were blown off the rails, and to the place where ten dead men were found? *A.* Yes.
20121. *Q.* Did you notice whether any of them were burnt? *A.* They were found on the flats.
20122. *Q.* If it were a split of the main explosion, travelling along the 4th Left, then it was that split of the force which burned these men? *A.* One man who died there worked at Stafford's Flat. I found him sitting down quite naturally.
20123. *Q.* If the explosion travelled along there, from the split of the main explosion, was it not that split that burned that man. *A.* I do not think the man was burned. There was a piece of skin off one arm—he may have been burned or not.
20124. *Q.* Did you notice evidences of burning? *A.* No; he was blackened; but the other men had not any marks on them.
20125. *Q.* Did you come to this conclusion of yours after or before the inspection of the month of September? *A.* Before the September inspection.
20126. *Q.* Well, then, you had only been in the mine on the night of the disaster and once afterwards? *A.* No.
20127. *Q.* How often afterwards? *A.* Five times.
20128. *Q.* On five different days? *A.* At five different times.
20129. *Q.* I understand you to say that you went into the mine on the day of the disaster; that your foot was injured, and that you went in the next day? *A.* On the Monday and on the following day—on five days.
20130. *Q.* On the Thursday, Friday, and Saturday, you were with the rescue parties? *A.* With my eyes open for other things as well.
20131. *Q.* Did you on the Thursday, Friday, or Saturday, take any notes in writing? *A.* No.
20132. *Q.* On the Monday did you? *A.* Yes.
20133. *Q.* On the Tuesday? *A.* I would not be sure on the Monday and the Tuesday. I know that at the inspection on the Monday following I took notes.
20134. *Q.* Leaving out the Thursday, Friday, and Saturday, you took no notes on the Monday and the Tuesday? *A.* I inspected again.
20135. *Q.* When? *A.* In September.
20136. *Q.* You had formed your conclusion by then? *A* Yes.
20137. *Q.* So on the Monday and the Tuesday you took notes in writing? *A.* Yes.
20138. *Q.* After that Tuesday, right on to September, you made no inspection? *A.* I went there later on in August.
20139. *Q.* You were there on the Thursday, Friday, and Saturday, and took no notes? *A.* No, not written notes.
20140. *Q.* On the Monday and the Tuesday you were there and took notes? *A.* Not on the Tuesday following the disaster.
20141. *Q.* Were they not the only occasions you were there until September? *A.* Yes.
20142. *Q.* That is all the days you took notes in writing. When did you lose them? *A.* I lost them in the process of shifting.
20143. *Q.* When? *A.* At the end of last year.
20144. *Q.* After taking two days' notes you formed a conclusion? *A.* No; that was too bald. When I was in the mine I had my eyes open.
20145. *Q.* I am only speaking of the notes in writing? *A.* Yes, I took notes on those two days.
20146. *Q.* On those two days were you not travelling in a different part of the mine from the main level? *A.* No.
20147. *Q.* Did Mr. Jones accompany you? *A.* He was with me once.
20148. *Q.* Did you not travel in this way: you entered at the daylight heading, went across the cross-cut heading, and up the 5th Right rope road? *A.* There is something I forgot about this. I was there one day, but I have not remembered. I went in at the tunnel mouth and out that road.
20149. *Q.* You forgot it? *A.* I was sent there to conduct someone to show them the results of the explosion.
20150. *Q.* Up to this moment you had forgotten it? *A.* I forgot it.
20151. *Q.* At that time was young Mr. Vickery with you? *A.* No.
20152. *Q.* Do you remember seeing him? *A.* No.
20153. *Q.* Were you with Mr. Jones and Mr. Vickery? *A.* I was not there at any time with Mr. Vickery.
20154. *Q.* Having formed this conclusion, have you discussed it with other mining persons? *A.* Yes.
20155. *Q.* Have you discussed it with Mr. J. C. Jones? *A.* I think, at the initial part of the thing, that I saw Mr. Jones about this theory.
20156. *Q.* Did you discuss it? *A.* I showed him some of these things.
20157. *Q.* Anybody else? *A.* I have talked about it to Mr. Thomas Cook, and to Mr. Robertson, and Dr. Robertson.
20158. *Mr. Robertson.*] Pardon me.
20159. *Witness.*] The last time I met you at Corrimal.
20160. *Mr. Robertson.*] *Q.* Not about the theory? *A.* I was talking about coal-dust.
20161. *Q.* You may have discussed the Kembla explosion; but the first I knew about this theory was at this Court? *A.* I spoke to you about the coal-dust.
20162. *Mr. Lysaght.*] *Q.* Before last September you had adopted this theory—that the fall in the goaf forced out air—that that raised a high temperature—and that the dust became ignited? *A.* Yes.
20163. *Q.* Did you consider the proposition which His Honor put to you this morning, that the fall of that roof would have an opposing force below it? *A.* I considered that, and still advance the theory.

20164. *Q.* Do you not see that it would negative the assumption that the fall would be at the rate you say it fell? *A.* No.
20165. *Q.* Can you tell me at what rate a solid body will fall? *A.* At the rate of so many feet per second, and a gradual increase.
20166. *Q.* What is the rate? *A.* Sixteen feet for the first second; and it goes on increasing. I forget the application of the rule.
20167. *Q.* Does not your theory assume that there were 4 feet 6 inches of atmosphere in the goaf? *A.* Yes.
20168. *Q.* And the weight of the strata falling would be in proportion to its thickness? *A.* No, according to the distance it fell.
20169. *Q.* The weight would be in proportion to its area? *A.* Yes.
20170. *Q.* Assuming there was 4 feet 6 inches of a fall? *A.* Yes.
20171. *Q.* And the width of the strata was 4 feet 6 inches—I mean thick—and it had to fall 4 feet 6 inches? *A.* Yes.
20172. *Q.* Well, what do you think was the thickness? *A.* It might be some feet.
20173. *Q.* What did you assume? *A.* I did not go into it like that.
20174. *Q.* Will you not say that if it were only 6 or 8 inches thick there would not be sufficient pressure to force out the air? *A.* No; there would not, if you assume that.
20175. *Q.* What is the thickness that would be required to force out the air? *A.* You want thickness, and also to get it to fall freely.
20176. *Q.* What would you say? *A.* I would say about 6 feet.
20177. *Q.* You think that is a fair assumption?
20178. *Mr. Wade.*] Does the witness know what you are talking about?
20179. *Mr. Lysaght.*] *Q.* I am talking about the thickness of the strata that fell down and forced out this rush of air. You say that it was essential that it should be 4 feet or 6 feet thick? *A.* We are assuming that.
20180. *Q.* You could not get the rush of air unless you had it? *A* I never considered that aspect of the question.
20181. *Q.* You never considered the thickness of the strata which would be necessary to get the pressure? *A.* Not particularly.
20182. *Q.* Do you not know that an inspection of the goaf edges discloses the fact that the fall was not completed until after the explosion, because the stone was clean? *A.* That may be so.
20183. *Q.* If the stone fell before, it would be covered with dust; but the evidence was that it was clean? *A.* I did not say that it all fell before the explosion.
20184. *Q.* Do you say that the fall was not completed at the time of the explosion? *A.* It is possible it might not be.
20185. *Q.* Do you admit that the stone at the goaf edges might fall afterwards? *A.* That does not follow.
20186. *Q.* Do you not know that the stone at the edge of the goaf was found to be clean, indicating that it fell afterwards? *A.* No.
20187. *Q.* Did you look to see? *A.* I did.
20188. *Q.* Did you examine the stone? *A.* It was fairly clean—it was not dirty.
20189. *Q.* The stone was admitted by Mr. Atkinson to be clean—do you know that the stone at the goaf edge was clean? *A.* It may have been clean.
20190. *Q.* Does that not indicate that the fall had not been completed before the explosion? *A.* It does indicate that to some extent.
20191. *Q.* That being so, what becomes of your fall of 4 feet 6 inches? *A.* It is covered over by a later fall.
20192. *Q.* Do you not know that a week before the disaster 2 feet 6 inches had already fallen? *A.* No.
20193. *Q.* Did you hear it? *A.* No.
20194. *Q.* Do I understand that you base your theory on certain things, without knowing that a week before the disaster 2 feet 6 inches of that roof had fallen in that goaf? *A.* I did not know that.
20195. *Q.* Now that you do know it, does that alter your theory? *A.* Not materially.
20196. *Mr. Bruce Smith.*] I thought the witness knew it before.
20197. *Witness.*] I have known it since I was told this morning.
20198. *Mr. Lysaght.*] When you formulated your theory, did you not know that the roof had fallen? *A.* I did not know of the fall of 2 feet 6 inches.
20199. *Q.* Do you know that, when the men took out the pillars within 4 yards of the 4th Right, they had to timber the place up to keep the roof from falling in on them in small pieces? *A.* No, I did not know.
20200. *Q.* Do you know that, within 20 yards of the entrance of the 4th Right goaf, the waste had fallen almost solidly and settled down, with the exception of some pillars that had to be taken out? *A.* No.
20201. *Q.* From where did you get your area of 40 yards to fall? *A.* In conversation with Morrison.
20202. *Q.* When did he tell you? *A.* Some day after the explosion.
20203. *Q.* Do you not know that Morrison admitted that he had never got beyond the edge of the goaf.
20204. *Mr. Wade.*] Morrison said that on one side there was a length of 40 yards, and on the other a length of 30 yards, which had fallen.
20205. *His Honor.*] He said that 40 yards fell; but he could not say how much had fallen altogether. It was hard to make out how far he got in the goaf; but he did not get in any appreciable distance.
20206. *Mr. Wade.*] It was a play on words. He was asked if he went into the goaf. That meant the middle of the goaf; and he said no. And he was told afterwards that he had not done his duty by not going to the edge of the goaf and examining it.
20207. *Mr. Lysaght.*] *Q.* You say that a body would fall 16 feet in a second of time? *A.* Yes.
20208. *Q.* Of course, the first part of that fall of 16 feet would be slower than the last part? *A.* Yes.
20209. *Mr. Robertson.*] If it takes a second for 16 feet, how do you arrive at half a second for 4 feet 6 inches? *A.* The time is equal to the square root of the space fallen divided by 16·1.
20210. *Q.* If it takes a second for 16 feet, what does it take for 4 feet 6 inches? *A.* I worked it out according to the formula. It accelerates in speed as it falls.
20211. *Q.* It falls 16 feet in the first second? *A.* Yes.
20212. *Q.* How can you possibly arrive at half a second for 4 feet 6 inches? *A.* By working the formula? The formula is, that the time equals the square root of the space fallen divided by 16·1.
20213. *Q.* You may be right; but at first blush it does not appear so? *A.* Yes. 20214.

20214. *Mr. Ritchie.*] *Q.* Do you say Morrison, who gave you the particulars of the fall, did not give you information of previous falls? *A.* I spoke to him and asked him what the area was that had fallen; and he told me.
20215. *Q.* He did not tell you that 2 feet 6 inches had previously fallen? *A.* No.
20216. *Q.* You base your calculation on the fact of that fall not having taken place; and you include the dust which was operated on by that fall? *A.* Yes.
20217. *Q.* Then you would not have so much dust for the subsequent fall to operate on? *A.* Not so much; but it takes so very little dust to be operated on.
20218. *Q.* If the first fall would take away half the dust, where would the other dust come from? *A.* You have it in the mine.
20219. *Q.* Whereabouts? *A.* In the mine there is the coal debris on the orifice of discharge, and there is the matter wiped up by the discharge.
20220. *Q.* I think it would have had a material effect in altering your opinion if you knew that the first fall had taken place? *A.* I do not want to mislead anyone. I think there was a commencement of force at the 4th Right. One theory presupposes that it was lit by a light, but where is the evidence of a light. That force would blow out any light.
20221. *Q.* Your theory presupposes that you have dust to operate upon? *A.* But it takes such a small quantity of dust.
20222. *Q.* If you have had other evidence here as to what the facts are, there is no harm in altering your opinion if you are wrong? *A.* There is no doubt about the matter in my mind.
20223. *Mr. Lysaght.*] *Q.* When you were told by Morrison that there were 40 square yards to fall, do you not at once assume that that 40 yards fell in a solid body? *A.* That is the assumption.
20224. *Q.* It is an assumption which your theory depends upon mainly. Is it not well known in mining experience that after the first fall the subsequent falls are smaller as a rule, and do not fall in a solid body? *A.* I cannot say that that is my experience.
20225. *Q.* Take the roof at Kembla—would not the first fall probably be heavier than any subsequent fall? *A.* No: in mining falls we often get the lighter fall to commence with.
20226. *Q.* Do you not assume that there would be one big solid fall? *A.* Yes.
20227. *Q.* Now you know that there was not one big solid fall the first time, but a fall of 2 feet 6 inches. Are you not led to the conclusion that none of the falls would be much greater? *A.* No, I am not led to that conclusion at all.
20228. *Q.* And that the roof would be more likely to crumble away after the first fall? *A.* No.
20229. *Q.* You think that after the first fall other falls would be heavier? *A.* No, I do not say so.
20230. *Q.* What do you mean—that it may be as heavy as the first fall or heavier? *A.* It is hard to say.
20231. *Q.* Did you not say that you expected the roof to fall in a solid block? *A.* Yes.
20232. *Q.* You expected that? *A.* I meant a solid block horizontally, not in thickness.
20233. *Q.* Not in thickness? *A.* No.
20234. *Q.* The thickness may vary from 2 inches to 20 feet? *A.* It may be anything at all.
20235. *Q.* You assume that the thickness was 2 ft. 6 in.? *A.* Yes.
20236. *Mr. Wade.*] *Q.* The thickness of what? *A.* I mean the distance it fell was 4 ft. 6 in.
20237. *Mr. Lysaght.*] *Q.* I put it to you again. Does not your theory assume that the fall which drove out this air, and created this temperature, was 4 ft. 6 in. in the thickness of the strata? *A.* I do not say that. I say you may assume that thickness.
20238. *Q.* Well, we have assumed? *A.* It is not good badgering me like this.
20239. *Q.* I am not badgering you. You said that the strata which fell was 4 ft. 6 in. thick? *A.* That is right.
20240. *Q.* In order to get the temperature raised, is it not necessary to assume that the thickness of the falling body was 4 ft. 6 in.? *A.* As long as the body falling was thick enough to cause displacement of the air, that would be thick enough for the purpose.
20241. *His Honor.*] Did not Mr. Sellers assume that the weight of the falling body was so great that the factor of retardation by compression of the air might be left out. Did he not calculate it as being a fall in vacuo.
20242. *Mr. Lysaght.*] He said that he had considered it as a factor, and that the air would have an opposing pressure to the fall.
20243. *Mr. Robertson.*] *Q.* In an air compressor, unless you have some power at the back of the piston you cannot have any pressure of the air in front? *A.* That is right.
20244. *Q.* Unless you had some weight in this 4th Right you could not get any pressure there? *A.* That is perfectly true.
20245. *Q.* You must have the weight—the equivalent of the force behind the piston? *A.* Yes.
20246. *Q.* You must assume a certain weight of strata to give the power necessary to produce the pressure of the air in the orifice? *A.* Yes.
20247. *Mr. Lysaght.*] *Q.* What weight do you assume—what is the thickness of the strata? *A.* This morning I said 4 ft. 6 in.
20248. *Q.* Then it is right that you consider 4 ft. 6 in. sufficient *A.* I cannot understand this question.
20249. *His Honor.*] *Q.* Did you not make a calculation on the assumption that the roof fell at a rate which is consistent with the formula you stated? *A.* Yes.
20250. *Q.* Do you not know that the formula is calculated on the assumption of a fall in vacuo? *A.* Yes.
20251. *Q.* Then this is not a fall in vacuo—that does not apply if there is resistance by the force underneath? *A.* I assume that the roof that did fall would be sufficient to leave out force underneath altogether.
20252. *Q.* You assume that the weight was so great that, although the force underneath could not be actually eliminated as a factor, it might be left out altogether in making the calculation? *A.* Practically speaking that is so.
20253. *Mr. Robertson.*] *Q.* Coming to the illustration of the air compressor. Is it not a fact that the steam pressure is usually greater than the air pressure—or that the area of the steam piston is greater than the area of the air piston? *A.* That is to get the movement.
20254. *Q.* To obtain a pressure of 36 lbs. in that orifice, what thickness would you require? [*No answer.*]
20255. *Q.* Every foot would be a pound, roughly? *A.* Yes.

20256. *Q.* With one pound to the foot, how many feet do you want to produce your pressure of 36 lbs. ? With only 4 ft. 6 in. of strata you would only have 4½ lbs. per foot? *A.* You said just now that the greater you make the steam piston in relation to the air piston you get a larger amount of pressure.
20257. *Q.* In the air compressor, to get 36 lbs. at the end of the stroke, you have to have more than 36 lbs. of steam pressure? *A.* Yes; you have to have sufficient power to cause action.
20258. *Mr. Lysaght.*] *Q.* With the roof of the goaf standing, there would be an atmospheric pressure under it of 15 lbs. to the square inch? *A.* It would be over it at the top and bottom as well.
20259. *Q.* Does it not follow that you must have a pressure superior to 15 lbs. for every square inch? *A.* What do you mean.
20260. *Q.* With 15 lbs. to the square inch of pressure on the roof, you must have a margin in the weight falling over that 15 lbs. for every squre inch that falls?—— [*Interrupted.*]
20261. *Mr. Robertson.*] I do not follow that question.
20262. *Mr. Lysaght.*] *Q.* I say that it requires more that 15 lbs. weight of opposition to neutralise the 15 lbs. of air pressure? *A.* I think you can leave the factor of the atmospheric pressure out.
20263. *Q.* As you do? *A.* Not as I do. First of all you have the mass of rock hanging. A rupture takes place, the atmospheric pressure acts over the whole of the mass that begins to fall.
20264. *Q.* It acts on one part of the mass only, until there is sufficient space to operate on the other part. *A.* You only want a crack in the rock.
20265. *Q.* Directly it splits it begins to fall? *A.* Because the air gets in.
20266. *Q.* The distance which it would fall was only 4 ft. 6 in. The impetus it would get from the atmospheric air would be nothing? *A.* I never said anything about the impetus from atmospheric air.
20267. *Q.* We can leave that out of consideration? *A.* Not altogether.
20268. *Q.* Do you say the air gives it an impetus? *A.* No; but the air is present.
20269. *Q.* In what way would the air affect it? *A.* The assistance it gets from the atmospheric air is a large quantity.
20270. *Mr. Ritchie.*] *Q.* Do I understand that when the mass was falling the atmospheric air was on top of the fall? *A.* What I say is that, immediately it gets to falling point, the power of the strain below is discounted by the atmospheric pressure above it.
20271. *Q.* Where does the air come from? *A.* Which air?
20272. *Q.* The air you have at the top of the falling mass? *A.* It may be the air in the goaf.
20273. *Q.* What do you say it was? *A.* I was not there to see it.
20274. *Mr. Lysaght.*] *Q.* You have already driven all the air out and have left none to get out of the goaf? [*No answer.*]
20275. *His Honor.*] The tendency in a case of that kind is for the propulsion of the air to be followed by a back-lash into the partial vacaum formed.
20276. *Mr. Robertson.*] And the air rushes into a vacuum very quickly.
20277. *His Honor.*] There is usually a little time.
20278. *Mr. Bruce Smith.*] Assuming that the whole thing comes down *en bloc* there is no space of time.
20279. *Mr. Lysaght.*] *Q.* After the air got past the aperture of the 4th Right, towards the main level, would not the space be filled by suction in the 4th Right? *A.* No.
20280. *Q.* Would not the suction sweep back from the 4th Right? *A.* The impression which you give is an erroneous one. You do not understand the argument.
20281. *Q.* And I do not think you do, either. *A.* The calculations do not depend on the question of the air displaced. There is a fall; and there is a displacement of some air—— [*Interrupted*].
20282. *Q.* How does that affect the "back-lash" that I was speaking of? *A.* What back-lash. I have allowed for that.
20283. *Q.* You say that it was 50 per cent. of the air which was forced out by the fall in the direction of the 4th Right, and that 50 per cent was calculated as the back lash.—This is what you said this morning;

"You say the element of speculation will come in, and you are assuming that a certain amount of air will escape into the goaf and not be driven out? *A.* Exactly.

"*Q.* What allowance do you make for that possibility? *A.* Fifty per cent. of the whole."

A. That covers the back-lash.
20284. *Q.* It has nothing to do with the 50 per cent., because that never got out. The allowance you made was for air that did not leave the goaf? *A.* No.
20285. *Q.* You want to change it now? *A.* There was a certain amount of air displaced by this fall, of that I allowed 50 per cent. to be driven out, and the other 50 per cent. to provide for the other cases. The other 50 per cent. covers the back-lash.
20286. *His Honor.*] You are assuming that the air was absolutely driven out of a certain space without leaving a substitute equal to that space, so that there was an absolute vacuum according to your assumption. You have 50 per cent of air driven out in one direction, and 50 per cent. in another direction, so that there is 50 per cent of back-lash wanting? *A.* I do not see it.
20287. *Mr. Lysaght.*] *Q.* Now, just tell me what evidence you had to entitle you to assume that the roof fell 4 feet 6 inches, so far as thickness is concerned? *A.* It is just speculation.
20288. *Q.* What did you base it on? *A.* The whole thing is speculative.
20289. *Q.* Is it not wildly speculative? *A.* No.
20290. *Q.* In view of the fact that the first fall was 2 feet 6 inches, is it not wildly speculative to assume that the next fall was 4 feet 6 inches? *A.* I do not say so. It was simply ordinary speculation.
20291. *Q.* Do I not understand you to say that in your opinion fire-damp had no part in the explosion at any time? *A.* That is my opinion.
20292. *Q.* Do you know that 2½ per cent. was discovered by the Chief Inspector in the back headings? *A.* At what time?
20293. *Q.* Shortly after the explosion? *A.* After the explosion is different altogether.
20294. *Q.* I think you accounted for that by saying that you believed it resulted from the coal dust? *A.* It was a disarrangement of the coal—— [*Interrupted.*]
20295. *Q.* I am speaking of the gas found by the Chief Inspector at Morrison's heading. You know that the Chief Inspector, two or three days after the disaster, found an accumulation of gas with the safety-lamp at the top of this heading? *A.* I heard so.

20296. *Q.* Do you say that gas was given off from the face of the coal, or that it was an accumulation by reason of the explosion of the coal-dust? I should think that it was due to the great heat going on in the mine after the explosion distilling the gas under the seam.
20297. *Q.* Does not your assumption that the dust exploded necessarily assume that there was gas in the coal from which that dust came? *A.* Yes.
20298. *Q.* Does it not assume that the coal seam was a gaseous seam——
20299. *Mr. Robertson.*] You can find coal-gas without finding pit-gas.
20300. *Mr. Lysaght.*] I know the distinction.
20301. *Q.* You assume that the heat that might burn a man came from the explosion of the coal-dust—would not that be an explanation of the gaseous matter thrown off by the coal-dust? *A.* Some portion of it might be, but not all of it.
20302. *Q.* Did I say all? *A.* No.
20303. *Mr. Robertson.*] *Q.* You do not say that it is gas that might be got by distillation. There is a difference between occluded gases and other gases? *A.* I mean that the coal when subjected to great heat would give off gas.
20304. *Q.* The gas found, after chemical process, in combination with the coal is not the same gas as is given off by the coal in the mine? *A.* No; there is a difference in the composition of them.
20305. *Q.* Do you mean that the gas which accumulated in the mine was gas set up by chemical combinations or distilled by great heat? *A.* It might be the latter.
20306. *Q.* It was the occluded gas in the coal? *A.* Speaking broadly there was great heat, and the gas was distilled; the operation set at liberty certain gases; and the gases rose by gravity to the highest parts.
20307. *Mr. Robertson.*] *Q.* Do I understand you to say that the dust contained fire-damp? *A.* I do not say that; but there are certain hydro-carbons.
20308. *Q.* Chemically bound together? *A.* Yes.
20309. *Mr. Lysaght.*] *Q.* I put it to him that his theory is that the seam was one which gave off gas. I now draw his attention to the following extract from Donald Stuart:

> There was already at hand, in the coal-dust lying upon the passages of the mine, a practically unlimited supply of gaseous educts capable of giving rise to an explosion. These educts were obtained by processes which were originated by the surplus heat of an ordinary charge of explosive, or by the heat generated in the ignition of a body of fire-damp; and, when the activities were initiated, they carried destruction and death into the workings where oxygen was available, and there were no wet spaces to break down the temperature.

That is what you want to convey as to the way the gas exploded? *A.* Yes.
20310. *Q.* There is no suggestion here that it was heat from compressed air, but heat generated in the ignition of a body of fire-damp or the surplus heat of an explosive? *A.* I do not say there was no heat.
20311. *Q.* You assume that the heat arose from the propulsion of the air from the goaf? *A.* Yes.
20312. *Q.* The only authority is for heat from two causes—the surplus heat of an ordinary charge of explosive, or heat by the ignition of fire-damp; and the coal-dust theory is not carried beyond that? *A.* Bedson has demonstrated that gas can be obtained from coal-dust simply by heat.
20313. *Q.* When I asked you about the gas from the dust I wanted to see how you accounted for the Chief Inspector finding 2½ per cent. of fire damp in those headings? *A.* It might be the unconsumed gas from the explosion.
20314. *Q.* The unconsumed gas from the dust? *A.* No.
20315. *Q.* You say that it is fire damp that comes from the coal, do you not ——[*Interrupted.*]
20316. *Mr. Robertson.*] *Q.* You may have a coal seam which gives off no fire-damp; and yet you may have an explosion of dust from that coal seam which produces fire-damp? *A.* Not exactly.
20317. *Q.* Is not that so? *A.* The Camerton case was a similar case. That was an explosion in a mine where gas was never found.
20318. *Q.* You may have an explosion of fire-damp, and an explosion of coal-dust, producing gases which are practically fire damp? *A.* Yes, the gas has the same qualities.
20319. *Q.* You may get fire damp from an explosion of dust from a seam in which there is no fire-damp? *A.* Yes.
20320. *Mr. Lysaght*] Does the witness say that the percentage of fire damp was the result of an explosion of coal-dust. If so, then it came from the coal-dust. If it did not come from the coal-dust, where did it come from?
20321. *Mr. Robertson.*] You reason from this that the coal was gaseous?
20322. *Mr. Lysaght.*] Not gaseous.
20323. *Mr. Wade*] You put it to him that way just now.
20324. *Mr. Lysaght.*] *Q.* Do you not see that, fire-damp being found at the top heading, I want to know where, in your opinion, it came from? *A.* I cannot tell you. It may be the unconsumed gases of the coal dust.
20325. *Q.* Is that your assumption concerning the gas that was found in those headings three days afterwards?
20326. *Mr. Wade.*] The evidence is four days afterwards.
20327. *Mr. Lysaght* | *Q.* Would the gas found four days afterwards be gas which might have come from the coal dust? *A.* Yes.
20328. *Q.* Would it not have been consumed in the explosion? *A.* Not necessarily.
20329. *Q.* There may have been imperfect combustion? *A.* Yes.
20330. *Q.* Because of the result of imperfect compustion, it may have accumulated? *A.* Yes.
23331. *Q.* Do you not know that the current of air sweeping to the back heading was interrupted, and there was nothing to sweep it there? *A.* It does not require a current of air to sweep it there, because gas arrives by its own gravity to the highest place.
20332. *Q.* Is it not more probable that the gas found at the top heading, extending to the face, was given off by the face of the coal and did not come from the dust? *A.* Not at all.
20333. *Q.* Did you not find it not only there, but all along the faces of these headings ——
20334. *Mr. Wade.*] There is no evidence of that.
20335. *Mr. Lysaght.*] *Q.* How long afterwards did you know that gas was found there? *A.* I never heard of it.
20336. *Q.* Would it alter your opinion? *A.* I would not alter my opinion on hearsay evidence.

20337. *Q.* Do you say that the gas found in the top heading came from the coal dust? *A.* What top heading? I do not know where that gas came from.
20338. *Q.* Mr. Atkinson found various percentages of gas under 2 per cent. in these headings, shortly after the disaster. I want to know, in your opinion, did the gas come from the coal-dust, or from the heading. The headings are to the left of No. 1 main level? *A.* I think it is possible that the gas came from the headings.
20339. *Q.* Do you know that a witness gave evidence of gas being found in No. 1 main level? *A.* Some distance away.
20340. *Q.* Yes? *A.* I did not know that.
20341. *Mr. Wade.*] That was in James' heading, half a mile away.
20342. *Mr. Lysaght.*] I am speaking about Smith, who was taking up stone on the 4th Left.
20343. *Mr. Ritchie.*] *Q.* On the question of distilling gas—is there any way of distinguishing gas given from the coal by heat from gas given off naturally? *A.* Some of the gases, in my opinion, are similar in that respect. For instance, the caps are the same; and the pure gases are supposed to have no smell.
20344. *Q.* Gas distilled from coal does have a smell? *A.* I do not know in what degree.
20345. *Q.* If you light gas distilled from coal, does that have a smell? *A.* I never lit it. I have read about it.
20346. *Q.* You told us you discovered gas yourself after the disaster. Did you notice if it smelt? *A.* No, I did not notice it. There were a lot of dead horses about; and they may have affected my sense of smell.
20347. *Q.* Did it differ from gas you found elsewhere? *A.* No.
20348. *Q.* You could not notice anything by the smell or the flame? *A.* No.
20349. *Mr. Robertson.*] Whether the gas is given off from the coal naturally or by being distilled, there is not smell? *A.* No.
20350. *Q.* Is it due to the presence of other elements? *A.* Some other elements may be present in it.
20351. *Q.* Whether you find it issuing from the coal or getting it through distillation, it has no smell? *A.* No.
20352. *Mr. Lysaght.*] *Q.* Just let me bring your mind back to the brattice that was burnt at the top heading? *Q.* Which heading?
20353. *Q.* At the top heading No. 1? *A.* That is the back heading.
20354. *Q.* You accounted for that being burnt by the intense heat which would be there, and not by flame? *A.* We had a difference of opinion about the matter of heat. I did not think it was flame. I think flame would have consumed it more.
20355. *Q.* Whatever it was, it was intense heat? *A.* Yes.
20356. *Q.* The same intense heat which would operate on the coal-dust and explode it? *A.* It would operate on the coal-dust and distil it.
20357. *Q.* Do you know that the dust taken from the same place, and sent for analysis, showed that the volatile matter had not been distilled? *A.* I did not know that.
20358. *Q.* If it showed that the volatile matter had not been distilled, does it not negative your theory that there was sufficient heat to distil it? *A.* It depends where you got the dust from.
20359. *Q.* From the back heading—from Morris' place, inbye ——
20360. *Mr. Robertson.*] *Q.* Just at the spot where the brattice is burnt? *A.* It does not affect my theory very much. Some of the dust may have been damp.
20361. *Mr. Lysaght.*] *Q.* If there were sufficient heat to scorch the brattice, there must have been sufficient to distil the volatile matter in the dust? *A.* That does not follow.
20362. *Q.* Is not your theory based on the distillation of the volatile matter? *A.* Not the whole of it.
20363. *Q.* Do you know that the analyst says that there was very little difference in the amount of volatile matter found in it, and the dust naturally ——[*No answer.*]
20364. *Mr. Robertson.*] Mr. Sellers may not understand that the dust sent for analysis was supposed to be coked. It was scraped off. But it was found to be practically unchanged, by the analyst? *A.* It was, as I described it yesterday, melted.
20365. *Q.* Pasted together? *A.* I called it melted dust.
20366. *Mr. Lysaght.*] *Q.* If the dust is found upon analysis, and also upon microscopical examination, to be unchanged, is that consistent with a coal-dust explosion? *A.* I do not see that it is inconsistent with it.
20367. *Q.* Surely you admit that, to bring about a coal-dust explosion, you must have the volatile matters driven off from the dust? *A.* To a certain degree; but not necessarily the whole of them.
20368. *Q.* Partially? *A.* You mean that, if some of the dust had been subjected to a greater temperature than other portions of it, it would not be altered. Some of the dust was only heated or melted; but it was not in such a state as to make the carbon volatile.
20369. *Q.* Would you not expect some of the chemical composition of the dust to be changed? *A.* Yes.
20370. *Q.* So far, the examinations made microscopically and analytically show that it is unchanged? *A.* Does all the dust tested show this characteristic?
20371. *Q.* Yes? *A.* One must not forget that this coal-dust contains, relative to its weight, a large percentage of volatile carbon; if you lose a percentage of that there is the difference in the amount of gas.
20372. *Mr. Bruce Smith.*] Four per cent. is the volatile proportion (of volatile hydrocarbons that may appear to have been lost).
20373. *Mr. Robertson.*] We have had dust analysed and found 24 per cent. (volatile hydrocarbons). The volatile matter in the coke-dust is 23· something.
20374. *Witness.*] There are portions of the coal seam which are more friable than other portions of the seam. These bands contain a higher percentage of volatile matter. They are the bright bands, and they contain more volatile matter than the darker seams. If you have taken dust from portions of the whole of the seams of the mine, then you have not taken a fair proportion of that part of that seam in which there is the most dust.
20375. *Mr. Robertson.*] *Q.* We presume that there is a fair proportion? *A.* There are certain layers that yield a higher proportion of dust than others.
20376. *Q.* You say that some of the bands contain more bituminous matter? *A.* Yes, if you analyse those bituminous bands, and they yield 40 per cent. of volatile carbons, there is no paradox.

20377. *Q.* Then some of the dust from the seams contain more bituminous matter and some less? *A.* Coal of the lowest specific gravity, which is the most bituminous, may make the most dust.
20378. *Q.* Would you not expect to find, after the explosion, a considerable change in the chemical constituents of the dust? *A.* I would really expect to find a considerable change.
20379. *Mr. Ritchie.*] *Q.* The samples of coal, in its natural state, came from the same sections as the dust? *A.* Some of the coal is stratified in different layers. It is the bright material from which you get most dust; the proof is that on the timbers the dust is very bright, and it is soft and highly bituminous. I think that it would yield a higher proportion of volatile hydrocarbons than dust from the other coal.
20380. *Q.* You mean that if you take coal out of another part of the seam, and take samples from it, you get less hydrocarbons? *A.* Yes.
20381. *Mr. Bruce Smith.*] Mr. Hamlet took constituent parts of the whole of the seams; if he had taken particular portions of the dust it would have brought out a different average.
20382. *Witness.*] Different portions of the seam are more friable than others, and they crumble more easily. It may be that the bulk of the dust in the mine is from those seams; if that is so, it has an important bearing on Mr. Hamlet's analysis.
20383. *Mr. Bruce Smith.*] Just so.
20384. *Mr. Robertson.*] A very small proportion of the dust plays a part in the explosion. It may be almost imperceptible dust, and it might have been consumed in a gaseous form and disappeared.
20385. *Mr. Bruce Smith.*] Mr. Hamlet took 24 as his standard of volatile matter in the dust. If he had taken other portions of coal-dust he might have got 50 per cent., and that would mean 50 per cent., instead of 4 per cent., as he reported.
20386. *Mr. Robertson.*] I do not think you could carry it to any such extreme.
20387. *Mr. Ritchie.*] *Q.* Have you any knowledge of dusts made up of different parts of the coal containing high hydro-carbons? *A.* I assisted in making some calorific tests, and these showed that there were higher results in some portions of the coal than in others.
20388. *Q.* Was there much difference? *A.* I forget; but I know that, in Newcastle also, the more highly bituminous the coal, the higher the results which we got in the calorimeter.
20389. *Mr. Robertson.*] There is no doubt that different seams vary in composition.
20390. *Mr. Lysaght.*] *Q.* I do not care how much volatile matter there was originally in the dust; if the heat was intense enough to burn the brattice, was it not intense enough to extract the whole of the volatile matter from the coal-dust, and not to leave the percentage which Mr. Hamlet found? *A.* Not necessarily.
20391. *Q.* Can you burn brattice at a low temperature? *A.* Yes, you can burn brattice at a low-flame temperature. You can burn it at the flame temperature of a candle; but you cannot burn coal unless you have considerable heat.
20392. *Q.* To burn brattice cloth with heat, apart from flame, it must be there for some time, and the heat be up to a certain degree. If the brattice cloth were burnt with heat, would not the same degree of heat have extracted the whole of the volatile matter from the dust? *A.* No.
20393. *Q.* Do you say that the brattice cloth with heat, apart from flame, was burnt, and yet the dust was not affected, and most of the volatile matter extracted? *A.* It is possible for the brattice cloth to have been burnt by the application of heat, but to extract all the volatile carbon out of the dust in the atmosphere would require a higher temperature.
20394. *Mr. Robertson.*] *Q.* Was not the brattice cloth of a tarry description? *A.* Yes.
20395. *Q.* Some of the tarred cloth might ignite at a low flash point? *A.* Some of it is easily ignited.
20396. *Q.* The tarry matter would be ignited on that brattice cloth at a low temperature; and that might bring about the burning of the brattice itself? *A.* It might be possible, it is hard to say.
20397. *Q.* The first thing would be the ignition of the tarry matter, and afterwards of the cloth itself? *A.* Yes.
20398. *Mr. Lysaght.*] *Q.* And then you would have a flame that would propagate another disaster? *A.* You might have a flame but it does not follow that it would propagate a disaster.
20399. *Q.* Let me put this to you. Your theory assumes that the heat was such at the 4th Right opening from the goaf as to distil the coal-dust? *A.* You are not correct. There was sufficient heat to get the initial ignition of the coal-dust, but it does not follow that there was distillation.
20400. *Q.* Do I understand that the evidences of force which might be observed at Powell's flat or Stafford's flat, or other remote places, would arise from the explosions of the dust as it went along? *A.* Take one section by itself.
20401. *Q.* Take the evidence of seven tubs having been blown off the rails at Price's flat. What I want to know is—would the force that was exerted there be force arising from the explosion of coal-dust which might be in the vicinity? *A.* No, not in the vicinity.
20402. *Q.* Then it might come along to the flat? *A.* I explained the blowing over of the tubs by the force expanding——
23403. *Q.* I want to know whether the force exerted was force that came from the initial place. [*No answer.*]
20404. *Q.* I suppose it might have come from some other quarter? *A.* You asked me this afternoon how many explosions there might be, and you set up a series theory. I do not know. But accepting your own theory as being correct—you have an initial ignition at that point, and small quantities of coal-dust in the road—the gases present and the oxygen, might cause a second explosion.
20405. *Q.* Listen to this :—

> The combustion of gaseous hydro-carbons at a locus and at the moment of their evolution, exerts no more mechanical force than is exhibited in the burning of a gas jet; secondly, the isolated and widely separated exhibitions of violence over the field of disaster would be as inexplicable upon such an hypothesis as they are inconsistent with it.

20406. *Q.* Do you agree with that? *A.* It is a very complicated passage.
20407. *His Honor.*] Mr. Sellers has not suggested the hypothesis that the carburreted hydrogen given off by the dust exploded, but he says that the gas being so evolved accounts for the gas in the heading——
20408. [At this stage the further examination of the witness was postponed.]
20409. [Mr. Bruce Smith put in the correspondence which had passed between the Mines Department and Mr. William Rogers, Manager of the Mount Kembla Colliery, and it was marked *Exhibit 41.*]

20410. Mr. Bruce Smith also brought up the correspondence which took place over the ventilation of the Corrimal Colliery, and read the following extract from the report of Mr. James Rowan, the Inspector of the colliery, dated the 19th of September, 1900 :—

> Robert Vardy, check-inspector, informed me that he was now satisfied that the instrument they had taken the air with was at fault, and did not give a true measurement; and he would inform John Wynn, the other check-inspector, of the same.

The Inspector also stated that he had much pleasure in saying that he found the ventilation in a satisfactory state throughout the colliery. [*The correspondence was marked Exhibit* 42.]

[The Commission at 4·10 p.m. adjourned until 2 o'clock the following day.]

WEDNESDAY, 25 FEBRUARY, 1903—2 *p.m.*

[*The Commission met at the Supreme Court, King-street, Sydney.*]

Present:

C. E. R. MURRAY, Esq., D.C.J. (President).

D. A. W. ROBERTSON, Esq., Commissioner. | D. RITCHIE, Esq., Commissioner.

Mr. Bruce Smith, Barrister-at-Law, instructed by Mr. Wood, Crown Solicitor's Office, appeared on behalf of the Crown.

Mr. A. A. Atkinson, Chief Inspector of Coal-mines, assisted Mr. Bruce Smith.

Mr. A. A. Lysaght, Solicitor, appeared on behalf of—

(*a*) the representatives of deceased miners, wheelers, &c. (victims of the explosion);
(*b*) the employees of the Mount Kembla Colliery (miners, wheelers, &c.); and
(*c*) the Illawarra Colliery Employees' Association (the Southern Miners' Union).

Mr. C. G. Wade, Barrister-at-law, instructed by Messrs. Curtiss and Barry, appeared on behalf of the Mount Kembla Coal and Oil Company (Proprietors of the Mount Kembla Mine).

(Mr. J. Garlick, Secretary to the Commission, was present to take shorthand notes of the evidence and proceedings.)

Mr. DUNCAN McGEACHIE was sworn, and examined as under :—

Examination by Mr. Wade:—

20411. *Q.* What is your name? *A.* Duncan McGeachie.
20412. *Q.* What are you at present? *A.* Manager of West Wallsend Colliery.
20413. *Q.* How long have you been there? *A.* I have been resident Manager there about three years now.
20414. *Q.* Have you been colliery Manager elsewhere? *A.* I have been, at Waratah and Killingworth.
20415. *Q.* That is in the Newcastle district? *A.* Yes; and a short time in the Southern district, about eighteen months at Coalcliff Colliery, in the south.
20416. *Q.* Anywhere else? *A.* No. Those are the only places that I have been in charge of.
20417. *Q.* And what is your total mining experience? *A.* I have been altogether connected with mining now for twenty-eight years.
20418. *Q.* Did you have any experience in Scotland before you came here? *A.* Yes.
20419. *Q.* How many years did you have in Scotland? *A.* About twelve years.
20420. *Q.* Apart from Mount Kembla, you have actually seen a pit after an undoubted gas and coal-dust explosion? *A.* I have.
20421. *Q.* Where was that and when? *A.* Dudley, for instance.
20422. *Q.* That is four or five years ago now? *A.* Yes.
20423. *Q.* I want you to describe the conditions of the pit as you saw it after you got down. How long did you get there after the actual occurrence or explosion at Dudley? *A.* I was there immediately or about an hour after the explosion occurred. It took about three or four hours to get a rope on and things put right.
20424. *Q.* Before you got down the shaft? *A.* Yes.
20425. *Q.* Had the ventilation been deranged? *A.* Yes. On our first attempt we only got half-way down and had to return.
20426. *Q.* Half-way down what? *A.* Half-way down the shaft—and had to come back again.
20427. *Q.* Owing to what? *A.* Owing to the after-damp. We met the after-damp about half-way down. We had to return up to the surface then; and they improved the ventilating appliances, the fan, for instance. The main air-drift from the upcast shaft to the fan was knocked about a good deal; and we could not get a great deal of air. We closed that up, and as soon as we got that done we were able to get to the bottom.
20428. *Q.* What was it like when you got down to the pit bottom, in respect of the temperature? *A.* It was pretty hot; the temperature was pretty high; and immediately we went to get away from the pit bottom we discovered in a great many places coal-dust burning, live coal-dust, especially near the pit bottom in the bords.
20429. *Q.* Lying where? *A.* Lying on the floor, and in other places, on the props, burning. The coal-dust was quite hot on the props.
20430. *Q.* First of all, with regard to the question of coked-dust, did you see any of that? *A.* Yes.
20431. *Q.* Just tell us? *A.* Not so much on my first visit as on my second.
20432. *Mr. Bruce Smith.*] This evidence, on the face of it, is not clearly admissible now, because an account of the Dudley explosion really has no application to this case, unless it is put in this way: "I visited Kembla; and I formed the opinion that it did or did not take place from certain causes. I formed that opinion because I visited the Dudley Mine after an undoubted explosion from gas and coal-dust."
20433. *Mr. Wade.*] If you give me time, I will come to that.

20434. *Mr. Bruce Smith.*] I know; but it is a matter of the way it appears on the notes.
20435. *His Honor.*] That does not matter in this case.
20436. *Mr. Bruce Smith.*] I do not object to it. It is a very fair comparison, so long as it does not run into too much detail.
20437. *Mr. Wade.*] *Q.* Now I want to ask you to tell us the different parts of the mine in which you saw coked dust, first of all, at Dudley? You see you have got main roads, bords, pillars, headings, and so on? *A.* Yes.
20438. *Q.* Just tell us where it was? *A.* Everywhere that the blast had swept along, you could always find the coked dust, either on the timbers or the skips, almost everywhere in the track of the direct force.
20439. *His Honor.*] *Q.* Coked dust? *A.* Yes, coked dust.
20440. *Mr. Wade.*] *Q.* And what thickness would that be? Take a prop, for instance, how thick would the coked dust be upon the props? *A.* Various thicknesses.
20441. *Q.* From what to what? *A.* I dare say you would find it over an eighth thick.
20442. *Q.* An eighth of what? *A.* An eighth of an inch thick.
20443. *Q.* In other parts? *A.* In other parts, slightly more, and other parts less.
20444. *Q.* How would it be on the prop: what part of the prop: the top or the bottom, or the middle, or what? *A.* Right over it from top to bottom you could get coked dust, on the main road especially.
20445. *Q.* Would it be on one side of the prop, or both sides, or what? *A.* Well, on a great many props it was all round it. On others it was just immediately in the face of the direct force of the blast.
20446. *Q.* You said you also saw coked dust on the skips? *A.* Yes.
20447. *Q.* Where would that be? *A.* They would be standing on the main road, I suppose, about 100 yards from the pit bottom.
20448. *Q.* And how thick was that coked dust on the skips? *A.* I could not say the thickness there; but I remember just noticing the coked dust on the edge of the skip, and rubbing it off with my hand.
20449. *Q.* Did you see that in more than one case on the skips? *A.* Yes, I noticed it more particularly at the pit bottom where the timbers were broken. Timbers that had been newly broken were practically covered with coal-dust.
20450. *Mr. Robertson.*] *Q.* Which pit do you mean? *A.* The main pit, the downcast pit.
20451. *Q.* The winding shaft? *A.* Yes.
20452. *Mr. Wade.*] *Q.* When you speak of the timbers that had been broken, do you mean the timbers that had supported the roof? *A.* Yes, they were 12-in. timbers, 12 in. square.
20453. *His Honor.*] *Q.* Those were pine? *A.* No; they were all hardwood, heavy timbers, evidently taken out of the bush.
20454. *Mr. Wade.*] *Q.* Did you see any signs of charring? *A.* The whole of this dust was charred—practically the whole of it.
20455. *Q.* Did you see any charring of timber or wood? *A.* Oh yes, slightly.
20456. *Q.* What timber would that be? *A.* The same timber that I referred to at the pit bottom, especially at the pump chamber.
20457. *Q.* That is close to the pit bottom? *A.* It was immediately in the pit bottom.
20458. *Q.* You told us that when you first went down you found coal-dust burning in bords close to the pit bottom? *A.* No, that was my second visit down.
20459. *Q.* You need not bother about the number of times you visited at present; but did you see that anywhere else besides close to the pit bottom? *A.* No. In the other parts that we visited the main roads were all fallen, and you could not see the coal-dust that was buried there; but we found, in several places, traces where it probably was burning, because we had small fires under these falls.
20460. *Q.* Dudley is not a very big mine? *A.* No, it was not a large mine at that time.
20461. *Q.* Could you say over what extent of the coal workings at that time you saw the indications of the coked dust; would there be any part of the mine left out? *A.* I was not on the right-hand side, on the upcast shaft side; I was not in that district at all; but in the other part you could find traces, more or less, through the whole of that part of the colliery.
20462. *Q.* The left-hand side? *A.* Yes.
20463. *Q.* That would be about half the mine? *A.* About half the mine. With regard to the right-hand side, the night I went there to go on that side of the pit it was found to be afire and was then sealed off.
20464. *Q.* Now let us come to Kembla; when did you first arrive at Kembla; *A.* The Saturday after the disaster.
20465. *Q.* That would be the 2nd of August? *A.* Yes.
20466. *Q.* And when were you first inside the pit—was it that night? *A.* I suppose it would be about 2 o'clock in the afternoon when we went in. When I say 2 o'clock I mean, roughly, any time from half-past 1 to half-past 2.
20467. *Q.* I suppose you were helping in the rescue work first of all, were you not? *A.* Yes.
20468. *Q.* Do you remember how many visits you made into the pit altogether? *A.* I was in the pit every day from that up till the following Friday.
20469. *Q.* That was during the week? *A.* Yes, including Sunday.
20470. *Q.* And did you make observations yourself as to the signs of force, for the purpose of tracing this matter if you could? *A.* After the Monday morning only. Not so much on the Saturday and Sunday, because we were more on rescue work then, getting out the bodies; but on the Monday we went in for that purpose.
20471. *Q.* Do you remember going up to the faces of No 1 heading on that Saturday night? *A.* Yes.
20472. *Q.* The 2nd of August? *A.* Yes.
20473. *Q.* Do you remember whom you went with? *A.* With Mr. Atkinson, Mr. Humble, Morrison, and two other men; I do not remember all the names.
20474. *Q.* Was there any discussion about going there before you actually went up? *A.* Yes.
20475. *Q.* What was that? *A.* Well, we talked over the advisability of going into the place. Morrison, of course, said that he had a particular mission—that we had to call in there; and I remember Dr. Robertson saying to him to go to that place and see if we could find a trace of gas. When we came up to that point, I mentioned to Mr. Atkinson or to Mr. Humble, or both—I do not remember which—that I did not think it

was wise to go there, seeing that the ventilation was all disarranged; and, if gas was to be found at all, it war sure to be found there, and it would be unfair to try there at all, seeing that the ventilation was cut off from the faces, or words to that effect.

20476. *Q.* Who was it induced you to go? *A.* Mr. Atkinson said, "All right, we will go," or something to that effect. We went up.

20477. *Q.* Where was the ventilation cut off at that time? *A.* From the 4th Left right away back to the outside.

20478. *Q.* Did you make an examination? *A.* Yes, I tried for gas with the hydrogen flame, and I think, if I remember correctly, I got ½ per cent. there.

20479. *Mr. Bruce Smith.*] *Q.* That was up in the face? *A.* No, not quite the face—the cut-through.

20480. *Mr. Ritchie.*] *Q.* Which one? *A.* The one nearest the face.

20481. *Mr. Wade.*] *Q.* Can you say, from your experience, whether the fact of gas being there is any indication, under these circumstances, that it was gas given off from the face? *A.* I could not say what gas it was. The gas gave an indication in the flame, but I would not like to say it was fire-damp. It gave a clear cap on the flame. It may have been fire damp, and it may have been co-carbon monoxide.

20482. *Mr. Robertson.*] *Q.* If it were a half per cent, of carbon monoxide, you would know by its effect on yourself? *A.* Yes.

20483. *Mr. Bruce Smith.*] *Q.* Did you know? *A.* We did not feel any serious effects.

20484. *Mr. Ritchie.*] *Q.* Did it affect you? *A.* No. Still, you would get a cap with only ·25 per cent. of carbon monoxide, and I doubt whether you would feel it in your body.

20485. *Mr. Wade.*] *Q.* How long were you there, do you think? *A.* Just the time of taking the reading.

20486. *Mr. Bruce Smith.*] *Q.* You did not advance? *A.* No we came back.

20487. *Mr. Wade.*] *Q.* Now, from the result of your examination and observation in Kembla, just tell us where it was you remember finding any coked dust or anything liked coked dust? *A.* We found a little near the face of these same two headings on the Monday, on a prop in the back heading.

20488. *Q.* On what part of the prop? *A.* I do not remember now whether it was facing the cut-through or facing the side.

20489. *Q.* On the top or the lower part? *A.* Near the top.

20490. *Q.* Did it extend lower down? *A.* No, it was only at one part that I saw the coal dust on the prop.

20491. *Q.* How did you come to the conclusion that that was coked dust? Did you say coked dust or coal-dust? *A.* It was coked dust. It seemed to be heated dust.

20492. *Q.* How did you tell that? *A.* It seemed to be coked—as though it had been under heat.

20493. *Q.* Did you tell by the feel or the look? *A.* I put my fingers on it.

20494. *His Honor.*] *Q.* Did you go by the smell at all? *A.* No.

20495. *Mr. Bruce Smith.*] *Q.* Did you say it was hot or warm? *A.* Well, it was fair; you could not say it was hot, not for coal. The air was what we considered fair under the conditions.

20496. *Q.* I thought you were speaking of the dust? *A.* Oh, no; that was on the Monday.

20497. *Mr. Wade.*] *Q.* Do you remember finding it anywhere else—any signs that looked like coked dust? *A.* No; I do not remember seeing coke. Yes, I think there were a few particles of coked dust found in the cut-through to the left further down, near where there had been a fire and where the brattice was burnt. [*Bord No.* 87.]

20498. *Mr. Bruce Smith.*] *Q.* Did you take notes in your pocket-book at all? *A.* Yes. I did not take the whole of the notes because, for instance, in the taking of readings I was simply reading and the others were booking; and I was left without a great many notes of that kind for the sake of getting through quickly.

20499. *Mr. Wade.*] *Q.* Now, speaking generally, is there any resemblance in the conditions at Kembla to the conditions you saw at Dudley after the disaster? *A.* You mean so far as destruction is concerned, or what?

20500. *Q.* Take the destruction, if you like, first of all? *A.* There was much less destruction at Kembla than there was at Dudley, so far as the inside of the mine is concerned; and of course the pit was comparatively cool; the ventilation was good. I could see no signs of flame or burning anywhere.

20501. *Q.* What about coked dust? Was there any resemblance between the appearance of the coked dust you saw in the two mines?

20502. *Mr. Bruce Smith.*] Would it not be better to let him tell us what struck him, instead of assenting to what is put to him?

20503. *Mr. Wade.*] I ask him, first of all, is there any resemblance or not?

20504. *His Honor.*] *Q.* Did you compare the appearance of the coke dust in the two mines? *A.* I could not compare the two except from memory.

20505. *Q.* But, bearing in mind what the appearance of the dust at Dudley was, did you make any comparison with the dust at Kembla at the time? *A.* No; it did not strike me at the time, while I was walking through it, until afterwards; but the coked dust at Dudley was burnt perfectly hard into a crust; you could get it off in flakes 2 inches long sometimes, 2 inches square; but in Kembla it was perfectly fine, a little coked, but not to the same extent as in Dudley.

20506. *Mr. Bruce Smith.*] I submit, your Honor, that the only reason why this evidence can be given at all is that Mr. McGeachie may have made some deduction as to the cause of the Kembla accident from the differences which he observed in the two mines.

20507. *Mr. Wade.*] If you would give me time, I would bring that out.

20508. *His Honor.*] If I might suggest to you, Mr. Bruce Smith, without interrupting you, that the Commissioners can also draw deductions. If Mr. McGeachie, for instance, is a man who does not care to draw deductions, or if his deductions were objected to, still his facts, from which we could draw deductions, might be material, and would be material to a certain extent.

20509. *Mr. Bruce Smith.*] But we are to be guided to some extent by the first principles of evidence; and it would be better for this witness to give us the evidence himself of the principal differences between the phenomena of the two explosions.

20510. *His Honor.*] That is what he is doing.

20511. *Mr. Bruce Smith.*] No. Mr. Wade is asking him about particular things.

20512. *His Honor.*] He is answering my questions, now. I took the examination out of the hands of Mr. Wade, and asked him what was exactly in his mind, in his recollection, so that there could not be any suggestion made to him ; and now he has described it exactly ; and I think the evidence is taken down of what, in his recollection, the difference was.
20513. *Q.* There was a difference? *A.* Yes.
20514. *Q.* There is a difference in the coal, is there not? Did you compare the coal for the purpose of noting the difference in the coal-dust? *A.* No, I did not do that. But I think the one is almost as susceptible to fire as the other. I think there is very little difference, so far as that is concerned—so far as the analysis of the coal is concerned.
20515. *Q.* So far as their bituminous nature is concerned, what do you say? *A.* There might be a slight difference ; but I do not think there would be such a difference as to cause one to coke to such an extent that you could take it off 2 inches square, while the other would rub away with your finger perhaps in taking it off.
20516. *Mr. Ritchie.*] *Q.* Is there anything in the nature of the coal that would cause the one to run together more than the other? *A.* I think so ; there is no doubt that there is ; but I do not think under a heat of that kind it would give any difference.
20517. *Mr. Robertson.*] *Q.* Is not the Newcastle coal, of which Dudley is a type, essentially a coking coal? *A.* Yes.
20518. *Q.* Now, can you say that of the southern? *A.* No, it is not such a good coking coal as the northern coal.
20519. *Q.* Is it not a fact that the Dudley coal contains a very large percentage of volatile hydro-carbons? *A.* Yes.
20520. *Q.* What would you say, 30 or 40 per cent.? *A.* No, I could not say what the Dudley analyses are.
20521. *Q.* You know the average composition of Newcastle coal ; it contains probably 35 per cent? *A.* Yes, I know some of them contain that.
20522. *Q.* And the Kembla coal 24 per cent. Would not that make a very material difference in respect of its tendency to coke by being exposed to heat? *A.* No doubt it would make a difference ; yes, certainly.
20523. *Q.* Broadly speaking, Newcastle coal is a coking coal, and the southern coal is not? *A.* My impression of the two dusts referred to is this ; in the one case it has been exposed to flame, and in the other case it has not been exposed to flame. That is how I would like to put it.
20524. *Q.* Which was exposed to flame? *A.* Dudley was exposed to flame ; and, in my opinion, the dust in Kembla was not exposed to flame. It was exposed to a certain heat ; but I would not like to say that there had ever been flame there.
20525. *Q.* But the same heat that would bring about complete coking in the case of Dudley might not have the same effect in the case of Kembla dust? *A.* It might not.
20526. *Q.* The same heat? *A.* I would not be prepared to say that.
20527. *Q.* But you are aware that, even in a common house fire, the Newcastle coal sticks together in a pasty mass before there is any actual flame passing through the top? *A.* Yes ; but it is of a soft nature when it does that. You can almost take it and squeeze it up with your finger and thumb.
20528. *Q.* Which? *A.* The Newcastle coal.
20529. *Q.* Any Newcastle coal, if you put it on an ordinary domestic fire, has a tendency to cake together before there is any great heat near it? *A.* Yes.
20530. *Q.* Could you get any southern coal to cake together in a domestic fire? *A.* I could not say that. I have not seen it tested in that way.
20531. *Q.* So you see there is a very broad difference in the nature of the two coals in respect to the tendency to coke? *A.* There is no doubt there is ; but there is a difference in the quality of the coal anterior to coking.
20532. *Q.* Is not the southern coal essentially a steam coal, and the Newcastle coal essentially a gas coal? *A.* Well, it is a bright bituminous coal ; but it is not all gas coal. If you go to the Greta measure, then I will say it is a gas coal.
20533. *A.* Here is a report of the Department of Mines showing that the average percentage of volatile hydro-carbons in the Dudley coal is from 36·88 to 37·90. Now, in the Kembla coal, the volatile hydro-carbons average about 24 per cent. ; so there are 50 per cent. more volatile hydro-carbons in the Dudley coal than in the Kembla? *A.* Oh, there is a great difference, no doubt.
20534. (At this stage Mr. W. R. Pratt, Assistant Shorthand-writer to the Commission, attended to take the notes of the evidence and proceedings.)
20535. *Q.* In addition, the Kembla coal contains more ash? *A.* I did not go into the comparative analysis of the coal at all in arriving at my conclusion.
20536. *Mr. Wade.*] *Q.* You have been speaking now of the coke in the mine and the difference in the coal-dust? *A.* Yes.
20537. *Q.* I want you to indicate where the dust is most numerous? *A.* Do you mean in Kembla?
20538. *Q.* In which colliery is it more numerous? *A.* I only saw two lots in Kembla ; but in Dudley, everywhere you went, you could get cakes of coked dust. In fact Kembla was practically free from coked dust or from any sign of flame. I never saw any sign of flame, excepting in one particular place where there had been a fire.
20539. *Q.* Was that in No. 1? *A.* Yes.
20540. *Q.* Did you see some brattice at the back heading? *A.* There was a small piece of canvas at the end of the cut-through there. It was torn.
20541. *Q.* When you say torn, what do you mean? *A.* It seemed to have been exposed to heat, and was torn off as if a certain force had been applied to it.
20542. *Q.* How do you mean? *A.* As if someone had struck it with something, and it was partly torn off.
20543. *Q.* What was the condition of the texture of the brattice? *A.* It seemed to have been exposed to heat.
20544. *Q.* Could you double it up? *A.* Yes, you could double it up quite easily.
20545. *Q.* Would it bend? *A.* It did not break.
20546. *Mr. Ritchie.*] *Q.* You say that a part of it was torn? *A.* Yes, the part that was exposed to heat.
20547. *Mr. Robertson.*] *Q.* Was it fire-proof brattice or ordinary tarred stuff? *A.* It was ordinary tarred stuff.

20548. *Mr. Wade.*] *Q.* Have you used tarred brattice yourself? *A.* Yes, we have sometimes used it. We generally use a non-inflammable brattice.
20549. *Q.* Do you know whether there are defects in the manufacturing of brattice? *A.* Yes, sometimes we get it bad.
20550. *Q.* In what way? *A.* There are bad parts in it, as if some of it had been exposed to heat. I have had to return half a dozen rolls of the same stuff. I would not put it up. It would scarcely hang its own weight.
20551. *Q.* Suppose there had been flame in that back heading where the brattice was—actual live flame—what do you think would have been the result? *A.* It would have left traces; and if there had been flame it would have burnt the brattice. If any dust had been near, it would have left traces of the coal-dust as well.
20552. *Q.* Supposing there was 1 per cent. of fire damp at the face of the back heading, and supposing flame came into that back heading, and supposing the flame licked up that fire-damp, what would you find? *A.* I would expect to find an explosion of gas. There would be traces of flame, and force from the face; and the brattice would be knocked down, and probably burned.
20553. *Mr. Robertson.*] *Q.* Can you get an explosion by 1 per cent. of gas and flame? *A.* It would be an important addition to the flame.
20554. *Q.* Flame and 1 per cent. of fire damp? *A.* It would help to increase the flame. It would be rather an unusual thing.
20555. *Mr. Wade.*] *Q.* Suppose that there was 1 per cent. of fire-damp and coal-dust, and the flame came in? *A.* That would make a much greater force, and the force would be all in one direction—from the face of this heading outwards.
20556. *Q.* You would expect to find the force going out from the back heading? *A.* Yes, from the face right outwards. Instead of that, the force here is going in the opposite direction.
20557. *Mr. Ritchie.*] *Q.* From where? *A.* From the 4th Right it goes inbye.
20558. *Mr. Robertson.*] *Q.* Then we are to assume that the force in the first instance went inbye? *A.* Yes.
20559. You asked him, Mr. Wade, was not the evidence of force outbye—if the flame had gone the back heading and met with 1 per cent. of gas and dust.
20560. *Mr. Wade.*] I asked him; and he said outbye.
20561. *Mr. Robertson.*] That would be inconsistent with flame going inbye.
20562. *Mr. Wade.*] *Q.* What were the indications of force you saw in the back heading? In what direction were they going? *A.* In the back heading there appeared to be very little force anywhere. There was very little sign there of force in any direccion.
20563. *Q.* Do you remember seeing a bottle there. In what direction was it carried? *A.* Inwards.
20564. *Q.* That has been fixed at the second cut-through from the face, No. 1 heading? *A.* The bottle was at the heading.
20565. *Q.* Did you, between the face of the back heading and the cut-through where Morris was, see any signs of force going outbye? *A.* No.
20566. *Q.* Now, suppose there was a sufficient body of gas in the back heading to cause an explosion at the second cut-through from the face, would you expect much flame there? *A.* No doubt if there were gas there it would cause an explosion, and it would leave traces. The flames produced through the explosion would leave traces on the props and canvas, and in all directions where the force went.
20567. *Q.* Did you see anything to support that suggestion—that there was an explosion in the back heading from the second cut through to the face? *A.* No. In my opinion no explosion took place. In fact, in my opinion, there was no explosion at all.
20568. *Mr. Bruce Smith.*] *Q.* Do you mean that no explosion took place in the mine? *A.* Yes.
20569. *Mr. Wade.*] *Q.* I will come back to that. If you were told that Purcell was working in bord No. 105, next to the heading—if there was gas extending back as far as the second cut-through from the face of the back heading, and the air current went round the next cut-through to the back heading—do you think they would feel any effects in Purcell's bord? *A.* If there was gas it would be carried right round there.
20570. *Q.* Now, what was the condition of the floor of the main heading inbye of the 5th Right? *A.* Do you mean the floor only?
20571. *Q.* Take the floor? *A.* As to dust?
20572. *Q.* Yes? *A.* As I said, there was very little dust anywhere—the greater part of the floor is damp.
20573. *Q.* I am talking of the jig, where the hill rises inbye of the 5th Right? *A.* That was very free and clean, and it seemed as if they had been making a jig—there was a good deal of brushing there. There was no coal-dust to be seen there.
20574. *Q.* Between the 4th Right and the 5th Right, on the main rope road, what was the condition of the road? *A.* It was damp.
20575. *Q.* When you first saw it? *A.* When I walked along it it was wet.
20576. *Mr. Robertson.*] *Q.* Do you say it was all damp? *A.* Partly. There was a good deal of the road wet when I walked along there.
20577. *Mr. Ritchie.*] *Q.* What proportion of it would be wet? *A.* I think I may safely say half of it.
20578. *Q.* For what length? *A.* From the 4th Right to the 4th Left, going inbye. Roughly speaking, I should say half.
20579. *Q.* The floor was wet? *A.* Yes, the floor was wet.
20580. *Q.* Between the 4th Right and the 4th Left, what were the indications of force; were they inbye or outbye? *A.* Going inbye.
20581. *Mr. Wade.*] *Q.* Did you see any indications of force between the 4th Left and the 4th Right going outbye? *A.* The indications were all inbye.
20582. *Q.* The direction of force was all inbye? *A.* The direction of force was all inbye.
20583. *Q.* Now, supposing the gas had come out of the 4th Right, without any violence, where do you think it would go to under ordinary conditions? *A.* It would mix up with the intake air.
20584. *Q.* Where? *A.* On the main road.

20585. *Q.* How would it get there? *A.* If the gas came out of the 4th Right, and was not forced out —— [*Interrupted*].

20586. *His Honor.*] No one has suggested that the gas came out without any force at all. Mr. Atkinson has not suggested that the gas was expelled without any force.

20587. *Mr. Wade.*] Mr. Atkinson said that the force was sufficient to drive the chocks out.

20588. *Mr. Robertson.*] A velocity of 50 miles an hour will do that. The witness said that if the force came out without violence it would mix with the intake air.

20589. *Witness.*] I understood that both the roads there were intake; but I find that one is a return and one an intake.

20590. *Mr. Robertson.*] *Q.* You withdraw that statement? *A.* Yes.

20591. *Mr. Wade.*] *Q.* Supposing the air got forced out with sufficient violence to knock out those canvas stoppings? *A.* Well, it would mix with the main intake air at once.

20592. *Q.* Now take the proposition that there is a body of inflammable gas only, reaching from the 4th Right to the 4th Left, do you know at what percentage of gas to air it would become inflammable? *A.* You say a body of inflammable gas.

20593. *Q.* What is the lowest percentage at which it would become inflammable? *A.* From 1 to 5; that would be the lowest.

20594. *Q.* Do you mean that 1 per cent. would be inflammable? *A.* 5 per cent. I take the highest explosive point to be 1 to 9, and from that back to 1 to 5.

20595. *His Honor.*] *Q.* Why do you put the one in? *A.* Say a foot of one to 9 feet of the other—or 1 foot of one gas to 5 of another. That would be 20 per cent. of gas.

20596. *Mr. Robertson.*] I understand him. From 1 per cent. to 5 per cent. would be inflammable.

20597. *Witness.*] I mean to say that the gas mixed with nine times the quantity of air is the most inflammable.

20598. *His Honor.*] That is approximately 11 per cent.

20599. *Mr. Wade.*] *Q.* Do you mean that 11 per cent. of gas in the air is highly explosive, and that the inflammable proportion is 5 per cent.? *A.* Yes; it is the same thing.

20600. *Mr. Ritchie.*] *Q.* Do you say from 9 to 11 per cent.? *A.* I say five times its own quantity.

20601. *Q.* You say that at 9 per cent. it reaches its highest inflammable state? *A.* Yes.

20602. *Q.* What is its lowest inflammable state? *A.* 5 per cent.

20603. *Q.* Will it explode then? *A.* I take it that it might be exploded. The higher you get above 9 you get less and less, and below 5 you get less and less explosive power.

20604. *Q.* Between 5 and 11 per cent. it is explosive; but at 9 it is most explosive? *A.* Nine times is most explosive. Then take it back, from 1 to 5 it will explode. If you take it above from 14 to 15, there will be so much gas that it will not explode at all.

20605. *Mr. Wade.*] *Q.* Do you know how many cubic feet of fire-damp there would be if there were 5 per cent. between the 4th Right and the 4th Left? *A.* I should want to know the area. It would be a very large area; it would cause a lot of damage if it exploded.

20606. *Q.* You would expect a large flame to start with if it ignited at Morrison's flame? *A.* Yes.

20607. *Q.* Would you expect to find any indications of the direction in which it had gone? *A.* It would have gone outwards from that point.

20608. *Mr. Ritchie.*] *Q.* What would have gone outwards? *A.* The force if the explosive mixture had ignited. I was asked if it would have left traces. I say a great many traces. There would be a great body of gas in that area.

20609. *Q.* You do not think it possible for a falling mass to expel the whole of the gas before the explosion took place, and for no traces to be left? *A.* You mean expel it from the 4th Right.

20610. *Q.* Yes. *A.* If it had been expelled from there suddenly, and with force, the lights would have been blown out.

20611. *Q.* You would not have any traces? *A.* You would see traces, whether it was gas, or whatever it was. The traces would be there, whether it was gas, wind, or water, if it came out as suddenly as that.

20612. *Q.* If by the falling matter there the whole of the gas was expelled before the explosion, would you find any indications in the 4th Right? *A.* Practically that would be the seat of the explosion, as the force would come from there. It would have to go slowly to catch alight. If it was expelled very suddenly, the force would put out the light.

20613. *Q.* It is said that the light that lit the gas was some distance away from the seat or the centre of the gas? *A.* Then you must assume that the gas came slowly, otherwise it would not have come through the canvas.

20614. *Q.* It might have come through the canvas, and, having come through there, it might afterwards have come on slowly? *A.* But even the force of the air would cause concussion.

20615. *Q.* The force of the air may have died away before it reached that light, and not have been sufficient to put that light out? *A.* Take it for granted that that was so. There must be traces in the 4th Right if there was an explosion there. There would be some timber blown about or burnt, and we should have seen traces of flame there; but there are no traces of flame to be seen. I cannot think that gas came out of there in either large or small quantities, otherwise there would have been indications to show that there had been flame.

20616. *Mr. Wade.*] *Q.* Supposing it lit and ran back to the 4th Right junction with the 4th road, and that was the centre of the explosion, would you then expect to find any signs of explosion in No. 4? *A.* Certainly.

20617. *Q.* Did you see any signs in the 4th Right roadway? *A.* No, I saw signs of force, but no signs of flame.

20618. *Q.* Did you examine the skips and bars that support the roof in the 4th Right? *A.* Yes.

20619. *Q.* Did you see any signs of flame or coke-dust on them? *A.* No signs whatever.

20620. *Q.* Did you notice the chocks? *A.* Yes.

20621. *Q.* Did you see any indications of flame on them? *A.* No.

20622. *Q.* Now, let us come to the 4th Right roadway and go up to the goaf edge. First of all, tell us what you saw there, what indications of force and in what directions? *A.* Yes. Well, there was some timber

timber close in to the edge of the goaf—I do not know what it had been; it looked like old chocks. They were forced partly into the roadway, as if two forces had been exerted on them—a force inwards towards the centre of the road and an outward force. There is no doubt that the timber had been inside the goaf before. I mean that it was inclined inwards and outwards.

20623. *Mr. Robertson.*] *Q.* What did you say? *A.* I spoke of some timber there, and said that it seemed to have been forced inwards towards the centre of the road, and outwards towards the hauling road.

20624. *Mr. Ritchie.*] *Q.* Were they forced toward each other? *A.* Towards each other and outwards at the same time.

20625. *Q.* Have you any notes of it? *A.* No, but I remember it. Mr. Robertson was there at the time

20626. *Mr. Robertson.*] I do not remember it.

20627. *Mr. Wade.*] *Q.* You could draw a sketch showing the mouth of the goaf, the travelling road, No. 1 haulage road, and the 4th Right road? *A.* Yes.

20628. *Q.* The chocks were close to the goaf edge? *Q.* Yes, I saw some chocks lying in that place.

20629. *Q.* Where did they come from? *A.* I understand that they were forced together.

20630. *Q.* There was one prop which was inclined inbye—whereabouts was that? *A.* It was on the right-hand side.

20631. *Q.* At what angle was it lying? *A.* It would be lying inwards 4 or 5 inches off the plumb.

20632. *Q.* What would be the space between the top of the prop and the roof, if the prop were upright? *A.* 8 or 10 inches.

20633. *Q.* Can you account for that prop being tipped over? *A.* Only in one way. It was at one time against the roof; and the stone fell out and pushed it over.

26034. *Q.* What was there round it on the floor? *A.* A lot of rubbish.

20635. *Q.* There was a lot of rubbish and dust lying there? *A.* Yes.

20636. *Q.* Do you mean dirt that might have been there before the day of the disaster? *A.* I suppose so. It was the dirt which was holding the prop in a leaning position.

20637. *Mr. Robertson.*] *Q.* What position? *A.* It would have fallen by its own weight otherwise. I remember sitting on one of the props. That is what drew my attention to them; and in that way the matter was impressed on my mind. I think if you cast your mind back to the Thursday or Friday when were there, you will remember it; and I think I gave the same explanation then as I am giving now.

20638. *Q.* What was that? *A.* About the stone pushing the prop in.

20639. *Q.* Did you notice anything else—any dust or rubbish towards the juction of the Main Right rope road? *A.* There was rubbish at the inbye corner of the junction of the 4th right and the main haulage way.

20640. *Mr. Wade.*] *Q.* Do you remember in the course of your visits to the mine finding the body of a boy called Walker? *A.* We found him on the Sunday.

20641. *Q.* Whereabouts? *A.* On the outside of the 2nd Right rope road.

20642. *Q.* Where was he? *A.* He was lying in a skip under a fall.

20643. *Q.* What did you notice about his appearance? Where there any signs of burning? *A.* No, none at all.

20644. *Q.* Was he damaged at all—were any limbs broken? *A.* Oh, yes, he was knocked about very much. Half his head was off. His left arm was hanging over the skip, and I could examine that thoroughly. There were no signs of burning.

20645. *Q.* Was his arm bare? *A.* Yes, his left arm was bare.

20646. *Q.* I want to ask you what is your explanation of this disaster. Where do you say the force came from? *A.* My opinion is, from what I have seen of the direction of force, that it came from the 4th Right, on to the main road and divided, one part going to the right and the other to the left. One part would go to the face of No. 1; and the other part would go out of the tunnel.

20647. *Q.* Would you say, from what you saw, that the force was great or slight, or very great? *A.* It must have been a great force—there is no doubt about that, according to the damage done. The air came out with great velocity.

20648. *Q.* When do you think that the damage on the outbye side of the 4th Right was done? *A.* It was all done at one time. The whole thing was only a matter of seconds.

20649. *Q.* Going inbye and outbye? *A.* Yes, the whole of the damage done would be a matter of a very few seconds.

20650. *Q.* What do you say about the conditions at the face of No. 1 heading—the indications of heat spoken of? *A.* I think the heat there was through the compression of the air on the face.

20651. *Q.* Do you mean the great force from No. 4 Right? *A.* It was simply a great blast of wind. The force divided itself. It compressed the air; and that would raise the temperature to a great extent. If these men were singed at all, it would be the means of singeing them, because the air would be very hot.

20652. *Mr. Robertson.*] *Q.* Do you think that there was no heat before the air reached the face? *A.* I say the heat would be greater there—the greatest amount of pressure would be there. The heat would be caused by the compression at the face of No. 1 heading.

20653. *Q.* Was there no heat when that blast traversed No. 1 main road—was there no heat anywhere else before it reached there? *A.* There may have been a certain temperature before the air was expelled, but the greatest amount of heat would be there through compression against the coal-face and getting a fresh supply of oxygen. In going outbye it got a free outlet. Coming to the face it could not get any outlet.

20654. *Q.* Was there no heat sufficient to burn anything until it reached that point? *A.* There were no signs of it.

20655. *Q.* Will it alter your opinion if you are told the fact that men were burned outbye and inbye of that point, and that horses had been burnt? *A.* Men may have been singed from that hot atmosphere, but they may have walked after that. It is hard to say where men come from.

20656. *Q.* If the bodies generally were black, and the hair taken off, the boots off, and so on—could a man have worked far after that? *A.* He may have been pitched some distance, but he could not walk far.

20657. *Q.* Will that modify your views. It is unquestionable that bodies were found inbye and outbye severely burned? *A.* I cannot say that.

20658. *His Honor.*] *Q.* Is it your theory that there was no combustion anywhere? *A.* There is no sign of any actual complete combustion. There has been partial combustion at the face. I do not think there has been any complete combustion.

20659. *Q.* Is it through the presence of so much practical combustion that you explain the presence of carbon-monoxide? *A.* It may be so.
20660. *Mr. Ritchie.*] *Q.* Do you say that the greater compression was at the face of the heading? *A.* Yes.
20661. *Q.* Would that be the first solid body? *A.* It would be the first dead stop.
20662. *Q.* Did you know that there were dead stoppings before you came to it? *A.* That is simply the dividing points. The air came out and turned to the right and to the left. After it went to the face it could get no further.
20663. *Q.* Do you say that the force which came out of the 4th Right would give a higher temperature at the back heading than it would give at the 4th Right? *A.* There was, I think, the greatest compression there; where you find the highest compression, there you find the greatest heat.
20664. *His Honor.*] We have now the centre of the occurrence moved up to the face of the back heading. I cannot comprehend it.
20665. *Mr. Robertson.*] *Q.* How do you account for the burning of the bodies outbye and inbye, and also the burning of the horses? *A.* I cannot account for it.
20666. *Mr. Ritchie.*] *Q.* Do you know that men were burnt at the tunnel mouth? *A.* No.
20667. *Mr. Robertson.*] *Q.* Do you know that there was a boy completely denuded of clothing about 100 yards further outbye than the boy Walker was found burnt? *A.* If it was gas from the 4th Right that burnt him, the boy Walker would be burnt.
20688. *Q.* Another boy was burnt 100 yards further on?
20669. *Mr. Wade.*] Do you mean Silcock.
20670. *Mr. Robertson.*] Yes.
20671. *Mr. Wade.*] He was not burnt.
20672. *Mr. Robertson.*] Nonsense, I saw him myself. There was not a bit of hair on his body. There was a man named Purcell. There was no question as to his hair being burnt, and charred. There was no doubt about a horse at the 4th Left—there was no question about that horse being singed all over.
20673. *Mr. Wade.*] I know nothing about that. We have no evidence about horses being singed.
20664. *Mr. Robertson.*] The evidence is clear about Purcell, about the horse, and about Silcock.
20675. *Mr. Wade.*] I quite admit that you get indications of singeing and burning without flame.
20676. *Mr. Robertson.*] As to whether it was flame or heat I am not saying.
20677. *Mr. Wade.*] I think there were indications of burning on Aitken and Morrison. Hammon said he had a scorching on the back of his ears, but there was no burning.
20678. *Mr. Robertson.*] The explosion had blown out when it met him.
20679. *Mr. Wade.*] I think Hammon was only 30 yards away from the main force.
20680. *Mr. Robertson.*] No, I think that he was a long way off.
20681. *His Honor.*] What I should like to say is this: that although your theory is there was a terrific compression which caused this outburst—although you say there were no signs of burning at the seat of the compression—although there were no signs of burning at the first point where the outburst met an obstacle—yet you say it turned at an acute angle, ran backwards for 100 yards to the face, and there for the first time caused compression which generated heat enough to constitute burning. I think that that theory is utterly ridiculous, and the other Commissioners are of the same opinion—it is utterly ridiculous, and it is an apparent waste of time to try and force such a theory upon us. We must draw the line somewhere.
20682. *Mr. Bruce Smith.*] That is not Mr. Sellers' theory. He not only admitted that there were coal-dust explosions, but they were the main element in the whole disaster.
20683. *His Honor.*] That is so.
20684. *Mr. Bruce Smith.*] This witness says that there was no explosion at all. He said that in answer to a question of mine. I got him to say that there was no explosion in the mine.
20685. *Mr. Ritchie.*] *Q.* Do you know whether there is any evidence to show heat at the stacks of timber? *A.* There may or there may not be. I should like to say that the face of No. 1 is the highest point. You have an atmosphere there which you have not got in any other part of the mine. You meet an atmosphere that gets more oxygen through the cut-through. The air expelled from the 4th Right was mostly carbolic acid gas, and in this way you get no large signs of heat, but the atmosphere coming from the 4th Right would be hot.
20686. *Q.* What do you mean by hot? *A.* Not high enough to cause flame. It may be anything from 90 to 100 degrees, up to 150 degrees.
20687. *Mr. Robertson.*] *Q.* Was not the compression of the air in that orifice sufficient to raise it to a point high enough to ignite coal-dust? *A.* At the heading it might be—at the face of the heading, perhaps, it was.
20688. *Q.* Let us start from the beginning—what would be the temperature of that air coming out ftom the 4th Right? *A.* I could not possibly say what the temperature would be. I assume it would be higher than the ordinary air.
20689. *Q.* How much? *A.* I could not tell you that. I could only assume that it was higher than the temperature because it was lying in the goaf. It may have been lying there, and got no fresh air mixed with it.
20690. *Q.* There is simply an increase of temperature because of the air being stagnant? *A.* I say that the air would give a higher temperature than the air outside.
20691. *Q.* How much higher? *A.* I cannot say, because I do not know the conditions before the fall. I imagine that if there were a fall over a large area, the air would come out of a narrow channel at great velocity.
20692. *Q.* How much higher in temperature would the air be? *A.* I cannot say.
20693. *His Honor.*] By the time that it came back from the face I should think it would be reduced to its normal temperature.
20694. *Mr. Ritchie.*] *Q.* The portion of the air which went inwards would reach the 4th Left and the 5th Right and the cut-throughs, would not that reduce the compression? *A.* Yes. But if you fire anything from a projectile it will go straight. The moment the air started to go backwards the compression at the face commenced.
23695. *Q.* Air is not a solid matter? *A.* It will compress.

20696. *Q.* If it split naturally at the coming out of the 4th Right, would it not split at each opening which it passed? *A.* Yes. I do not say that it did not. When it reached the openings they were full of air, and the moment you apply pressure to the centre of a road you apply pressure to every inch of that road.

20697. *Mr. Bruce Smith.*] *Q.* If bodies were found burned on the outside of the 4th Right, would it not upset his theory.

20698. *His Honor.*] The witness has given himself away. He has treated air as an inelastic liquid. He says that if you apply force at one place you apply it all over. But if you apply force to an elastic fluid like air, it neutralises the jerk of the pressure, in every direction instantaneously, and you do not feel it in a remote point at all.

20699. *Mr. Ritchie.*] *Q.* Would the fact that bodies were burnt at the tunnel mouth alter your decision? *A.* I do not see how they could be burnt there without there being signs of burning present.

20700. *Q.* They were burnt? *A.* What I say is they were not burnt with flame. There may have been heat enough to burn them. I have seen no sign of flame in the pit. The momont an explosion occurs with fire-damp you see plenty of flame.

20701. *Q.* Did you say that the air would be sufficiently high in temperature to burn people outside? *A.* The air going outwards would burn people as well—at least it might burn them. I do not know of the air outwards, but the air going inwards certainly would.

20702. *Mr. Wade.*] *Q.* Did you examine the bars supporting the roof outbye of the 4th Right? *A.* Yes.

20703. *Q.* Was there any dust on them? *A.* No coked dust that I saw.

20704. *Q.* Was there a wide area at the 2nd Right—a larger area than in the ordinary No. 1 road? *A.* I could not say the width of the 2nd Right.

20705. *Q.* There is a junction there of three roads? *A.* Yes.

20706. *Q.* How far is that from where Walker was found—would you say 20 yards? *A.* It is a good distance; he was found on the flat.

20707. *Mr. Robertson.*] *Q.* Here is the evidence, Mr. Wade, of Sells, as to the burning. It is para. 4941 of the evidence:—

> Jack Purcell was badly burnt, he was very close to there. Willie Silcock had all the clothes burnt off him, all he had on was one boot, and that was shrivelled up with fire. His hair and everything else was burnt.

That is in answer to Mr. Lysaght.

20708. *Mr. Wade.*] He argues that he was burnt, but all the clothes were off him. There were no clothes burnt.

20709. *Mr. Robertson.*] Sells could not say anything about the clothes being burnt, if the clothes were not there.

20710. *Mr. Wade.*] That was a question I asked him. He says that Silcock's hair was burnt—he only had one boot on—and that was shrivelled up by fire.

20711. *Mr. Robertson.*] *Q.* The evidence is according to my recollection, but apart from the question of Silcock, there was ample evidence that other persons were burnt.

20712. *Mr. Wade.*] I say that you can get these indications by heat as well as by flame.

20713. *His Honor.*] If you really think that you can make the Commission believe that the expulsion with some considerable amount of violence, of a body of air out of the 4th Right, can cause heat high enough to be generated to cause a system of burning a long distance of, and in various directions, I am afraid you are reckoning without your host. We cannot believe it.

20714. *Mr. Wade.*] I am proving no theory. We say that it is possible to get sufficient heat at the initial point—at the propelling point.

20715. *His Honor.*] The Commissioners think it impossible.

20716. *Mr. Wade.*] That is the argument, and I am also dealing with coal-dust.

20717. *His Honor.*] Can you show that at any inquest or any inquiry ever held concerning a colliery explosion a theory such as this was ever suggested.

20718. *Mr. Wade.*] If you asked me twenty years back to suggest the theory of explosion by coal-dust, or to say that it had been suggested, I should have had to answer no, also.

20719. *His Honor.*] That is not the question. The rationale of the question to my mind is plain. Some of the evidence which this witness has given seems to me to be so utterly ridiculous from a scientific—from a simple, primary, scientific point of view, that we really cannot pay attention to it.

20720. *Mr. Bruce Smith.*] This witness's evidence differs from Mr. Sellers' evidence.

20721. *Mr. Robertson.*] I have found the page on the evidence, Mr. Wade, in which your cross-examination occurred with reference to Silcock. It is on page 213.

20722. *Mr. Wade.*] I see that Sells, in answer to a question by myself, as to what was the appearance of the body of Silcock, said:—

> "*A.* Black, like a nigger. His legs were broken, and twisted about, but I saw no skin broken. He was lying on the rails; he was not covered up at all.
>
> "*Q.* You only guess that the clothes were burnt off him. You did not see any burns? *A.* I did not see any burns—no.
>
> "*Q.* You did not find any loosening of the skin? *A.* I would not say that I did.
>
> "*Q.* Loosening—as you found in the case of Aitken? *A.* I would not swear there was a loosening of the skin. It was not broken, although his hair was burnt off."

20723. *Mr. Ritchie.*] You see, his hair was burnt off.

20724. *Mr. Wade.*] I say that heat without flame will burn, but if the heat was so great as to burn his clothes off the body would have been charred. My contention was this, the witness Sells could say that so and-so was burnt—his clothes were burnt off his back. That would be the foundation for a strong body of flame. I put the question to him, if with other indications he found that the skin was broken, and he could not say that it was broken.

20725. *Mr. Robertson.*] Everything was burnt off unquestionably.

20726. *Mr. Wade.*] I might say that after His Honor's observation just now, I shall probably be able to shorten the evidence. I want to ask the witness in the box now a question about watering.

20727. *Q.* Is there a difficulty about watering the haulage roads? *A.* We water all our main roads.

Witness—D. McGeachie, 25 February, 1903.

20728. *Q.* Have you come across any difficulties? *A.* Of course, there are some parts which we cannot water with safety.
20729. *Q.* Because of what? *A.* It depends on the shale roof which breaks off if you apply water to it, but that is only the case where the shale is exposed.

Cross-examined by Mr. Lysaght:—

20730. *Q.* Are you aware that a number of men were burnt near Price's flat? *A.* No.
20731. *Q.* Are you aware that some tubs were blown off the line? *A.* Yes.
20732. *Q.* If any men were burnt in Price's flat, can you account for them being burnt? *A.* No, I do not think I can.
20733. *Q.* Or any men at the tunnel mouth? *A.* No, unless it was by the hot air.
20734. *Q.* There would be no compression of air along the travelling roads? *A.* No.
20735. *Q.* When did you first decide on this theory? *A.* I have not decided on any theory. I am giving you what I saw in the pit. I am giving you pure facts.
20736. *Q.* Have you had any conversation with Mr. Sellers? *A.* No.
20737. *Mr. Wade.*] I will make an admission. This question had been discussed among the mine managers. I will make you a present of that.
20738. *Mr. Lysaght.*] The witness says no.
20739. *His Honor.*] Mr. Lysaght is entitled to ask the question.
20740. *Mr. Lysaght.*] *Q.* Did you discuss the question of the evidences of heat without flame with Mr. Sellers? *A.* No.
20741. *Q.* Did you discuss it with Dr. Robertson? *A.* Yes.
20742. *Q.* With any other mining manager? *A.* No. I have discussed it with Mr. Humble.
20743. *Q.* And with Dr. Robertson? *A.* That is all.
20744–6. *Q.* You told Dr. Robertson that it was not a fair thing to go and see if there were gas at the top heading? *A.* Yes.
20747. *Q.* You said that Dr. Robertson told you to try and go to the face and get traces of gas? *A.* That was on the Saturday. He said, "Go to the face of that place and test it."
20748. *Q.* Do you know why he wanted the face of the heading tested? *A.* It is a likely place to find gas, because it is high.
20749. *Q.* Did you know that the mine had given off gas before? *A.* No.
20750. *Q.* You never knew that a man was burned there years ago? *A.* No.
20751. *Q.* Do you know that gas had been reported by miners? *A.* No.
20752. *Q.* Have you got the note-book you took your notes in? *A.* Yes.
20753. *Q.* Look how many leaves are taken up with notes. I want to see the value of your notes? *A.* There are nine leaves and a half of the book taken up with notes.
20754. *Q.* You did not take any notes until the Monday? *A.* There were no notes taken until the Monday.
20755. *Q.* All of them were taken on the Monday? *A.* I was there on the Friday and other days.
20756. *Q.* Did you take notes on the subsequent days? *A.* Yes.
20757. *Q.* You were there on the Monday, Tuesday, Wednesday, Thursday, and Friday, and all the notes you took, during those five days, are comprised in nine pages and a half of a small note-book? *A.* Yes.
20758. *Mr. Robertson.*] That question is hardly fair, because it does not require a large note to jog a man's memory about a matter.
20759. *Mr. Lysaght.*] *Q.* What do you mean by saying that you did not think it was fair to go and look for gas? *A.* Because the air was cut off.
20760. *Q.* How did you know? *A.* Because we were in the mine. It was said in the mine on the 5th Right, near to a stopping which was blown out.
20761. *Q.* Where was that stopping—was it a stopping on the 5th Right rope road that was down? *A.* The whole of them were down.
20762. *Q.* What stopping was it that you saw down which caused you to say that it was not fair to go and look for gas? *A.* All of them were down.
20763. *Q.* Was it a door or a stopping? *A.* I did not see a door, it was a stopping between the back and the front heading.
20764. *Q.* Which way was it blown? *A.* The stoppings were blown into the front heading.
20765. *Q.* It must have been a stopping inbye of the 5th Right? *A.* All the stoppings were deranged.
20766. *Q.* Did you observe a stopping inbye of the 5th Right? *A.* I say they were all deranged.
20767. *Q.* Which way were they blown? *A.* There were two with the top blown off.
20768. *Q.* Do you know which way they were blown? *A.* A big stone was lying on the front heading, and part of the stopping was blown out.
20769. *Q.* Keep in mind the first cut-through inbye of the 5th Right. Was the stopping blown towards the main level or towards the travelling road? *A.* The stone was in the main road and the loose stuff on the back heading.
20770. *Q.* And the next one? *A.* They were all the same way.
20771. *Q.* Have you no note of it? *A.* No, it was on the Satuaday night. It was on the Monday that we tried to find the seat of the disaster. We were all asked to try to find the face of No. 1 Right and see whether there was anything there.
20772. *Q.* I want to know why it was unfair to ask you to do that? *A.* My reason for saying it was unfair was because we were asked to go in a place where the air was cut off.
20773. *Q.* It was unfair to whom? *A.* It was unjust to anyone who tried to find gas under false conditions—under conditions which do not exist at other times. Everything was deranged, and the fact of us finding gas there would not be a guarantee that gas had been there at any other time.
20774. *Q.* Who said there had been gas there at any other time? *A.* No one.
20775. *Q.* To whom was it unjust? *A.* It was a test that was useless to anyone, because it would be made under unfair conditions. That is what I want to get at. It is no use making a test when you cannot rely on it.

20776. *Q.* Do you not see that under your theory if any gas was there before the disaster it would be licked up by the heat or dissipated before this time. As this gas was found after the disaster how did it get there? *A.* I cannot account for it. It may have been left by the heat. I cannot tell you how it got there.
20777. *Q.* I suppose it would be an absurdity to say that it came there from the face of the coal? *A.* I cannot give you any explanation. The gas was so slight that if it had been there you could not have found it.
20778. *Q.* Did not Mr. Atkinson find gas with the safety-lamp? *A.* I never heard of it.
20779. *Q.* Can you give me any other reason why it was unfair? *A.* That is the only reason—because it would be making a test under false conditions.
20780. *Q.* It would not have been a valueless test if no gas were found there? *A.* I cannot say.
20781. *Q.* You would have need of the test then? *A.* At any meeting I have gone to I say what I have found, and no one can show that I have made an unfair reading of the pit.
20782. *Q.* You said that you did not think of making a comparison between Kembla and Dudley at the time you made the inspection of the mine? *A.* No, I did not.
20783. *Q.* That was the first occasion you thought of it? *A.* On the first day that I came out of the mine, on a Saturday, I passed the remark.
20784. *Q.* At that time you thought that it was an explosion of gas and coal-dust? *A.* I did not think anything. I knew that there was a great absence of flame and coal-dust—that was the remark I passed.
20785. *Q.* You know that the Dudley explosion was one of gas and coal-dust—you remarked that you were not able to observe conditions of gas and coal-dust? *A.* The remark passed by me was that the conditions of Kembla and Dudley were not to be compared.
20786. *Q.* What put gas and coal-dust into your mind at all? *A.* You never heard me mention gas and coal-dust.
20787. *Q.* What put the Dudley explosion into your mind? *A.* I never gave it a thought.
20788. *Q.* I want to know what put the Dudley explosion of gas and coal-dust into your mind as having anything to do with Kembla? *A.* I drew a comparison between the two.
20789. *Q.* Did you think there had been an explosion of gas and coal-dust at Kembla? *A.* No.
20790. *Mr. Robertson.*] *Q.* Do you consider there has been an explosion at all? *A.* I cannot find any trace of complete combustion throughout the colliery. I can only speak from the facts I saw in the mine.
20791. *Q.* What do you call the whole phenomena—the wholesale destruction of property—how do you think it was caused? *A.* I would say it was a pure wind blast.
20792. *Q.* Do I understand you that it was a pure wind blast? *A.* That was the cause of it at the initial point.
20793. *Mr. Lysaght.*] *Q.* There was some incomplete combustion of what? *A.* Of coal-dust.
20794. *Q.* You say incomplete combustion of coal-dust ——[*Interrupted.*]
20795. *His Honor.*] Is it worth while continuing this evidence?
20796. *Mr. Lysaght.*] I was going to ask him how he accounted for Dr. Nash and Dr. Paton stating that sixty or eighty men died from carbon monoxide poisoning.
20797. *Witness.*] I did not know that.
20798. *Mr. Lysaght.*] *Q.* Did you inquire? *A.* No.
20799. *Mr. Robertson.*] *Q.* Did you see any of the bodies? *A.* Three or four—I saw Rees and Stafford.
20800. *Q.* What did they die of? *A.* We simply found the bodies that night—and marked the place.
20801. *Q.* How was the flesh? *A.* The flesh was all right, but they were black with dust coming from work. There was no sign of burning on them.
20802. *Q.* Do you mean to say that according to the medical evidence a large number of these men died from after-damp? *A.* I read it in the paper.
20803. *Q.* What produced it—you cannot have it without an explosion? *A.* If it is pure after-damp there must be complete combustion. I understood that it was carbonic oxide. You can get that from incomplete combustion.
20804. *Mr. Robertson.*] *Q.* There must have been an explosion to produce it or else heat? *A.* There must be heat.
20805. *Q.* Did you ever hear of after-damp without an explosion? *A.* Not so far as I know of.
20806. *Q.* If you were told that the men died from after-damp you would draw your own conclusions? *A.* I understood that the men died from carbonic oxide.
20807. *Mr. Ritchie.*] *Q.* Did you read the medical evidence? *A.* I only read what I saw in the Newcastle paper—everything was very short.
20808. *Q.* Did you see about the burning? *A.* I saw about the burning.
20809. *Q.* I thought you said you knew nothing about burning? *A.* You said at the tunnel mouth.
20810. *Q.* Did you try to find out what was the cause of the explosion without finding out the facts? *A.* The facts are for anyone to see in the pit—the starting point—and the damage done.
20811. *Mr. Robertson.*] *Q.* Would not the condition of the bodies be a factor in enabling you to arrive at a conclusion? *A.* Yes.
20812. *Mr. Lysaght.*] *Q.* What made you assume that there had been a big fall in the 4th Right? *A.* I was told it.
20813. *Q.* Who told you that there had been any fall in the 4th Right? *A.* On the Monday afternoon Mr. Atkinson and I were with a party.
20814. *Q.* Who told you there had been a fall? *A.* Thomas Cook I think he was the first to say anything of it, when the two parties met he said, "Have you found anything?"
20815. *Q.* Is it on the word of Thomas Cook that you accepted the statement that there had been a fall? *A.* No, you wanted to know who told me. I left then and went to make an examination of it myself, and the remainder of the party walked away. We walked in as far as we could go.
20816. *Q.* Did you know that a week before the disaster 2½ feet of that goaf had fallen? *A.* No.
20817. *Q.* You assumed that it was all one fall? *A.* Yes.

[The Commission, at 4·40 p.m., adjourned until 10 o'clock the following morning.]

TUESDAY,

TUESDAY, 26 FEBRUARY, 1903, 10 *a.m.*

[*The Commission met at the Supreme Court, King-street, Sydney.*]

Present:—

C. E. R. MURRAY, Esq., D.C.J. (President).

D. A. W. ROBERTSON, Esq., Commissioner. | D. RITCHIE, Esq., Commissioner.

Mr. Bruce Smith, Barrister-at-Law, instructed by Mr. Wood, Crown Solicitor's Office, appeared on behalf of the Crown.

Mr. A. A. Atkinson, Chief Inspector of Coal-mines, assisted Mr. Bruce Smith.

Mr. A. A. Lysaght, Solicitor, appeared on behalf of—

(*a*) the representatives of deceased miners, wheelers, &c. (victims of the explosion);

(*b*) the employees of the Mount Kembla Colliery (miners, wheelers, &c.);

(*c*) the Illawarra Colliery Employees' Association (the Southern Miners' Union).

Mr. C. G. Wade, Barrister-at-Law, instructed by Messrs. Curtis and Barry, Solicitors, appeared on behalf of the Mount Kembla Coal and Oil Company (Proprietors of the Mount Kembla Mine).

(Mr. J. Garlick, Secretary to the Commission, was present to take shorthand notes of the evidence and proceedings.)

20818. *His Honor.*] I might mention that we have received this morning a letter from Mr. Bower, enclosing Mr. Atkinson's letter to him of the 26th of May, 1902, and the Chief Inspector's report, dated the 27th of September, 1902, which was referred to. The original letter which was received by Mr. Atkinson is not attached; and, of course, Mr. Atkinson may produce that, if he wishes to do so. Perhaps it is unnecessary to go further into the matter than to say that Mr. Atkinson's letter, written to Mr. Bower, is such an absolutely fair and proper communication that Mr. Bower's suggestion that he got something like a snub seems to fall to the ground completely. Mr. Atkinson's letter is a very fair one, and is very carefully written so as not to, by any possibility, give any offence to Mr. Bower.
20819. *Mr. Bruce Smith.*] Is Mr. Bower complaining of it now?
20820. *Mr. Ritchie.*] No. He was asked for a copy of it; and he has simply sent it down.
20821. *Mr. Robertson.*] He gives one report to the colliery in the official book and another to the miners, I take it; and they are different.
20822. *Mr. Ritchie.*] He really drew attention to certain matters in a letter to Mr. Atkinson: and those matters were not put in his report.
20823. *Mr. Robertson.*] And therefore I think the fault lies with Mr. Bower.
20824. *Mr. Ritchie.*] Mr. Atkinson might produce that letter.
20825. *Mr. Atkinson.*] I have the whole of the papers, if the Commission desire to see them.
20826. *His Honor.*] I will hand down these letters for Counsel to see if they wish. Mr. Bower explained it by saying that ——
20827. *Mr. Ritchie.*] It was some fear on the part of his companion.
20828. (The papers referred to were then handed down for Counsel to see. They were a letter from the Chief Inspector of Coal-mines, dated 26th of May, 1902, to Mr. W. Bower, which was put in and marked *Exhibit* No. 43; and a report, dated 27th of September, 1902, of an inspection of Seaham Colliery made by check-inspectors Bower and Stenhouse, which was put in and marked *Exhibit* No. 44.)

Mr. S. H. WARBURTON was sworn, and examined, as under:—

Examination-in-Chief by Mr. Wade:—

20831. *Q.* What is your name? *A.* Silvester Henry Warburton.
20832. *Q.* What are you? *A.* A mining surveyor.
20833. *Q.* Where? *A.* Mount Kembla Colliery.
20834. *Q.* How long have you been employed in that capacity? *A.* About five and a half years.
20835. *Mr. Ritchie.*] *Q.* As mining surveyor? *A.* Well, as assistant before: for about two years, I suppose, as mining surveyor.
20836. *His Honor.*] *Q.* Assistant before to whom? *A.* To Mr. White and Mr. Littlejohn.
20837. *Mr. Wade.*] You made a plan of the different signs of force in Mount Kembla? *A.* I did.
20838. *Q.* When did you make that? *A.* Immediately after the disaster, before anything was disturbed.
20839. *Q.* That is a bit vague: what month would it be, do you remember? *A.* I cannot say.
20840. *Q.* Do you remember the Government Mining Surveyors being there? *A.* Yes.
20841. *Q.* Was it about that time? *A.* Just the same time.
20842. *Q.* Was anybody with you? *A.* Yes.
20943. *Q.* Who? *A.* Mr. Hay and Mr. Morrison.
20844. *Q.* Morrison the deputy? *A.* Yes.
20845. *Q.* Look at *Exhibits* 37, 38, and 39—those are your plans? *A.* Yes.
20846. *Q.* I want you to take the one showing the 4th Right, first of all. How did you come to draw the 4th Right at right angles? *A.* I had directions from Dr. Robertson to make the 4th Right the centre to start from
20847. *Mr. Ritchie.*] *Q.* I did not quite hear that? *A.* I had directions from Dr. Robertson to start my surveying from the 4th Right, and then to work backwards and forwards.
20848. *Mr. Wade.*] *Q.* Work backwards and forwards, where? *A.* From the 4th Right.
20849. *Q.* On what? *A.* On the main road. I went in to Morris and son's place, up at the back heading of No. 1, then on the left hand as far as Aitken and son's place.
20850. *His Honor.*] That is not an answer to your question, Mr. Wade.
20851. *Mr. Wade.*] I am coming to that, Your Honor.
20852. *Q.* Did you take any observations of force in the 4th Right road at all *A.* Yes.

20853. *Q.* In respect to what? *A.* In respect to the force coming from the 4th Right. I took observations as to the force coming from the 4th Right goaf.
20854. *Q.* I want to know now, if that is so, why you did not draw the 4th Right at the correct angle? *A.* Because I could not get in up there at the time I made the survey, owing to the black-damp coming out of the 4th Right.
20855. *Q.* How do you mean? *A.* I could not get in here to show the proper angle at which the heading was driven.
20856. *Q.* You got signs of force up here [*pointing to a portion of the 4th Right between the main No. 1 level and the 35-acre goaf*]; how did you get that? *A.* I got that afterwards.
20857. *Mr. Robertson.*] *Q.* Could not you get the angle afterwards? *A.* Yes; but the fact of the matter was that I had forgotten all about the angle. I showed the cut-throughs at right-angles; and I showed the 4th Right at right-angles; and then, when I came to make my measurements for the shunt, which I had not shown on the plan at the same time as this, I found this was out; and I did not alter it, thinking that perhaps it would not be a great matter.
20858. *Mr. Wade.*] *Q. Exhibit* No. 38 shows your section of forces towards the face of No. 1 Right? *A.* Yes.
20859. *Q.* You see the line of cut-throughs branching off to the left from No. 1 front heading. What is the distance there at that point marked in red ink? *A.* 1,458 feet.
20860. *His Honor.*] *Q.* 1,458 feet from where? *A.* 1,458 feet from the 4th Right to the places to the left.
20861. *Q.* From the junction of the 4th Right with the main road? *A.* Yes.
20862. *Mr. Wade.*] *Q.* Tell us the signs of force you saw travelling that line of cut-throughs, going to the left or west.
20863. *Mr. Bruce Smith.*] Do you mean the line of cut throughs near the face?
20864. *Mr. Wade.*] Yes, the line of cut-throughs travelling to Purcell's and Aitken's.
20865. *Mr. Bruce Smith.*] The nearest to the faces.
20866. *Witness.*] Yes.
20867. *Mr. Wade.*] *Q.* What was the first thing you saw? *A.* The first thing I saw was the piece of canvas lying at the rib here.
20868. *Q.* Do not say "here." Describe the place. Just show us the first sign of force you saw leaving the front heading, and say what it was—describe it? *A.* The canvas on the left-hand rib leading into the cut-through to the left of the main tunnel at a distance of 1,458 feet from the 4th Right junction.
20869. *Q.* How was that canvas? *A.* It was lying at the corner of the rib, against the rib.
20870. *Q.* In what way against the corner—lying up tight or loose? *A.* Well, of course, canvas, as a rule, lies up loosely against anything; but it seemed to have been driven with considerable force up against the side of the rib.
20871. *Q.* On that plan, across the front heading near that point there is a screen marked with a dotted line? *A.* Yes.
20872. *Q.* Was that screen there at the time you made the survey? *A.* No, previous to the disaster.
20873. *Q.* What was that—canvas, or what? *A.* Canvas.
20874. *Q.* Can you say at all what become of it? Did you see any remains of that canvas screen when you were making that survey? *A.* I concluded that this piece on the corner of the rib was the remains of that screen.
29875. *Q.* What is the next thing you saw going to the west? *A.* Another piece of canvas there [*pointing to the plan*].
29876. *Q.* Before you got to that point? *A.* Signs of force in Purcell's bord, No. 105.
20877. *Q.* What did you notice there? *A.* The canvas on the left hand, or western side, of the bord was blown inwards towards the left-hand rib, the west rib.
20878. *Q.* Did you see how it has been fastened? *A.* Yes, the timbers were standing. One or two were down. The props that supported the canvas were still standing.
20879. *Q.* On which side of the props had the canvas been nailed? *A.* On the right-hand side going in.
20880. *Q.* Which do you call the right-hand side? *A.* This side [*pointing to the plan*].
20881. *Q.* I think there is some mistake. You see the way you have drawn that? *A.* Yes.
20882. *Q.* I ask you which side had the canvas been nailed before it was moved? *A.* On the left-hand side.
20883. *Q.* And where had it been moved to? *A.* Still further to the left-hand side; away from the previous position, to the left.
20884. *Q.* The west? *A.* Yes.
20885. *Q.* Was there anything else you saw in the bord itself? *A.* I saw no signs of any flame.
20886. *Q.* Take the cut-through at the mouth of that bord,—how had the air been taken up there when it was working? *A.* On the wide side.
20887. *Q.* How was that done? *A.* By bratticing.
20888. *Q.* Where? *A.* By a screen across the roadway, and then up to the face.
20889. *Q.* Did you see any sign of that screen that had been across the roadway? *A.* Yes
20890. *Q.* Where was that? *A.* It was blown in this direction, west.
20891. *Q.* Did you see any canvas blown west? *A.* Yes, this canvas 103 feet from the junction of that cut-through with the main level.
20892. *Q.* You have got something shown there as wrapped around the prop—that is the canvas you refer to? *A.* Yes, whirled round the prop.
20893. *Q.* What is the next thing you saw going in? *A.* I saw a cap at 144 feet from that same mark at the junction of the main level and that cut-through, which I took to belong to Thomas Tost.
20894. *Q.* Was that cap identified? *A.* No; but the previous night I found his body in the vicinity—not the previous night, but the night of the disaster. I found his body along here [*pointing to the plan*].
20895. *Q.* Where is "here"? *A.* I have not shown his body, because, of course, it was not there when I was making the survey. It was still further to the westward of that piece of canvas which I have mentioned as being wrapped round a prop.
20896. *Q.* His body would be between the turning into his own working place and the turning into Purcell's working place? *A.* No, his body was immediately opposite his own working place, in the middle of the road, and his face was downwards.
20897. *Q.* The cap was lying on the ground? *A.* Yes.
20898. *Q.* Was the lamp in it, did you notice? *A.* I did not see the lamp.

20899. *Q.* Now, I want the other signs of force? *A.* I proceeded up Thomas Tost's and Dunn's place, and I noticed that the canvas had been shifted off the props to the westward.
20900. *Q.* How had that canvas been fastened? *A.* Just the same way as in the other bord.
20901. *Q.* On the west side of the props? *A.* Yes, on the west side of the props.
20902. *Q.* Was there a canvas across the road into Tost's place? *A.* No, there was none standing there at the time.
20903. *Q.* But there had been? *A.* Yes, in the ordinary course of working there was.
20904. *Q.* Was that there? *A.* No, it was not there.
20905. *Q.* Did you see any sign of that? *A.* What I took to be it I saw wrapped round a prop in the middle of the road at 203 feet distance from that previous starting-point on the main level.
20906. *Q.* That would be to the westward? *A.* To the westward of where it was previously.
20907. *Q.* Did you see anything else there? *A.* I saw what I took to be Thomas Tost's shirt or some article, in that bord, wrapped round a prop, showing no signs of any burning.
20908. *Q.* What is the next sign, going west still? *A.* Then I went towards Aitken and son's pillar—at a distance of 356 feet from the previous starting-point on the main level.
20909. *Q.* What did you see there? *A.* I saw on the pillar just a little indentation in the coal, where I understood they had been working at the time of the accident, just commencing to take a stook as it were, a lift, as it were, out of the pillar.
20910. *Mr. Robertson.*] *Q.* By the way, what was the object of starting to take out the pillar before it was formed? [*Witness did not answer.*]
20911. *Q.* The pillar, I think, was not quite formed; there was not another cut-through above that? *A.* This was worked out, all waste [*pointing to the plan*].
20912. *Q.* Point to Aitken's pillar? [*Witness did so.*]
20913. *Q.* Was there a cut-through above that? *A.* No, it was waste workings.
20914. *Q.* Was there a cut-through above that line of cut throughs? *A.* No, there was not a line of cut-throughs.
20915. *Q.* Then that would be actually taking out the pillar before it was formed? *A.* There was a bord here that I have not shown.
20916. *Q.* But it is not a pillar until it has four sides, is it?
20917. *Mr. Bruce Smith.*] *Q.* Mr. Robertson wants to know, was not this continuous coal from here upwards [*pointing to the plan*]? *A.* No.
20918. *Mr. Robertson.*] *Q.* Was that a complete pillar? *A.* No; but I believe it was far less in size than I have shown it.
20919. *Q.* It is a very simple question. You know a pillar must have four sides to it. Was it a complete pillar? *A.* Yes, it was a complete pillar.
20920. *Q.* If there was not another cut-through higher up, how could it be a complete pillar? *A.* There was a split, I understand, Mr. Robertson, taken across from the top side, and a kind of stook left here, and that was to be taken out later.
20921. *Q.* Is that shown on the plan? [*The plan was shown to Mr. Robertson.*] In point of fact it was not a pillar at all? *A.* They were taking a lift up from the edge of the waste. This would be like the boundary, there, the left-hand side [*the west side*].
20922. *Q.* As far as I can see, the pillar was not a pillar at all. However, I do not know that it is very material.
20923. *Mr. Wade.*] *Q.* Which way were they working? *A.* From south to north.
20924. *His Honor.*] *Q.* Is that all solid coal to the north of the ends of those bords, as far as they have gone? *A.* Yes, all solid coal.
20925. *Mr. Robertson.*] Then that could not be a pillar.
20926. *Mr. Wade.*] I might point out to the Commission that the thing would be much more plain if we had the colliery plan. That is a plan made out by the Government officials, partly from the colliery plan, and partly from information. That goaf on the lithograph is different from what appears on the actual colliery plan.
20927. (Witness produced the actual colliery plan, which was shown to the Commisson.)
20928. *Mr. Ritchie.*] This does not appear to show any difference from the lithograph.

[*Mr. Wade then explained the plan to the Commission.*]

20929. *Witness.*] I may say here that it is a pure mistake that I have shown this dotted line on the east side of this pillar.
20930. *Mr. Bruce Smith.*] *Q.* That is solid coal to the east? *A.* Yes.
20931. *Mr. Wade.*] *Q.* I want the signs of force. You have got as far as Aitken's place? *A.* I saw partially-filled skips blown over on to their sides.
20932. *Q.* Where were they when you saw them? *A.* They were to the westward, about 25 feet from the centre of Aitken's and son's working place.
20933. *Q.* How were they—on the rails, or off the rails, or what? *A.* Off the rails, jumbled up all together, coal thrown about.
20934. *Q.* Did you notice anything else about the skips, about the bottom of the skips? *A.* There was coal lying about.
20935. *Q.* Whereabouts? *A.* Hard up against the end of the skips.
20936. *Q.* Which end? *A.* The eastward end.
20937. *Q.* Anything else? *A.* I noticed a coat wrapped round a prop. It did not appear to have been touched by any flame.
20938. *Q.* Where was the coat round a prop?
20939. *Mr. Bruce Smith.*] Might I suggest that, if all these things that Mr. Warburton speaks of are shown on his plan, he might give his evidence as Mr. Cambage did, and say "I made that plan from observations which I personally made in the mine; that plan is correct," and it will not take up much time.
20940. *Mr. Wade.*] I have nearly finished.
20941. *Q.* About this coat—how was it on the prop; was it fastened or not, to the side? *A.* No, it appeared to be just wrapped round the prop.
20942. *Q.* Where was it, on the gronnd, or what? *A.* Almost on the ground.
20943. *Q.* Was the prop standing? *A.* Yes, the prop was standing.

20944. *Q.* Tell us exactly where the coat was with regard to the prop? *A.* It was wrapped immediately round the prop.
20945. *Q.* Would it be on the ground? *A.* I would not like to say it was right on the ground, but it would be about mid-way.
20946. *Mr. Robertson.*] *Q.* Was it standing up in that position, wrapped round the prop? *A.* Wrapped round the prop.
20947. *Mr. Wade.*] *Q.* What was the prop? *A.* It was a prop that had been used for directing the brattice in the cut-through.
20948. *Q.* A split prop, or what? *A.* A round prop.
20949. *Q.* Was there anything else you noticed? *A.* I also saw a knife driven hard into a prop, so hard that you could not possibly pull it out without breaking it, immediately in front of the roadway leading in to Annesley and James' pillar. This knife was on the outbye side of the prop.
20950. *Q.* Was it open or shut? *A.* The blade was driven in; it was open.
20951. *Q.* Was the knife standing open, or partly shut, or what? *A.* Standing open, with the handle dropped. It was driven like that [*indicating, with a quill pen, that the blade was almost in a straight line with the handle, the angle between blade and handle being a very obtuse one*].
20952. *Q.* Did you say the handle was dropped? *A.* No, the blade was like in that direction, straight. It would be driven into the prop that way [*indicating as before*].
20953. *Q.* Was that all? *A.* Yes, that was all. Of course I went into Annesley and James' place, and I saw a full skip standing there untouched.
20954. *Q.* How was the brattice? *A.* I did not notice the brattice.
20955. *Q.* Was it a bord or a pillar? *A.* A pillar. They were taking a lift off it.
20956. *Q.* Now, come down here to the line of cut-throughs next outbye from those you have been speaking of—that is just inbye of the 5th Right.
20957. *Q.* You have got a marking here "Canvas cloth slightly disturbed"? *A.* Yes.
20958. *Q.* That is in the second cut-through? *A.* Yes.
20959. *Q.* In what way was it disturbed? *A.* Just pieces blown about a bit.
20960. *Q.* And what does this thing like a prop mean? *A.* The props were standing.
20961. *Q.* But what does this indicate? *A.* That is in pencil; it is not in ink.
20962. *Mr. Bruce Smith.*] Is it not yours? *A.* I do not know whether it is really mine.
20963. *Mr. Wade.*] It is mine.
20964. *Mr. Bruce Smith.*] I suppose nobody else has made any marks upon this but yourself and Mr. Wade? *A.* No.
20965. *Q.* It is all your own? *A.* Yes.
20966. *Mr. Wade.*] *Q.* You have the ventilation plan here, have you not, Mr. Warburton? *A.* Yes.
20967. *Mr. Bruce Smith.*] Before he goes to the ventilation plan, do you mind asking him how he came to write that other angle, at the 3rd Left, as a right angle instead of an obtuse angle?
20968. *Mr. Wade.*] *Q.* Just explain that? *A.* For the same reason. I had directions to start from the main road; and I did not think it was of any consequence; and I showed them at right angles.
20969. *Mr. Bruce Smith.*] You had your pit plan before you when you drew this? *A.* Yes.
20970. *Q.* And that does not show a right angle? *A.* No.
20971. *Q.* You did not even follow that? *A.* No, my directions were to make the 4th Right the starting place.
20972. *Mr. Wade.*] *Q.* On this plan [*plan showing the ventilation of the mine*] what does the blue represent? *A.* The main intakes.
20973. *Q.* And the pink, or carmine? *A.* The main returns.
20974. *Q.* There is a piece here from the 2nd Right road which you have not got marked at all; that is, between the telephone cabin in No. 1 main road and the cross-cut heading? *A.* That is purely a scale of air ventilating that section. This blue line here shows the main intakes, and the carmine the main returns. Of course there are scales of air ventilating other sections.
20975. *Mr. Robertson.*] *Q.* But is not there a connection between some of these? Is not that 2nd Right rope road virtually an intake airway? *A.* It is a kind of balance.
20976. *Q.* It could go either way? *A.* If anything it had a tendency to go this way [*indicating an easterly direction*].
20977. *Q.* An intake air? *A.* Yes, an intake air.
20978. *Q.* There are no doors? *A.* No.
20979. *Q.* And, therefore, it is intake air? *A.* Yes.
20980. *Q.* Does that apply to both these headings—there are two parallel headings there, you know; are they both intake? *A.* No. The front heading I call the rope road. On the back heading, I understand, there was a door.
20981. *Q.* But you only understand that? *A.* Well, I have seen it; but a couple of weeks, or, perhaps, less than that, before the disaster, I do not remember seeing it; so I cannot swear to the point.
20982. *Q.* Further to the south there are two headings coming up from the daylight tunnel; are not they intakes too? *A.* Yes.
20983. *Q.* Well, they ought to have been shown in blue? *A.* Well, I have simply shown the main intakes and returns. There are other marks on the plan as well, which the Government Draftsman put on, showing the ventilation, showing the way it runs. I simply put the main intakes on.
20084. *Q.* To a certain extent, the plan is incomplete? *A.* No; there are arrows shown on the plan denoting the way the ventilation travels.
20985. *Q.* Yes; but you show on the plan that the intakes are in blue; and I know myself several roads that should have been coloured blue that are not. I do not know how many more there may be in addition to what I know from my own observation? *A.* Would not you call those splits scales of air, whether main intakes or not?
20986. *Q.* Whether main intakes or not, they are intakes? *A.* You see this was simply made after the Government Draughtsman had put the arrows on showing the ventilation.
20987. *Q.* But we asked the Company to supply us with a plan showing the ventilation of the mine at the time of the explosion; and a plan has been supplied which is incomplete, to say the least of it? *A.* There are arrows showing the direction of the ventilation as well.

Witness—S. H. Warburton, 26 February, 1903.

20988. *Q.* Then, another point, you have marks there indicating, I think, canvas doors and also wooden doors. What do you indicate canvas doors by? *A.* I have no marks here of my own, with the exception of two; that is, intakes shown in blue, and returns carmine.
20989. *Q.* That is not my question—how do you indicate canvas doors? *A.* With a C.
20990. *Q.* And wooden doors? *A.* With a D.
20991. *Q.* And wooden doors are not in the table of references? *A.* I did not make that table of references. This was simply sent to me; I could not make an alteration.
20992. *Q.* The Company was asked to supply a plan to the Commission; and, evidently, they supplied a plan made up by somebody else? *A.* These lithographs were sent to us.
20993. *Mr. Robertson.*] Quite so; and you ought to have put the information on.
20994. *Mr. Wade.*] *Q.* You put on that plan the different C's and D's that should be on the different roads? *A.* Yes, that is correct.
20995. *Q.* But in the reference table there is no reference for wooden doors? *A.* No.
20996. *Mr. Robertson.*] Can you say that the plan is accurate? *A.* To the best of my knowledge it is. It was made under the direction of the Manager and the firemen for the district. I simply put down what was told me under the direction of the Manager and the firemen for the district at the time of the disaster.
20997. *Mr. Ritchie.*] *Q.* But does not your colliery plan show the system of ventilation? *A.* No.
20998. *Mr. Robertson.*] That would not necessarily be the case. If a plan of the ventilation is required, it is usual to have a separate small scale plan to show it by itself, because the colliery plan is changing from day to day.
20999. *Mr. Bruce Smith.*] Surely the canvases and the doors are part of the system of ventilation which the Court directed the Company to prepare for its information?
21000. *Mr. Wade.*] The canvas and the doors are shown on the lithograph; but he assumes no responsibility for them, and he is not prepared to say they are correct.
21001. *Witness.*] I am prepared to say they are correct.
21002. *Mr. Wade.*] *Q.* Have you checked over the doors and canvas as shown on the lithograph? *A.* Yes, I have checked them. There is one mistake. I found a door opening the wrong way.
21003. *Q.* That is the wooden door in the back heading just inbye of the 5th Right? *A.* Yes; you see I have altered that, and drawn it this way [*pointing to the plan.*]
21004. *Q.* Does the loop of the D show the way the door opened? *A.* Yes. It opened towards the tunnel-mouth.
21005. *Q.* You were in the mine on the night after the disaster? *A.* Yes.
21006. *Q.* When were you first in those places, such as Purcell's and Tost's and Aitken's? *A.* That would be on my second visit.
21007. *Q.* How long after was that? *A.* It would be about 1 o'clock in the morning of the Friday.
21008. *Q.* Were the conditions the same then as they were when you made the plan? *A.* Yes, practically the same.
21009. *Q.* Were the bodies there when you first went in, or had they been moved? *A.* The bodies were all there, with the exception of William Nelson's body.
21010. *Q.* Listen to my question. I am talking of those places which you have been describing, to the west of No. 1 front heading? *A.* Yes, I can say the bodies were there.
21011. *Q.* The bodies were there in those places when you first went in there? *A.* Yes.
21012. *Q.* Do you know, of your own knowledge, anything about any chocks near the goaf edge in the 4th Right? *A.* When I went in I discovered timber blown hard over against the left-hand rib.
21013. *Q.* On what date? *A.* This would be two or three days after, when we could get in. I saw the remains of what I took to be chocks driven hard up against the rib, as it were, of the bord.
21014. *Q.* On which side—can you describe it? *A.* Yes, it would be on the left-hand side looking in the bord.
21015. *Q.* Would it be on the inbye side or the outbye side of the 4th Right road? ——
21016. *Mr. Robertson.*] Are not you referring to the waste in the 4th Right, the edge of the fall in the 4th Right?
21017. *Mr. Wade.*] *Q.* I want to get at these chocks. I want to know if he knew anything about them before the disaster.
21018. *Q.* Take the No. 1 main rope road, from the 2nd Right junction up to the 5th Right junction, what was the condition of that road as to moisture or dryness at the time of the disaster? *A.* I should think it was damp, especially from the 4th Right up to the 4th Left; it was damp; in fact, we always had a great amount of trouble to keep the rope from being damped by the water.
21019. *Q.* Where was the swallow;—was there a swallow there? *A.* There was a slight swallow about the middle of the road, midway between the 4th Right and the 4th Left.
21020. *Q.* Do you know the 3rd Right? *A.* Yes.
21021. *Q.* Was there any moisture or water about there? *A.* My memory does not say about that.
21022. *Q.* Do you remember if there was a pump or a sump near the 3rd Right? *A.* In the 3rd Right there used to be a sump. We had a good deal of water in here [*pointing to the plan*], and we used to drain it from here into a water-level.
21023. *Q.* How did it run from the 3rd Right? *A.* By gravity.
21024. *Q.* But through what part of the mine? *A.* Along the No. 1 travelling road, and then across a cut-through into a drain cut across the main level; then again through a drain to the water-level, and down a staple shaft to the surface.
21025. *Q.* How far would it go along the travelling road from the 3rd Right—how many yards, roughly? *A.* Say, roughly, about 200 or 300 yards.
21026. *Q.* Before it turned off? *A.* Before it turned off to go into the drain.
21027. *Q.* Do you remember if there was any moisture in the 4th Right road after the disaster? *A.* No, I do not remember seeing any.
21028. [*A lithographed plan of Mount Kembla Mine, showing the ventilation of the mine at the time of the disaster, prepared by Mr. S. H. Warburton, Surveyor, Mount Kembla Mine, was put in and marked 'Exhibit No. 45.'*]

Cross-examination

Cross-examination by Mr. Lysaght:—

21029. *Q.* The whole of your experience has been obtained at Kembla? *A.* No.
21030. *Q.* Where else? *A.* Newcastle.
21031. *Q.* What experience had you at Newcastle? *A.* I had had experience also at Keira. I was under Mr. McGeachie and Mr. Jones at Keira; and I was under Mr. D. McGeachie, Mining Engineer, at West Wallsend.
21032. *Mr. Ritchie.*] *Q.* Do you call Mr. McGeachie, of Keira, a mining engineer? *A.* I think so; he holds a mine manager's certificate.
21033. *Mr. Lysaght.*] *Q.* What is the total number of years' experience you have had? *A.* I am not sure of the exact date at present; but I should think from five to six years.
21034. *Q.* Now, in preparing the plan showing the ventilation of the mine, you simply put blue where the arrows showed intake, and carmine where they showed return; is not that all? *A.* I went over the colliery plan again with the Manager and the fireman for each district where I was ventilating, and checked the ventilation; and where they were main intakes I coloured them blue; and where they were main returns I coloured them red; and splits of air going through, scales of air, I left with the arrows shown by the Government draftsmen; and added others where necessary.
21035. *Q.* You simply took the lithograph, and put on the blue to show intake simply where the arrows showed intake, before you verified it with the Manager? *A.* No.
21036. *Q.* Do I understand that you verified it before you put down the blue and the red marks? *A.* Yes.
21037. *Q.* On what day did you verify it? *A.* I cannot remember the exact date.
21038. *Q.* Where did you verify it? *A.* In the colliery office, in the presence of the Manager.
21039. *Q.* At Kembla? *A.* At Kembla.
21040. *Q.* How long ago? *A.* Just a short time ago. I cannot give you the exact date—a few days ago.
21041. *Q.* A few days ago? *A.* Well, immediately we got the information from Sydney we attended to it. I do not remember the date.
21042. *Q.* Cannot you remember when it was that you verified this plan with the Manager and the deputy
21043. *Mr Wade.*] Do you mean for this purpose; to bring it here?
21044. *Mr. Lysaght.*] Yes, it was not prepared until it was brought here.
21045. *Mr. Wade.*] The plan of the ventilation of the mine was prepared long ago.
21046. *Mr. Lysaght.*] *Q.* Do I understand that the plan that is brought here was prepared long ago? *A.* No.
21047. *Q.* When was that plan of the ventilation, with the red and blue put on, prepared by you? *A.* That was prepared when we got the request from the Court.
21048. *Q.* About how long ago? *A.* I told you I cannot tell you the exact date. I told you a few days ago, immediately after we got word from the Court. I cannot go any further.
21049. *Q.* How long did the verification of it take? *A.* A good while.
21050. *Q.* What is a good while? *A.* Hours.
21051. *Q.* How many hours—just roughly? *A.* I cannot say that. I did not have a watch on it.
21052. *Q.* Was it in the forenoon or the afternoon? *A.* It was in the evening, after work.
21053. *Q.* One evening? *A.* Yes, and part of one morning.
21054. *Q.* You see here on the plan that no arrows are shown on that road down to the daylight heading [*referring to the daylight heading running between the 7-acre goaf and the 9-acre goaf*], nor on the travelling road [*referring to the travelling road running parallel to the daylight heading*] no arrows are shown? This is not a travelling road.
21055. *Q.* What name is that? *A.* It is called the wet heading.
21056. *Q.* It is from No. 1 down to the daylight adit: there are two roads: and this lithograph shows no arrows on either of those two roads; and it not showing arrows you did not show in which direction the air went? *A.* As I have said before, this was a kind of balance here.
21057. *Q.* I do not care what it was; you did not show in which direction the air went because there were no arrows there.
21058. *Mr. Wade.*] *Q.* Did you say that was the reason why you did not show it?
21059. *Mr. Lysaght.*] *Q.* Was not the reason you omitted to put either blue or carmine on those two roads because there were no arrows to show in which direction the air was going? *A.* That is not the reason.
21060. *Q.* You say that is not the reason *A.* That was not the reason. The main reason was, as I have said before, the blue lines show the main intakes.
21061. *Q.* Now, can you tell me in which direction the air was travelling on the bottom of those two roads? *A.* Yes, the air would have a tendency to go that way (west).
21062. *Q.* From the daylight adit towards the No. 1 travelling road? *A.* Yes, and then it would be picked up again by this air and carried on [*meaning that it would be carried on with the main intake air in No. 1 main level*].
21063. *Q.* Now, regarding the top of one of these two—which way was the air going? *A.* There was a canvas there (at the eastern end of the road); and, if it had a tendency at all, it would go through the canvas. There was a canvas here at the top of this daylight heading on both the roads going to the No. 1 main level.
21064. *Q.* Now, would not the fact of those two stoppings being there prevent the air —— [*Interrupted*].
21065. *Mr. Wade.*] He did not say stoppings.
21066. *Mr. Lysaght.*] *Q.* Did not you say canvas stoppings? *A.* I said canvas stoppings.
21067. *Mr. Wade.*] *Q.* Not two canvas doors? *A.* Canvas stoppings, tight canvas stoppings.
21068. *Mr. Lysaght.*] *Q.* Would not the effect of those two tight canvas stoppings there be to prevent any air coming on to the No. 1 main level? *A.* People know that where there are canvas stoppings there is always a certain amount of leakage. That is why doors are put in.
21069. *Q. His Honor.*] Fixed canvas stoppings? *A.* Yes.
21070. *Q.* Not merely hanging? *A.* Not that you could get through.
21071. *Mr Ritchie.*] *Q.* They were nailed? *A.* They were nailed top and bottom.
21072. Mr. *Lysaght.*] *Q.* Was not the object of those two stoppings to prevent any air going in to the No. 1 main level? *A.* Yes, because we had a district up here to ventilate [*pointing to the district to the east and the north of the 35-acre goaf*].

21073. *Q.* That being so, do you say that the air would travel towards the No. 1 Main Road? *A.* Yes, there would be a slight tendency to go that way. There is a kind of balance here (the daylight heading) as well. These are all old workings—no new workings here.
21074. *Q.* Do not you see that unless the air was prevented by those stoppings from getting on to the main level there would have been very little air to go up to the men on the 5th Right? *A.* Yes, I have said before that they (the stoppings) were there to lead the air into those working places.
21075. *Q.* Do I understand now that all the air going in the daylight heading had to go right up to the 5th Right, and none of it to go to the No. 1 main level? *A.* Had it to go there?
21076. *Q.* That was the object of the scheme of ventilation? *A.* Yes.
21077. *Q.* Now, do you say that you know that quantities of air did scale through these canvas stoppings towards the main level? *A.* I say it would have a tendency; but, on the other hand, it would mix with the intake air and do duty just the same.
21078. *Mr. Wade.*] *Q.* Intake air from where? *A.* If any scaled through from this No. 1 daylight, through the canvas, it would mix eventually with this intake air coming in No. 1, and ventilate these workings.
21079. *Mr. Ritchie.*] *Q.* Were the ends next the No. 1 travelling road open? *A.* No, I think there was a canvas there.
21080. *Mr. Ritchie.*] There is no canvas shown on the plans.
21081. *Mr. Robertson.*] I do not think there was any canvas.
21082. *Mr. Lysaght.*] *Q.* Looking at the 2nd Right rope road, was not that part of the main intake for the men up in the 5th Right? *A.* There would be a little coming up there; but it was a kind of balance.
21083. *Q.* Does not the ventilation plan show the current of air passing along the 2nd Right rope road by the arrow? *A.* Yes, it is a scale: a little air might go up there.
21084. *Q.* The 2nd Right rope road was the haulage road? *A.* Yes, just so.
21085. *Q.* Would not that require to be ventilated? *A.* Yes, there was a certain amount of air coming up there, sufficient to keep it clean.
21086. *Q.* Why did not you show that then as an intake airway? *A.* It is not a main intake. I have said before that these blue lines simply represent the main intakes; scales of air are shown by arrows.
21087. *Q.* Then this plan does not represent the true ventilation of the colliery? *A.* Yes, it does.
21088. *Mr. Bruce Smith.*] *Q.* Do you mean that it came from east to west along the 2nd Right? *A.* From west to east.
21089. *Q.* What are you going by—by those arrows? *A.* Yes.
21090. *Q.* Are you sure those arrows are right? *A.* I said it would have a tendency: I said it was a balance.
21091. *Q.* I am not speaking of the heading to the daylight tunnel, but of the 2nd Right. Would it go from east to west or west to east—think of it irrespective of those arrows? *A.* It would go from west to east.
21092. *Q.* I think you will find those arrows are wrong. Are you sure whether the air went from east to west or west to east along the 2nd Right? *A.* If you look at page 34 of the inquest evidence you will see Adam Frost's evidence on that, at the beginning of the second last paragraph.
21093. *Mr. Lysaght.*] *Q.* Do you know that Frost, who was somewhere about here at the time of the explosion, said that that air was travelling from east to west? *A.* Yes, I will say again that there was a balance here.
21094. *Mr. Robertson.*] He merely refers to the arrows.
21095. *Mr. Bruce Smith.*] And Frost says the arrows are wrong on the plan.
21096. *Witness.*] I do not care what Mr. Frost says. I say what I have been saying before: there was a balance here; and, if anything at all, the air had a tendency to come this way, which it did. I have got it many a time.
21097. *Mr. Ritchie.*] *Q.* You say that your indications by blue there show your main system of ventilation? *A.* Yes, the main intakes.
21098. *Q.* Is it not a fact that the travelling of the air along the 2nd Right rope road is really a part of your main system of ventilation? *A.* No, it is not a part of the main system.
21099. *Q.* You know that the whole of the ventilation which goes along the No. 1 travelling road must go by the 2nd Right rope road: do not you know that you have double doors there on the inbye side of the 2nd Right? *A.* But there is a cut-through there, you will notice on the plan, before you come to those doors; and the furnace is on this side (west); and, consequently, there is a pull on the ventilation this way (west), a pull on the air.
21100. *Q.* Is not that so, that the air must travel along the 2nd Right rope road? *A.* No "must."
21101. *Q.* What are the doors for? *A.* To stop its going into the return from the 5th Right.
21102. *Q.* Where does the ventilation go then? *A.* It runs into the main level.
21103. *Q.* I thought you said a moment ago that the arrows as on this plan were correct? *A.* I have already said that there was a balance there, and the air would have a tendency to go up the 2nd Right.
21104. *Q.* But the arrows point clearly to the fact that the ventilation does go there? *A.* But you understand that those arrows simply denote a scale of air, not the main intake.
21105. *Q.* Did you have any arrows here on this plan? *A.* There is one on here at the top end.
21106. *Q.* As a matter of fact, do not the arrows on the plan that you have prepared show that the ventilation comes from the main heading into the back heading, into the travelling road, instead of going where you say now? *A.* The back heading of the 2nd Right?
21107. *Q.* Do not the arrows indicate that the ventilation is coming from the main heading into the back heading? *A.* There is a scale towards both places; the principal air would go into the main level.
21108. *Q.* Your arrows do not indicate that? *A.* But the blue line does.
21109. *Q.* The arrows indicate that the principal portion was going to the 2nd Right? *A.* The blue line shows it.
21110. *Q.* I thought you told the Commission that you took as your guide the arrows, and that you had verified those arrows as correct? *A.* No.
21111. *Q.* If we are to take the arrows, we must believe that the main ventilation from this part of the main heading must go to the 2nd Right? *A.* It would have a tendency to go there.
21112. *Q.* This door which you had to alter—you have placed that on subsequently to the preparation of the lithograph? *A.* Yes.
21113. *Q.* Was that door there prior to the explosion? *A.* I understood so. I was not here for a little while before the disaster.

21114. *Mr. Lysaght.*] At various places on this plan you have shown double doors where originally only single doors were shown? *A.* Yes.
21115. *Q.* Look at these double doors on the 4th Left travelling and haulage roads: by whose authority did you put the double doors there? *A.* Mr. Morrison's.
21116. *Mr. Wade.*] They are not double doors; they are canvas doors.
21117. *Mr. Lysaght.*] *Q.* There are two canvas doors instead of single doors, as before. By whose direction did you put the canvas doors along the 4th Left travelling and rope roads? *A.* From my own knowledge, and from Mr. Morrison's.
21118. *Q.* Did Mr. Rogers give you any directions as to where canvasses were to be shown that were not already shown on the plan? *A.* Mr. Rogers was there at the time: he was in the office at the time.
21119. *Q.* Can we take it that we are depending on Morrison for the position of these canvas doors as shown by you—those that were not already on the lithograph? Can we take it that you relied on Morrison for the position? *A.* And my own knowledge, too. I said that before.
21120. *Q.* When had you been up the 4th Left travelling road to see those canvas doors? *A.* A week or two before.
21121. *Q.* And can you swear that there were double doors at the junction of the 4th Left travelling and rope roads with the main level? *A.* I cannot swear; but to the best of my belief there were.
21122. *Q.* If you were up a week before the disaster —— [*Interrupted.*] *A.* A week or two, I said.
21123. *Q.* You ought to know if there were double doors at the junction of the 4th Left with the main level; do you know it? *A.* I cannot say exactly.
21124. *Q.* You do not remember? *A.* I do not remember.
21125. *Q.* And do you mean to say that you can remember the positions of doors farther along the 4th Left from your own knowledge? *A.* Yes, from memory.
21126. *Q.* And can we take this clearly, that you put these double doors at the 4th Left on the direction of Morrison? *A.* Morrison and the Manager.
21127. *Q.* Can you remember that the Manager did tell you to put double doors there? *A.* No; they were both in the office together; and my mind was not that much impressed with the details.
21128. *Q.* Have you ever prepared at any time a plan showing the ventilation of Kembla Mine before this one? *A.* Yes.
21129. *Q.* When did you prepare the last? *A.* I think I prepared one for the inquest.
21130. *Q.* Was it produced? *A.* I could not say. I was not examined on it.
21131. *Q.* Did you take it to the Court at Wollongong, to the inquest? *A.* Yes, and Mr. Wade had it.
21132. *Mr. Lysaght.*] Was it put in, Mr. Wade?
21133. *Mr. Wade.*] It was not put in; it was for my own information.
21134. *Mr. Lysaght.*] *Q.* I suppose the plan you prepared for the inquest would be a good deal more reliable than a plan prepared six months afterwards from memory; would it not? *A.* It would have a tendency to be, I should say.
21435. *Q.* Do you know where that plan is now? *A.* No.
21136. *Mr. Lysaght.*] Perhaps Mr. Wade could produce the plan that was prepared for the inquest, and not put in.
21137. *Mr. Wade.*] It was not prepared for the inquest; it was prepared for me. If I can find the plan I used at the inquest, I will produce it.
21138. *Mr. Lysaght.*] *Q.* Did it show the doors at the 4th Left? *A.* I could not say.
21139. *Q.* Is that the only plan that you prepared showing the ventilation of Kembla Mine? *A.* Yes, I think so.
21140. *Q.* So we have got this, that, during the whole time you were surveyor to Kembla Mine, you never prepared a plan showing what the ventilation was? *A.* No; I was never asked to.
21141. *Q.* So that, if any person, any inspector, wanted to know the scheme of ventilation in Kembla, he either had to go and look himself, or ask somebody? *A.* He could go and see the colliery plan, and it would be explained to him.
21142. *Q.* But it would not explain the matter itself? *A.* It could be shown in a short time.
21143. *Q.* You do not keep a small plan of the ventilation, as Mr. Robertson says is the practice.
21144. *Mr. Robertson.*] I did not say it was the practice. I said it could be done if it were necessary.
21145. *Witness.*] If we had any new system of ventilation, I would get orders to show a certain district, and the proposed alteration in the ventilation. That happened from time to time.
21146. *Mr. Lysaght.*] What occurs to me is this: that, from time to time, a plan ought to be prepared showing the ventilation of the colliery; and that it should be compulsory upon them to keep such a plan.
21147. *Mr. Robertson.*] It is so difficult; the conditions change from day to day.
21148. *His Honor.*] It could only be done by a tracing being taken from the colliery plan, and treated as a ventilation plan.
21149. *Mr. Lysaght.*] Yes.
21150. *Mr. Bruce Smith.*] *Q.* When you say it could be shown on the colliery plan, you mean that it is not shown, but that it could be pointed out? *A.* Yes.
21151. *Mr. Lysaght.*] *Q.* I would like to know what directions Dr. Robertson gave you concerning the preparation of these other plans? *A.* He simply said, "Make your starting point the 4th Right, and work inbye and outbye from that place; outbye to the 2nd Right, showing directions of forces, and all details possible to get. Then proceed inbye from the 4th Right, and show, as before, all directions of force and details of skips and rollers torn out; and go to the face of Morris and son's place, and the back heading and the front heading of No. 1 main level, and also as far as Aitken and son's place, on the left hand."
21152. *Q.* Is that all? *A.* That is all.
21153. *Q.* Do you know that, in the plans you have prepared, a number of things are omitted which are shown on the Government Surveyor's plan? *A.* That might be possible. He might have had a better light than I had.
21154. *Q.* Had you a bad light when you were looking for evidences of force? *A.* No, I had a fair light but I might possibly have omitted some, and possibly have some that he has not got.
21155. *Q.* Were not you taking your surveys at the same time as the Government Surveyor? *A.* Well, partly. I was in at times when he was not there.

21156. *Q.* If you started at the 4th Right, where did you get your distances from to get that start? *A.* From the colliery plan. I made the 4th Right the starting place, and measured from there. I checked my final measurements with the colliery plan.
21157. *Q.* You actually measured the whole of the road yourself; and then checked it with the colliery plan? *A.* Yes.
21158. *Q.* But in the 4th Right, you say, could you not get the angles correctly, because of the black-damp? *A.* That was the first time.
21159. *Q.* Why did not you the second time? *A.* Thinking it of no great importance, I showed the 4th Right as a right angle.
21160. *Q.* Did you go and get any evidences of force in the 4th Right? *A.* Yes, subsequently.
21161. *Q.* When there was no black-damp? *A.* There was black damp there, but not sufficient to extinguish a light.
21162. *Q.* Where is the plan that shows the cut-throughs inbye of the 5th Right? Where is the first cut-through inbye of the 5th Right shown? *A.* [*Witness pointed out the position on Exhibit No.* 38.]
21163. *Q.* These are the cut-throughs inbye of the 5th Right? *A.* Yes.
21164. *Q.* You have not shown on that paln the directions in which the stoppings on those cut-throughs were blown. *A.* I have shown this, the force going that way, [*Pointing to the arrows on the plan.*]
21165. *Q.* Do not you know that the stopping in the first cut-through inbye of the 5th Right was not blown in the direction you show? *A.* From what I remember, the surface of that stopping was blown that way (east), and some stone by the side had fallen on the main road. The surface was blown to the right of the main road towards the back heading, to the east; the stones had fallen roughly down.
21166. *Q.* But does not your plan show the whole force as going from the main level into the back heading? *A.* Not the whole, but part of it.
21167. *Q.* This mark shows the main force up the front heading; it is not an indication of force between the two headings? *A.* There in an arrow here [*pointing to it on the plan*].
21168. *Q.* Do you mean to tell me that this arrow indicates anything more than the direction of force up the No. 1 Right? *A.* There is an offshoot here [*pointing to the plan*].
21169. *Q.* Do you mean to tell me that that arrow going straight up there indicates anything but the main force going up the No. 1 Right main level? *A.* Yes, the main force, and there is an offshoot here.
21170. *Mr. Robertson.*] Have you an arrow going across the cut-through? *A.* Yes.
21171. *Mr. Lysaght.*] The point of the arrow is up here, showing the whole of the force going directly into the back heading.
21172. *Mr. Wade.*] No.
21173. *Mr. Bruce Smith.*] The force in the cut-through is shown one way only, from west to east.
21174. *Mr. Lysaght.*] Yes.
21175. *Q.* Inasmuch as your plan shows that the forces in the cut-through went from west to east, how can it be reliable when you say that there were evidences indicating forces from east to west in that cut-through? *A.* Well, it struck against the side, and kicked back, as it were; that is my opinion. Those forces would strike against the right-hand rib, here, and go that way and that way.
21176. *Q.* That has nothing to do with the force in the cut-through itself. Why did not you show on this plan that there was a force in the cut-through from east to west also? *A.* Because I did not think there was. In my opinion there was not that force.
21177. *Q.* Do you know that evidence has been given here that stopping was mainly blown——*Interrupted.*
21178. *Mr. Wade.*] I object to the question. It is absolutely immaterial.
21179. *Mr. Lysaght.*] Perhaps I can get what I want in another way.
21180. *Q.* Take the next cut-through: you show by that that the force was going from the front heading into the back heading? *A.* Yes.
21181. *Q.* You do not show any force from the back heading towards the front heading? *A.* No.
21182. *Q.* Then do I understand that both these cut-throughs appeared to give the same evidences of force? *A.* Yes, as far as I observed.
21183. *Q.* Do not you know that they gave different evidences or force entirely? *A.* No, I do not.
21184. *Q.* Will you tell me what evidences of force there were in that second cut-through inbye of the 5th Right? *A.* The top of the stopping was blown off, the same as before.
21185. *Q.* What were those stoppings in those two cut throughs? *A.* Stone, and muck, and stuff—slack.
21186. *Mr. Robertson.*] *Q.* They were faced up with big stones? *A.* Yes, very big stones.
21187. *Q.* On the side next the No. 1 main road? *A.* Yes.
21188. *Q.* And those big stones might have been tumbled over by the force of the explosion? *A.* Yes, it is quite possible; and then, if the large stones were tumbled down by the explosion, the small stuff might run down over the top of them.
21189. *Mr. Lysaght.*] *Q.* What about the evidences of force in this third cut-through inbye? *A.* I could not observe very much there, except just the surface blown off.
21190. *His Honor.*] *Q.* Blown which way? *A.* Towards the right hand.
21191. *Mr. Lysaght.*] *Q.* I see you have marked on the plan near the top of this back heading "canvas at corner heated": what do you mean by that? *A.* Well, there did not seem to be any great flame, it seemed to me to be just excessive heat.
21192. *Mr. Ritchie.*] *Q.* What did I understand you to say with regard to the direction in which these stoppings were blown? *A.* From the front heading into the back.
21193. *Mr. Bruce Smith.*] From west to east?
21194. *Mr. Wade.*] That is the force he shows.
21195. *Mr. Lysaght.*] *Q.* When you say the canvas did not show any great flame?—[*Interrupted.*] *A.* It did not show any signs of flame.
21196. *Q.* You say it did not show any signs of great flame? *A.* Well, I say flame.
21197. *Q.* Do I understand there was any flame at all? *A.* I did not see any signs of flame.
21198. *Q.* Not any flame? *A.* No, just excessive heat.
21199. *Q.* Do not you know a number of men were burnt? *A.* No.
21200. *Q.* Did you see anybody who had been burnt? *A.* No.
21201. *Q.* Not one? *A.* Not one.

21202. *Q.* Did you see any person whose hair had been burnt? *A.* I saw Thomas Purcell; and his hair appeared to be slightly singed; it seemed to have turned a grayish color more than anything else; because when I came to him—we had a man in the pit at the time named Dunning—I said to the men with me "This is Thomas Dunniug, because he is so gray; it cannot be Purcell."
21203. *Q.* Do you say that you never noticed signs of burning on any man at all? *A.* No, I cannot say that I did see any signs of flame.
21204. *Q.* Did you notice signs of burning on any horses? *A.* No.
21205. *Q.* Did you notice signs of burning on any props? *A.* I saw a little coked dust; and I saw a couple of props charred; but I would not take much notice of that, because, as a rule, most of the timber we get at the pit is charred in the bush before it reaches the mine; so I really could not say whether they were charred.
21206. *Q.* Besides the canvas at the top heading, did you notice signs of any other canvas burnt? *A.* No.
21207. *Q.* You did not? *A.* No.
21208. *Q.* How often, as a rule, would you travel through the mine? *A.* I could not say, because I have a lot of other duties as well.
21209. *Q.* About how often? *A.* Perhaps two or three times a fortnight.
21210. *Q.* You know, I suppose, that the travelling roads were not watered? *A.* They were watered naturally most of them.
21211. *Q.* I mean, apart from the natural watering, they were not watered—you know that? *A.* Because it was not necessary. They were quite damp, in fact too damp. We had many a complaint from the miners as to the dampness of the road.
21212. *Q.* Do I understand you to say that there were no dusty travelling roads in Kembla? *A.* Not what I would consider dusty.
21213. *Q.* What would you consider dusty? *A.* Well, I would consider, as dusty roads, roads in which it would not be safe to allow men to travel with naked lights.
21214. *Q.* Is that your idea of a dusty road, a road that it is not safe to allow men to travel in? *A.* With a naked light.
21215. *Q.* What do you mean by "not safe to travel in"? *A.* Well, in case of anything happening in the way of a disaster at any time
21216. *Q.* What has that got to do with the travelling of the men? (No answer).
21217. *Mr. Bruce Smith.*] I do not think he professes to be an expert.
21218. *Mr. Lysaght.*] But this is as to the condition of the mine; he says the mine was not dusty in any part.
21219. *Q.* I want to know what is your idea of a dusty travelling road; and you tell me a road that it is not safe for men to travel in. *A.* In case anything happened.
21220. *Q.* It would not be a matter of travelling, in case of disaster? *A.* It would help the disaster, if you had a dusty road.
21221. *Q.* Then do you mean that there should be a certain number of feet of dust on a travelling road before you would call it dusty—or a certain number of inches? *A.* I cannot say.
21222. *Mr. Wade.*] Shall I take Your Honor's ruling at this point. Mr. Lysaght is trying to make the witness an expect, and then to knock him down. He has not posed as an expert; and he has not been brought here as an expert. He was brought here as a mining surveyor, to give evidence about these plans.
21223. *Mr. Lysaght.*] He gave me a description of the mine, by saying that there were no travelling roads that were dusty. Now, I want to know what is his idea of a dusty road.
21224. *His Honor.*] I understand Mr. Lysaght wants to find out from the witness the condition of the mine, merely the physical condition.
21225. *Mr. Wade.*] And then he asks him how much dust it would take to make a road dusty, which is a question to be put to an expert.
21226. *His Honor.*] I ask Mr. Lysaght not to go too far in that direction.
21227. *Mr. Lysaght.*] Very well, Your Honor.
21228. *Q.* Would you call a road dusty that had only about an inch of dust along it? *A.* No, I would not.
21229. *Q.* You would not call that a dusty road? *A.* If the roof, and sides, and all were alike—— [*Interrupted.*]
21230. *Q.* I am only talking about the floor: never mind about the roof and sides: would you call a floor that had an inch of dust on it a dusty floor? *A.* If it were finely divided dust, I would.
21231. *Q.* If it were not in finely divided particles? *A.* If it were rough stone, and stuff, I would not.
21232. *Q.* At the inquest you gave certain evidence about the taking of the air—I want to know where you took the air? *A.* Inside the mine.
21233. *Q.* Do not you understand what I mean, when I say "where did you take the air"—what part of the mine? *A.* Well, there are so many different parts to take it. I will explain it to you.
21234. *Q.* Did you take it at the main intake, or at the split, or the face, or where? *A.* At the main intake, splits, and where I thought necessary.
21235. *Q.* Did you ever take it at the face? *Q.* At the face of the mine?
21236. *Q.* Yes. *A.* I have taken the ventilation roughly at the face.
21237. *Q.* With the anemometer? *A.* With the anemometer.
21238. *Q.* But your practice has been, I take it, to take it at the beginning of the split? *A.* Yes.
21239. *Mr. Wade.*] And where else necessary, he says.
21240. *Mr. Lysaght.*] *Q.* And the record is put in the book? *A.* Yes.
21241. *Q.* The record you put in the book is the record taken at the main splits? *A.* Yes, and also the returns.
21242. *Q.* What was the average ventilation of Kembla at the time of the disaster? *A.* I should say roughly about 90,000 odd cubic feet of air.
21243. *Q.* That is purely from memory? *A.* Yes, it is about six months ago.
21244. *Q.* Do you know what it is now? *A.* Well, we got a reading a short time ago of 106,000 cubic feet.
21245. *Q.* Have you ever known the air to be reversed in Kembla? *A.* When the furnace was a bit slack; and in summer when they were cleaning fires; but it happened very seldom, perhaps three or four times since I have been there.
21246. *Mr. Bruce Smith.*] *Q.* Three or four times in how long? *A.* In about six years. 21247.

21247. *Mr. Lysaght.*] *Q.* Speaking of that knife, and the coat that was wrapped round the prop, did they appear to have been put there by, perhaps, some person wanting to indicate where he had been? *A.* No.
21248. *Q.* Or to have been blown there? *A.* They appeared to have been blown. Of course it was difficult to tell——[*Interrupted.*]
21249. *Q.* Did you see anything at all in the headings to the left of No. 1 that had seemingly been put up by any men as an indication where they were? *A.* No.
21250. *Mr. Wade.*] You say "headings." Do you mean bords or headings.
21251. *Mr. Lysaght.*] Bords.
21252. *Q.* When you were surveying the 4th Right, did you notice the stones at the head of the goaf? *A.* Yes.
21253. *Q.* Were they clean? *A.* Yes, they were clean.
21254. *Q.* And how high were they off the floor of the 4th Right? *A.* Roughly, about 3 or 4 feet.
21255. *Q.* And did the clean stone extend back some distance into the goaf? *Q.* It seemed to be a very close fall.
21256. *Q.* Did they appear to be clean? *A.* No, there was a good bit of dust about.
21257. *Q.* At the edge of the goaf, the fall, when you surveyed it, was about 3 or 4 feet high; the clean stones were on top? *A.* There was a little bit of dust about.
21258. The aperture to the goaf was not blocked up when you were surveying? *A.* It was blocked up. Between the roof and the top of the fall perhaps there would be 2 or 3 feet.
21259. *Q.* Is that so: between the roof and the top of the fall there were 2 or 3 feet when you were surveying? *A.* No, there seemed to be a kind of convexing——[*Interrupted.*]
21260. *Q.* I quite understand that; but I want to know whether, at the edge of the goaf, there were between 2 and 3 feet between the top of the fall and the roof? *A.* Well, I think there would be a good deal more than that.
21261. *Q.* How much more? *A.* I could not see it well.
21262. *Mr. Robertson.*] *Q.* Do you mean the original roof at the edge of the fall?
21263. *Mr. Lysaght.*] Yes, I think he may not understand it.
21264. *Q.* I am speaking of the original roof going into the goaf. I want to know—was the fall 2 or 3 feet from the height of the original roof. *A.* It was more.
21265. *Mr. Ritchie.*] *Q.* It was about the level of the original roof? *A.* Yes, as far as I could see.
21266. *Mr. Lysaght.*] *Q.* And the stones that you could see there were clean? *A.* Fairly clean, yes; a little dust.
21267. *Q.* Do you know whether there were any stoppings put round that 35-acre goaf at the entrances to that goaf? *A.* I could not be sure.
21268. *Q.* As a matter of fact that goaf had several openings out on to the 5th Right, and that intake air, without any stoppings at all? There were several openings along the 5th Right and the cross-cut heading into the goaf without any stoppings at all? *A.* There were just a few, to allow a scale of air to ventilate and keep the goaf clear.
21269. *Q.* It was not the practice to put in stoppings? *A.* The practice was to put in stoppings where required.
21270. *Q.* But not all the way round? *A.* If necessary.
21271. *Q.* I am asking what the condition was of that particular goaf from your memory? *A.* In this particular goaf there were a few places, so that the air could go through them and drain this place, and then go away into the return—take it into the return.
21272. *Q.* You say a few; about how many were there like that on the east side of the goaf? *A.* I cannot say from memory.
21273. *Q.* Roughly? *A.* I would not say roughly.
21274. *Q.* On the north side, about how many were left open without stoppings? *A.* I cannot speak from memory; I should think about two.
21275. *Q.* And I think it is a fact that those canvas doors on the 4th Left were old ones; they had been doing duty for a good while? *A.* Oh no; some of them were pretty good. As soon as they got old they would be repaired.

Examination by Mr. Bruce Smith:—

21276. *Q.* With regard to those two stoppings inbye of the 5th Right, where you have shown an arrow indicating the direction of force right up the front heading—have not you? *A.* Yes.
21277. *Q.* And then you have shown two arrows indicating that the force at right angles to that went from west to east? *A.* Yes.
21278. *Q.* You have not shown any arrow to show any doubt about its going the other way? *A.* No
21279. *Q.* I mean your map indicates a force one way only? *A.* Yes.
21280. *Q.* I mean as regards west to east? *A.* Yes.
21281. *Q.* Where did you get that information? *A.* From my own observation.
21282. *Q.* Only your own observation? Whom were you with when you marked that? *A.* I was with Mr. Hay and Mr. Morrison.
21283. *Q.* How long ago? *A.* Shortly after the disaster.
21284. *Q.* But you prepared this lately? *A.* That plan has been prepared a long while.
21285. *Q.* And you say Morrison was with you when you indicated the force as from west to east? *A.* He was in the pit with me, not in the office.
21286. *Q.* He saw it with you? *A.* Yes.
21287. *Q.* Are you aware that Morrison has given evidence that the force was from east to west in both those stoppings? *A.* No, I am not aware of that.
21288. *A.* Did he differ from you at that time as to what you saw? *A.* No.
21289 *Mr. Bruce Smith.*] I think it is only fair to read this to the witness.
21290. *Q. His Honor.*] Certainly.
21291. *Mr. Bruce Smith.*] *Q.* Morrison said "Then, as you go up the main tunnel, the first stopping was driven this way (west); and then the corner of the next stopping—I do not know whether it was blown out or fell out—but it fell into the road." What do you still think about it? *A.* Well, we have had no conversation about it.
21292. *Q.* You both saw it? *A.* Yes.
21293. *Q.* You saw the debris at the time Morrison saw it? *A.* Yes; and I saw it in the mine, too, before the disaster

21294. *Q.* I think you said that some of the stones were down on the west side of the original position of the stopping? *A.* Yes.
21295. *Q.* And some of the stopping was on the other side? *A.* Yes.
21296. *Q.* What induces you to think that the fall was all the one way? *A.* I am inclined to think that the stuff on the west side had fallen down of its own accord.
21297. *Q.* And the other had been blown down? *A.* Yes.
21298. *Q.* Did you find stuff on both sides? *A.* Yes.

Examination by Mr. Robertson:—

21298½. *Q.* You assisted in the removal of some bodies in to No. 1 main travelling road? *A.* Yes.
21299. *Q.* Do you remember the three men's bodies in the telephone cabin? *A.* Yes.
21300. *Q.* Were there no indications of burning on them? *A.* I did not notice any.
21301. *Q.* Do you remember the boy Silcock? *A.* Yes.
21302. *Q.* Were there no indications of burning on him? *A.* I saw that boy on the night of the disaster. I did not see any signs of burning on him. I believe Mr. Rogers and I were the first to discover that boy; and he was as black as coal-dust; and we could see no signs of burning.
21303. *Q.* Did you see any hair on him? *A.* No.
21304. *Q.* Well, the hair must have been burnt off? *A.* I did not see any signs of burning.
21305. *Q.* What had become of the hair?
21306. *Mr. Ritchie.*] *Q.* Had he previously no hair? *A.* I am not in a position to say that.
21307. *Mr. Robertson.*] *Q.* Do you mean to say that you did not notice any signs of burning on the boy? *A.* I did not notice.
21308. *Q.* Of course you must have seen the horse on the flat near to the 4th Left? *A.* Yes.
21309. *Q.* What was the condition of that horse? *A.* I did not examine that horse.
21310. *Q.* You passed it very often? *A.* I passed it; but it was too strong for me; I could not stand it. I was sick the first time I passed it, so I left it.
21311. *Q.* Were you in the 4th Right with a party consisting of Mr. Atkinson, Mr. Humble, and myself, about a week after? *A.* No; I think that would be Mr. Hay.
21312. *Q.* What indications of force do you show on your plan in the 4th Right? *A.* I show a force outwards.
21313. *Q.* What does your plan show? *A.* (*Exhibit No. 39 was shown to Mr. Robertson.*)
21314. *Q.* Are you sure that chock was in that position? (*pointing to a mark on the plan*)? *A.* I have been given to understand that it was there.
21315. *Q.* You were given to understand that? *A.* Yes.
21316. *Q.* I understood that you prepared that from your own observation? *A.* No, this was shut [*meaning that the goaf was fallen closely*].
21317. *Q.* Who gave you to understand? *A.* Morrison. I saw the timber lying about here.
21318. *Q.* So far as your own observation is concerned, you can throw no light on it? *A.* Not with regard to those chocks.
21319. *Q.* Did you see any props with the bottom half buried in slack? *A.* No, I cannot say that I did.
21320. *Q.* Then you cannot throw any light at all from your own observation? *A.* I believe I did see those props now: there was a lot of slack lying in here.
21321. *Q.* Props with the bottoms half buried in slack? *A.* I cannot say that I saw a lot of props, though.
21322. *Q.* From your own personal observation you could not speak? *A.* No, I did not go in there.
21323. *Q.* As a matter of fact, so far as the 4th Right was concerned, you relied upon information supplied to you? *A.* I saw props lying here, between the travelling road and the goaf in the 4th Right, lying down.
21324. *Q.* Did you see a large stone about 4 yards inside? *A.* No, I did not see that stone.

Examination by Mr. Ritchie:—

21325. *Q.* Did you see Mr. John Clark and Patrick Purcell after the disaster? *A.* Yes.
21326. *Q.* Were they all burnt? *A.* Yes, they appeared to be burnt a bit.

Re-examination by Mr. Wade:—

21327. *Q.* Tell us about these occasions when you say they would be cleaning out the fires—when would that be, any special day of the week? *A.* Yes, it would be on the Sunday.
21328. *Q.* Were there any men in the pit then? *A.* No, not these times I speak of.
21329. *Q.* Did you ever make any examination with the safety-lamp yourself? *A.* Yes, I have made examinations.
21330. *Q.* How did it come about? *A.* I was going up for an examination; and I wanted to find gas, if I possibly could, just to be able to say I had seen it: and I went into the most likely places in the mine to find it, and could not find it.
21331. *Q.* Was that more than once? *A.* Yes, a number of times.
21332. *Q.* Did you ever make any test when the furnace was being cleaned out, when the fires were being cleaned? *A.* No, I did not.
21333. *Q.* You usually take the measurements of the air? *A.* Yes.
21334. *Q.* Did you take any measurement anywhere down near the cross cut heading near the junction of the 2nd Right with the cross-cut heading? *A.* Yes, I took measurements in that.
21335. *Q.* Which roadway? *A.* The 2nd Right.
21336. *Q.* Was that recently, before the disaster? *A.* Yes: it was my custom to take it there.
21337. *Q.* Would that help you to say if there was any air crossing or scaling? *A.* My returns would help me. I took the returns here, on the 5th Right, between the last bord and the back heading of No. 1.
21338. *Q.* I want to know, as a matter of fact, did you make any measurements in the 2nd Right road which would tell you whether the air actually was coursing in there or not? *A.* Yes.
21339. *Q.* To what extent was it coursing: in what way? *A.* I would, perhaps, find that there was a little going through these places here (*opening into the goaf from the cross-cut heading*).

(At 1 p.m. the Commission adjourned until 2 p.m.)

AFTERNOON.

AFTERNOON.

On resuming at 2 p.m., Mr. W. R. Pratt attended to take shorthand notes of the evidence and proceedings.)

SILVESTER HENRY WARBURTON, previously sworn, was further examined, as under :—

Re-examination by Mr. Wade :—

21341. *Q.* You said that you tested with the safety-lamp for gas before your examination? *A.* Yes.
21342. *Q.* You said that you passed eighteen months ago? *A.* Yes, eighteen months ago.
21343. *Q.* It is at least eighteen months ago since you tested for gas? *A.* I have tested since then.
21344. *Q.* What made you? *A.* Because I had never seen gas, and I have never seen it yet.
21345. *Q.* Not in West Wallsend? *A.* No.
21346. *Q.* You made a test for the purpose of getting experience? *A.* Yes.
21347. *Q.* That is eighteen months ago? *A.* Yes, I have tested since then.

ALFRED ERNEST OSWALD SELLERS, who had been previously sworn, was further examined as under :—

Cross-examination by Mr. Lysaght :—

21348. *Q.* When you were making a calculation as to the fall of roof in the goaf, did you calculate that it would fall on an even surface? *A.* Not necessarily so.
21349. *Q.* You had had a previous fall of 2 feet 6 inches, and this first fall would be distributed unevenly all over the place? *A.* Not necessarily so.
21350. *Q.* Do you not know that Morrison has stated that the first fall was an uneven one? *A.* No.
21351. *Q.* Would that alter the force of the propulsion of air? *A.* Not materially.
21352. *Q.* Did you allow for that? *A.* No.
21353. *Q.* Do you know that the pipe of the seam was about 6 feet? *A.* Yes, I assumed that.
21354. *Q.* Would not the effect of a solid fall, 4 feet 6 inches thick, on the top of a fall 2 feet 6 inches, be to block up the aperture of the goaf? *A.* You are presuming that the fall sheared off on a line close to the edge of the 4th Right.
21355. *Q.* Do you know that the first fall did come out to the edge of the goaf? *A.* It may have done so.
21356. *Q.* Would not a fall of 4 feet 6 inches in a solid mass, falling evenly, block up the remainder of the height in the goaf and obstruct the passage? *A.* Not necessarily so.
21357. *Q.* Is not the strong presumption that it would? *A.* I did not trouble myself about the matter one way or the other.

Re-examined by Mr. Wade :—

21358. *Q.* Just explain the way a roof does fall? *A.* That is a wide question—it falls under various conditions.
21359. *Q.* What would be the usual conditions? *A.* Take a normal set of circumstances, and an ordinary roof, it would depend how the roof is bridged on the goaf.
21360. *Q.* Take this room as representing the roof and face of a bord. Supposing that the roof, as a matter of fact, has fallen over a height of 20 feet above the present roof—would you find a big square room right up, or would it be filled up? *A.* It would have a tendency to a dome.
21361. *Q.* As it would have a tendency to a dome, you would not get so much edge? *A.* No.
21362. *Q.* In answer to Mr. Lysaght, you said that, if the first fall in this 4th Right came down solid, it would produce similar results to those which took place on the occasion of the second fall? *A.* That was, so far as the matter of the displacement of air was concerned.
21363. *Q.* Is it necessary to assume that the first fall came down solid? *A.* No, it is not necessary.
21364. *Q.* Do the facts suggest that—suppose there was no displacement of canvas doors? *A.* That would prove that the first fall was a piecemeal one.
21365. *Q.* If there was not this development of violence from the first fall, would you expect the dust to be driven out, or would there be some left? *A.* I would expect some dust to remain in the goaf, as I have explained frequently.
21366. *Q.* Supposing the second fall did come down solidly on top of the first fall, do you think there was anything to prevent any dust being swept out? *A.* No, there was nothing to prevent it. It would come out with the air—a portion of the dust.
21367. *Q.* Supposing there was dust under the first fall—would there be anything to prevent the second fall driving that dust out? *A.* It would not be so easy to do it. Take the condition of the first fall. There would be a lot of cracks in the material which fell. All the dust reachable by the air would be stirred up, but not much would be driven out.
21368. *Q.* Why not? *A.* It would be sheltered by the first fall, and the dust would not necessarily come from the goaf—I mean the dust need not necessarily come from it.
21369. *Q.* Did you see indications of dust in the 4th Right road which could be stirred up by the blast? *A.* There was some small coal debris, and things of that kind, which would leave a certain amount of dust.
21370. *Q.* Can you say, from what you did see, that as a matter of fact dust had been disturbed in the 4th Right road? *A.* There was dust which came out with the fall—that is visible round the junction of the 4th Right No. 1 heading. There was dust there that might have been driven out.
21371. *Q.* Look at plan, *Exhibit* No. 26, do you see tracings showing dust at the corner of the 4th Right road and No. 1 front heading ;—is that the place you are speaking of? *A.* Yes.
21372. *Q.* Why did you think that dust had been moved? *A.* My impression was that before the explosion a certain amount of dirt and dust and small coal debris was lying on the other side of the road between No. 1 main heading and the goaf on the 4th Right. A portion of the dust was left there, and it may be that dust was driven from points near the goaf.
21373. *Q.* Do you think that, if the dust you found at the corner of the 4th Right road had been driven from the direction of the 4th Left, you would expect to find signs of dust on the inbye side of the rollers? *A.* Yes, on the inbye side of the rollers, No. 1 main heading.
21374. *Q.* Do you think that the dust in the 4th Right No. 1 main heading could have come down the main No. 1 main heading? *A.* No, I do not think so.

21375. *Q.* Can you say what amount of dust in the air would be sufficient to set up the first conditions of a coal-dust explosion—that is, supposing the air came out of the 4th Right at great velocity? *A.* Haldane says that so small an amount as one tenth of 1 per cent. would be sufficient.
21376. *Mr. Robertson.*] *Q.* One tenth of 1 per cent.? *A.* Yes, that would be sufficient volatile matter to carry on an explosion. It is in Dr. Haldane's report.
21377. *His Honor.*] One-tenth per cent. of 1 per cent. would be one-thousandth part? *A.* Yes.
21378. *Mr. Bruce Smith.*] *Q.* Of what? *A.* Of dust in the atmosphere. Other authorities give 1 lb. of dust for every 160 cubic feet of air.
21379. *Mr. Robertson.*] *Q.* That would be a dense cloud? *A.* Yes.
21380. *Q.* That is another authority? *A.* Yes. Dr. Haldane has made some experiments in the matter; and he arrived at his conclusion by considering the amount of volatile matter or distilled matter, which could be evolved from an atom of dust.
21381. *Mr. Wade.*] *Q.* Am I to understand that 1 lb. of dust in 160 cubic feet of air, in the presence of a blown-out shot, will be sufficient to set up an explosion? *A.* Yes, if other conditions are present, such as the proper amount of agitation, the requisite temperature, and the dryness and fineness of the dust.
21382. *Mr. Robertson.*] *Q.* Do you think it would require a pound of dust? *A.* Dr. Haldane, who goes into the question of the distillation of dust, says much less.
21383. *Q.* It depends upon the grain of the dust? *A.* Yes, upon the fineness of the dust.
21384. *Q.* A pound weight of coarse dust would not be sufficient? *A.* It must be fine. and dry, and there must be the requisite temperature; and it must be agitated.
21385. *Q.* Would it be necessary to have the dust fine enough to pass through the gauze of a safety-lamp? *A.* I think so.
21386. *Mr. Wade.*] *Q.* Taking it that 291 degrees Fahrenheit is the ignition point of dust, must that be fine dust? *A.* I will refresh my memory from Professor Bedson, the quotation is taken from page 571, volume 14, part 4, from "Transactions of the Federated Institution of Mining Engineers." The quotation is as follows:—

Professor Bedson, in concluding his remarks upon his experiments, said that: (1) It is shown that with an easily oxidisable material, such as coal-dust, it is only necessary to accelerate the oxidation by heating the dust, in contact with air, to a temperature within the limits of those likely to be reached in compressing air to 58 lbs. in order to bring about, in the course of time, the ignition of the dust. (2) These results have been possible, even when experimenting with a comparatively small amount of material, an influence of importance, as is shown by the results obtained in the two different series of experiments made, the conditions of which differed essentially only in the amount of coal operated upon. In the second series, with 1 oz., a temperature of 356 degrees Fahrenheit was required for ignition; whilst in the third series, with 10ozs., the temperature required was reduced to 291 degrees Fahrenheit. Despite the fact that the one or two experiments made with the deposit found in the Ryhope air receiver, made under conditions similar to those in which coal-dust was successfully ignited, were not in a like manner successful; still, as there can be no doubt that this material is of a nature somewhat akin to the coal-dust entering so largely into its composition, and, like it, capable of being oxidised by the oxygen of the air, the constant exposure of this substance to the action of air heated by compression must result in the acceleration of the oxidation, and as with coal-dust in a rising temperature, until in some portion of the mass local ignition begins. Combustion once begun at any point in the mass, the conditions are most favourable to its extension. Further, the heat generated by a combustion of a portion of the mass might serve to distil destructively neighbouring portions, and thus give rise to the formation of combustible gases; which, mixing with the air, would form an explosive mixture. An explosive mixture formed under these conditions would be readily ignited by contact with the already burning material.

21387. *Q.* Well, supposing that you got a small quantity of dust at ignition point for a start, would that carry you far? *A.* You would have to gather more dust as you went along. It is clearly obvious that unless that explosion was fed by other dust, in course of time it would die out.
21388. *Q.* What was the appearance of the ribs and the roof in No 1. Was there any dust on them. Were they clean or not? *A.* There was a good deal of dust on the timber, and particularly on the rails. The ribs from the 4th Right going inbye were swept pretty clean of dust.
21389. *Q.* Well, supposing there had been no dust in a semi-coked condition anywhere near the junction of the 4th Right and No. 1 rope road—do you think the blast had anything to do with it? *A.* The intensity of the blast may have swept it away.
21390. *Q.* Bearing in mind the condition in which you saw No. 1 rope road, on the inbye side of the 4th Right, has the absence of traces of coked dust at that point any bearing on the matter—is it consistent with your view or inconsistent? *A.* I do not think it is inconsistent. I was not able to see all the evidences of coked dust. I have an impression that in the 4th Left rope road a portion of the dust remaining there showed some signs of coking.
21391. *Q.* Was there much of that dust? *A.* No, not much.
21392. *Q.* How much. Can you describe it? *A.* It was about 5 feet from the floor on the north west corner of the pillar near No. 4 Left. There was a patch.
21393. *Q.* What size was the patch? *A.* Six inches or something like that. That size describes a sort of ledge it was in; but the coke did not occupy that space. A portion of the dust in that deposit appeared to be coked.
21394. *Q.* You mean that at the height of 5 feet from the floor you found an area 6 inches square? *A.* It was about the height of 5 feet from the bottom.
21395. *Q.* If you are working a piston, not air-tight, in a cylinder, you will not get any compression of air or heat? *A.* It depends on the velocity with which the piston is moving.
21396. *Q.* How often should it move? *A.* Four hundred feet a minute is a fairly good piston average.
21397. *Q.* Would you get the same result with a piston not air-tight if you get added velocity? *A.* The result would, of course, be much less if the piston were not air-tight, but still you get a certain amount of pressure.
21398. *Q.* Has the base of the piston anything to do with it? *A.* That is essential.
21399. *Q.* At what rate would that roof be falling in the 4th Right. Have you worked it out. I think you calculated a fall of 4 feet? *A.* Yes.
21400. *Q.* And you assumed, taking it as a fall in vacuo, that it would take half a second to fall? *A.* Yes.
21401. *Q.* The acceleration in a second in 32 feet? *A.* Yes.
21402. *Q.* It would be falling at the rate of 16 feet when brought up? *A.* Yes.
21403. *Mr. Robertson.*] As an illustration, that would be the end of the stroke? *A.* Yes.
21404. *Q.* You said that it travelled 4 feet 6 inches in half a second? *A.* Yes.

21405. *Q.* With respect to the speed of a piston, the question is whether you can pay attention to it, with only a fall of 4 feet 6 inches. The roof, which would be the piston in this case, would be at rest to begin with? *A.* Yes.

21406. *Q.* It only reached that speed at the end of the 4 feet 6 inches; and, from the beginning of that space of 4 feet 6 inches to the end of it, there would be some period when the piston would be moving at a slow rate of velocity? *A.* Yes.

21407. *Q.* But the piston of an air-compressor is working at a uniform speed throughout? *A.* Yes. But if you take the piston of an air-compressor, there is no flow of air in front of it, because the air has not time to get back.

21408. *Q.* The piston in this case was 44 yards square, and was moving at a low velocity; and it was at rest to commence with? *A.* There is a period in the stroke of the engine when it is at rest.

21409. *Q.* Theoretically there is; but you have the momentum of the fly-wheel to carry it on from the momentary rest, and there is also the speed of the engine to act in the same way? *A.* Yes.

21410. *Q.* In the case of this large piston, 44 yards square, you had not a fly-wheel to give you the impetus? *A.* You had the force of gravity, which would have a great influence.

21411. *Mr. Wade.*] *Q.* In the one case the weight is behind; and in the other case it is on the top of the piston? *A.* Yes.

21412. *His Honor.*] *Q.* The only way in which this question of 16 feet per second comes in is, that if you consider the roof as being let go all at once, without any bearing-up force, due to teasing away, and then if you take out all the intervening gases, such as air, it would be material in relation to the force represented by the impact with the floor. That is the only way the 16 feet comes in at all? *A.* The velocity at the moment of impact would be much greater (than the mean rate of falling).

21413. *Mr. Robertson.*] *Q.* What would be the ordinary pace of a piston in an air-compressor? *A.* 300 to 400 feet per minute.

21414. *Q.* For the purpose of ascertaining the effect, why not take 4 feet 6 inches as the average speed—that is to say, 9 feet for a revolution? *A.* Yes, take it in that way.

21415. *Q.* There is half a second for a fall of 4 feet 6 inches? *A.* Yes.

21416. *Q.* How much would that be. Nine feet in a second multiplied by sixty seconds is 540 feet a minute—therefore, for all practical purposes, there is not much difference in the speed of this solid piston formed by the roof and the speed of the air-compressor. So that, if the piston of the air-compressor failed, by reason of leakage of the piston, to work up any considerable pressure of air, the same effect would result in respect to the fall in the 4th Right? *A.* The roof does not exactly compress the air. The high temperature would be got by friction when the air was being forced through a small passage. A certain body of air has to go through a small passage in a certain time. The passage creates friction; and, therefore, it necessarily creates heat.

21417. *Q.* Have you any authority to show what amount of friction can be generated in the absence of compression? *A.* Not entirely in the absence of compression.

21418. *Mr. Wade.*] *Q.* With regard to the things which you saw outbye and inbye of the 4th Right, were there any inflammable or easily burning substances in that Right? *A.* There were two pieces of canvas on the 4th Right road—one on the road opposite the 4th Right and the other on the road opposite.

21419. *Q.* Then neither of the pieces of canvas were in the 4th Right? *A.* One of the pieces was in the 4th Right.

21420. *Q.* In the main road? *A.* There were two pieces of canvas that had been there.

21421. *Q.* Did you find them actually there. Did you find any inflammable substances? *A.* There was some timber there.

21422. *Q* Did you see any bark, or anything like that? *A.* Not particularly, I cannot remember.

21423. *Q.* Let us go back to Morrison's light for a moment. Supposing for the sake of argument that a mixture of inflammable gas passed over Morrison's light at the rate of 50 or 60 miles an hour, do you think there would be time for the gas to ignite before the flame was put out? *A.* I think that the force would put out the light before the gas reached it—I mean the propulsion of air in front.

21424. *Q.* Consider it that that is not tenable—that the cushion of air in advance does not put the light out. Supposing that the actual inflammable mixture reaches the light at 50 miles an hour? *A.* I do not think the gas would light. It would take some seconds to light fire-damp.

21425. *Q.* I want you to find me an authority on that point? *A.* I remember reading quite recently that it takes ten seconds.

21426. *Mr. Robertson.*] *Q.* What to do? *A.* To ignite fire-damp with an ordinary naked light.

21427. *Q.* Ten seconds? *A.* It was an illustration of this kind; it dealt with the old system of testing, in the days before safety-lamps were common, and when they tested fire-damp with a naked light. They would put the light near the fire-damp, and then withdraw the light. The article went on to indicate that a certain temperature was necessary.

21428. *Q.* Is that in accordance with reason or common sense? *A.* I was surprised when I read it. It stated that a certain time must elapse before fire-damp could be lit by a naked light. There is a certain temperature requisite.

21429. *Q.* How long? *A.* Ten seconds with a naked light—that is on account of the temperature of the light not being sufficient to light it instantaneously.

21430. *His Honor.*] *Q.* You want the white light of a true flame? *A.* I am speaking of the ordinary miner's light.

21431. *His Honor.*] *Q.* You might ask yourself how the gas is lit in a gas engine, or an engine of that nature—how it is that they can work it at all. They work up, I believe, in some cases to 100 strokes a minute? *A.* The ignition depends on a certain temperature of the hydro-carbons.

21432. *Q.* The flame in the case of these engines is lighted by a spark; formerly a light was used. The running of a motor engine depends entirely upon the fact that an electric spark lights an explosive mixture of hydro carbons and air. They work up to a 1,000 strokes a minute, and more. The action is absolutely instantaneous? *A.* Just so.

21433. *Mr. Ritchie.*] *Q.* Which would be the most intense, the flame of a lamp or the flame of a blown-out shot? *A.* The flame of a blown-out shot.

21434. *Q.* How many seconds would it take to light fire-damp by means of a blown-out shot? *A.* I cannot say. Ignition depends on the temperature of the heat. A blown-out shot would be of a higher temperature than an ordinary miners' light.

21435. *Q.* As a matter of fact, do you believe that it takes ten seconds to light fire-damp? *A.* I cannot say; but I read it ten days ago.
21436. *Q.* Is it a recent or an ancient authority? *A.* It is not ancient. It was during the last ten years.
21437. *Mr. Robertson.*] *Q.* You do not put that to us seriously—how long do you think it would take? *A.* I cannot say how long it would take.
21438. *Q.* I ask you, as a man of experience, how long do you think it would take. Supposing you went with a naked light into a body of gas, how long do you think it would be before something happened? *A.* I should think immediately; but the question is whether one would tell the time.
21439. *Q.* Now count ten—would it take the time during which you count ten. Try with an ordinary gas light—do you wait ten seconds to light? *A.* I understand that it was a matter of temperature.
21440. *Q.* Try it with that gas light there. You think it would take ten seconds? *A.* No.
21441. *Mr. Wade.*] *Q.* Do you put that forward as your own view, or only as something that you have read? *A.* Only as something which I have read in a book.
21442. *Q.* You do not say that it is your own view? *A.* No.
21443. *His Honor.*] It would be easy to get a scientific opinion on this.
21444. *Mr. Wade.*] It would, if necessary. The witness says that he does not claim it as his own view of the case.
21445. *Q.* Supposing that an ignition of gas took place at Morrison's flame, and that the flame of the gas ran back to the 4th Right, and the centre of the accident was the 4th road junction on the main road? *A.* Yes.
21446. *Q.* And that that body of flame was the start of the explosion;—do you think that the indications which you saw at Kembla were consistent with this? *A.* I really could not say. I could not answer a question like that. It has a wide application.
21447. *Q.* Can you give us any idea? Supposing the gas was driven out of the 4th Right into the main road, and it splits in the rope road, and some goes up the travelling road and some down it, what would be the quantity of gas you would require at the 4th Left to ignite a flame and carry it to the 4th Left? *A.* About 6 per cent. of gas.
21448. *Q.* How many cubic feet would you want ——[*Interrupted*].
21449. *His Honor.*] You are assuming that the whole of the section of the tunnel would be filled with gas down to the floor. That is not the assumption that has been made. The assumption was that there was gas along the roof.
21450. *Mr. Wade.*] Take the distance as 200 yards.
21451. *His Honor.*] Or whatever the distance is.
21452. *Mr. Wade.*] *Q.* What would be the minimum quantity of gas between the 4th Left and the 4th Right in order to carry a light for a distance of 200 yards? *A.* It would only require a streak of gas; it would not require to be large in area.
21453. *Q.* You have no idea? *A.* Oh, the gas might be 5 or 6 inches square, or there might be a body of gas 2 or 3 inches thick, or less than that would do.
21454. *Mr. Robertson.*] It is easily ascertained. Take the distance as 600 feet, and, say, 3 inches in thickness, that would be 1,800 feet (cubic). That, at a proportion of 6 per cent., would be 108 cubic feet of gas? *A.* Yes.
21455. *Mr. Wade.*] *Q.* Would you expect, if the junction of the 4th Right was the scene of an explosion, to find signs of flame in the 4th Right road? *A.* If the gas was lighted with a light at No. 4 Left, the flame would rush back with the gas. The flash would go from the 4th Left to the 4th Right.
21456. *Q.* Well, if there were an explosion at the 4th Right junction of the main road, what would you expect to find? *A.* I should expect to get some signs of force at points from the 4th Left to the 4th Right.
21457. *Q.* Would you expect to find indications in the 4th Right road? *A.* There would be some, I should imagine.
21458. *Q.* Now, if the air was travelling up the 4th Left at a pace of 50 miles an hour, would you expect to have some dust mixed up with the air? *A.* Yes.
21459. *Q.* If you had dust in the air, and a long flame lit at the 4th Left, would you expect, under these circumstances, to get an actual coal-dust explosion for a start? *A.* If the gas came out with that force, and gathered up dust, and an ignition took place at the 4th Left, there would be a pretty strong explosion with coal-dust.
21460. *Q.* Supposing it ran outbye? *A.* Then there should be some signs of force between the 4th Left and the 4th Right, where there would be a radiation of force.
21461. *Q.* Supposing there was a radiation where Morrison was, and some went on and some went outbye, would you say that there would be sufficient dust to cause an explosion? *A.* Yes.
21462. *Q.* Would you expect to find a shattering of the stoppings under those conditions? *A.* Yes, I should expect so.
21463. *Q.* Would you find some signs or force going outbye of the 4th Left? *A.* Yes.
21464. *His Honor.*] *Q.* Would you not suppose, if it did take place, and if most of the explosive mixture still remained somewhere about the opening of the 4th Right, that a second explosion would obliterate all signs of outbye force between the 4th Right and the 4th Left, and that the final result would be an exhibition of force inbye from the 4th Right towards the 4th Left? *A.* Yes. If the second explosion were greater than the first, it would destroy the evidences of the first explosion.
21465. *Q.* It would be a running explosion. It would not take more than a second for the whole thing? *A.* No.
21466. *Mr. Wade.*] *Q.* Would an explosion in the 4th Left take any effect upon skips going outbye of the 4th Right? *A.* It would have some effect.
21467. *Q.* If you have an explosion working out of the 4th Right, would it have any effect on the skips between the 4th Left and the 4th Right? *A.* It would have some effect. As His Honor has said, the evidences of force might be neutralised by a second explosion.
21468. *Q.* We have evidence that skips were detached, and that there was a wrecking of the telephone wires between the 4th Right and the 4th Left, and that they were carried inbye. What I want to know is, if the skips between the 4th Right and the 4th Left should not have been carried outbye? *A.* Not necessarily.

necessarily. You might have a first explosion in the 4th Left and carry that explosion on to the 4th Right, and the lash of the second explosion would cover over the effects of the first explosion, and carry the skips inbye.

21469. *Q.* Where would the skips be all the time? *A.* They would be knocking about. There might be damage, and that damage would depend on the density of the explosion.

21470. *Q.* If you had an explosion of gas at the 4th Left—gas and coal-dust—would you expect it to be violent? *A.* Not at the first initiation; it would depend on the amount of gas present. Supposing a certain amount of coal-dust were ignited, that would increase in a short time; and it would gather force as it travelled out, and where it would meet with more oxygen.

21471. *Q.* Do you think it would gather more force than it got in the 4th Right? *A.* It would gather more force.

21472. *Q.* What would be the natural tendency going out against the air? *A.* It would get more force.

21473. *Q.* Would you expect it to double back again? *A.* Not unless there was a large body of gas to assist it, and create a second large explosion.

21474. *Q.* If you had a body of gas, to make another explosion on the 4th Right junction, would you not expect to find signs of flame in the 4th Right road? *A.* I should expect to find some.

21475. *Q.* Would there be any reason for those signs being blown away from the 4th Right under those conditions? *A.* There would be no particular reason; although we have had some illustration of that fact. It is hard to tell from the contradictory forces where an explosion actually began.

21476. *His Honor.*] That might be taken as a general supposition. It is hard to tell, when anything in the nature of an accident takes place, what will happen? You generally find that what has happened has not been what was expected.

21477. *Mr. Wade.*] *Q.* That refers to that particular gas explosion at Camerton, where force occurred at intervals? *A.* Yes. The passage says that, if you take the radiation of force, it will not help you—you are no further advanced—you are arguing in a circle.

21478. *His Honor.*] *Q.* They all confound one another? *A.* Yes.

21479. *Mr. Lysaght.*] I was quoting that case as a general proposition.

21480. *Mr. Wade.*] *Q.* You used the expression several times the other day that the roof fell in a solid block. What do you mean by that? What is the usual process in a roof falling? *A.* That depends entirely on the character of the roof. Usually a roof falls piecemeal; especially if it is of a friable nature and jointed.

21481. *Q.* What do you mean by a solid block? If this ceiling were the roof, do you mean that it would come down like one solid piston? *A.* Yes, come down as a piston.

21482. *Q.* Without a break? *A.* It might break as it fell.

21483. *Q.* You mean the displacement of a solid piston without a break or any intervals? *A.* Yes.

Examined by Mr. Bruce Smith:—

21484. *Q.* Did you express an opinion as to the effect of watering as a preventative in connection with coal-dust explosions? *A.* I think so.

21485. *Q.* I think you said that water would not act as a preventative? *A.* I said that it could not be depended on as a preventative.

21486. *Q.* An explosion took place at the Maclaren Colliery, one of the pits belonging to the Tredegar Iron and Coal Company, Monmouthshire, and the General Manager of the Company reports as follows—in a statement in the journal called "The Colliery Manager":—

> Four hours and a half previous to the explosion the whole of the west level has been previously watered, both floor and sides; and it is my firm conviction, and that of others, that the damp state of this level has been the means of saving the pit.

A. I do not disagree with that.

21487. *Q.* I thought you expressed the opinion that watering had no effect, because fire would go over it? *A.* I think I said it could not always be depended upon.

21488. *Q.* You heard McGeachie assert the opinion that there had been no flame, because certain things had not been thoroughly burnt? *A.* I was not here yesterday.

21489. *Q.* Have you read Atkinson Brothers' "Explosions in Coal-mines"? *A.* Yes.

21490. *Q.* That authority says:

> The coking of dust is an indication often wanting over long lines, where great force and flame have passed.

Showing that, although the flame has passed, the dust has not coked because of the quick passage. *A.* Yes.

21491. *Q.* And on page 48 that authority says:

> No coked dust was observed on the main haulage road where flame had evidently passed, and where force had been greatest. At the extremities of the explosion coked dust was abundant.

You see from this that, although the dust is not coked in the places where it is found, flame may have passed over it. *A.* Yes.

21492 *Q.* You have not been asked for an opinion about gas coming from above the coal-seam? *A.* Yes. I was asked my opinion as to whether it had been known. I was speaking of the Illawarra district. I said it had not.

21493. *Q.* In a mining lecture delivered by Mr. F. W. Hardwick at the Firth College, Sheffield, he says:

> The regular emission of fire-damp is not so noticeable as from the coal. Gas, however, is found in the strata. It is occasionally met with in metalliferous mines, especially where a bed of bituminous shale or schist comes in the regular workings.

and he further says:

> If the roof consists of a hard rock, which, when it breaks down, does not pack tight, but leaves open spaces, the danger of the goaf as a reservoir of gas will be greatly increased"?

A. That presumes that the strata give off gas.

21494. *Q.* That is an authority for gas being given off in the strata above the coal? *A.* Yes.

21495. *Mr. Robertson.*] From cracks in the strata.

21496. *Mr. Wade.*] But the gas comes from the coal? *A.* We want an authority for gas in the natural strata.

21497. *Mr. Bruce Smith.*] If the roof is shaley it would be soft strata, and gas might be found.

21498. *Mr. Robertson.*] *Q.* Would it be likely that there would be any cracks? *A.* There would not be many vertical fissures.
21499. *M.r. Bruce Smith.*] You remember that Mr. Atkinson, when he was examined, said there was no authority for this.
21500. *Mr. Robertson.*] *Q.* This goaf had an an area of 44 yards square, without any support; and it is improbable that there would be any crack in the strata? *A.* The strata contain nothing to give off gas.
21501. *Q.* Will you say that it is highly improbable that there was any gas in the strata? *A.* I should say it was improbable that there was any gas in the strata above the coal-seam.
21502. *Q.* You mean, unless the gas found its way from the coal-seam? *A.* The strata itself gives off no gas.
21503. *Mr. Bruce Smith.*] *Q.* You are asked about a skip which indicated the way that the forces had driven. Is it not possible that a body of gas came out of No. Four Right and tapered in a fine point up to Morrison's light, lit, and went outbye until it met a big body of gas, and the explosion took place there? *A.* Yes.
21504. *Q.* Is not that the way that gas would run? The ventilation would carry the point of it to Morrison's lamp? *A.* I would not bind myself to it.
21505. *Q.* The explosion would not necessarily be at the tapering point, but at the point to which the gas went? *A.* Yes, and it would drive things inbye of that light—inbye of the place.
21506. *Q.* Where you have a number of coal-dust explosions they are not necessarily of the same force and intensity? *A.* No.
21507. *Q.* Where you have a series of coal-dust explosions, and a number of conflicting forces at work, the results may preponderate in one direction, and yet they may be the outcome of a number of back-lashes? *A.* Yes.
21508. *Q.* Is it not possible that various objects which it is thought should have gone inbye, may in the first place have gone inbye and then have been driven outbye and inbye again, and then be driven to their present position? *A.* Yes, it is possible.
21509. *Q.* You knew a man named Nixon; and you found him inbye of No. 4 Right? *A.* There may have been an explosion at Morrison's light; and that would blow him inbye.
21510. *Q.* Do you think, if the explosive mixture lit at Morrison's light, it would lick up all the gas available, and there would be none left to go further on? *A.* I should think that the first light would be the light to light the gas.
21511. *Q.* Do you mean all the gas there was to travel? *A.* Yes, unless there was a large quantity.

Examined by Mr. Robertson :—

21512. *Q.* Did you observe, over the area of this explosion, newspaper and other combustible materials lying about? *A.* Yes, I saw some fragments of paper on the left hand side of No. 1.
21513. *Q.* Did you notice some newspaper at the cut-through at the back heading of No. 1, where the brattice was burnt? *A.* I cannot say I did.
21514. *Q.* Would you think it probable that newspaper could be exposed to the flame of a gunpowder shot and the dust of an explosion, and yet remain unconsumed? *A.* It seems to be hardly feasible; but you have authority for these things happening, and for the flame missing various articles.
21515. *Q.* If it were demonstrated to you that it was possible that a newspaper could be exposed to a gunpowder flame and a dust explosion, would you draw the conclusion that an explosion in a mine-producing flame may yet fail to ignite combustible material? *A.* The flame may not extend the full width of the area. It may be confined to the centre of a road.
21516. *Q.* Then you think it is consistent to find highly combustible material unconsumed? *A.* Yes.
21517. As a matter of interest I may say that I put a newspaper in front of a gunpowder explosion with which I ignited dust, and the newspaper remained unconsumed, so there is nothing incompatible with combustible material in a mine remaining untouched where an explosion has occurred.
21518. *Q.* Were you asked about the pillars in the Metropolitan Colliery? *A.* I do not know.
21519. *Q.* You have had eight or nine years' experience. Did you observe that the pillars were large? *A.* Yes.
21520. *Q.* From your experience, do you consider that large pillars are necessary? *A.* Oh, yes; decidedly.
21521. *Q.* And, in spite of the large pillars in the Metropolitan Colliery, did you notice any of the effects of weight? *A.* Yes, in the slant district.
21522. *Q.* Serious trouble arose there? *A.* Yes.
21523. *Q.* Can you tell the size of the pillars? *A.* They might be 50 yards by 99 yards.
21524. *Q.* Fifty by one hundred yards is the ordinary size. Do you know whether any difficulty was experienced in ventilating those bords? *A.* No, only the ordinary difficulties.
21525. *Q.* And that, in spite of the fact that the Metropolitan Mine is a gassy one? *A.* Yes.
21526. *Q.* And the ventilation is easily conducted to the face? *A.* There is no greater difficulty than is found elsewhere.
21527. *Q.* What would be the effect if legislation were passed which would practically limit the size of pillars to 30 yards? *A.* It would take away the right of the management to make pillars as strong as they could be.
21528. *Q.* I am taking the Metropolitan Mine? *A.* We should have more creeps and less coal.
21529. *Q.* Do you think we could work the mine at all with 30-yard pillars? *A.* You might work it.
21530. *Q.* Would there be any more danger? *A.* Yes, to the miners and to the mine.
21531. *Q.* Do you think it wise that restrictions should be placed on the Manager's discretion as to the manner of working a seam? *A.* No. It is a matter which cannot be accomplished by legislation. The conditions vary so much that the matter should be left to the Manager's discretion.
21532. *Q.* Is the working of the seam governed by conditions? *A.* Almost entirely.
21533. *Q.* Do you think, in the face of what has happened that it would be prudent in the future to work Kembla with naked lights? *A.* I think I would use safety-lamps. One would be satisfied then that they had done all that could be done to keep things safe.
21534. *Q.* Here is a mine that had the general reputation of being very safe—giving off very little gas—some say no gas at all. Yet we have a disastrous explosion. If there are other mines of a similar character in the district, would it be safe to work them with naked lights? *A.* Not if there is gas present.
21535. *Q.* What is a gassy mine? *A.* I should say a mine that gave off gas in detectable quantities.

Witness—A. E. O. Sellers, 26 February, 1903.

21536. *Q.* With the hydrogen lamp? *A.* Yes. It would want a little calculation; but, if there were a mistake, it would be on the safe side.
21537. *Q.* It is not the normal condition of things that we have to provide for? *A.* No, it is abnormal conditions.
21538. *Q.* Under ordinary conditions a gassy mine is safe? *A.* Yes.
21539. *Q.* Do you think it necessary to provide for contingencies that may arise in the best regulated colliery? *A.* Yes; and if gas is given off it would be a fair thing to work with safety-lamps.
21540. *Q.* An accumulation of gas may occur in a slightly gassy mine? [*No answer.*]

[The Commission, at 3·45 p.m., adjourned until 2 o'clock on the following Monday.]

MONDAY, 2 MARCH, 1903, 2 p.m.

[*The Commission met at the Supreme Court, King-street, Sydney.*]

Present:—

C. E. R MURRAY, Esq., D.C.J. (President).

D. A. W. ROBERTSON, Esq., Commissioner. | D. RITCHIE, Esq., Commissioner.

Mr. Bruce Smith, Barrister-at-Law, instructed by Mr. Wood, Crown Solicitor's Office, appeared on behalf of the Crown.

Mr. A. A. Atkinson, Chief Inspector of Coal-mines, assisted Mr. Bruce Smith.

Mr. A. A. Lysaght, Solicitor, appeared on behalf of—
(*a*) the representatives of deceased miners, wheelers, &c. (victims of the explosion);
(*b*) the employees of the Mount Kembla Colliery (miners, wheelers, &c.); and
(*c*) the Illawarra Colliery Employees' Association (the Southern Miners' Union).

Mr. C. G. Wade, Barrister-at-Law, instructed by Messrs. Curtiss and Barry, Solicitors, was present on behalf of the Mount Kembla Coal and Oil Company (Proprietors of the Mount Kembla Mine).

(Mr. J. Garlick, Secretary to the Commission, was present to take shorthand notes of the evidence and proceedings.)

Mr. WILLIAM HAY was sworn and examined, as under:—

Examination-in-chief by Mr. Wade:

21541. *Q.* What is your name? *A.* William Hay.
21542. *Q.* What are you? *A.* Clerk and weighman.
21543. *Q.* Employed at Mount Kembla? *A.* Yes.
21544. *Q.* Do you hold any certificates under the Coal Mines Act? *A.* Yes; second-class certificate of competency.
21545. *Q.* How long have you been at Mount Kembla? *A.* Fourteen years altogether.
21546. *Q.* Where are your duties, as weighman—would not they be outside the mine? *A.* I would not be at the weighing-cabin more than half my time.
21547. *Q.* What would you be doing during other parts of your time? *A.* Making up the pay-sheets; and going in with the under-manager, measuring up the miners' work.
21548. *Q.* How often do you help the under-manager to measure? *A.* Two days a fortnight; and I used to go in idle days, any days the pit was idle, doing anything that they were doing, assisting.
21549. *Q.* Do you know the faces of the No. 1 heading up at the extreme end of No. 1 Right? *A.* Yes.
21550. *Q.* Do you know that those two headings were idle before the 31st of July? *A.* Yes, the No. 1 main heading.
21551. *Q.* Had you been up there any time before the 31st of July? *A.* Yes, I was up there with the under-manager on the 19th of July I think it was.
21552. *Q.* Who was the under-manager; do you mean Mr. Nelson? *A.* Mr. William Nelson.
21553. *Q.* What day was that? *A.* A pay Saturday.
21554. *Q.* Were there any men in the mine? *A.* No, only us two; and men who were engaged repairing the air furnace.
21555. *Q.* What do you mean by that—was the fire out? *A.* Yes, the fire was out.
21556. *Q.* Do you remember where you went that day with Mr. Nelson—any particular parts of the mine? *A.* We went down the water heading from No. 1 Right, and followed the intake air from the adit, and examined a few bords in the 5th Right, and into the main heading, the main No. 1 heading, and into the back heading.
21557. *Q.* What did you have with you—what light? *A.* We had the safety-lamps, the Davy lamps.
21558. *Q.* Did you use the safety-lamps at the No. 1 heading at all? *A.* Yes, the under-manager tested for gas at the No. 1 heading.
21559. *Q.* With what result? *A.* We did not find any.
21560. *Q.* Whereabouts was it, do you know? *A.* Both the front heading and the back heading.
21561. *Q.* Whereabouts were you with regard to the face? *Q.* In the corner, the right-hand corner, and the left-hand corner.
21562. *Q.* At the face? *A.* Yes.
21563. *Mr. Bruce Smith.*] *Q.* Behind the fence? *A.* Behind the fence.
21564. *Mr. Wade.*] *Q.* Yards behind the fence? *A.* Oh, the fencing at the bottom of the headings?
21565. *Q.* Yes? *A.* Oh, yes, right up at the faces.
21566. *Q.* Did you notice whether there was any canvas up near the face of the back heading? *A.* Yes. The canvas was there to carry the ventilation up to the face from the last cut-through in the back heading.
21567. *Q.* What state was it in? *A.* It was intact; everything was all right.
21568. *Q.* In good order? *A.* Yes, in good order.

21569. *Q.* Do you remember having any conversation with Nelson that day at which the question of gas was introduced? *A.* Yes, we were speaking about gas; and I asked him if he had ever seen gas in Kembla, and he said "No."
21570. *Mr. Lysaght.*] I object, your Honor. I take your Honor's ruling as to whether this evidence can be given of statements made by a man who is dead.
21571. *Mr. Wade.*] My friend has been quite ready to take evidence as to statements made to men who are dead; and, therefore, I ask, in the same line exactly, to have admitted as evidence statements made by Mr. Nelson, from the other point of view.
21572. *His Honor.*] I hardly think that, on an inquiry of this kind, the man being dead, the evidence ought to be rejected. The man was there, doing his ordinary business, and holding conversations in relation to his ordinary business, I understand, with another man employed on the same mine; not making communications as to any outside matter for any purpose; but merely having a conversation in relation to the subject matter of their visit there, and in relation to the mine. Under those circumstances, I certainly think that, in an inquiry of this sort, as the man is dead and it is impossible to communicate with him, such evidence ought to be admitted.
21573. *Mr. Wade.*] *Q.* Do you remember what the conversation was? *A.* Yes, I asked Nelson if he had ever seen gas in Kembla, and he said "No." The reason that I asked him that was because I was very anxious to see if I could see it.
21574. *Mr. Lysaght.*] I object to the reason, your Honor. It is not part of that conversation.
21575. *His Honor.*] *Q.* Did you say that, or did you not actually say it to Nelson? Did you say that to Nelson? *A.* Yes.
21576. *Q.* That you were anxious to see gas, or that you had not seen gas before? *A.* I had seen gas before I came to this country.
21577. *Q.* Did you say you had not seen gas there? *A.* Yes.
21578. *Q.* Is that the reason you were anxious—to see whether it was there or not? *A.* Yes.
21579. *Q.* Then what you say is that you were, in point of fact, whatever you thought, making, as far as you were concerned, a particular search for gas? *A.* Yes.
21580. *Q.* By means of, or through, Nelson, because Nelson used the lamp? *A.* Nelson used the lamp; yes.
21581. *Mr. Wade.*] *Q.* Had you any particular object in view when you were trying to get an instance of gas?
21582. *Mr. Lysaght.*] I object to the object he had in view.
21583. *His Honor.*] It is to explain his being there.
21584. *Mr. Bruce Smith.*] I understand now that he says he said to Mr. Nelson what his object was.
21585. *Mr. Wade.*] That is not what I am asking; it is something else that I want now.
21586. *Q.* You said you wanted to find gas. Was there any other reason that you wanted to find gas—any reason to benefit yourself—anything in the way of experience of gas? *A.* Yes, I wanted to see it. It was a long time since I had seen it. I wanted to see it just for experience previous to going up for the examination.
21587. *Q.* You spoke of going round with the under-manager and measuring, about perhaps twice a fortnight? *A.* Yes.
21588. *Q.* To whom were you referring then? *A.* Mr. Leitch and Mr. Nelson, too.
21589. *A.* How long had Nelson been under-manager at this time, on the 19th of July? *A.* I could not say exactly. I think about four or five weeks roughly.
21590. *Q.* Have you ever been round the 4th Right with Leitch, whilst he was under-manager? *A.* Yes; I have been in the 4th Right pillars with Leitch when he was under-manager.
21591. *Q.* How often would you be there, could you say; could you give us an average? *A.* I was not there a great many times. I could not exactly give an average.
21592. *His Honor.*] *Q.* Do you mean once, twice, or three times? *A.* I mean more than that.
21593. *Mr. Wade.*] *Q.* Give us some idea? *A.* Say once a month I was in the 4th Right pillars.
21594. *Q.* Going back how far? Leitch left in the beginning of June? *A.* Yes.
21595. *Q.* How long before that had you been going round once a month? *A.* About eighteen months previously.
21596. *Q.* Did you ever, in any of those trips in the 4th Right, see any indications of pillars or coal having been buried or lost? *A.* No, I did not.
21597. *Q.* Did you ever take the safety-lamps into the 4th Right district? *A.* No; I was never in the 4th Right with a safety-lamp.
21598. *Q.* Were you in the No. 1 Right headings after the disaster? *A.* Yes.
21599. *Q.* How soon after, do you remember? *A.* I was in the next morning, but not for long—not far up the heading.
21600. *Q.* When next after the disaster did you see the canvas at the face of the back heading? *A.* I think it was Friday or Saturday; I am not sure,
21601. *Q.* It would be within a couple of days? Yes.
21602. *Q.* Did you see any difference then? *A.* Yes.
21603. *Q.* What was it? *A.* The canvas door was partly gone.
21604. *Q.* Whereabouts would that be? *A.* At the bottom of the last cut-through.
21605. *Q.* Across the bottom, do you mean? *A.* Yes, carrying up the ventilation. It stopped the ventilation from going through the cut-through, and carried it round the face.
21606 *Q.* What was the difference between that, when you saw it on the Saturday after the disaster, from when you had seen it before on the 19th of July? *A.* When I saw it on the 19th of July it was all intact, right round, right to the face.

Cross-examination by Mr. Lysaght:—

21607. *Q.* When did you go up for examination, Mr. Hay? *A.* In January last.
21608. *Q.* You had been up before, I think? *A.* Yes; I had been up twelve months previously.
21609. *Q.* Have you got any note in writing of this visit on the 19th of July? *A.* I think I saw Mr. Atkinson turn Mr. Nelson's report book up——[*Interrupted*].
21610. *Q.* That is not what I asked you. I asked you if you had any note of this visit of the 19th of July? *A.* None whatever.

21611. *Q.* Do I understand you made no note? *A.* I made no note.
21612. *Q.* But you say that a note of that visit was made in a report book? *A.* Yes.
21613. *Q.* By whom? *A.* By the under-manager.
21614. *Q.* Did you see it made? *A.* I did not.
21615. *Q.* How do you know it was made? *A.* Because it is there in the under-manager's writing.
21616. *Q.* And in what report book is that? *A.* It is in the under-manager's report book. He keeps a report book.
21617. *Q.* Where is that now? *A.* I do not know.
21618. *Q.* Where did you see it last? *A.* When I saw it last I think I saw the Chief Inspector with it in the office—in the colliery office.
21619. *Q.* When was that? *A.* The day after the disaster.
21620. *Q.* Where is that book now? *A.* Well, I have not got it.
21621. *Q.* Are not you the clerk in charge of those books? *A.* No, certainly not.
21622. *Q.* Who has got the custody of those books? *A.* I do not know.
21623. *Q.* Who has the custody of that under-manager's report book? *A.* The under-manager himself.
21624. *Q.* He is dead? *A.* Yes.
21625. *Q.* You saw it the day after the disaster in Mr. Atkinson's hands? *A.* Yes.
21626. *Q.* In the colliery office? *A.* In the colliery office.
21627. *Q.* At Mount Kembla? *A.* At Mount Kembla.
21628. *Mr. Ritchie.*] *Q.* There are a number of books put in here? *A.* I think it is among those.
21629. *Mr. Bruce Smith.*] *Q.* Would you know it if you saw it? *A.* Yes.
21630. *Mr. Wade.*] *Q.* You have not been fingering it since then? *A.* No; in fact I was surprised to see my name was mentioned there.
21631. *Mr. Lysaght.*] *Q.* Could you pick it out from this lot, Mr. Hay? [*Handing a number of books to the witness.*] *A.* Yes; I think that is it plain enough. [*Handing a book to Mr. Lysaght.*]
21632. *Q.* That is the one, is it? *A.* I think so; I am not sure—I could not swear.
21633. *Q.* You say that you were surprised to see your name mentioned? *A.* Yes.
21634. *Q.* Where did you mean mentioned? *A.* Is not it mentioned there?
21635. *Q.* Do not ask me a question, please. Where was your name mentioned? *A.* Well, the Chief Inspector was reading it, I think; and he said my name was there. That is the only time.
21636. *Q.* Did you see your name mentioned? *A.* No.
21637. *Q.* Will you look and see if you can find your name mentioned anywhere in it? *A.* [*Witness looked at the report-book.*]
21638. *Mr. Ritchie.*] *Q.* Is that the report-book?
21639. *Mr. Lysaght.*] Seemingly. He gives me that as the book.
21640. *Q.* Now, I only gave it to you for you to see your name mentioned in it, if you could? *A.* Yes.
21641. *Q.* Are you satisfied that, in the report there, on the 19th of July, your name is not mentioned? You have looked at the 19th of July, and read it? *A.* Yes.
21642. *Q.* Are you satisfied that your name is not mentioned in the report of the 19th of July? *A.* Yes.
21643. *Q.* I would like you to tell me, if you can, what time you went into the mine with Mr. Nelson on this 19th of July? *A.* Well, I could not tell you to a few minutes. It was in the morning, though, before breakfast, or about breakfast-time.
21644. *Q.* About what time, now;—you remember the occasion? *A.* Yes, I remember it well.
21645. *Q.* Tell me about what time you went in? *A.* I think it would be about 8 or 9 o'clock.
21646. *Q.* How long were you in the mine, please? *A.* I could not say.
21647. *Q.* Roughly? *A.* Oh, well, say three hours.
21648. *Q.* From about 8 or 9 to about 12 or 1? *A.* Yes.
21649. *Q.* You went into the Daylight heading, here? *A.* No; we went in the travelling road—the main travelling road.
21650. *Q.* Then, tell me where you went to? *A.* We went into the 1st Right, here.
21651. *Q.* You mean the No. 1 Right? *A.* Yes.
21652. *Q.* The main level? *A.* Yes; then into the 1st Right, round the faces between the 1st Right and the 2nd Right, and up the cross-cut heading to the 5th Right along the rope-road.
21653. *Q.* And from the 5th Right where to? *A.* I do not know how many bords we went up on the 5th Right—one or two of those bords.
21654. *Q.* And then where? *A.* And then into the headings—No. 1 heading.
21655. *Q.* Will you show me any mention in this report of having been in the No. 1 headings; have a look at it;—show me any mention of the No. 1 headings in the book?
21656. *His Honor.*] Is that a short report there of the whole day's work, do I understand?
21657. *To Mr. Lysaght.*] He has not mentioned the No. 1 Right.
21658. *Q.* First of all, is that the right day? *A.* It is Saturday, the 19th.
21659. *Q.* And that is in his own handwriting—Mr. Nelson's own handwriting? *A.* Yes; and this is the day, too, because the ventilating furnace is mentioned.
21660. *Q.* Read it, please? *A.* [*Reading*] "19th of July, Saturday. Entered mine at 8·15 a.m., and visited 2nd Right front and back headings; thence to 5th Right rope-road, and to a few working-places in 5th Right in No. 1 Right, and found same free from inflammable gases, and in good order. Thence to where dams were put in, to keep back water from shaft and No. 1 workings, and to ventilating furnace, which was being repaired, and arranged with furnace-men to light on the 20th; and came outside at 12·15 p.m., and left mine at same.—W. Nelson."
21661. *Mr. Lysaght.*] *Q.* You see there that there is not a single mention of your having gone into either the front or back heading of No. 1? *A.* No, there is not.
21662. *Q.* And you see that Mr. Nelson does mention having gone into the headings in the 1st Right and 2nd Right? *A.* Yes.
21663. *Q.* He does not say anything about the main headings at the top of No. 1? *A.* Yes.
21664. *Q.* Will you tell me whether you went round to the furnace with Mr. Nelson? *A.* Yes, I went to the furnace with Mr. Nelson.
21665. *Q.* Is that the report which I understand that you refer to? *A.* That is the same report that I refer to.

21666. *Q.* There is no other under-manager's book with any report, to your knowledge? *A.* No, I do not think so.
21667. *Q.* Can you account at all for the mention of the back heading of No. 1 having been omitted from this report? *A.* I cannot.
21668. *Q.* Have you read this report since the day Mr. Atkinson saw it? *A.* Never read it through.
21669. *Q.* I suppose it was part of Mr. Nelson's duty to go in and inspect that back heading? *A.* It is his duty to inspect, certainly.
21670. *Mr. Wade.*] *Q.* Do you know anything about his duties? *A.* Oh, I know some of his duties; but I have nothing to do with his duties.
21671. *Mr. Wade.*] If this is to be used for any material purpose, it is necessary, your Honor, of course, to find out, first of all, whether he is a competent judge of Mr. Nelson's duties.
21672. *His Honor.*] You may ask him some questions on re-examinations, Mr. Wade. So far, Mr. Lysaght is perfectly within his rights in asking these questions as to Mr. Nelson's duties.
21673. *Mr. Lysaght.*] *Q.* Do you remember seeing the jig wheel which was placed at the top of the heading? *A.* I do.
21674. *Q.* Which heading was it in, front or back? *A.* The front heading.
21675. *Q.* Did Mr. Nelson say anything to you about how long it was since he had been up to that back heading? *A.* No, he never said it.
21676. *Q.* Was this, do you say, his fortnightly visit there;—do you know whether he used to go up there on an average once a fortnight? *A.* I do not know how often he used to go there.
21677. *Q.* Did he say anything about having been up there the week before? *A.* He never mentioned whether he had been up there, or had not been up there.
21678. *Q.* Did not the jig wheel practically fence off that front heading? *A.* Practically.
21679. *Q.* Practically it did? *A.* Yes.
21680. *Q.* Did you go over that jig wheel, or did you go in the back heading way? *A.* We went past that jig wheel.
21681. *Q.* In the main heading, in the front heading? *A.* Yes.
21682. *Q.* When did you get into the back heading, then? *A.* After we had tested in the main heading, we came through the top cut-through and into the back heading.
21683. *Q.* And, when you came out, which way did you come out? *A.* We came out and along the 4th Left road.
21684. *Q.* You see that, by doing that, you went from the 5th Right right past the travelling road, up the main level, down the travelling road, and were giving yourselves a long journey round—you see that, do you not? *A.* I see what you mean.
21685. *Q.* Your ordinary course would have been up the travelling road from the 5th Right? *A.* Yes.
21686. *Q.* But you did not go that way? *A.* No.
21687. *Q.* Can you tell me why it was that you did not follow that ordinary course? *A.* I could not; I was just following him.
21688. *Q.* Would you be surprised to know that the day before the 19th of July, Mr. Nelson had been right up the No. 1 main heading? *A.* I would not be surprised.
21689. *Q.* Would you be surprised to learn that? *A.* I would not.
21690. *Q.* I suppose you will admit that, if Mr. Nelson had been up the day before, or anywhere near that jig wheel, there would have been no need to go again to test for gas? *A.* But the furnace was being repaired.
21691. *Q.* If Nelson had, the day before, or two days before, been right up at the jig wheel, there would have been no need to go up there again two days afterwards? *A.* Yes; but I said he might have gone up there because the furnace was stopped, and the ventilation was slacked. There was no fire; and that is the reason; that is why we were there.
21692. *Q.* Why? *A.* Just to have a look round.
21693. *Q.* Did you expect to find gas? *A.* We went to see if we could find gas.
21694. *Q.* Did you expect to find gas? *A.* No.
21695. *Q.* But you did not take any flare lights? *A.* No.
21696. *Q.* You did not take any risk? *A.* We did not take any risk, no.
21697. *Q.* Now, I am reading from Mr. Nelson's report on the 17th July—"And to where jig was getting fixed on No. 1 main heading, and found everything all right, and came outside at 3 p.m." That is on the Thursday, the 17th of July.
21698. *His Honor.*] Just read that again, please.
21699. *Mr. Lysaght.*] This is a continuation of the report—"And to where jig was getting fixed on No. 1 main heading, and found everything all right."
21700. *His Honor.*] That was on the Thursday, you say.
21701. *Mr. Lysaght.*] Yes, the 17th of July. Apparently he did not go past the jig wheel on that occasion, your Honor.
21702. *Mr. Wade.*] That is a different thing altogether from what you were asking just now.
21703. *Mr. Lysaght.*] *Q.* As far as you know, no report had been made until Mr. Atkinson read it? *A.* No, I must have got mixed up just now. Mr. Atkinson read it; and I was telling him about my visit —— [*Interrupted*].
21704. *Q.* As far as you know, no report had been written? *A.* No.
21705. *Q.* And since that day you had never seen this report? *A.* No.
21706. *Q.* Whom did you first tell that you had been up with Mr. Nelson on the 19th of July? *A.* The Manager. The Manager and everybody; they all knew, the officials ——[*Interrupted*].
21707. *Q.* I am asking you whom you first told? *A.* I cannot say.
21708. *Q.* What did you say "the Manager" for? *A.* I have told you a few.
21709. *Q.* Do you remember whom you first told? *A.* I could not say.
21710. *Q.* When did you tell the Manager? *A.* If not the first, it was not far off.
21711. *Q.* How long ago? *A.* Oh, he knew; he was there. When I had come out of the mine I told him I had been up there.
21712. *Q.* When? *A.* The first time I saw him.
21713. *Q.* Just after the disaster? *A.* No before the disaster. He would know that I was there on the Sunday.

21714. *Q.* Let me clearly understand you;—you say that Mr. Rogers would, on the 20th of July, know that you had been to the top of the front and back headings the day before? *A.* Yes.
21715. *Q.* Did you tell him on that day? *A.* On the Saturday.
21716. *Q.* Or any time, did you tell him that about that time, before the disaster? *A.* Yes.
21717. *Q.* You distinctly remember telling him? *A.* Yes.
21718. *Q.* Where did you tell him? *A.* I think on the Sunday morning, at the house.
21719. *Q.* Will you tell me why you wanted to go and tell Mr. Rogers that you had been right up to the top of the No. 1 main and back heading? *A.* Yes; I generally used to tell him, when I had been in the mine like that, where I had been.
21720. *Q.* Is that the only reason? *A.* I had no reason whatever to tell him.
21721. *Q.* And you say that the Manager knew;—do you know whether the deputies knew, the officials? *A.* Oh, yes, I suppose they knew.
21722. *Q.* Did you ever tell them? *A.* I do not know whom I told. I did not keep it any secret.
21723. *Q.* I do not want to catch you: but I ask you again, do you distinctly remember telling the Manager (Mr. Rogers) on the 20th that you had been to the top of the front and the back headings? *A.* Yes.
21724. *Q.* Do you know that Mr. Rogers stated at the inquest (page 40) that there was no reason for not inspecting the 30 or 40 yards beyond the fence at the top of No. 1 Right, except that there were no men working there. [*Reading from depositions at Inquest*]—"There were no men working there, and, therefore, there was no reason to inspect it";—did you know that he stated that? *A.* No.
21725. *Q.* Were there any men working there? *A.* No.
21726. *Q.* How long was it before you went there that men had been working there? *A.* I could not state that.
21727. *Q.* About how long? *A.* I could not give anything like it. I think it was a fair while; I could not state it.
21728. *Q.* Then, is it not a fact that, beyond the jig wheel the place was fenced off and ingress practically forbidden to it? *A.* Yes.
21729. *Q.* On the 19th July? *A.* Yes.
21730. *Q.* And it had been in that condition for some time? *A.* Yes.
21731. *Q.* Can you tell me of any other place that you went through which had been fenced off on that 19th of July? *A.* I could not remember.
21732. *Q.* Can you remember going through any other place at all that had been fenced off? *A.* We went through old workings and bords, or anywhere.
21733. *Q.* Can you tell me any place that you went through, that you remember, that had been fenced off like that? *A.* I could not.
21734. *Q.* Will you tell me how it was fenced off? *A.* Just a rail across.
21735. *Q.* A what? *A.* Just a piece of timber across, you know.
21736. *Q.* I do not know; I have some evidence about it;—can you tell me what sort of a fence was on the front heading? *A.* I could not describe the fence.
21737. *Q.* Cannot you tell me any sort of a description of the fence that was on the front heading? *A* I could not tell you what kind; I see so many fences.
21738. *Q.* Have you no idea? *A.* No.
21739. *Q.* Can you give me any idea what sort of a fence there was on the back heading? *A.* No; I could not.
21740. *Q.* And do you not remember getting through it? *A.* Oh, yes.
21741. *Q.* Through the fence on the front heading and through the fence on the back heading? *A.* Yes.
21742. *Q.* Both of them? *A.* Yes.
21743. *Q.* And yet you cannot remember? *A.* No; I cannot.
21744. *Q.* Whether there was one bord, or two bords, or three bords or anything else? *A.* No.
21745. *Q.* You cannot remember? *A.* I cannot.
21746. *Q.* How did you come to remember that it was on the 19th July that you were there? *A.* Because of the furnace being repaired; that is what made me remember about the 19th of July.
21747. *Q.* But do not you know that the furnace was being repaired for some days? *A.* Some days?
21748. *Q.* Yes? *A.* The fire was not out on the Friday.
21749. *Q.* Do you tell me that the furnace repairing had not started on the Friday? *A.* Yes.
21750. *Q.* Where did you get the date that the furnace was drawn from;—to what did you refer to fix this date? *A.* I knew that the furnace was going to be out on the Saturday because there was no work; it was a pay Saturday.
21751. *Q.* To what did you refer to fix the date as the 19th of July? *A.* I knew that pay Saturday was the 19th.
21752. *Q.* Did you calculate it back from any books? *A.* I know. It is on account of my clerical work, making up the pay due. If I dated one pay ticket, I dated all the pay tickets the 18th; that would be Friday, and I could easily remember the 19th.
21753. *Q.* And that is how you do? *A.* Yes.
21754. *Q.* And I understand that you, yourself, never used the safety-lamp? *A.* No; I did not.
21755. *Q.* Did you test for gas yourself anywhere? *A.* No; I never tried to.
21756. *Q.* You simply carried the lamp? *A.* I just watched. The under-manager tested; and it was not necessary for both to test.
21757. *Q.* I take it that he tested in a lot of other places besides? *A.* No.
21758. *Q.* Is that the only place he tested for gas? *A.* He tested, as I said before, two or three bords in the 5th Right—I could not say how many—those bords to the rise, next to the heading; and then he tested the front and back headings.
21759. *Q.* Were Morris and son working near this back heading at this time, the 19th of July? *A.* No, they were not working there; no one was in the mine.
21760. *Q.* Was that their working place? *A.* No.
21761. *Q.* Where was Morris and son's working place? *A.* It had not started—yes it had—it had just started, I think.
21762. *Q.* Do you know where Morris and son were working at the time of the disaster? *A.* Yes; in that cut-through there [*pointing out the position on the plan*]. 21763.

21763. *Q.* I want to know—had that cut-through been started in from the back heading at the time of the inspection (by Mr. Nelson and witness)? *A.* No, that had not started.
21764. *Q.* What did you tell me it had for? *A.* I did not tell you it had.
21765. *Q.* Did not you say Morris' place had just started when you were up there? *A.* I do not remember saying that.
21766. *Q.* Will you swear you did not?
21767. *Mr. Robertson.*] I understood him to say that it had just started.
21768. *Mr. Lysaght.*] *Q.* You are the man who was supposed to be there? *A.* Yes, I was there.
21769. *Q.* I want to know had Morris' place started? *A.* Well, I do not think it had started.
21770. *Mr. Ritchie.*] *Q.* When was this? *A.* On the 19th.
21771. *Mr. Lysaght.*] *Q.* You say you do not think it had started? *A.* I am not too clear about it.
21772. *Q.* Did you go into it? *A.* No, I did not. I am not too clear about that.
21773. *Q.* Now, you can remember the very route you took, coming down the back heading to go over to the 4th Left; and you cannot remember whether that place had started? *A.* No, I cannot remember everything.
21774. *Q.* Then you can tell me how the ventilation was carried past that cut-through which Morris afterwards worked? *A.* By the brattice.
21775. *Q.* Can you tell me how the brattice ran? *A.* [*Witness explained it on the plan to Mr. Lysaght.*]
21776. *Q.* Then I understand from you now that the cut-through between the front and back headings, being the continuation of what was afterwards Morris' place, had stoppings in? *A.* Yes, brattice.
21777. *Q.* Then how many cut-throughs would be there, above Morris' place or what would be Morris' place, with brattice stoppings? *A.* All but the last one.
21778. *Q.* How many would that be? *A.* I could not tell you.
21779. *Q.* Cannot you remember the number of cut-throughs that would be above Morris' place up to the top of the heading? *A.* No.
21780. *Q.* Now, you cannot tell me the kind of fences; you do not know whether Morris' place had started; and you cannot tell me how many cut-throughs? *A.* I was not taking notice of fences or cut-throughs.
21781. *Q.* There may have been three or four? *A.* You could tell by the distance, you know.
21782. *Q.* Cannot you remember going through cut-throughs? *A.* Yes.
21783. *Q.* Cannot you remember how many cut-throughs you went into above where Morris' place would be? *A.* Yes, I can remember going into one—the top one.
21784. *Q.* Is that the only one? *A.* No.
21785. *Q.* Would you go into all the cut-throughs that were there? *A.* No.
21786. *Q.* Can you tell me how many you did not go into above Morris' place? *A.* No.
21787. *Q.* Nor can you tell me how many cut-throughs there were above what was afterwards Morris' place? *A.* No, I cannot; I do not remember.
21788. *Q.* Do I understand from you now that the canvas went straight up the back heading to the last cut-through?
21789. *Mr. Wade.*] The witness has never said that at all.
21790. *Mr. Lysaght.*] *Q.* Just tell me where the canvas did go; from what would be Morris' place afterwards where did the canvas go? I ask you not to look at the map; tell me from your recollection: where did the canvas go from that place which would be afterwards Morris' working place? *A.* I do not understand you.
21791. *Q.* Did not you tell me the air was carried up with brattice? *A.* Up to the back heading, yes.
21792. *Q.* I want to ask you where was that brattice? *A.* It was there.
21793. *Q.* Where? *A.* Carrying the air into the back heading.
21794. *Q.* Do not look at the map: I ask you to tell me from your memory? *A.* It was from the top cut-through, like that [*describing it with his finger on the desk to Mr. Lysaght*]; it used to come up the back heading, and up to the face of the back heading, and down back again.
21795. *Q.* So that, when you would be coming down the travelling road, you would be coming against the intake air? *A.* Coming down the travelling road?
21796. *Q.* That is the question. Is not that so?
21797. *Mr. Robertson.*] Had not you better say what travelling road you refer to?
21798. *Mr. Lysaght.*] I am speaking of the back heading.
21799. *Mr. Robertson.*] In point of fact, that particular place to which, I think, you refer would not be designated the travelling road.
21800. *Mr. Lysaght.*] It is the back heading then.
21801. *Q.* I want to know, as you were coming down there from the face, were you coming against the intake air or travelling with the air? *A.* Coming from the face to the back heading.
21802. *Q.* You say you came from the front heading into the back, and down the back heading. I want to know were you travelling against the air coming down the back heading? *A.* Yes; the air was going up.
21803 *Q.* Where was it you turned to go into the front heading?
21804. *Mr. Wade.*] I object to this. The evidence is the very opposite. It is only done for the purpose of catching the witness. His evidence all through has been that he went up the front heading first, and then down the back heading. Mr. Lysaght takes it as if the man said the opposite.
21805. *Mr. Lysaght.*] *Q.* I am taking it as you said. I asked you whether you did not go up the front heading, and go down the back heading. At what point did you go from the back heading into the front? *A.* I intended to say that I went up the front heading, and come across the top cut-through into the back heading, and back again across the cut-through, and down the main road.
21806. *His Honor.*] *Q.* Do you mean the same cut-through? *A.* Yes.
21807. *Mr. Lysaght.*] *Q.* Well, then, you say that you came in from the front to the back heading by the top cut-through, and went from the back heading into the front heading by the same cut-through? *A.* Yes.

[Mr. W. R. Pratt attended to take shorthand notes of the evidence and proceedings].

21809. *Mr. Lysaght.*] *Q.* Now, how far did you go down the back heading? *A.* I came down the top cut-through, and back through the same cut-through.
21810. *Q.* You mean down from the face? *A.* Yes.

21811. *Q.* So it is clear from your statement that at no time on that day were you in any part of the back heading between the 5th Right and the last cut-through? *A.* I was up at the face.
21812. *Q.* At no time on the 19th were ever you or Nelson at any place between the 5th Right and the last cut-through in the back heading? *A.* No, I do not think I was.
21813. *Q.* When you were in the back heading you would not be travelling against any incoming air at all? [*No answer.*]
21814. *Q.* You never came down the back heading past the last cut-through? *A.* No.
21815. *Q.* The air went through the last cut-through into the last heading? *A.* It had brattice up to the face and up to the last cut-through.
21816. *Q.* Do you tell me that, from the last cut-through up to the face, which is not being worked, there was brattice right up to that face? *A.* Yes, the brattice was there intact.
21817. *Q.* Can you tell me how many months that place had been standing there unworked? *A.* No, I could not. I could not say how many months it was that the back heading had been stopped.
21818. *Q.* Now, if that back heading was bratticed from the last cut-through right up to the face, you would not be meeting the intake air at all when you came down? *A.* I take it that the place was ventilated.
21819. *Q.* Do you not see that you did not, on that occasion, come round the brattice, and go down the back heading? *A.* We would not do that.
21820. *Q.* You would not do that, it is clear. How far from the face was the brattice cloth, actually? *A.* I could not say exactly how far it would be from the face.
21821. *Q.* Can you give me any estimate? *A.* Oh, say half a dozen yards or more.
21822. *Q.* Six yards? I could not exactly say; I will not swear to any distance.
21823. *Q.* Can you tell me how far it was from the last cut-through to the face? *A.* No.
21824. *Q.* Cannot you give me any idea of the distance from the last cut-through up to the face? *A.* It could be estimated.
21825. *Q.* What do you estimate it at? *A.* Twenty yards; perhaps more.
21826. *Q.* There would be about 14 yards of brattice cloth towards the face? *A.* Yes.
21827. *Q.* And at no time did you go round the brattice cloth round the back heading? *A.* No.
21828. *Q.* Do you not see that you would not be meeting the intake air at all? [*No answer.*]
21829. *Mr. Wade.*] That is not in accordance with the question put to the witness. The question was, "Supposing you came down, you would be going against the air in the heading?" Now, Mr. Lysaght is taking it as a fact.
21830. *His Honor.*] The witness did not say "I came against the intake air in coming down from the face of the back heading, towards the 5th Right," but he said, "If I came down I would go against the air."
21831. *Mr. Lysaght.*] *Q.* You went up the front heading, and I understood that you did not branch into the back heading until you got to the last cut-through in the face? *A.* Yes.
21832. *Q.* Do you remember passing through any canvas doors? *A.* No.
21833. *Q.* Do you know whether there were any canvas doors in that cut-through going to the left of the working places? *A.* I have not got the pit in my head.
21834. *Q.* I am only speaking of the place which you afterwards knew as Morris' working place. Do you remember whether in the front heading you went through any doors? *A.* I cannot remember going through any canvas doors.
21835. *Q.* After you got on the 5th Right did you open any canvas doors? *A.* You would have to open canvas doors.
21836. *Q.* Did you? *A.* Yes.
21837. *Q.* You remember opening them? *A.* I do not remember canvas doors. I remember being there.
21838. *Q.* I ask you if you can remember opening some canvas doors? *A.* I cannot remember, I suppose I did open a canvas door to get through.
21839. *Q.* Do you know a door was there? *A.* It would have to be there.
21840. *Q.* Do you know it would be there? Yes.
21841. *Q.* You might tell me this. That is the highest part of the mine? *A.* Yes.
21842. *Q.* Was that a pretty dusty place before the explosion? *A.* No, you would not call that a dusty place.
21843. *Q.* What would you call a dusty place? *A.* I should call a place dusty when there was dry dust on the roof and on the floor.
21844. *Q.* How much dust? *A.* Oh, if the dust is plainly seen and it is dry dust, I would call it dusty.
21845. *Q.* How many inches? *A.* I would not say anything as to how deep. If the dust is plainly to be seen on the roof and on the floor I should call it dusty.
21846. *Q.* Which was the dusty part, in your opinion? *A.* The bottom of the 5th Right.
21847. *Q.* And the next dusty place? *A.* Oh, I do not remember the different places; there were patches dusty.
21848. *Q.* There were patches dusty—where were they? *A.* You would find dusty patches in different parts of the mine.
21849. *Q.* Can you tell me, referring to this large waste, whether the openings to it had any stoppings? *A.* I cannot tell you. I suppose they had.
21850. *Q.* I do not want supposition—can you tell me? *A.* I did not examine them.
21851. *Q.* Can you tell me? *A.* No.
21852. *Q.* I think it is a fact that, at this junction of the 4th Left with No. 1 main level, there were single canvas doors. You can look at this plan [*Exhibit No.* 29] if you like. You see the 4th Left rope road and the 4th Left travelling road, at the junction with No. 1 main level—can you say whether there were single doors there? *A.* There were canvas doors there.
21853. *Mr. Bruce Smith.*] Is all this evidence pointing to anything?
21854. *His Honor.*] I see where it is pointing to.
21855. *Mr. Bruce Smith.*] What is it going to lead to?
21856. *Mr. Lysaght.*] *Q.* You are clear there were single canvas doors there? *A.* There were a lot of canvas doors there.
21857. *Q.* At the first junction of the 4th Left travelling road and the 4th Left rope road—are you clear about their being there? *A.* Between the main heading and the 4th Left.
21858. *Q.* Are you clear there were single canvas doors there? *A.* I know there were doors there. I could not say whether they were single doors or not.

21859. *Mr. Ritchie.*] There is a discrepancy between the plans. There are double doors on one plan, and single doors on the other.
21860. *Mr. Lysaght.*] Yes, I know that. That was the object of my question.
21861. *Q.* I want to ask you now about the 4th Right, which you say you went into. How long was that before the disaster that you went into the 4th Right pillars? *A.* I could not state the date.
21862. *Q.* Roughly? *A.* I would not say.
21863. *Q.* Three months before the disaster? *A.* Take it at that if you like.
21864. *Q.* It is not what I like. It was with Mr. Leitch? *A.* Yes.
21865. *Q.* Were you there with anybody besides Mr. Leitch? *A.* I suppose I might be.
21866. *Q.* Do you not remember? *A.* No.
21867. *Q.* Do you not know that Mr. Leitch left the colliery some months before the disaster? *A.* No.
21868. *Q.* How long before the disaster did he leave? *A.* I do not know—it was not many months—two or three at least.
21869. *Mr. Wade.*] Months.
21870. *His Honor.*] It is not fair, Mr. Lysaght, to tell the witness in your question as if you knew the fact when you did not know it.
21871. *Mr. Lysaght.*] *Q.* Now, can you remember being in the 4th Right pillars with anyone except Mr. Leitch? *A.* No.
21872. *Q.* When you went in, the pillars were being worked? *A.* Yes.
21873. *Q.* I think it is a fact that the shift-men had to timber up the roof so that the men could work the pillars? *A.* Yes.
21874. *Q.* The roof behind, at the waste, had fallen very solidly? *A.* Yes, very weightily.
21875. *Q.* Very weightily? *A.* Yes.
21876. *Mr. Robertson.*] Do you not think it would be better that you should ask the condition of the goaf?
21877. *Mr. Lysaght.*] I put the questions to the witness so that he cannot see what is the nature of the answer implied.
21878. *His Honor.*] Sometimes you put a question that might lead the witness to answer the question in a different way from that in which he ought to answer it.
21879. *Mr. Lysaght.*] *Q.* Do I understand that, all round the pillars of the 4th Right, the goaf had fallen weightily? *A.* Yes.
21880. *Q.* And they had fallen on the occasion of this visit of yours with Mr. Leitch? *A.* Yes.
21881. *Q.* Now, will you tell me about what area of pillars were remaining to be taken out when you were there with Mr. Leitch? *A.* I could not tell you.
21882. *Q.* Roughly? *A.* I have no idea.
21883. *Q.* Can you think at all? *A.* No, I have a poor memory.
21884. *Q.* You have a poor memory? *A.* Yes.
21885. *Q.* Can you tell me whether there were 10, 20, 30, 40, or 50 yards remaining? [*No answer.*]
21886. *Q. Mr. Robertson.*] Mr. Hay is not an ordinary underground official, and he cannot be expected to have the same knowledge as an underground engineer.
21887. *Mr. Lysaght.*] Mr. Wade puts the witness forward to speak authoritatively as to the condition of a portion of the mine; and I want to show that he does not know anything about it.
21888. *Mr. Wade.*] We have evidence that Mr. Leitch and Mr. Hay were seen going out of the mine. That is why I called him.
21889. *Mr. Robertson.*] The witness might remember a particular part of the mine, certainly.
21890. *Mr. Bruce Smith.*] I understand that he was clerk and weighman, and that he went into the mine occasionally with Mr. Leitch.
21891. *Mr. Lysaght.*] *Q.* I see, in answer to a question of mine, that the witness said that he went in the 4th Right pillars once a month with Mr. Leitch? *A.* That was to take the rates for the under-manager.
21892. *Q.* Would he measure the pillars? *A.* Yes.
21893. *Q.* On the last occasion when you were with Mr. Leitch, cannot you tell me how many pillars there were to be worked out? *A.* No.
21894. *Q.* Can you give me no idea? *A.* No.
21895. *Q.* What do you mean by saying there were no pillars lost? *A.* I have seen them finish pillars, they have got the coal all right.
21896. *Q.* There must have been a dozen pillars lost? *A.* As far as I know, there might be.
21897. *Q.* Do you not know that the shift-men had to go in the 4th Right and keep up the roof for them to take down the pillars? *A.* The shift-men have to repair all sorts of places.
21898. *Q.* Did the shift-men have to go in and keep up the roof? *A.* I know the shift-men were in there putting timber up.
21899. *Q.* How long before the disaster? *A.* I could not say.
21900. *Q.* Do you not know that they were taking pillars out of a place 20 yards from where the goaf stood? *A.* I do not understand you.
21901. *Q.* I want to find out the area of the pillars that were worked out in the surrounding goaf; and I want to know what pillars were left. What area would be left when the pillars were extracted? *A.* I could not say.
21902. *Q.* Can you give me no idea? *A.* No.
21903. *Q.* Is it not a fact that you only went some 12 or 20 yards into the 4th Right with Mr. Leitch?
21904. *Mr. Wade.*] When?
21905. *Mr. Lysaght.*] *Q.* On the day he speaks of? *A.* I do not remember how far I went in.
21906. *Q.* You said, "I went measuring once a fortnight with Mr. Leitch and Mr. Nelson." What were you measuring with Mr. Leitch and Mr. Nelson for? *A.* When he was measuring the place.
21907. *Q.* Then you did make it a custom to go and measure the place? *A.* Yes.
21908. *Q.* Have you been in the 4th Right? *A.* Yes.
21909. *Q.* With Nelson? *A.* No; I cannot say with him.
21910. *Q.* With Leitch? *A.* Yes.
21911. *Q.* How long before the disaster were you measuring with Leitch in the 4th Right? *A.* I can give you no idea.

21912. *Q.* You were in the mine after the disaster. Did you notice any canvas burnt at the top of the back heading? *A.* I saw an alteration in the canvas.
21913. *Q.* Did you notice the burns? *A.* It seemed to be burnt.
21914. *Q.* Did you not know whether it was burnt? *A.* I could get canvas, and you would not know whether it was burnt or not.
21915. *Q.* Never mind me. Do you know about this canvas being burnt? *A.* People get deceived about canvas being burnt. There was heat there.
21917. *Q.* Had you any doubt about its being burnt? *A.* It was burnt.
21918. *Q.* Have you any doubt that a number of men were burnt? *A.* I never examined them.
21919. *Q.* Did you see Purcell and Silcock—was Purcell burnt? *A.* I did not examine him: I only saw him outside.
21920. *Q.* Do you know whether he was burned? *A.* Yes.
21921. *Mr. Ritchie.*] *Q.* Which one? *A.* Tom Purcell.
21922. *Mr. Lysaght.*] Do you know where he was found? *A.* Somewhere in the back travelling road in the 2nd Right.
21923. *Q.* Do you know of anyone else besides Purcell who was burnt? *A.* Not from my own personal knowledge, only from hearing people speak.
21924. *Q.* Can you give me any idea as to the direction in which the flame travelled? *A.* Yes.
21925. *Q.* In what direction? *A.* It turned right and left from the 4th Right.
21926. *Q.* The flame was travelling right and left from the 4th Right? *A.* I do not say flame.
21927. *Q.* Can you tell me the direction in which the flame was travelling? *A.* No, not the flame.
21928. *Q.* Have you any doubt that flame was travelling? *A.* Something travelled.
21929. *Q.* Have you any doubt that flame travelled at that disaster? *A.* There must have been heat to cause it.
21930. *Q.* I am talking about flame? *A.* I was not there to see; but there must have been flame if there was burning.
21931. *Q.* Have you any doubt at all? *A.* No, I have not.
21932. *Q.* Now, perhaps, having told me there was flame, you will tell me what, in your opinion, caused the disaster? *A.* I have a doubt about it.
21933. *Mr. Wade.*] This witness is not put forward by me as an expert at all. If his opinion is of any use to the Commission, I have no objection to it.
21934. *His Honor.*] He saw certain signs of force; but his answers may be of little value. He is asked now if he can form any opinion at all.
21935. *Mr. Wade.*] He is not put forward as an expert.
21936. *His Honor.*] He is, to a certain extent, something like an expert.
21937. *Mr. Lysaght.*] *Q.* You did see a number of indications of burning throughout the mine? *Q.* Yes.
21938. *Q.* Charred dust on props, and things like that? *A.* Yes, coked dust.
21939. *Q.* I will not go into details; but, having seen what you did, what, in your opinion, caused the disaster? *A.* I do not know.
21940. *Q.* Have you not thought? *A.* I have thought a lot but come to no conclusion.
21941. *Q.* Have you any doubt that fire-damp played a part in the disaster? *A.* I do not know whether fire-damp played any part in that disaster.
21942. *Q.* Have you any doubt? *A.* I have a doubt because I never saw fire-damp.
21943. *Q.* Do you know that a number of men died from carbon-monoxide poisoning? *A.* Yes.
21944. *Q.* Can you give us any idea where that carbon-monoxide gas came from? *A.* It came from incomplete combustion.
21945. *Q.* Of what? *A.* Coal-dust, or anything that caused the explosion.
21946. *Q.* What do you think? *A.* Coal-dust, I consider, was an element.
21947. *Q.* So you have a theory? *A.* I have been thinking a little over the matter.
21948. *Q.* Do you say that coal-dust was an element? *A.* Yes.
21949. *Q.* In your opinion, was that coal-dust lighted? *A.* I cannot say.
21950. *Q.* Have you got no opinion? *A.* No.
21951. *Q.* Do you say you do not know whether fire-damp played a part in it? *A.* I do not know. It is strange no one found it.
21952. *Q.* How long have you been at Kembla? *A.* Fourteen years.
21953. *Q.* Do you know that a man named Gallagher was burnt? *A.* I know he was burnt.
21954. *Q.* With fire-damp? *A.* Yes, he must have been.
21955. *Q.* You told me you never knew about it? *A.* I said I never saw it.
21956. *Q.* Do you know that Ronaldson gave evidence of fire-damp—that it was given off in small quantities in the mine? *A.* No.
21957. *Q.* Would it shock you to know it? *A.* No.
21958. *Q.* Would it surprise you to know that, five or six years ago, Mr. Ronaldson gave evidence that fire-damp in small quantities was found in the mine? *A.* It is rather surprising to me.
21959. *Q.* If you have never seen fire-damp, why did you want to take the safety-lamp with you when Mr. Nelson had one, and you did no examining? *A.* I did not want to examine where he was examining.
21960. *Q.* You said you did not examine at all? *A.* I said that.
21961. *Q.* Why did you take a safety-lamp? *A.* I intended to examine; but, seeing him examine, I did not bother.

Re-examined by Mr. Wade:—

21962. *Q.* You said "Yes," in answer to a question which included these words, "That indications of burning were found throughout the mine." Tell us exactly in what spots you saw indications of burning? *A.* In the top cut-through, and between No. 1 front and back headings. There was a lot of coke there.
21963. *Q.* Anywhere else? *A.* On the timbers in the back heading.
21964. *Q.* Where abouts? *A.* It was on the left side in the cut-through.
21965. *Q.* How far was it. On the last cut-through—from there up to the face—between that and the face? *A.* Yes.
21966. *Q.* Anywhere else? *A.* Towards the small goaf—the 17-perches goaf—there were indications of coked dust.

21967. *Q.* Where do you mean? *A.* On the 4th Left.
21968. *Q.* Where Aitken was working? *A.* Yes.
21969. *Q.* Anywhere else? *A.* I do not think I could say anywhere else. Those are the only places I know of.
21970. *Q.* Let us understand about the measuring. Was it part of your regular duty, or not, to go in with the under-manager? *A.* I was going in with the under-manager for experience.
21971. *Q.* For your own experience? *A.* Yes. I used to go into the mine whenever I had an opportunity; in order to get experience.
21972. *Mr. Ritchie.*] *Q.* I suppose you were acting officially? You were not going in except on official duty? *A.* Not to measure.
21973. *Q.* You would go in officially when measuring? *A.* Yes.

Examined by Mr. Bruce Smith:—

21974. *Q.* Do you know of two stoppings inbye of No. 5 Right? *A.* Yes.
21975. *Q.* You went in that direction after the disaster? *A.* Yes.
21976. *Q.* Can you remember which way they were blown out? *A.* I remember there were some of the stones on the main heading—they came towards the main heading.
21977. *Q.* Where were the others? *A.* They seemed to be both ways.
21978. *Q.* Do you mean to say, from the forces you saw, there were indications of forces both ways? *A.* Yes; a sort of recoil.
21979. *Q.* As much one way as the other? *A.* I could not say.
21980. *Q.* Which way did the force preponderate? *A.* From the main heading. From the back heading the force seemed to have come back and knocked out the stones too. It seemed a rebound from the rib side.
21981. *Mr. Robertson.*] *Q.* That stopping which Mr. Bruce Smith referred to—was it not built of large stones? *A.* There was no need for a stopping.
21982. *Q.* Was it not faced with large stones in front, and backed up with small coal? *A.* There was coal at the back, and fair sized stones in the front.
21983. *Q.* If the explosion caused the stones to topple over, the coal would run down? *A.* On top of the stones.
21984. *Q.* If it were faced with large stones, and if the explosion struck it, it may have tumbled over into the main heading? *A.* Yes.
21985. *Q.* And the small loose stuff behind would run down in front? *A.* Yes, and cover the stones.
21986. *Q.* And give the appearance of its having been driven in from the back heading? *A.* It may have done so.

JAMES BARR was sworn, and examined as under:—

Examination-in-chief by Mr. Wade:—

21987. *Q.* What is your name? *A.* James Barr.
21988. *Q.* You are Manager of the Co-operative Colliery, Newcastle District? *A.* Yes.
21989. *Q.* How many years experience have you had? *A.* Forty-two.
21990. *Q.* Leaving Kembla out of the question, have you had any practical experience of explosions in collieries? *A.* Yes.
21991. *Q.* Where has that been—what have you seen? *A.* Well, in Scotland I was slightly burnt by an ignition of fire-damp.
21992. *Q.* Was that an explosion? *A.* It was an ignition. It probably went 50 or 60 yards.
21993. *Q.* Have you had any experience anywhere else? *A.* I have had an experience in the Newcastle District—at the Monkwearmouth Colliery—now the Seaham.
21994. *Q.* What was that? *A.* A slight explosion.
21995. *Q.* Over what area did it go? *A.* The explosion carried nearly 200 yards.
21996. *Q.* Were there any indications left at Seaham of flame? *A.* Yes, coke.
21997. *Q.* Where? *A.* On the trees, the timber, the pit bottom, and the sides.
21998. *Q.* Have you had experience anywhere else? *A.* Yes; at Dudley.
21999. *Q.* Were you in the big explosion there four or five years ago? *A.* Yes.
22000. *Q.* Did you see indications of flame there? *A.* Everywhere, right throughout the mine—everywhere from the pit bottom to the face.
22001. *Q.* You saw what? *A.* Indications of flame, coked dust, and timber burnt and charred.
22002. *Q.* You were in Mount Kembla after the disaster? *A.* Yes.
22003. *Q.* When did you go? *A.* I got there on the Saturday afternoon.
22004. *Q.* On the 2nd of August? *A.* Yes.
22005. *Q.* I am not going through all the details—but did you go through the whole of No. 1 Right? *A.* I do not know that I went through every part, but I went through the major portion of it.
22006. *Q.* Do you know the 4th Right? *A.* Yes.
22007. *Q.* Where it joins No. 1 main road? *A.* Yes.
22008. *Q.* Did you travel it inbye and outbye? *A.* I went up it—I went outbye and I went inbye. I went into the main road, and came round out of it. I went in by different ways.
22009. *Q.* Where do you say the force divided? *A.* It divided at a point in the main road, a portion going inwards and a portion outside. It divided itself on the main road.
22010. *Q.* Did you see skips and coal, and rollers, and various things blown about? *A.* Yes.
22011. *Q.* Did you see any signs of coking or heat on any of these skips? *A.* No, I did not.
22012. *Q.* Did you see any resemblance between the condition of things at Kembla and what you saw at Dudley? *A.* None whatever—not so far as flame was concerned.
22013. *Q.* Do you remember whether you saw coal on the outbye side of the Right, either in skips or on the floor? *A.* There was some about the dividing point—there was a heap of coal there, and some dust.
22014. *Q.* What do you mean by the dividing point—you say, "about the dividing point"? *A.* Show me the plan. [*Witness looked at the plan—Exhibit No.* 29—*and pointed to the outbye side of the* 4*th Left.*]

22015. *Q.* If it had been a case of gas explosion at the junction of the 4th Right, and if it had been helped by coal-dust —— [*Interrupted*].
22016. *Mr. Ritchie.*] *Q.* Excuse me; I suppose the witness had a memory about that heap of coal without its being marked on the plan? *A.* Yes.
22017. *Mr. Wade.*] I did not see it; but I see that the letters are upside down.
22018. *Q.* At what particular place do you locate it? *A.* The coal I saw there was in a heap.
22019. *Q.* How do you locate the spot? *A.* By the distance from No. 4 Right.
22020. *Q.* If there was a gas explosion at the junction of the 4th Right and the main road, would you expect to find any indications of force—say at that heap of coal on the outbye side. *A.* Certainly. If there had been an explosion there, there would be indications of coke. There is no doubt about that.
22021. *Q.* Would you expect to find it far out, besides near that heap of coal? *A.* Yes.
22022. *Q.* Would you expect to find it on the inbye side? *A.* Yes. It expanded in that way, and wherever the gas expanded and flame travelled there would certainly be coke. There can be no doubt about that.
22023. *Q.* If the gas explosion was helped by dust, would you expect to find signs after an explosion like that? *A.* There would be signs—there is no doubt about that.
22024. *Q.* Have you had experience of the effects of falls? *A.* Yes, I have.
22025. *Q.* In your own colliery? *A.* Yes.
22026. *Q.* When was that—recently? *A.* Not recently. We have falls occasionally, but not of any magnitude at all. I am speaking of from two and a half to three years ago, when we had falls.
22027. *Q.* Can you give us any evidence of the extent at which the effects of these falls were felt? *A.* Yes.
22028. *Mr. Bruce Smith.*] *Q.* Can you give us the area of the fall? *A.* Yes. We had one fall two years and nine months ago. The lights were blown out a quarter of a mile away, and the tops of the skips—I mean the coal projecting on the tops of the skips—was blown away.
22029. *Mr. Wade.*] *Q.* Do you know how much roof fell—about what area? *A.* I suppose nearly two pillars—an area 30 yards long by 32 yards broad; and over a third of that space was filled with refuse and small coal.
22030. *Q.* What do you mean? *A.* An area 32 yards x 30 yards; and the small coal, and the refuse from the workings, would take up about a third of it.
22031. *Mr. Bruce Smith.*] *Q.* Do you mean that each pillar was 32 x 30; or do you mean the two together? *A.* I am taking the two together.
22032. *Mr. Wade.*] *Q.* How high was the goaf? *A.* Six feet; but a third of that would have to come off.
22033. *Q.* Were there any openings? *A.* Yes; it was open all round about it. A wheeler was driving a horse, and he was forced into the skip by the blast. In another case a man was taking empty tubs out when the fall commenced, and he was hurled 20 yards past them; and all the timber on the road was blown out a distance of 20 yards. The small coal was smashed into his back, or battered into it—whatever term you may like to use—and he was bleeding freely.
22034. *Q.* What sized coal are you speaking of? *A.* Coal about the size of a marble.
22035. *Mr. Ritchie.*] *Q.* Was this small coal knocked into the boy's skin through his shirt? *A.* That is the statement made to me. He bled profusely.
22036. *Mr. Wade.*] *Q.* You saw his back? *A.* No.
22037. *Q.* How long was it after the occurrence that you were told? *A.* Well, very recently he told me.
22038. *Q.* Do you refer to the fall of two years and nine months ago? *A.* Yes.
22039. *Q.* And he only told you recently? *A.* Yes; but I had a report at the time.
22040. *Mr. Bruce Smith.*] *Q.* At the time? *A.* Yes.
22041. *Q.* I should like to see it? [*No answer.*]
22042. *Mr. Ritchie.*] *Q.* From whom was this report? *A* The underground manager gave it to me verbally.
22043. *Q.* Did he mention this fact to you? *A.* No, he did not; but the men were terribly frightened—they were terrified at the time.
22044. *Mr. Bruce Smith.*] *Q.* Did you report this to the Department? *A.* No.
22045. *Mr. Wade.*] *Q.* You are not supposed to? *A.* No.
22046. *Q.* You do not report cases where there is only bleeding from the skin? *A.* No.
22047. *Q.* And where there are no bones broken? *A.* No.
22048. *Q.* Have you got any sketch with you showing the place in the mine? *A.* Yes, I have.
22049. *Q.* Has it been prepared lately? *A.* Yes.
22050. *Mr. Bruce Smith.*] *Q.* Was it prepared by you? *A.* It was prepared under my instructions.
22051. *Mr. Wade.*] *Q.* You say that it represents the working of the mine exactly? *A.* Yes; it is a tracing off the plan.

[At this stage the further examination of the witness was adjourned, and the Commission, at 4 p.m., adjourned until 10 o'clock the following morning.]

TUESDAY, 3 *MARCH*, 1903, 10 a.m.

[*The Commission met at the Supreme Court, King-street, Sydney.*]

Present:—

C. E. R. MURRAY, Esq., D.C.J. (President).

D. A. W. ROBERTSON, Esq., Commissioner. | D. RITCHIE, Esq., Commissioner.

Mr. Bruce Smith, Barrister-at-Law, instructed by Mr. Wood, Crown Solicitor's Office, appeared on behalf of the Crown.

Mr. A. A. Atkinson, Chief Inspector of Coal-mines, assisted Mr. Bruce Smith.

Mr. A. A. Lysaght, Solicitor, appeared on behalf of—

(*a*) the representatives of deceased miners, wheelers, &c., (victims of the explosion);
(*b*) the employees of the Mount Kembla Colliery (miners, wheelers, &c.); and
(*c*) the Illawarra Colliery Employees' Association (the Southern Miners' Union).

Mr. C. G. Wade, Barrister-at-Law, instructed by Messrs. Curtiss and Barry, Solicitors, was present on behalf of the Mount Kembla Coal and Oil Company (Proprietors of the Mount Kembla Mine).

(Mr. J. Garlick, Secretary to the Commission, was present to take shorthand notes of the evidence and proceedings.)

Mr. JAMES BARR, previously sworn, was further examined as under:—

Examination-in-chief by Mr. Wade:—

22052. *Q.* Taking that first fall that we were talking about yesterday, Mr. Barr, did you say how far the lights were put out—I think you did—did you say a quarter of a mile or half a mile away;—how far did you say the lights were away that were extinguished by the first fall? *A.* Only a quarter of a mile.
22053. *Q.* Were there any openings, or was it a narrow passage closed in? *A.* All the working bords were open.
22054. *Q.* Is that the nature of it, then, that there were openings all the way down the whole of the quarter of a mile? *A.* Yes, pretty well.
22055. *Q.* Would the air have a chance to spread out on either side? *A.* Yes.
22056. *Q.* Now, with regard to the second fall you spoke of;—did anything else happen besides what you told us about the boy being driven and pelted in the back with small coal? *A.* No, not the second fall. He was tumbled into the skip.
22057. *Mr. Bruce Smith.*] *Q.* It was in the first fall that he got the coal in his back? *A.* Yes.
22058. *His Honor.*] *Q.* What happened at the second fall? *A.* He was tumbled into the skip. He was riding in front of his skip; and the air came and caught him and tumbled him into the skip.
22059. *Q.* Backwards? *A.* He was coming in against the blast. His horse was in front of him; and he was riding on the front of the tub; and it caught him and upset him into the tub. He was standing with his foot on the bumper of the skip.
22060. *Mr. Robertson.*] *Q.* The top of the skip would get him behind the knees? *A.* He was standing on the bumper of the tub.
22061. *Q.* Then the top of the skip would get him behind his knees?
22062. *His Honor.*] *Q.* It would not take much to capsize him? *A.* Do not make any mistake about that. It took a good bit to turn him, because he was supported by the end of the tub; and he had to be tumbled right over.
22063. *Mr. Robertson.*] *Q.* Suppose this is the end of the skip, and you are standing on the bumper; how much would it take to tumble you over there? *A.* Suppose I am standing like that [*crouching alongside of the jury box*], it is going to take something to tumble me over there [*the other side of the rail round the jury box*].
22064. *Q.* What is the height of the skip? *A.* 2 feet 2½ inches from the bumper.
22065. *Q.* Is it not 2 feet? *A.* 2 feet 2½ inches.
22066. *Mr. Wade.*] *Q.* What size was this wheeler? *A.* He was a young man.
22067. *Mr. Ritchie.*] *Q.* Was he very tall or short? *A.* He was a man, I suppose, about 5 feet 8 inches, or 5 feet 8½ inches.
22068. *His Honor.*] *Q.* Would he be able to stand upright there? *A.* No, not exactly.
22069. *Mr. Wade.*] *Q.* How was the roof? *A.* The roof was all right.
22070. *Q.* But with regard to his head? *A.* It was a 6-foot place.
22071. *Mr. Ritchie.*] *Q.* He was about 5 feet 8 inches? *A.* Yes.
22072. *Q.* And your skip is 2 feet 6 inches from the bumper? *A.* Yes, fully that. I am not going to give you it exactly to an inch or 2 inches; but it is thereabout.
22073. *Q.* Then 3 feet 6 inches of his body would be above the skip, and 2 feet 6 inches below? Taking the height of that wheeler as 5 feet 8 inches, then 2 feet 6 inches of the legs would be from the bumper to the top of the skip, and 3 feet 2 inches of the heavier part of the body would be above the skip altogether? *A.* Well, our wheels are 12-inch wheels.
22074. *Q.* But there is no need to go into the question of the size of the wheels;—you have already told us that he was standing on the bumper, and that from the bumper to the top of the skip was 2 feet 6 inches? *A.* Yes; but he was in a stooping position.
22075. *Q.* How do you know that? *A.* Generally speaking they are. I have seen him. That is all I know.
22076. *Q.* Did you see him on this occasion? *A.* No; but, as a general rule, I have seen them every day, nearly.
22077. *Mr. Bruce Smith.*] *Q.* Do they go about with their knees bent? *A.* Yes, they have their feet on the tub.
22078. *Mr. Wade.*] *Q.* On your roadway, standing on the bumper, could a man 5 feet 8 inches stand upright? *A.* No.

22079.

22079. *Mr. Ritchie.*] *Q.* Would he be sitting on it with his legs swinging in front of him? *A.* No; but generally speaking he is in a stooping position; and generally speaking there would be the major portion of the man down below the top of the tub.
22080. *Mr. Wade.*] *Q.* Could you give us the name of the wheeler? *A.* Yes, Thomas Loneragan.
22081. *Q.* Is he at the colliery still? *A.* Yes, he is a miner now. He is working on the coal.
22082. *Q.* Did you have any other experience of a fall doing any damage? *A.* In the Co-operative?
22083. *Q.* Yes. *A.* Yes. It is the second fall you are talking about now.
22084. *Q.* Was there any besides that? *A.* Yes; there was a third fall, in what is known as the cross-cut workings.
22085. *Q.* What took place there? *A.* There was a fall there and ——[*Interrupted*].
22086. *Q.* When was that? *A.* About three years ago; and the wheeler was coming out just at the time when it commenced to work. He was following the skips. He had three full tubs; and he was about 2 chains out from where it fell, with the horse in front of the tub, pulling the tubs out; and the blast caught the hind end of the tubs and swept them sideways, and the corner of the skips caught the props and took them with them a considerable distance; and the horse was blown by the blast into a bord end.
22087. *Q.* Did you say those tubs were full or empty? *A.* Full.
22088. *Q.* What became of the tubs? *A.* The hind end was swung round off the rails, and the corner of the skips caught the props and took them a considerable distance with them, and the horse was blown right into a bord end.
22089. *Mr. Robertson.*] *Q.* And that was 2 chains from the fall? *A.* Yes; about 2 chains from the fall, as near as possible.
22090. *Mr. Wade.*] *Q.* Were there other openings round about there? *A.* Yes; for far enough in all directions, with the exception of just where the fall took place—the one side or face; but all above that for nearly half a mile was open.
22091. *Mr. Ritchie.*] *Q.* Was there any damage done in any other direction? *A.* No; that was the only damage that was done.
22092. *Q.* No indications of force having travelled up through those other openings? *A.* No; right through the old workings there was no indication that I could see afterwards.
22093. *Mr. Wade.*] *Q.* Are those your only experiences of the effect of falls of roof and blasts of air? *A.* No; I have had experience in Scotland.
22094. *Q.* What way? *A.* The same way. I have been upset on a flat nearly half a mile off, and others besides me; and one young man got his leg broken there—smashed in amongst the tubs.
22095. *Q.* Have you seen this lithograph before? *A.* I saw it here yesterday.
[Mr. Wade then explained to the witness the principal features of the mine on the plan.]
22096. *Q.* What I want to ask you is this: you were in the No. 1 main right, between the 4th Right and the 4th Left? *A.* Yes.
22097. *Q.* If a fall of roof drove the air out into the No. 1 main road, and drove out the canvas screens across the roadway of the 4th Right, what effect do you think it would have on Morrison's light, which was 200 yards away at the 4th Left? *A.* It would put it out.
22098. *Q.* Supposing that the fall of roof in the 4th Right liberated some gas in the strata, and came out with sufficient force to knock the canvas screens out into the main road, do you think that if the air went up towards the 4th Left it would have got alight at Morrison's light or would have blown it out? *A.* Oh, no.
22099. *Q.* What do you mean by "Oh, no"? *A.* It is impossible.
22100. *Q.* To get alight? *A.* Yes; it is impossible under such conditions as that. This is a return; and that is an intake. There are two currents of air there; and if a blast came out of here (the 4th Right) it had to face both of these currents. The blast coming out of the 4th Right had to cross the current of return air going to the furnace, and, as a natural consequence, if there were pressure enough to lift this canvas, by a natural law the intake would want to come to the return.
22101. *Q.* When would that be? *A.* If the canvas between the intake and the return was lifted, by a natural law the intake air would want to come to the return.
22102. *Q.* To short circuit? *A.* Yes; therefore there would have to be pressure enough coming out of here (4th Right) to overcome both of those currents of air: consequently the pressure would be so great that this light (Morrison's light) would be put out.
22103. *Mr. Robertson.*] *Q.* I do not quite follow that reasoning. If the pressure was so great as to cause the intake air to come round into the return, it would reduce the velocity of the air approaching Morrison's light? *A.* Why? According to that plan they are too separate currents.
22104. *Q.* But according to your own statement just now the intake would pass round into the return and face that blast? *A.* Certainly it would, by a natural law. If you open a separation door between an intake and a return, then it must come through.
22105. *Q.* But would not that reduce the velocity of the air or the gas approaching Morrison's light? *A.* Ah, ah! but if the pressure was sufficient to overcome that, then the velocity would be greater, would it not?
22106. *Q.* But I understand that that blast was opposed by another force, in the shape of the intake air? *A.* No; that blast, when it came out of there, had to resist the intake air at that particular point, between the intake and the return, had it not? And then, again, am I to understand that the pressure came out of there and just gently put that return current to one side and held it at bay there, and then went up there (up the No. 1 main level) and struck that light—am I to believe that?
22107. *Q.* That is your way of putting it;—you say it met an opposing force? *A.* Yes.
22108. *Q.* And would not the effect of that opposing force be to reduce the velocity of the blast? *A.* Certainly, at that point; but at the same time, if it went there, across those currents, it would turn all the return air into the intake, as well as the intake itself, and, consequently, it would be increased, would it not?
22109. *Q.* I cannot say. I am asking you? *A.* There is a problem we have got to work out; and I say that it will.
22110. *Mr. Ritchie.*] *Q.* Would it not be increased towards the furnace, according to your way of putting it? *A.* No; according to the way that Mr. Wade has put it to me there, the blast coming out of the 4th Right would have to cross the return. If it had to cross that return it would hold that return on one side, at bay, or carry it with it.

22111. *Q.* You say this, that if it did cross the return and went into the intake it would have to dislodge the canvas, and that the intake, instead of going in to Morrison's light at all, would come through, and would make towards the furnace, increasing the velocity towards the furnace, but decreasing it towards Morrison's? *Q.* Yes; if the intake had had sufficient pressure to overcome the blast that came out of the 4th Right and the return as well; but if it was sufficient to go through the return and also carry the intake with it, it would increase the velocity down to the right, as it was pointed out to me.
22112. *His Honor.*] *Q.* Does not it seem that the question whether one is an intake and the other a return, whether there is that slow motion up or down, is absolutely immaterial when it is compared with and related to such a motion of air as you assume that the fall would have to cause to do anything at all? If the air came out of the 4th Right with sufficient velocity to carry away the door, and to shoot across the return and into the intake air at all, do not you see that the question of the motion of the air, whether intake or return, is absolutely immaterial? It is, in fact. That air does not matter; you can treat it as air at rest. It is ridiculous to try to co-ordinate two motions of that kind so that the infinitely smaller one can affect the infinitely larger one.
22113. *Witness.*] Well, it is a natural law.
22114. *Mr. Wade.*] *Q.* You started with the canvas being blown down: I want to know what blew the canvas down? *A.* Force.
22115. *Q.* From where? *A.* From the 4th Right.
22116. *Q.* If that force blew the canvas down, where do you think it would go? *A.* Well, according to what I saw there it split in the intake, and one portion went inbye and the other portion went outbye.
22117. *Q.* Do you think the force was great? *A.* I have no doubt it was great.
22118. *Q.* Do you think the force of the current of air was great after it got into the main No. 1 road? *Q.* Yes, it was great; there is no doubt about that.
22119. *Q.* If you got a strong current there, do you think that Morrison's light would have been able to live, and allow of the ignition of gas which might be in the current of air? *A.* Seeing that there were two currents there, and considering the force that I saw there, I think it is an utter impossibility. That is my opinion.
22120. *Q.* I do not see how you bring in the second current. If you have got your current of air from the 4th Right, broken through the canvas screen, and on the No. 1 main road——*A.* And it struck the intake air and increased the force towards the light.
22121. *Q.* The air would not short circuit until after you broke the canvas down? *A.* It could not short circuit at all. I do not mean to say that it would short circuit. I mean to say that it had gone there, and, striking the intake air, it would increase the velocity of the intake air.
22122. *Q.* I thought you meant, first of all, that it would short circuit? *A.* No; as it came out of there the force was so great that it had to counterbalance the intake air; and it was that much over-balanced that it carried the intake with it and increased the velocity.
22123. *Q.* Then you do not mean that, after the blast from the 4th Right had knocked the canvas screens down, the air would short circuit? *A.* No. After the trouble was by, it would short circuit.
22124. *Q.* After the blast had subsided? *A.* Yes.
22125. *Q.* But whilst the blast was going out you say it could not short circuit? *A.* No.
22126. *Mr. Robertson.*] *Q.* I do not quite understand how you brought in that reference to short-circuiting? *A.* Well, I did not bring it in.
22127. *Q.* But you did, distinctly; you said that the air would short circuit? *A.* What I wanted to show you, and you must know perfectly well, is that there was a canvas door between the intake and the return, and, if that force came out at the 4th Right, that force had to cross the return; it had to be sufficient to cross the return and lift the canvas. Very well, then, the force had to be sufficient to overcome a natural law from the intake, had not it? Well, then, if it was strong enough to overcome that natural law—that is, to carry the intake air with it—would it not naturally increase the velocity of that intake? Would not it, now?
22128. *His Honor.*] Mr. Robertson is not here to be cross-examined, really. Mr. Wade seems to have got puzzled himself. We are all puzzled, I think.
22129. *Mr. Wade.*] No. I see what he means now, your Honor. He expressed it badly before. He did not mean that the air did short circuit; but he says that, if the air was sufficiently strong to force this canvas door down, then it would go into the intake, and, if it was sufficiently strong to force the intake down, it would increase the speed of the intake and would not short circuit.
22130. *His Honor.*] That question of short-circuiting is absolutely immaterial.

Examination by Mr. Bruce Smith:—

22131. *Q.* I want to ask you some questions about your experience. I understand that you have had several personal experiences of gas? *A.* Yes.
22132. *Q.* Where was the first? *A.* In Scotland.
22133. *Q.* Were you personally concerned in that explosion, or did you merely see the effects afterwards? *A.* Well, I felt them.
22134. *Q.* How do you know there was gas in that case? *A.* Well, I saw it.
22135. *Q.* You saw the flash? *A.* Yes; and I was burnt.
22136. *Q.* And you were burnt? *A.* Yes.
22137. *Q.* Where were you burnt? *A.* My head was singed, and my face was scarred
22138. *Q.* Did you wear a beard then? *A.* Yes, very little beard then.
22139. *Q.* Your hair was singed? *A.* Yes.
22140. *Q.* What was the effect upon your hair? *A.* It all curled up crumbly.
22141. *Q.* Crumbled up in your hands? *A.* Yes.
22142. *Q.* With bulbous ends, and that sort of thing? *A.* Yes.
22143. *Q.* And your skin—was that burnt at all? *A.* Only reddened.
22144. *Q.* Did you see anybody else, by-the-bye, who had been burnt in the same way as yourself? *A.* Yes, I have seen them burnt.
22145. *Q.* Did you see their hair? *A.* Yes; but I did not get time to examine it.
22146. *Q.* What was your next experience of gas? *A.* I had another experience after that; but I came off a little more fortunate.
22147. *Q.* In Scotland? *A.* Yes.

22148. *Q.* Were you burnt at all? *A.* No; but a man about 200 yards from me was slightly scarred, too.
22149. *Q.* Did you see him after he was burnt? *A.* Yes.
22150. *Q.* What effect had it on him? *A.* He was all singed, too.
22151. *Q.* The hair all shrivelled up as if a candle had caught it? *A.* Yes.
22152. *Q.* Was his skin burnt at all? *A.* Yes; I think his arm was burnt, and the skin was dropping off his arm.
22153. *Q.* Can you describe to the Commission what the effect was upon his skin on that occasion? *A.* His skin was all burnt down the arm, here, and hanging down.
22154. *Q.* As if it had been a loose thing on the flesh? *A.* Yes.
22155. *Q.* Have you had any experience of gas out here? *A.* Yes.
22156. *Q.* Was that about the same effect? *A.* About the same effect; only it was more severe, out here, I think.
22157. *Q.* Do you think the effect on the hair was just about the same? *A.* There was not a hair left, hardly.
22158. *Q.* But on the skin? *A.* Well, the skin was all lying in shreds, torn down.
22159. *Q.* I want to go now to your experience of these falls; I think you told us you experienced one in Scotland? *A.* Yes.
22160. *Q.* And you told us that you were yourself upset half-a-mile away from the fall? *A.* Yes.
22161. *Q.* Was that the severest, do you think, of all that you have experienced? *A.* Yes, I believe it was.
22162. *Q.* Was anybody else affected by that fall but yourself? *A.* There were half-a-dozen of us there, and one boy got his leg broken.
22163. *Mr. Ritchie.*] What fall is this that he is referring to?
22164. *Mr. Bruce Smith.*] In Scotland.
22165. *Q.* You were half-a-mile away from this? *A.* Yes, about that; it was something like that.
22166. *Q.* And were there other people closer to the absolute exit of the air? *A.* Yes, I believe there were.
22167. *Q.* One of those had his leg broken? *A.* No; he was on the same flat that I was.
22168. *Q.* With regard to those who were much nearer to the outlet, how were they hurt? *A.* They were not hurt at all. They escaped in some way by getting behind the pillars, sheltering away from the main force.
22169. *Q.* Then I understand that the principal injuries on that occasion were that you were rolled over? *A.* And others as well.
22170. *Q.* And, I suppose, you were bruised? *A.* Well, I got a knock or two.
22171. *Q.* And the boy got his leg broken;—I suppose he struck something? *A.* He was bashed against a tub, and rolled over two or three times.
22172. *Q.* And that was the extent of his injuries? *A.* Well, bruises.
22173. *Q.* But no other kind of injury? *A.* No.
22174. *Q.* Now, take your first experience here; that is, the one in which the lights were extinguished a quarter of a mile away;—I understand you to say that the whole of that goaf, or whatever this came from, was open right along? *A.* Yes, with the exception of the place where it started to come out. There was a solid there. There was a pillar left, and then it was open in all directions.
22175. *Q.* I think you said that the extent of the fall was about 30 x 32 yards? *A.* Yes.
22176. *Q.* And on which side was the air forced out—the 30-yard side, or the 32-yard side? *A.* In the direction of the 30 yards.
22177. *Mr. Robertson.*] *Q.* Is that from your recollection, or from measurement on the plan? *A.* Measurement on the plan.
22178. *Q.* Recently? *A.* Yes.
22179. *Q.* It seemed to me, just looking at the plan, a good deal more? *A.* No. It is to scale; you can measure it; I have it here.
22180. *Q.* I would like to measure it; it may be wrong.
22181. [The plan was produced and shown to the Commission, to whom it was explained by the witness.]
22182. *Mr. Bruce Smith.*] *Q.* You are satisfied, Mr. Barr, now, from the discussion you have had there, that, with regard to that first fall in Newcastle, there was one outlet? *A.* Oh, yes, it had one to the rise as well.
22183. *Q.* There was only one outlet in the direction of the boy who was affected by it? *A.* Yes.
22184. *Q.* It had other outlets to ease itself; but there was only one outlet in the direction of the boy? *A.* Yes.
22185. *Q.* The boy, you told us, was knocked over into a tub?
22186. *Mr. Robertson.*] No; that was the boy with the small coal in his back.
22187. *Mr. Bruce Smith.*] Yes.
22188. *Q.* The light was put out a quarter of a mile away, and the small coal was driven into his back;—what had he on? *A.* He would have his shirt on.
22189. *Q.* Just trousers and jersey? *A.* Yes, something like that.
22190. *Q.* And some of the small coal was driven with such force that it went into his back? *A.* Yes.
22191. *Q.* Was anybody else injured? *A.* No.
22192. *Q.* On the second occasion a boy was tumbled over into a skip, and he was bruised, I suppose? *A.* Well, he told me he was very much frightened anyway.
22193. *Q.* And he might have been bruised? *A.* Yes.
22194. *Q.* Was there any other injury to anybody by that fall? *A.* No.
22195. *Q.* Then, on the third occasion, three years ago, when the wheeler had three tubs, the horse was blown to the bord end? *A.* Yes.
22196. *Q.* And I suppose he was very much knocked about? *A.* I do not think he was much knocked about.
22197. *Q.* Was any other injury done? *A.* No; no more than the timber carried away by the tubs.
22198. *Q.* Now, on those occasions when you experienced gas and burning, and so on, would this description about fit the case [*reading from the depositions taken at the Coroner's Inquest*]: "Curling up of the outer skin; the hair actually shrivelled, not only curled"? *A.* Well it was shrivelled: my head was like a blackfellow's; and there was very little hair left. That is all I can tell you.

22199.

22199. *Q.* I want you to tell the Commission whether, on any of these three occasions on which these falls took place, there was anything that corresponded with the burning or the shrivelling of the hair of anybody? *A.* No.
22200. *Q.* Was there any effect upon the skin, in any case, that corresponded with what you have described as resulting on the occasions when you saw gas? *A.* From the falls?
22201. *Q.* Yes? *A.* No.
22202. *Q.* You might tell me, quite apart now from what I have been asking you, about the strata on the occasion of these falls—the coal was out, I take it? *A.* Pretty well.
22203. *Q.* What kind of strata was it? *A.* Rotten shale and clay in that particular place.
22204. *Q.* A good deal of this information that you have given us about the falls was, I suppose, got from other people: I mean as to the position in which the boy fell? *A.* Yes.
22205. *Q.* And the tubs being turned round? *A.* Yes.
22206. *Q.* That is got from other people? *A.* Yes, that is right.

Cross-examination by Mr. Lysaght:—

22207. *Q.* Do you hold a certificate by examination? *A.* No; I hold it by service.
22208. *Q.* Service in this State? *A.* Yes.
22209. *Q.* And did you get that certificate shortly after the 1896 Act was passed? *A.* Yes, I think so.
22210. *Q.* Do I understand that you have never studied theoretical works on mining? *A.* Oh, no; you do not understand that.
22211. *Q.* Do I understand that you have studied? *A.* Well, in a way.
22212. *Q.* Well, you know all the constituents of gases, and things like that? *A.* Well, I do not know; that is a big question and covers a large area.
22213. *Q.* Do you know what proportion of coal-dust is dangerous? *A.* Well, it is given now by some of the text books to be 1 per cent. in some cases, and 2 per cent. in others, and so on.
22214. *Q.* You were in Kembla Mine after the disaster? *A.* Yes.
22215. *Q.* How many days? *A.* I went there on the Saturday night; I was in on the Sunday, on the Monday, and on the Tuesday.
22216. *Q.* And you know that there were considerable quantities of coal dust about the roads in some places?
22217. *Mr. Robertson.*] I do not think the witness quite understood your question as to what proportion of coal-dust was dangerous, Mr. Lysaght, as to whether you meant coal-dust or fire-damp.
22218. *Mr. Lysaght.*] [*Q.* You said 1 per cent. was dangerous—1 per cent. of what did you mean? *A.* Well, fire-damp along with coal dust.
22219. *Q.* I was not talking about fire-damp at all; I am asking you all about coal-dust at present. I ask you do you know what proportion of coal-dust is dangerous? *A.* Oh, well, the proportion of dust—if it is very thick, it is dangerous.
22220. *Q.* What do you mean by "very thick"—what is your idea of what accumulation of coal-dust on a roadway is dangerous? *A.* Oh, well, when it begins to get inches thick it is time there was something done with it.
22221. *Q.* Then do I understand you to say that anything under one inch on a road is not dangerous? *A.* Well, if it is of a damp nature.
22222. *Q.* I am not talking about being damp; I say dry? *A.* Well, in some places it would be dangerous under certain conditions.
22223. *Q.* Under the conditions of a blown out shot with 1 per cent. of fire-damp, or 2 per cent. of fire-damp, how much coal-dust would you say was dangerous? *A.* Oh, well, if it was there an inch or two thick, and within the radius of a shot, it would be dangerous.
22224. *Mr. Ritchie.*] *Q.* What do you mean by that? *A.* One inch, if it was within the radius of a blown out shot, would be dangerous.
22225. *Mr. Lysaght.*] *Q.* Do you not know that it has been established that a few ounces along a road are dangerous under certain conditions? *A.* It is quite possible under certain conditions.
22226. *Q.* Have you ever read that? *A.* Not a few ounces. No, I have not. I would very much like to see it, too. I would thank you to show it to me.
22227. *Mr. Bruce Smith.*] *Q.* You mean you would like to see the authority?
22228. *Mr. Lysaght.*] *Q.* You mean to say that you have never heard of the authority who said that? *A.* I say, when there is a little coal-dust within the radius of a blown-out shot, it is dangerous.
22229. *Mr. Ritchie.*] *Q.* What is it you would very much like to see—is it the authority or the effect? *A.* I would like to see the quantity.
22230. *Q.* You would like to see the authority for the statement Mr. Lysaght made? *A.* He talked about a few ounces; that is the way he put it to me.
22231. *Mr. Lysaght.*] *Q.* You might tell me this: have you read any scientific works on mining within the last five or six years? *A.* Oh, yes.
22232. *Q.* Have you read Atkinson Brothers on coal-dust explosions? *A.* No, I do not think I have read them on coal-dust explosions?
22233. *Q.* You might tell me this: what proportion of fire-damp do you say is dangerous—what percentage? *A.* Under what conditions?
22234. *Q.* Well, if a mine is giving off fire-damp, what percentage do you say is dangerous? *A.* Oh, well, when it is given off and can be detected in an ordinary safety-lamp, it is always reckoned dangerous.
22235 *Q.* This is the authority. Mr. Galloway has stated that 1 lb. of dust to 160 cubic feet of air is necessary in order to form an inflammable mixture; assuming 40 square feet area, then 1 lb. of dust is required for each length of 4 feet, or a quarter of a pound to each foot? *A.* Well, you put it to me in ounces. I said I would like to see the authority.
22236. *Q.* Is not a quarter of a pound 4 ounces? I say to you now, do you know that 4 ounces of dust per foot of a roadway is dangerous? *A.* You did not put it per foot.
22237. *Q.* Did you know that was dangerous? *A.* Yes.
22238. *Q.* If you know that is dangerous, I want to know did not you observe dangerous conditions in Kembla Mine.
22239. *Mr. Wade.*] I object to that question.

22240. *Mr. Lysaght.*] *Q.* Did not you observe over a quarter of a pound of dust there on the road per foot? *A.* Where shots were fired?
22241. *Q.* Never mind that—did not you see those conditions? *A.* Yes.
22242 *Q.* Did not you see 4 ounces and over? *A.* Yes.
22243. *Q.* Therefore, there were dangerous conditions that you saw there? *A.* Exactly.
22244. *Mr. Wade.*] I object to that question. I object to that going down. It is absolutely useless and immaterial how much dust he saw after the explosion. If he had seen it before, there might be something in it. We know that everything was much altered after the explosion.
22245. *Mr. Ritchie.*] Do you put this witness forward as an expert, Mr. Wade?
22246. *Mr. Wade.*] It is pretty obvious that I do not. I have asked him questions of fact only.
22247. *Mr. Lysaght.*] *Q.* You do not pose as an expert? *A.* No.
22248. *Q.* What, in your opinion, caused the Kembla disaster? *A.* A fall.
22249. *Q.* Yes, and what after that? *A.* I mean to say that there was a displacement of air in the No. 4 [*meaning the 4th Right*], which was forced to a point on the main road, and divided there in the direction of the forces I saw there, one portion going inbye and another going outbye. The portion that went inbye upset tubs, and blew the top of the tubs away from the wheels, and the wheels away from the frame; and in one case a wheel was blown from an axle Rollers and everything else, and steel clips attached to the steel wire ropes, were dragged along with tremendous force; and the friction was that great from those clips that fire was produced.
22250. *Mr. Robertson.*] *Q.* What produced fire? *A.* The clips fastened to the steel wire haulage rope; and the great force that went in there dragged those clips along with the skips a considerable distance; and that excess of friction caused fire.
22251. *Mr. Lysaght.*] *Q.* After the fire was caused by the friction of the clips, what caused the disaster? *A.* It produced fire, just something the same as you would see lightning in a thunderstorm. It was carried in, and the air was compressed as it went in; and it struck the heading face of No. 1 and rebounded there.
22252. *Q.* That is air? *A.* Yes; and I take it there was a slight explosion.
22253. *Q.* Of what? *A.* Of air—oxygen.
22254. *Q.* Explosion of air? *A.* Yes, by the rebound.
22255. *Q.* What, without any gas? *A.* Yes, it exploded there.
22256. *Q.* Without gas? *A.* Well, yes; it was heated up to such an extent that a slight explosion took place.
22257. *Q.* Was there any flame, do you say? *A.* Yes, there would be a little flame, from somewhere or another in the face of No. 1 somewhere.
22258. *Q.* And that is the only place where there would be flame, according to your theory? *A.* As far as I travelled through the whole of the mine, there is no trace of coke or flame anywhere.
22259. *Q.* Do you know that at least two or three men were burnt at the tunnel mouth? *A.* I would not be a bit surprised at that.
22260. *Q.* Will you tell me what burnt them? *A.* Hot air.
22261. *Q.* No, burnt with flame? *A.* With flame?
22262. *Q.* Yes. Now, will you kindly tell me how the hot air that you say was right up No. 1 caused all the friction of the clips? *A.* That is only part of the friction.
22263. *Q.* Where was the other friction that produced the heat? *A.* The friction of the rails, and the tubs, and the sides, and everything else.
22264. *Q.* That is only inbye; and I am talking of outbye? *A.* The same thing applies outbye.
22265. *Q.* Can you show me any evidence of force where there were tubs or skips, or anything else like that, outbye of the 4th Right? *A.* Yes, I can. Just there between the 4th Right and the 3rd Left, and on the back heading, where the rope road comes round to the 2nd Right, the tubs were all set up there.
22266. *Q.* Is that all regarding the generation of heat, the friction? *A.* It was all the way.
22267. *Q.* Is that all you want to say regarding the generation of heat? *A.* Yes.
22268. *Q.* Will you tell me how you account for men being burnt at Price's Flat, right away up here [*pointing to Price's Flat on the plan*]?
22269. *Mr. Wade.*] There is no evidence of men being burnt up there.
22270. *A.* Well, there was a great force went there too.
22271. *Q.* Where did that great force come from? *A.* It came —— [*Interrupted*].
22272. *Q.* It split at the 4th Left and went right along to Price's Flat? *A.* When the force came out of the 4th Right it was heated to a certain extent, and it would tend to expand; and a portion went up the 4th Left to Price's Flat [*explaining the answer by pointing out the course on the plan.*]
22273. *Q.* Now, will you tell me what temperature that air was, in you opinion? *A.* Well, now ——
22274. *Q.* Do you know anything about the temperature? *A.* I could not say exactly what temperature, it would be pretty hot to do it.
22275. *Q.* What is your idea of "pretty hot"? *A.* Anything under water boiling [*meaning the boiling point of water*].
22276. *Q.* Can you tell me how many degrees; have you any idea at all? *A.* I could not say; neither could you or anybody else.
22277. *Q.* Do you tell me that that heat ignited coal-dust? *A.* There was heat enough there to distil it.
22278. *Q.* But there was no flame? *A.* I say that there was flame, a little; and I believe if flame was produced at all, it was up here at the face [*pointing to the face of the No. 1 front heading*].
22279. *Q.* I want you to fix the position where the flame was. You say it was at the back heading? *A.* No; when that force went up there, it struck the solid faces and rebounded, the same as if you struck a ball on that wall there.
22280. *Q.* And you say that was what caused the flame? *A.* Yes.
22281. *Q.* Will you tell me of any authority that air will explode and cause flame, air without gas?
22282. *Mr. Wade.*] Ask him did he say air without gas would cause flame.
22283. *Mr. Lysaght.*] *Q.* You told me that the air exploded and caused flame? *A.* Well, I expect the oxygen and what was in there was compressed to such an extent —— [*Interrupted*].
22284. *Q.* Now, let me understand you; do you say that oxygen, being compressed, exploded and caused flame? *A.* I say that the air was heated up to such an extent when it came back there, when it rebounded up there, and it came in contact with free oxygen, that flame was produced.

22285. *Q.* Without any percentage of bi-carburetted hydrogen? *A.* Yes.
22286. *Mr. Ritchie.*] *Q.* This is pure air you are speaking of? *A.* Yes.
22287. *Mr. Lysaght.*] *Q.* Do you know of any authority at all for that? *A.* I am giving you my own opinion.
22288. *Q.* Do you know of any authority at all for the proposition that pure air—— [*interrupted*].
22289. *His Honor.*] Mr. Lysaght, is it necessary to continue that any further?
22290. *Mr. Lysaght.*] Very well, your Honor.
22291. *Q.* When did you first get this theory? *A.* When did I first hear it?
22292. *Q.* Yes? *A.* Many, many years ago.
22293. *Q.* When did you first tell it to anybody? *A.* Immediately after I came out of the mine.
22294. *Q.* To whom did you tell it? *A.* To Mr. McGeachie and to Dr. Robertson. I told him that it was my profound belief that it was a fall that caused the whole of the trouble.
22295. *Q.* Have you discussed the natter with Dr. Robertson since? *A.* No, never.
22296. *Q.* Let us clearly understand it; from about the Saturday after the disaster to the present time, you have never, at any time, discussed this matter with Dr. Robertson? *A.* Not the Saturday.
22297. *Q.* Then from the Tuesday after the disaster up to the present moment you have never discussed that theory of the disaster with Dr. Robertson; is that correct? *A.* That is correct.
22298. *Q.* Had you not seen a copy of this plan before? *A.* Never. I thought I saw it here yesterday.
22299. *Q.* Do you mean to tell me that, except yesterday, you had never seen a copy of this lithograph or plan? *A.* That is so.
22300. *Q.* Or had you never seen the colliery plan? *A.* I have seen the colliery plan; and I saw Mr. Atkinson with a skeleton plan at Kembla.
22301. *Q.* Until yesterday you had never seen a correct plan of the mine? *A.* I do not know whether it was a correct plan or not; it was a bird's eye view I saw that looked like it very much.

[*Witness retired.*]

22302. (Mr. Wade asked the Commission to grant him an adjournment until 2 o'clock, (from 11·15), in order that he might consider whether he could not dispense with the evidence of the remainder of the witnesses he had called, with the exception of Dr. Robertson. Dr. Robertson was not available at the moment; and Mr. Wade would see if he could get him by 2 o'clock.
22303. Mr. Lysaght asked whether Mr. Rogers, the Manager of Mount Kembla Mine, was to be called. At the inquest, Mr. Lysaght said, he was prevented from asking a number of questions, because they were considered to impinge on the functions of the Commission.
22304. His Honor said that the Commission was under the impression that Mr. Rogers should be called.
22305. Mr. Wade said that he had decided not to call Mr. Rogers, because he could see, by the attitude adopted at the Inquest, that there was an endeavour to compromise Mr. Rogers in some way. Mr. Rogers was a very bad witness; and at the Inquest advantage had been taken of that, notwithstanding Mr. Wade's protests. Of course, the Commission might call Mr. Rogers if they wished; but Mr. Wade had decided not to call him, as he did not think it would be fair to Mr. Rogers, in view of the indications from time to time that it was desired to get out from him some statement to be used afterwards to his detriment.
22306. Mr. Lysaght said that he desired to show that Mr. Rogers was an absolutely incompetent manager; and would ask the Commission to find that.
22307. Mr. Wade said he took the point that it was not a function of the Commission to find whether Mr. Rogers was incompetent or not.
22308. His Honor pointed out that, in the words of the Commission, they had to find whether Mr. Rogers was or was not to blame.
22309. Mr. Wade drew attention to Mr. Atkinson's evidence, and said that, if Mr. Atkinson's theory was correct, no one was to blame. Mr. Atkinson did not even connect the disaster with the omission to inspect the goaf once a week; and, further, Mr. Atkinson had said that it was a matter that could not have been foreseen, bearing in mind that gas never had been found in the 4th Right, that the coal was practically all out of the goaf, and the gas, if there was any, according to Mr. Atkinson, probably came from the strata, and, if so, it could not have been foreseen. The only object Mr. Lysaght could have in calling Mr. Rogers would be to extract from him some statement to be used against him afterwards, as there was a request made by the miners to have his certificate cancelled. With all respect to the Commission, Mr. Wade would not subject Mr. Rogers to such a possibility.
22310. Mr. Bruce Smith said that the propriety of calling the Manager ought not to depend on the possible consequences of his examination; and it would seem a very insufficient and very incomplete sort of investigation of a great disaster of this kind if the head and front of the management, who had charge of the mine, was not brought before the Commission to give his account of it. One very important piece of evidence which the Commission had not been able to get so far was the number and extent of the pillars left in the 35-acre goaf. It would be a matter for comment if the Manager were not called. If Mr. Lysaght were to misuse his position by going into questions that did not come within the limits of this investigation, His Honor would protect Mr. Rogers.
22311. His Honor said the Commission were all agreed that Mr. Rogers should be called; and, if no one else called him, the Commission would call him. Mr. Lysaght would certainly keep within the limits of cross-examination. His Honor did not think that Mr. Lysaght would go beyond the fair limits of cross-examination, but, if he should, it would not be allowed.
22312. Mr. Bruce Smith said he thought Mr. Rogers knew a good deal more about the mine than he showed at the Inquest. For the purpose of combating Mr. Lysaght, Mr. Rogers appeared to have taken up the attitude at the inquest of not knowing anything. Mr. Bruce Smith was sure that Mr. Rogers had much more practical knowledge than he exhibited in his examination on that occasion; and it would be a positive benefit to him to appear before the Commission to remove the impression that he exhibited an ignorance of practical matters, an impression which might have a very serious effect upon his reputation.
22313. Mr. Wade then asked for an adjournment until 12 o'clock.
22314. His Honor granted the adjournment, and the Commission rose until 12 noon.)

[The Commission resumed at 12 noon.]

22315. *Mr. Wade.*] I have not been able to get hold of Dr. Robertson, your Honor; but Mr. Leitch is here, and he might be called.
22316. *His Honor.*] Very well.

MR. GEORGE LEITCH was sworn, and examined as under:—

Examination-in-chief by Mr. Wade:—

22317. *Q.* Your name is George Leitch? *A.* Yes.
22318. *Q.* And what are you? *A.* Manager of Stanford Merthyr Colliery, West Maitland.
22319. *Q.* How long have you been Manager there? *A.* A little over eight months. I took office on the 15th of June, last year.
22320. *Q.* You had been at Mount Kembla before that? *A.* Yes.
22321. *Q.* When did you leave Mount Kembla? *A.* On the 7th of June.
22322. *Q.* And how long had you been there? *A.* Two years and one week.
22323. *Q.* In what position? *A.* Under-manager.
22324. *Q.* In carrying out your work as under-manager, how often would you be in the mine? *A.* Every day.
22325. *Q.* Do you mean every working day? *A.* Every day except Sunday; and sometimes on Sunday if any alteration was wanted.
22326. *Q.* Would you be in different parts of the mine? *A.* Yes, in different sections. Of course I would not get through the whole of the mine in one day. I used to take a section.
22327. *Q.* Could you say you had a good knowledge of every part of the colliery? *A.* I had a thorough knowledge of every part of the mine.
22328. *Q.* And the conditions of working, and things like that? *A.* Yes.
22329. *Q.* Now, whilst you were there, did you ever come across fire-damp? *A.* Never.
22330. *Q.* Was it ever reported to you by anybody? *A.* It never was reported to me while I was under-manager.
22331. *Q.* I suppose you have heard of the old case of Gallagher being burnt? *A.* Yes, I had heard about that; but of course that was previous to the furnace and the shaft going down.
22332. *Q.* That was fourteen years ago? *A.* Yes, past history.
22333. *Q.* But whilst you were under manager during those two years at Mount Kembla, did you, during that time, ever hear of gas being found? *A.* Never.
22334. *Q.* Did you work in Stockton at one time? *A.* Yes, I worked in Stockton from 1889 until 1893.
22335. *Q.* Can you say whether fire-damp was known in that mine? *A.* Never.
22336. *Q.* Do you have any experience of lighting what they call the smoke, the powder smoke? *A.* Do you mean after a shot?
22337. *Q.* Yes; that is what I want to ask you—under what conditions? *A.* Of course, I have seen it lit on many occasions after a shot, when the shot has not done its work.
22338. *Q.* Is that what you call a hanging shot? *A.* Yes; and the smoke like, the incomplete combustion from the powder, would be issuing from the cracks.
22339. *Q.* Was it always in the case of a hanging shot? *A.* Yes.
22340. *Q.* And do you know yourself whether there was any gas under those circumstances which might ignite? *A.* Well, yes; under those conditions, with incomplete combustion of gunpowder, you see, there would be CO, and CO_2, and sometimes a trace of CH_4. There might be; from the coal-dust being heated it would distil a little CH_4; but still the CO, and the incomplete products of the combustion of the gunpowder, would ignite when flame was applied to it. Then, of course, sulphur would be present as a solid: there might be a certain amount of sulphurous acid.
22341. *Q.* You know the faces of the No. 1 main headings? *A.* Yes.
22342. *Q.* Had they ceased working, were they standing idle, when you left? *A.* Yes, they were standing.
22343. *Q.* What was going on at that time? *A.* We were brushing and regrading main No. 1.
22344. *Q.* Whereabouts: at what point? *A.* About 9 or 10 chains outbye from the face.
22345. *Q.* Was there a jig wheel in position when you left? *A.* No; I had just finished the whole of the brushing, and the laying of the rails, and the putting in of the manholes, when I left. It was finished, and I paid them up the fortnight I left.
22346. *Q.* Have you seen this lithograph before? *A.* No.
22347. *Q.* But you know the colliery plan pretty well, I believe? *A.* Yes.
22348. *Q.* You see the 4th Left marked here? *A.* You have not got a scale here?
22349. *Q.* No. There is the face of the working? *A.* Yes.
22350. *Q.* I want you to show us, from what point they began to brush the road? *A.* That is what I want a scale for.
22351. *Q.* You can make one here? *A.* It was just above the cut-through, the first cut-through on the main heading above the back heading of the 4th Left heading.
22352. *Q.* That is where the two C's are on this plan (CC)? *A.* Yes. We started from just opposite that cut-through, between the two headings. We started to brush from there to here, almost up to the cut-through, within 3 or 4 yards of the cut-through where the intake air goes into the back heading.
22353. *Q.* How long were you doing that before you left? *A.* From memory I could not exactly say—several pays—it would be, I daresay, three or four pays; but from memory I could not say without the books, without the papers. Of course, if I had the rate-book I could say exactly. That is what we put the whole of the measured work into.
22354. *Q.* Which heading were you brushing? *A.* The front heading.
22355. *Q.* The front heading only? *A.* Yes.
22356. *Q.* What were you ballasting the road with? *A.* With the stone we brushed down from the roof.
22357. *Q.* What was that stone? *A.* Sandstone.
22358. *Q.* Of course, you have told us that you never knew yourself, or heard, of gas being found in Kembla? *A.* Never to my knowledge,
22359. *Q.* Is that the only reason why the faces were stopped in No. 1? *A.* The main No. 1 was stopped simply because we had to brush down the roof and regrade the road. That is the reason why the No. 1 front and back headings were stopped.
22360. *Q.* Could you tell us up to what time men were working in the front heading brushing and grading the road? *A.* I could not tell you from memory.
22361. *Q.* Up to how long before you left? *A.* I could not say from memory exactly. I should say up to about between two and three months. I know they were stopped there when Mr. Bates made his examination in April.

22362.

22362. *Q.* So that this practically had been finished before April of last year? *A.* That was exactly finished there. The last pay was from the 7th to the 30th or 31st of May, because I left on the Saturday following, and that was the 7th of June, and it was finished then.
22363. *Q.* Is that the time of the inspection? *A.* No.
22364. *Q.* When did it begin? *A.* I could not say when it began.
22365. *Q.* When did it finish? *A.* It finished the last week in May: it finished seven days before the 7th of June.
22366. *Q.* You see the way the air current is drawn on this plan now, the blue being the intake and the red the return? *A.* Yes.
22367. *Q.* What I want to ask you about is the course of the intake in the No. 1 headings inbye of the 5th Right: when you left, was the intake course the way it goes on the plan now? *A.* As it appears there.
22368. *Q.* Were you yourself at the faces of either the front or back heading of No. 1 whilst it was idle? *A.* Yes, front and back, on many occasions.
22369. *Q.* Did you have a safety-lamp with you? *A.* Yes, on one of the occasions I was there it was with Mr. Bates.
22370. *Q.* When was that? *A.* That was in April, the last inspection he made with me before I left Kembla.
22371. *Q.* Was the safety-lamp used then? *A.* Yes, a new Bifold safety-lamp was then used.
22372. *Q.* Was there any sign of gas lying in those headings? *A.* None whatever: we could not find a trace.
22373. *Q.* You say you were up there on many occasions? *A.* Yes.
22374. *Q.* What would you be with then—what light? *A.* A naked light. It was inspected every morning, you see, under the ordinary inspection.
22375. *Mr. Robertson.*] *Q.* Do you say it was inspected every morning? *A.* Yes, under the ordinary inspection.
22376. *Mr. Wade.*] *Q.* Up to when are you speaking of now; up to the time when you left? *A.* Yes, up to the time I left.
22377. *Mr. Robertson.*] *Q.* They were standing then? *A.* Yes, they used to go up through there and round the back heading.
22378. *Mr. Ritchie.*] *Q.* Who was the examining deputy then? *A.* Dungey.
22379. *Mr. Wade.*] *Q.* And what was Nelson at that time? *A.* Nelson was day-shift deputy.
22380. *Q.* Then a change was made when you left? *A.* Yes.
22381. *Q.* Nelson and Dungey were both raised? *A.* Of course I cannot say what took place when I left, only that I know that Nelson got my position. He was under-manager.
22382. *Q.* Were there men working at these bords marked 105 on the plan here? *A.* No, they were not working there. They were working lower down. They were not working those places then.
22383. *Q.* How far away would they be working? *A.* There [*indicating just by the 17-perches goaf, but not between that and the main heading*].
22384. *Q.* When would the end of the cavil be? *A.* The 30th of June.
22385. *Q.* Now, from what you saw, could you say whether Kembla was a dusty mine or not? *A.* Well, in some portions there was dust; but in others it was pretty wet.
22386. *Q.* Let us take the No. 1 main road? *A.* I would not, by any means, say that was dusty.
22387. *Q.* What is that? *A.* That was not dusty.
22388. *Q.* Was there any water actually on the road? *A.* Yes, there was, between the 4th Right and the 4th Left.
22389. *Q.* How was that lying? *A.* The water from the 4th Left and the 4th Right pillars used to come down the 4th Right heading, and down the back heading to the first cut-through, through that cut-through into the front No. 1 heading; and then it used to go along to a cut-through that was driven, and used to flow down through there into the old 3rd Left; so that, you see, that portion of the road was wet.
22390. *Q.* Show me the course of that on the plan? *A.* [*Witness showed the course on the plan to Mr. Wade.*]
22391. *Q.* It would get into the main rope road just inbye of the 4th Right? *A.* Yes. You see it gets, in the first place, along the 4th Right.
22392. *Q.* It went down through the cut-through where there are the figures 12 on the plan? *A.* I could not say whether that was the position; but somewhere about that. Of course if I saw the colliery plan I could say. There was water lying in the 4th Right, and nearly up to the 4th Left. It was damp nearly from the 4th Right to the 4th Left.
22393. *Q.* Where did it come out of the 4th Right—down the roadway? *A.* Yes; there was a sump in the 4th Right, two bords in, on the side of the 4th Right rope road.
22394. *Q.* Is that inside the road pillar? *A.* Yes. That is a solid pillar; any water made in this area (the 35-acre goaf) and falling that way (east to west)—of course the fall is that way—would be blocked against that pillar. Naturally it would go down that pillar; and the sump was here near the 4th Right on the bottom road. The water used to flow along that sump down alongside of the 4th Right into the back heading, and down the back heading into the first cut-through, and from that first cut-through into the front heading.
22395. *Q.* Was there much water coming out latterly? *A.* Yes, there was a continuous stream running there. Before we drove that cut-through we used to put a water-baler on every night to bale it out.
22396. *Q.* To bale out what, the sump? *A.* Yes; there was a sump driven there for the purpose of collecting it.
22397. *Q.* How long had you been baling that sump? *A.* From the time I went there until we drove that cut-through. We used to bale regularly when I went there; and we afterwards drove that cut-through and allowed the water to flow straight down to the pump; and of course that then dispensed with the baling.
22398. *Q.* Do you know the 3rd Right? *A.* Yes.
22399. *Q.* Was there any water down there? *A.* There was a little water from the 3rd Right.

22400. *Q.* Where did that come from: from the 35-acre waste? *A.* Yes.
22401. *Q.* How did that get away: where did it go to? *A.* There were pipes there to take it away, and it landed then into what we called the old road going to the 4-foot seam.
22402. *Q.* That is along the No. 1 Right travelling road? *A.* Yes; and then it was taken into the water-course that ran down into the shaft in the 4-foot seam.
22403. *Q.* Now, come to the 4th Right, the 35-acre waste; do you know how long that 4th Right district had been worked, to your own knowledge? *A.* We started to take out the pillars when I went there.
22404. *Q.* When you first went there? *A.* Yes.
22405. *Q.* Had all the bords been driven then? *A.* Yes, all these bords from the bottom end had been driven up to that point [*indicating a point in the 35-acre goaf*].
22406. *Q.* They drove them from south to north? *A.* Yes, they were all driven up to that point; bords were working at the northern end of the 35-acre waste when I went there.
22407. *Q.* And you had also begun to draw the pillars at that time? *A.* Yes.
22408. *Q.* Do you know what difference there was in the height between the eastern side of the 4th Right and the western side? *A.* I could not tell unless I saw the levels on the plan.
22409. *Q.* But there was some difference? *A.* Oh yes; the grade was towards the 1st Right end. The fall was that way. The fall was from the cross-cut heading to the main No. 1 heading, east to west.
22410. *Q.* During the whole time you were there, did you know of even one pillar of coal being lost through the roof coming down all over it? *A.* You mean a whole pillar of coal?
22411. *Q.* Yes. *A.* No, not a whole pillar.
22412. *Q.* What has gone? *A.* The only coal that was left in was stooks when we would be finished off a lift of the pillar. We would work it up to the last, perhaps, three or four skip fulls—from that to about half a dozen skips at the most.
22413. *Q.* And how did the roof fall in that 4th right? *A.* The 4th Right used to fall very well; it used to regularly follow the timber as a rule.
22414. *Q.* What do you mean;—supposing you drew the timber to-night? *A.* If you drew the timber to-night the chances are she would fall before you left, or she would be down before the morning. Of course, there are exceptions. I have seen it stand for two or three days; but as a rule it used to follow the timber.
22415. *Q.* And the other falls, after that, the second fall, and so on? *A.* Yes; you see the whole lot used to come for about 10 or 12 feet up when she took a fall in the 4th Right.
22416. *Q.* You mean that much roof would be displaced? *A.* Yes, 10 or 12 feet of it would fall.
22417. *Q.* Which fall are you speaking of now, the first or the second fall? *A.* When you draw the timber—the first fall.
22418. *Q.* What was left in the way of coal in the 4th Right when you left Mount Kembla? *A.* Well, the pillars are not shown here. There were two pillars and a half in when I left there.
22419. *Q.* And who were the men working there then? *A.* There were one pillar and a half, not two pillars and a half. McDill had finished that pillar and gone outside.
22420. *Q.* Was a man named Johnson there at that time? *A.* Yes; I believe he was mate with Jim McDill. No, I do not think Johnson was there then. I think Adam Stafford was his mate then. I could not say without the cavil sheet. I know that Jim McDill was working on one pillar, and Jim Fitzgerald and his son on the other pillar.
22421. *Q.* On the other side of the road? *A.* Yes; one was working on the top side, and the other on the bottom side. There were just those two stooks to come out when I left, there were not two whole pillars to come out when I left, to complete the whole of the 4th Right.
22422. *Q.* And how was the waste round those pillars? *A.* Well, I know she used to fall pretty well then; and I have often seen us try to go up above, and we could not. You see she would fall down pretty tight. If a place falls clean 10 or 12 feet up, and she comes close to the rib, it is a matter of impossibility for a person to get up between the rib and the stone.
22423. *Q.* You mean the stone that falls alongside the rib? *A.* Yes. She comes to the rib then and cuts it off; and it is a matter of impossibility for a person to get up between the stone then and the rib.
22424. *Q.* And you say that was the condition of affairs round that pillar and a half at the time you left; it had fallen up to then? *A.* Yes; the main heading that was, that is the 4th Right that was, she was close down; you could not get up there; it was fallen down, and the pillars on either side—I believe it was McDill, and Stafford, and Jim Fitzgerald—on either side of those it had also fallen pretty tight.
22425. *Q.* Pretty tight, you say? *A.* Yes.
22426. *Q.* Then, how far could you go in from the rib of the road pillar along the No. 1 road—how far could you go in along the 4th Right road—before getting blocked? *A.* Only a pillar and a bord. There was the bord on the outside; and the next pillar was the pillar they were working—that is 24 yards from the back heading, from the pillar next the back heading, that was 30 yards; and the width of the bord would make it about 44 yards; so that the face of this heading would be within about 50 yards from the pillar rib. That is, from the back heading the face then falling would be about 50 yards, say between 50 and 60 yards to make sure, from the back heading of No. 1 up to the 4th Right.
22427. *Q.* Were there any chocks or timber anywhere about the mouth of the 4th Right? *A.* Yes, in Jim Fitzgerald's place; that is the first bord going north, the first bord broken off the 4th Right. There was a chock outside of that standing alongside the rib, between the rib of the pillar and the roadway, that is the rails; and inside of that there were two chocks, one on either side of the road—no, both on the top side.
22428. *Mr. Robertson.*] *Q.* I was going to suggest that you might make a sketch of this locality as you left it. [*Witness commenced to draw a sketch.*]

[The Commission adjourned at 12·45 until 1·45 for luncheon.]

AFTERNOON.

[On resuming at 1·45 p.m. Mr. W. R. Pratt attended to take shorthand notes of the evidence and proceedings.]

GEORGE LEITCH, previously sworn, was further examined, as under:—

Examination in chief by Mr. Wade continued:—

22429. *Q.* What was left in the way of pillars;—there are two pillars marked on the other side of the right, next to the goaf? *A.* Yes.
22430. *Q.* That is, looking at the plan you are producing? *A.* Yes.
22431. *Q.* The road marked 4th Right is the road going into the 4th Right heading? *A.* Yes.
22432. *Q.* The length of roof to come down after the pillars had been worked would be 40 yards on the south side of the 4th Right road and from 20 to 25 yards on the north side—that would be about 70 yards total length? *A.* Yes. The length would be 69 yards; that is, 40 yards, and 4 yards, and 25 yards, making a total of 69 yards. Speaking from memory, I believe that they had not finished the second pillar when I left. I could not say for certain, but I think they were just finishing the last of the pillars. I could not swear that it was down. I put in a mark on the plan to show the pillars exactly as they were left. [*The witness marked on the plan, in thick pencil shading, to show the actual amount of solid coal there was left in the pillar further inbye at the time he left Mount Kembla*].
22433. *Q.* Now I want you to mark where these chocks were. [*The witness marked a square with two diagonal strokes running through it, indicating a place between the road and the rib.*]
22434. *Q.* Would the chock you mark be actually in the roadway? *A.* Yes; on the 4th Right heading.
22435. *Q.* Were there other chocks? *A.* Yes; in a bord.
22436. *Q.* Had that bord fallen;—were the chocks taken away? *A.* No; it had not fallen there.
22437. *Q.* How far had it fallen? *A.* It had not fallen in for about 20 yards.
22438. *Q.* Twenty yards in distance, and what in width? *A.* There would be about 7 or 8 yards.
22439 *Q.* You would have to add that area on to the 69 yards? *A.* Yes.
22440. *Q.* That would be 20 yards by about how much? *A.* Twenty yards by an average of 7 or 8 yards for the other bord.
22441. *Q.* Was there a chock anywhere else? *A.* There was a chock on one side of the bord and a chock on the other side. There was one chock on the 4th Right road, and there was one chock on the side of McDill and Stafford's place.
22442. *Q.* Do you know whether, in the ordinary course of working, when you come to the end of a district, those chocks are taken out? *A.* When we come to draw the timber, we take the chocks out.
22443. *Q.* Is that when the pillars are worked out? *A.* When we take out the timber; then, if possible, we take out the chocks. Of course, you cannot always get them out.
22444. *Q.* Do you know whether it was the practice to get the chocks out on the main heading? *A.* They would be easily got out.
22445. *Q.* Were there any other chocks between this place and No. 1 back heading? *A.* There was a big one near the sump.
22446. *Q.* Where would the sump be? *A.* On the 4th Right heading.
22446*a*. *His Honor.*] *Q.* Would that sump be baled out? *A.* It used to be baled out regularly, but after we drove a cut-through there we allowed it to fill up, fenced it off, and it ran into a gutter down the side. After we drove a cut-through between the 3rd Left and the 4th Left the water used to percolate through there, but before that we used to bale it out. It used to run by means of gravitation to where there was a pump, and was then pumped out.
22446*b*. *Q.* You say there was a chock near the sump;—on which side, the inbye or the outbye side? *A.* It was outbye—no, it was inbye, I remember.
22446*c*. *Q.* How far from the sump —— [*Interrupted.*]
22446*d*. *Mr. Robertson.*] As a practical man, it seems to me that this evidence about chocks six or seven weeks before the disaster can have no possible bearing on the matter at all, directly or indirectly, because a different disposition of the timber may have been made after Mr. Leitch left. This timber may have been withdrawn and other timber put in its place.
22446*e*. *Mr. Ritchie.*] *Q.* Supposing that 4th Right had been finished, would there have been any occasion to pull them down? *A.* No.
22446*f*. *Mr. Robertson.*] Mr Leitch cannot speak as to that. Between the date on which Mr. Leitch left and the finishing off of the pillars, other circumstances might have arisen to cause these chocks to be taken out and others put in their place. [*Mr. Wade then put in the plan to which witness had been referring, and it was marked Exhibit* 46].
22446*g*. *Mr. Wade.*] *Q.* Do you remember anything about a door at the back heading inbye of the 5th Right? *A.* Yes.
22447. *Q.* How was that door hung when you left? *A.* It was hung on the eastern rib, so as to fall towards the front heading.
22448. *Q.* The hinges were where? *A.* If you were coming up the heading you would come to the door and pull it towards you. The hinges were on the right-hand side of the door.
22449. *Q.* Would it close itself? *A.* Yes; that door would not remain open unless it was propped open.
22450. *Q.* You told us of the condition of the waste in that 4th Right during the last two months you were at Kembla;—was it practicable to go into the waste? *A.* To go in?
22451. *Q.* Yes? *A.* No; where it had fallen we could not. Of course, after the first fall a person might.
22452. *Q.* Even when there was a first fall? *A.* It would not be safe.
22453. *Q.* Would it be safe to go into the middle? *A.* You could only get to where she had taken a second fall, and you could not get any further.
22454. *Q.* When did you make an examination of the goaf edges? *A.* They were examined twice a day.
22455. *Q.* How? *A.* They were examined by the night fireman, before the commencement of each shift. If the fireman found any props broken he would mark it for a length of timber, and it would be renewed. The day shift deputy would do likewise.
22456. *Mr. Lysaght.*] That is all assumption on the part of the witness.
22457. *His Honor.*] The witness is speaking of what used to be done in the mine.
22458. *The Witness.*] I was speaking about day-shift man, and I was with him many a time; there is no assumption about that.

22459.

22459. *Mr. Ritchie.*] *Q.* Every day? *A.* Not every day, but when I was in his district I would go round with him.
22460. *Q.* You only went round in part? *A.* I could not go over the whole of it. I would direct him as to what work should be done, and I would see him examine the place.
22461. *Mr. Wade.*] *Q.* When you were there the man would be doing his duty? *A.* Yes.
22462. *Q.* Had you any reason to suppose that he was not doing his duty during your absence? *A.* No.
22463. *Mr. Lysaght.*] I object to this.
22464. *His Honor.*] The practice of the mine is all that the witness can speak to.
22465. *Mr. Wade.*] *Q.* Is that a practice which you enforced yourself? *A.* Yes.
22466. *Q.* Do you remember making any examination of the waste workings with Mr. Bates? *A.* Yes.
22467. *Q.* When? *A.* In April. That was the day when he had a new Bi-fold lamp.
22468. *Q.* In what part? *A.* We examined the waste up to the 5th Right bords, and there was also an examination in the cross-cut heading, and the bottom of the 4th Right to the bottom of the 3rd Right. The reason we went there was to see how this lamp would shape, and see if we could get any gas at all. I got up as high as I could and examined. We got some black-damp, but did not get any fire-damp.
22469. *Q.* Have you examined the waste yourself on any other occasion? *A.* Yes.
22470. *Q.* In the 4th Right? *A.* Yes.
23471. *Q.* Did you come across any signs of fire-damp? *A.* I never saw fire-damp in the mine.
22472. *Q.* Did you find any black-damp on any other occasion? *A.* Yes; I found it at the bottom of the 4th Right road.
22473. *Q.* Do you think that these odd skip loads of coal that were left when you were finishing the pillars would make any gas in the 4th Right? *A.* I do not see how they could, because they had been standing there for some considerable time—between two and three years at least—and there was only a little bit of the stook left. If any gas was there, it would have been drained off long before then. The coal would be crushed down, because when you draw the timbers the roof would come on top and press it down.
22474. *Q.* What was the roof just over the coal on the 4th Right? *A.* Next to the coal there was an inferior coal called "blacks," and next to that was the sandstone.
22475. *Q.* Have you ever heard of gas being given off from the sandstone seam at Kembla? *A.* No; I have heard of gas being at Mount Kembla before, at the time Gallagher was burnt.
22476. *Q.* Had that got anything to do with the strata of the roof? *A.* I could not say. I do not think so. I know there was none there afterwards, from the place where the previous gas was found, because I have been there dozens of times and never saw any.
22477. *Q.* Had that place been worked out in the meantime? *A.* Yes.
22478. *Q.* With regard to this inferior coal, was it taken down by the miners? *A.* Sometimes it was, and sometimes it was not. It depended where the parting was. Sometimes the parting was above the "blacks," and sometimes below it. Sometimes the "blacks" would come away with the coal.
22479. *Mr. Ritchie.*] *Q.* What was the thickness of the "blacks"? *A.* From 1 to 5 or 6 inches. In some places you could hardly see it. In most places it ran between 4 and 6 inches.
22480. *Mr. Wade.*] *Q.* You know the rule that every working place is to be examined within four hours immediately before the commencement of each shift? *A.* Yes.
22481. *Q.* We have been told that the stonemen would go into the mine at 9 o'clock at night to lift stone in different places? *A.* Yes.
22482. *Q.* We have also been told that the place which they took the stone from, at 9 or 10 o'clock at night, would be worked on the day shift, and would only be examined once, before they went in to take the stone out. Did you ever know that happen in your time? *A.* Never to my knowledge. Instructions were given that these places had to be examined. The numbers were given of the places that had to be brushed; and the deputies had to examine these places; and when they had done so they had to examine the whole of the places. I have had no occasion to doubt that this was done.
22483. *Q.* Did you make that clear to the deputies? *A.* Yes; because we had a discussion on that point not long after I went to Kembla.
22484. *Q.* Who? *A.* Mr. Rogers, myself, and the deputies.
22485. *Q.* For what purpose was the discussion? *A.* It had reference to the examination of the mine.
22486. *His Honor.*] *Q.* Was it a discussion in which you took opposite views? *A.* No; it was simply as to the time when the deputies should start to examine. Every place must be examined. I said to the Manager, "Are you sure they examine these places"? He said, "Yes." I did not know what the rule was with reference to the lifting of the stone. It seemed to be like a second examination on the same night. I was asking the Manager what the rule was for it. It was for my own information I wanted it.
22487. *Q.* You say that he told you the rule was to examine the place twice? *A.* Yes; and I have no occasion to think that he was not telling me the truth.
22488. *Q.* Did you have any discussion or talk about giving the deputies plenty of time——[*Interrupted*].
22489. *Mr. Lysaght.*] I object to this.
22490. *His Honor.*] The question is, how the mine was managed. You cannot find out how every individual workman was working; but this evidence may be material with a view of showing what the practice was.
22491. *Mr. Lysaght.*] There are the Special Rules.
22492. *His Honor.*] There is some evidence to show that the Special Rules were not conformed to. There is nothing to prevent a question being asked with a view of showing how the mine was managed so far as the action of its officers was concerned.
22493. *Mr. Wade.*] It may be open to the Commission to say that this witness was to blame, and I want to show that certain instructions were given most clearly.
22494. *Witness.*] The reason it came up was because I asked for information, having gone to the mine a stranger. Then it cropped up as to the time given to the deputies to do their work in.
22495. *Mr. Wade.*] *Q.* Was anything said about the deputies having plenty of time to do their work in? *A.* It was only mentioned—that was all. Some considerable time afterwards it was mentioned about them. If they did not have time, they ought to have, in four hours. At one time I remember it was said that, if one deputy had not got time to do it, then they would get two deputies. They would get somebody to give him a hand. The evidence was that they could do the work within the prescribed time; and the deputies always said so.

22496. *Q.* You were not at Mount Kembla after the date on which you left? *A.* No, I have not been there since. I tried to get away; but I found that I could not. I should very much have liked to have gone there at the time of the disaster.

Examined by Mr. Bruce Smith:—

22497. *Q.* Will you take your mind back to the day on which you left the mine? *A.* Yes; on the 6th of June.
22498. *Q.* Will you make a calculation and tell me what was the area of pillars and bords which were left unworked? [*No answer.*]
22499. *Mr. Robertson.*] From what Mr. Leitch says, the bords were fallen.
22500. *Witness.*] I wish to point out that it is not clear to me whether the 16-yard pillar was in, or whether it had been taken away.
22501. *Mr. Bruce Smith.*] *Q.* I want you to give me the total area of unworked coal when you left? *A.* Including that pillar?
22502. *Q.* Yes. And then without it? *A.* Where do you want it to—to the 30-yard pillar?
22503. *Q.* Yes. I want the total area of pillars, on the assumption that the 16-yard pillar was left. Cannot you tell me whether the pillar was taken out? *A.* No, not from memory.
22504. *Q.* You cannot give the Commission the area of unworked coal at the time you left? *A.* I can swear they were on the last pillars.
22505. *Q.* Can you tell me the length? *A.* The length of the pillar was 40 yards.
22506. *Q.* I want to know the total area of unworked coal in the 35-acre goaf on the day of your leaving the mine? *A.* Up to the 30-yard pillar?
22507. *Q.* Yes? *A.* Exclusive of the 30-yard pillar?
22508. *Q.* Yes, exclusive of the 30-yard pillar? [*No answer.*]
22509. *Mr. Robertson.*] There was one pillar and a-half left.
22510. *Mr. Bruce Smith.*] I can only get it from the witness up to the 6th of June; and I can get it from other witnesses afterwards.
22511. *Mr. Robertson.*] He says there was a pillar and a-half left. Would it not be better to ask him what was the area of the pillar and a-half, and get it that way.
22512. *Witness.*] You want the area?
22513. *Mr. Bruce Smith.*] *Q.* Yes. If you say there was a pillar and a-half left, I will ask you the area of that.
22514. *To His Honor.*] I take it the evidence of this witness is with a view of showing what was the size of the area in the goaf where the fall was.
22515. *His Honor.*] It is with a view of showing the probable size of the area where the fall was.
22516. *Mr. Bruce Smith.*] This evidence has a bearing on that given by Mr. Sellers, when he was estimating a force of 700 miles an hour.
22517. *His Honor.*] Mr. Sellers based his conclusions upon the assumption of communicating an enormous amount of force to a moving body of air by applying to it a formula without the place being in a state consistent with the proper application of his calculations.
22518. *Mr. Bruce Smith.*] *Q.* What is the result of your calculation—the area of the pillar and a-half which was left? *A.* About 850 square yards.
22519. *Q.* Now the bords had fallen? *A.* I am taking the coal.
22520. *Q.* And the bords had fallen? *A.* Yes.
22521. *Q.* Now, assuming after you left that there was no further fall until all the coal was taken out—never mind whether it was practicable or not—assuming that that is the total area which had fallen? *A.* You would also have the width of the heading.
22522. *Q.* What would be the width of the heading? *A.* There would be 192 square yards of heading.
22523. *Q.* Add that 192 yards to what you said before, and what will it make? *A.* 1,042 yards.
22524. *Q.* Is there anything else to add? *A.* Of course, that is assuming that the whole of the bord was down.
22525. *Q.* How much was not down? *A.* Twenty-five yards by 8 yards.
22526. *Q.* Put that in if you like? *A.* Yes.
22527. *Mr. Robertson.*] *Q.* Is that where the chocks were? *A.* Yes; and that makes 1,242 yards.
22528. *Mr. Bruce Smith.*] *Q.* And that would be the total area? Yes.
22529. *Q.* Now, during the time that you were in the mine you saw a large part of that goaf was worked? *A.* Yes.
22530. *Q.* What proportion? *A.* I worked almost the whole of it in the 4th Right.
22531. *Q.* You told us as to what was the usual time it took to fall; if you took the pillars out, that it would fall either immediately or the next morning? *A.* That is usually so.
22532. *Q.* Were there many exceptions to it? *A.* No. I have seen a strong patch here and there.
22533. *Q.* Was there anything in the nature of the coal being taken out to lead you to believe that it would be different from the coal cut from the rest of the goaf? *A.* Nothing.
22534. *Q.* You would expect, when the later pillars were taken out, that the fall would be in the same way that it was before you left? *A.* Yes,
22535. *Mr. Wade.*] The evidence is all one way—that it was not.
22536. *Mr. Bruce Smith.*] *Q.* That door which you were asked about. Is it a wooden door? *A.* Yes.
22537. *Q.* You described to the Commission the way in which the water came up against the big pillar and across into the intake, and along a northerly direction to the 5th Left? *A.* Yes.
22538. *Q.* Did it spread over the road, or was it in a narrow depression in the side of the road? *A.* It was in a depression in the side of the road.
22539. *Q.* Was the depression 6 inches deep? *A.* Yes, it was a gutter; but not 6 inches deep.
22540. *Q.* The water was constantly drained on the side of the road? *A.* Yes.
22541. *Q.* In the ordinary way it never flowed over the road? *A.* If anything got into the gutter, it would.
22542. *Q.* It was all carried along the side of the road, and did not touch the top of the road? *A.* No.
22543. *Q.* It would flow by gravitation? *A.* Yes; there was no sump there previously. There was a sump in the 4th Right, and one in No. 1.

22544. *Q.* With regard to gas. You told Mr. Wade that you never saw it, and never found it with the lamp. Have you not told people that you believed there was gas in Kembla? *A.* No, I never did. The person who told you that did not tell you the truth.
22545. *Q.* You did not believe there was gas in the mine? *A.* I did not believe it. I did not believe it when I heard of the accident.
22546. *Q.* Did you ever hear of gas in the mine before? *A.* No, not whilst I was under-manager.
22547. *Q.* Did you ever hear of its being found before? *A.* I have not heard of any gas being found since the time Gallagher was burned.
22548. *Q.* Did you ever hear gas issuing from the ribs of the coal? *A.* I have heard a noise; I would not say it was gas.
22549. *Q.* Did not your curiosity induce you to find out what it was? *A.* I heard the noise, but nothing of any consequence.
22550. *Q.* How did you account for it? *A.* Moisture will do it very often.
22551. *Q.* Was there any moisture where you heard the hissing? *A.* Yes.
22552. *Q.* You accepted that as conclusive? *A.* Yes; we tried many times, but never found it.
22553. *Q.* How did you try to find it? *A.* With the safety-lamp.
22554. *Q.* You never tried to light it? *A.* After we tried with the safety-lamp we put our lamp to it.
22555. *Q.* A naked light? *A.* Yes.
22556. *Q.* To the orifice from which you heard a noise issuing? *A.* Yes.
22557. *Q.* Without any protection whatever? *A.* Yes; without any protection whatever.
22558. *Q.* You told the Commission that where a shot had been fired, and there was incomplete combustion, you have seen something ignite. Was that at Kembla? *A.* No.
22559. *Q.* Have you seen it in Kembla? *A.* Yes.
22560. *Q.* How did you distinguish as to the constituent parts of it. You talked learnedly about CO, CO_2, and CH_4? *A.* I do not think you have got what I did say. I said that the result of incomplete combustion was that. That is what I said.
22561. *Q.* You were giving us a little bit of chemical information? *A.* I was asked for it.
22562. *Q.* You did not mean to say that you saw any of that in Kembla? *A.* No.
22563. *Q.* What is your opinion now as to the way the remainder of the roof would fall? *A.* From anything I saw, I believe it would go on falling as it did before.
22564. *Q.* It would fall after they took the timber out? *A.* I think it would fall next morning.
22565. *Q.* Do you think it is probable that the whole of that area would remain until the coal was out? *A.* It might.
22566. *Q.* It is physically improbable—do you think that it would? *A.* There was nothing there to lead me to believe that the stone was any harder than before. Of course, I must draw on my imagination; I do not know what was over the pillars.
22567. *Q.* Do you think it probable that the roof would remain until the whole of the coal was out? *A.* I cannot tell; I am not a prophet.

Cross-examined by Mr. Lysaght:—

22568. *Q.* I think that you said that, until you heard of the accident, you did not hear of gas in the mine, and that it was then too evident? *A.* I think you are adding something to it.
22569. *Q.* What, in your opinion, was the cause of the explosion? *A.* I cannot say—I was not on the job; and I have not seen the place since, and I have not seen gas there.
22570. *Q.* What, in your opinion, caused that explosion —— [*Interrupted*].
22571. *Mr. Wade.*] Is it a fair question?
22572. *His Honor.*] He is asked whether he has an opinion.
22573. *The Witness.*] I never saw any gas there; and I have never been to see the condition of the mine since; and now I am asked my idea as to what caused the explosion.
22574. *His Honor.*] *Q.* You do not consider yourself in a position to form an opinion? *A.* If I had seen the place it would be different.
22575. *Q.* And not having seen it? *A.* I am not in a position to give an opinion.
22576. *Mr. Lysaght.*] *Q.* In your opinion, did fire-damp play any part in the disaster? *A.* I never saw it. What is the good of my opinion. I cannot pass an opinion on what I did not see.
22577. *Q.* I do not care whether your opinion is not worth 6d.—did fire-damp play any part in that disaster? *A.* I cannot say what caused the explosion. You are asking me that now the other way about.
22578. *Q.* What is your opinion? *A.* Can you form an opinion on what you did not see?
22579. *His Honor.*] *Q.* Try to answer the question. *A.* According to the newspapers and the results, I should say that there had been a gas explosion accelerated by coal-dust. But just a little time ago you said that anything that I heard was not evidence.
22580. *Mr. Lysaght.*] *Q.* Have you any doubt that there was a gas and coal-dust explosion?
22581. *Mr. Wade.*] This is a useless waste of time. He says that, if he believes what he saw in the newspapers, there would be an explosion.
22582. *Mr. Lysaght.*] *Q.* Do I understand that you have no theory as to the case of the disaster? *A.* I never saw it. Have I not just told you what my opinion is.
22583. *His Honor.*] So far as he expresses an opinion, he has expressed it in your favour.
22584. *The Witness.*] Mr. Lysaght wants me to say the same thing again.
22585. *Mr. Lysaght.*] Which was the dustiest part of the mine? *Q.* It is not what you would call a dusty mine in the acceptation of the word dusty.
22586. *Q.* Is that what I have asked you—which was the dustiest part? *A.* As a rule, the pillars.
22587. *Q.* Which pillars? *A.* In some pillars in the 4th Right. It was dry there. The lower portion was wet, but the upper portion was dry.
22588. *Q.* You never watered the travelling roads? *A.* You say we never watered them.
22589. *Q.* Is that a fact? *A.* No.
22590. *Q.* You did water them? *A.* Yes; we had them watered by a bucket and a skip.
22591. *Q.* Did you flow water over the travelling road? *A.* Yes, we have done so.
22592. *Q.* Where? *A.* In the shaft district.
22593. *Q.* Did you water the neighbourhood of No. 1 district? *A.* No.

22594. *Q.* Do I understand that you carried a safety-lamp with you always when you were going through the pit? *A.* No, I did not.
22595. *Q.* What did you carry? *A.* A flare-light.
22596. *Q.* Did you carry a safety-lamp when the Inspector was with you? *A.* No; he carried it.
22597. *Q.* Can you remember whether, within three months of the time you left, you had been carrying a safety-lamp during your rounds? *A.* Never. I may have had a deputy's lamp.
22598. *Q.* What do you mean? *A.* I may have had a deputy's lamp; because one day we had to take it to test for gas.
22599. *Q.* Did you discover gas? *A.* No.
22600. *Q.* Did you carry a safety-lamp in Powell's Flat to examine for gas? *A.* I did not; that is not correct.
22601. *Q.* Within two months of your leaving the mine? *A.* I never carried it, unless with a deputy, or with the Inspector.
22602. *Q.* Do you remember making a special inspection in Powell's Flat for gas? *A.* A special one.
22603. *Q.* With the safety-lamp? *A.* I believe I did; but I did not usually carry the lamp with me.
22604. *Q.* Was that inspection with a safety-lamp in Powell's Flat? *A.* I forget now. I remember going with the deputy and examining a place. It was a place where they were going to start. I believe Willie Nelson and I made an inspection of the place near Powell's Flat in old No. 5.
22605. *Q.* Will you tell me the circumstances under which you made it? *A.* I went in there to start a place that had been standing for a number of years. That is all I can say in the matter.
22606. *Q.* Was gas reported there? *A.* No; I never did, as I told you —— [*Interrupted.*]
22607. *Q.* All right; I do not want any more;—gas was not reported? *A.* No.
22608. *Q.* Do you know whether Nelson discovered it on that occasion? *A.* No, he got no gas on that occasion; because I was with him.
22609. *Q.* Is that the only occasion you can remember going with the safety-lamp? *A.* That is the only one, unless going with an Inspector.
22610. *Q.* You might tell me why it was you allowed the rule for the weekly inspection of the wastes to be abrogated to a monthly inspection? *A.* It was the rule when I went there.
22611. *Q.* To have monthly inspections only? *A.* Yes.
22612. *Q.* You knew the rules required weekly inspections? *A.* I have already told you that the wastes were examined twice a day.
22613. *Mr. Ritchie.*] *Q.* Have you any reports of it? *A.* I have told you of it.
22614. *Q.* Did you see the reports? *A.* It was under General Rule 4.
22615. *Q.* Do not the Special Rules require that the reports shall be in writing? *A.* And then there are the return airways. We see the return airways every month.
22616. *Q.* I ask you, do you not report that? *A.* No. They are inspections under General Rule 4; and no provision is made under General Rule 4 for the waste workings to be reported.
22617. *Mr. Robertson.*] *Q.* You mean waste workings contiguous to working places? *A.* Yes.
22618. *Q.* You do not mean that you examine the whole of the waste workings? *A.* No.
22619. *Mr. Ritchie.*] *Q.* What do you call waste workings? *A.* After we have taken the pillars out, I would call the full length of the place a waste working. Is not that what you would call a waste working?
22620. *Q.* It is not for you to ask me questions? *A.* That is what I should say was a waste working.
22621. *Mr. Lysaght.*] *Q.* Does not Special Rule 10 say that the deputy "shall at least once in every week examine, so far as is practicable, the state of the waste workings and main airways, and make and sign a true report of the state thereof in a book kept at the office for that purpose." Do you know what that rule means;—that does not mean what you are referring to? *A.* The inspection of the goaf was done daily, and we had an inspection once a month.
22622. *Q.* I want to know why you abrogated the rule from once a week to once a month;—why was it not done once a week, as required by that rule? *A.* Simply because it had been the custom of the colliery to examine it once a month.
22623. *His Honor.*] *Q.* The custom before your time? *A.* It had always been the custom in connection with the colliery.
22624. *Q.* Before you went there? *A.* Yes.
22625. *Mr. Ritchie.*] *Q.* Did you not take the Special Rules as a guide? *A.* I did.
22626. *Q.* Were there any other Special Rules you ignored as well as that? *A.* No; I carried them all out.
22627. *Mr. Lysaght.*] *Q.* All excepting this one? *A.* Yes; and it was the custom of the colliery before I went there.
22628. *Mr. Ritchie.*] *Q.* Did you draw the Manager's attention to the fact that the rule was not being carried out? *A.* Yes.
22629. *Q.* What was the answer? *A.* That it had been the custom of the colliery whilst he was Manager, and also the custom of the colliery before he was Manager.
22630. *Q.* Did you consider you did your duty? *A.* I was not Manager; I was under-manager. I pointed it out to him, and that was the answer I got.
22631. *Q.* Who was the Manager? *A.* Mr. Rogers,
22632. *Q.* Did Mr. Rogers give you any other answer? *A.* No, not that I am aware of.
22633. *Q.* Was any question raised as to what the rule meant? *A.* What do you say?
22634. *Mr. Lysaght.*] *Q.* Can you tell the Commission whether any question was raised as to what the rule meant? *A.* Mr. Rogers was under the impression that it was carrying out the rule. I said, "No; he was not." He said he was, because he was examining the waste workings every day.
22635. *Q.* The explanation was that they were examining them every day? *A.* Yes; he said that they were examining them every day.
22636. *Q.* But that was not an excuse for not having a report in writing? *A.* He told me that that was the rule of the colliery.
22637. *Q.* You took no steps to have it reported to the Inspector? *A.* No; I had no right.
22638. *Q.* You, knowing that the Special Rule had been violated, did you report it to the Inspector? *A.* Mr. Rogers was under the impression that they were carrying out that rule.

22639. *Mr. Ritchie.*] *Q.* Do you really believe that the daily inspection was an examination of the waste workings? *A.* Yes, we were examining them; but we were not examining the whole of the return airways.
22640. *Q.* You were not examining the whole of the return airways? *A.* Not the whole of them.
22641. *Q.* Do you say you did not examine the whole of the airways? *A.* Not the return airways.
22642. *Q.* You say you examined the airways, but not the whole of them? *A.* Not the return airways going to the old workings.
22643. *Q.* You mean that the whole of the intake airways were examined daily? *A.* Yes.
22644. *Q.* And the whole of the returns? *A.* Not the whole of them. They were examined every second pay Saturday.
22645. *Mr. Lysaght.*] *Q.* They were not reported in any book? *A.* They were reported in the same book you had in your hands.
22646. *Q.* Were they reported? *A.* Yes.
22647. *Q.* And specially mentioned? *A.* Yes.
22648 *Q.* As an examination of the waste workings? *A.* Yes.
22649. *Q.* Show me in this book [*handing witness a book*]? *A.* That is not the book. That is the deputy's book. I mean the book you had in your hands when the other case was on. You looked at it, and you know it is there. I said that it was reported in a book under the form of General Rule 4, and specially mentioned.
22650. *Q.* Where is that book? *A.* I expect it will be down at the colliery.
22651. *Q.* We have been told that there was a fall in the 4th Right of 2½ feet, a week before the disaster. That indicated that the roof was falling in the same way that it had previously fallen in the previous area—is not that so? *A.* No.
22652. *Q.* Do I understand that it had fallen in a solid mass before? *A.* I do not know whether you understand it or not. You will find that I said it fell from 4 to 8 feet in thickness.
22653. *Mr. Ritchie.*] You said from 8 to 12 feet in thickness.
22654. *Mr. Lysaght.*] *Q.* Knowing that there was a 2 feet 6 inches fall, in your opinion was there sufficient area left to fall to force out air at any great pressure? *A.* There would be a sufficient area to cause a great pressure of air.
22655. *Q.* That was at the time you left;—if we know, as far as it is practicable to extract pillars, that they have been extracted, and the roof was allowed to fall, would you then say there was sufficient area to fall to force out air with great pressure? *A.* I said yes—but what do you mean by "great"?
22656. *Q.* Would it be pressure, in your opinion, sufficient to blow out the stoppings along the 4th Right? *A.* No—that is, the area in which the pillars had been taken out.
22657. *Q.* As far as practicable, if they had extracted the pillars, there would not be an area of fall sufficient to create a force to blow out the stoppings in the 4th Right? *A.* No.
22658. *Q.* Now, this small plan which you have produced shows that there are openings to this 4th Right throughout these pillars? *A.* No; those marks are continuous. They are not openings.
22659. *Q.* There was a part of the mine called the Old 4th Right—was that these 4th Right pillars? *A.* No; there is a difference between No. 4 Right and the 4th Right. The other was the Old No. 4 Right.
22660. *Q.* Were there no pillars to be extracted there in your time—six months before the disaster? *A.* No, I do not think so.
22661. *Q.* Tell me what is the meaning of this enty in a diary on the 17th of April, 1900, when you say that you went to arrange to get out some stooks of coal in Old No. 4? *A.* That is in the shaft section—the pillars there —— [*Interrupted.*]
22662. I do not want the information if it refers to Old No. 4.
22663. *Q.* I thiuk in the 4th Left travelling road, and rope road, there were certain canvas doors;—do you remember where they are? *A.* There were certain doors at the junction of the 4th Left travelling and rope roads. There were also other canvas doors lower down.
22664. *Q.* They had nothing to do with it? *A.* They have, because you want the Commission to believe that there were single doors between intake and return airways.
22665. *Q.* How many cut-throughs were passed before there was any canvas door? *A.* Four bords.
22666. *Q.* How many yards from No. 1 maiu level? *A.* About 72 yards.
22667. *Q.* A number of the openings to this goaf had no stoppings in them? *A.* They were fenced across.
22668. *Q.* I want you to tell me how many of these openings there were without stoppings on the north side of the goaf? *A.* I do not think there were any.
22669. *Q.* Just thiuk for a moment? *A.* I think the two bottom ones.
22670. *Q.* And how many were there on the east side of the goaf without stoppings? *A.* Oh, they were canvas stoppings.
22671. *Q.* Were there any left without stoppings? *A.* Not that I am aware of. You mean between the 4th Right and the 5th Right.
22672. *Q.* I am talking about the goaf on the east side? *A.* Between where?
22673. *Q.* Anywhere? *A.* There were the 4th Right stoppings.
22674. *Q.* Any others? *A.* No.
22675. *Q.* On the south side, how many openings were there without stoppings? *A.* On the south side of the goaf, none.
22676. *Q.* On the west side? *A.* None, excepting in the 4th Right.
22677. *Q.* Do you remember an explosion which took place on board a ship called the "Glaucus"? *A.* The "Glaucus"?
22678. *Q.* You know—she was laden with Kembla coal? *A.* How long is that since?
22679. *Q.* You remember her blowing up? *A.* I do not think I do now.
22680. *Q.* Have you never heard of her? *A.* I have heard of her, and seen her hundreds of times; but I do not remember her blowing up.
22681. *Q.* You told us you discovered black-damp in the 4th Right with Mr. Bates? *A.* Yes.
22682. *Q.* That is a noxious gas? *A.* Yes.
22683. *Q.* Did you report it any book? *A.* No. But it does not require —— [*Interrupted*].
22684. *Q.* That will do.

22685. *The Witness.*] Your Honor, cannot I explain?
22686. *His Honor.*] Mr. Wade will ask you afterwards.
22687. *Mr. Lysaght.*] *Q.* Did the deputies complain of not having sufficient time to do their work? *A.* Not to me.
22688. *Q.* Although you never saw gas in the mine, you know that it was a seam that gave off gas? *A.* No.
22689. *Q.* Do you not remember that Mr. Ronaldson stated that it gave off gas? *A.* I know he did.
22690. *Q.* Have you any reason to think that he did not state what was correct? *A.* The conditions of the colliery are different now.
22691. *Q.* Do you mean the seam? *A.* I cannot say that there is any difference in the coal. There was gas, and it was given off, towards the shaft district. That place has been tested ever since; but there was never known to be any gas there, or in the mine, until this disaster took place.
22692. *Q.* You know that Mr. Atkinson discovered gas? *A.* I saw it in the newspaper. I do not believe that any man would get it unless with the hydrogen lamp. I know he has examined in the highest part of the mine.
22693. *Q.* He got it with the safety lamp? *A.* How much?
22694. *Mr. Ritchie.*] *Q.* Do you doubt it? *A.* I was under the impression that it was with a hydrogen flame.
22695. *Q.* Are you surprised now to hear it? *A.* No, I am not surprised, after the explosion.
22696. *His Honor.*] *Q.* I suppose the explosion has had so much effect on your mind that you would not be surprised to hear of a fair quantity of gas being found in that mine? *A.* What I want to know is where it came from. I never saw it. I have been with the Inspectors and deputies, and never saw it. It is hard to believe that it was found. Mr. Atkinson examined in the highest part, and could not get gas.

Re-examined by Mr. Wade:—

22697. *Q.* You did not report black-damp: will you explain why? *A.* Mr. Lysaght pointed to the Rules but did not read them.
22698. *Q.* Is there anything in them compelling you to report black-damp? *A.* No, not black-damp, unless it is in a dangerous condition. I saw a little black-damp there; but it was not dangerous.
22699. *Q.* You know that there is a Rule under which workmen have to report black-damp to the officials? *A.* Yes.
22700. *Q.* You say there were openings around the 35-acre waste? *A.* Yes.
22701. *Q.* Would they be of any advantage to the waste? *A.* Certainly they would; that is how the 4th Right pillars got so much ventilation.
22702. *Q.* Now, about the canvas doors. What doors did you have in the 4th Left travelling and rope roads when you left? *A.* On the main rope road we had one door close to the junction of No. 1, one on the front heading, between the second and third bords.
22703. *Q.* How far away? *A.* Between 60 and 70 yards. There is one at Gill's Flat, about 150 yards from the junction, and one above Stafford's.
22704. *Q.* Were there four altogether on the rope road? *A.* Yes.
22705. *Q.* On the travelling road? *A.* There was a double door on the junction of the main No. 1, and the 4th travelling road; one on the next pillar, a cut-through, a bord's length away—say, 20 yards apart—and three or four more down between that and Kemp Stafford's.
22706. *Q.* On the question of the inspection of the wastes, after you mentioned the matter to Mr. Rogers, you took your instructions from him? *A.* Yes.
22707. *Q.* Did you differ with him as to the meaning of the Rule? *A.* Yes.
22708. *Q.* Now, I ask you this—although you never made any examination of what the Rule calls "the state of the waste workings and the main airways," once a week, but only once a month, was the examination which you made of the wastes adjoining the working places, which was made daily, as effective for practical purposes —— [*interrupted*]
22709. *Mr. Lysaght.*] I object to the witness answering that question unless he was there.
22710. *Mr. Wade.*] I will withdraw the question and put it another way to suit you.
22711. *Q.* This examination of the wastes adjoining the working places, that you saw the day-deputy make, was it as effective as making an examination once a week only —— [*interrupted*]
22712. *Mr. Lysaght.*] That is no reason for not carrying out the rules.
22713. *His Honor.*] The question may be asked for the purpose of explaining how the mine was managed with regard to safety.
22714. *Mr. Wade.*] *Q.* Well, take the 4th Right district—if there was gas being given off there, do you think the examination made daily would be sufficient to detect it —— [*interrupted*]
22715. *Mr. Lysaght.*] I object, unless the witness saw it.
22716. *Mr. Wade.*] He did see it.
22717. *His Honor.*] The question may be put in this form—was an examination made in a particular way.
22718. *Mr. Wade.*] *Q.* In regard to the examination you saw made by the day deputy, if gas had been given off in those wastes adjoining the working places to the 4th Right, do you think that that examination would have detected it? *A.* It would have been as effective then as it would at night.
22719. *Q.* You have an extra chance. You have examinations made daily—seven in the week instead of one, as under the Rule? *A.* There would be two daily.
22720. *Q.* You said that you did not water the travelling roads in No. 1; were you going to give any reason why you did not water them? *A.* In No. 1.
22721. *Q.* You said that you watered them in the shaft district, but not in No. 1. Was it because of anything? *A.* Because they did not require watering—most of the travelling roads were wet.
22722. *Q.* You made an examination of the pillars in the old No. 4 Right? *A.* Yes.
22723. *Q.* That was in the shaft district? *A.* Yes.
22724. *Q.* You say you took a safety-lamp there? *A.* No, we were going along the air course.
22725. *Q.* Have you known, after the first fall, any interval to elapse before the second fall took place? *A.* Yes.

22726. *Q.* How long? *A.* It depends upon the thickness of the first fall. If the first fall is between 4 or 5 feet thick, it is some time before the second fall takes place.
22727. *Q.* What do you mean by some time? *A.* A month or six weeks.
22728. *Mr. Ritchie.*] *Q.* What was the usual width of the first fall? *A.* From a foot to 2 or 3 feet.
22729. *Q.* Would it fall solidly or in pieces? *A.* If it was a foot fall—about a foot thick—I have seen it come down in one block, because there would be a parting in it. It would break when it fell.
22730. *Q.* That was when you got a parting? *A.* Yes. If it were 3 feet thick it would not fall as clean as when it was a foot or 15 inches thick.
22731. *Mr. Wade.*] *Q.* Generally speaking, the tendency was for it to come down in one piece? *A.* Yes; but if it were a thick fall it would be more irregular.
22732. *Q.* When you say that it fell in one piece, are you only referring to falls of a foot thick? *A.* Yes; the thicker the fall the more irregularly it would fall.

Re-examined by Mr. Bruce Smith:—

22733. *Q.* What were you referring to when you told Mr. Lysaght that Mr. Atkinson examined in the highest part of the mine? *A.* To when he was going round with Mr. Rowan.
22734. *Q.* What do you call the highest part? *A.* No. 1 heading.
22735. *Q.* He did examine that? *A.* Yes.
22736. *Q.* What did you give your answer as an explanation of—the fact that gas had not been found there? *A.* I had been asked if I carried a safety-lamp to make examinations for gas, and did I find it.
22737. *Q.* What was your answer to show? *A.* I was asked did I find it in any of these places. I said that Mr. Atkinson did not find it.
22738. *Q.* Why did you mention it. Do you mean that he had examined the highest places without finding gas. Are you not aware that he found hundreds of feet after the explosion? *A.* No.
22739. *Q.* You do not know that? *A.* No.
22740. *Q.* You told Mr. Wade just now, when he asked if some time elapsed between the first and second falls—you said "Yes, when the first fall was only a foot"? *A.* No, when the first fall was rather heavy.
22741. *Q.* Where there was only 2 feet—what is your experience of the length of time between the first and second fall? *A.* Three or four days.
22742. *Q.* Would that apply only to a fall of 2 feet and a half? *A.* Yes.
29743. *Mr. Lysaght.*] *Q.* From the main level is there a cut-through into a heading through a pillar of coal you left? *A.* Yes.
22744. *Q.* It is outbye of the 4th Left rope road, and there is a cut-through from the main heading to the first bord on the left. What was the width of it? *A.* The width is about 6 or 7 feet.
22745. *Q.* Was there any door in that cut-through between the main level and the bord? *A.* There was a stopping there, with a pipe through it.
22746. *Q.* Could any air go through that pipe? *A.* What would go through a 3-inch pipe along with the water.

Examined by Mr. Robertson:—

22747. *Q.* How many seconds would it take for a fall in that 4th Right. Would it take a minute, or half a minute? *A.* You know as much about the law of falling bodies as I do.
22748. *Q.* I am asking you about a falling roof in a mine. You have seen lots of falls? *A.* Do you mean from the time the roof starts until it finishes?
22749. *Q.* Yes? *A.* A light fall or a heavy one.
22750. *Q.* A light fall? *A.* In a light fall the roof would drop almost instantly—in half a minute.
22751. *Q.* With a heavy fall? *A.* She would work, and break away more slowly.
22752. *Q.* How long would it take—I am not tying you down to a second? *A.* I have seen a roof start and go the length of a pillar in two or three minutes.
22753. *Q.* Do you think it could occur in two seconds? *A.* No, only over a small area. If it was over a large area, and if it had been working for some considerable time, it would fall instantly at the last. With a light fall, when the roof comes away about a foot, there is only a foot of resistance to break, and once it gets away it falls like that. [*Witness made a movement with his hand and brought it down quickly on the desk.*] If the fall is 5 or 6 feet thick, the roof starts to break and crumble, and pieces start to crumble away, and it may take five minutes for a pillar length to fall. After that the rate would increase ten times, and the roof would keep working the whole of the time, and then it breaks away almost instantly.
22754. *Q.* What is the time to give to a fairly big fall? *A.* It might come down in a minute or less than that? If it was on the point of falling before it might come down in two or three seconds.
22755. *Q.* Would you care to work in the Mount Kembla mine with naked lights, in view of this explosion? *A.* I do not know. I have never been there to see whether, since the explosion there was gas or not. I see that the Chief Inspector has found it—I thought it was with a hydrogen flame; but now I am told he has found hundreds of cubic feet with the safety-lamp.
22756. *Q.* Do you doubt that there was an explosion? *A.* No, the evidence is too strong that there was one.
22757. *Q.* Would you care to work in Kembla Mine with a naked light? *A.* Well, I do not see that there would be any great danger, provided there was plenty of air.
22758. *Q.* Say there was not plenty of air? *A.* There is usually plenty of air there.
22759. *Q.* Do you think it would be wiser to increase the ventilation there? *A.* If there were gas, it would dilute it more. If you cut off the ventilation at the Metropolitan Mine you would have a high percentage of gas.
22760. *Q.* I take it that before working there with a naked light you would require the ventilation to be improved? *A.* I would not say that. I believe there is sufficient air to dilute it. I have never seen the mine since. When I was there I thought it one of the safest mines that I had ever seen in my life.
22761. *Q.* What other mines have you been in? *A.* Minmi, the Co-operative, the Stockton, the Hetton, the Cardiff, and the Stanford-Merthyr Mines.
22762. *Q.* Did you find gas in Stockton? *A.* No.
22763. *Q.* Did you find it in any of the other mines? *A.* I found it in the Minmi years ago.
22764. *Mr. Bruce Smith.*] *Q.* Did you report it? *A.* Gas was reported.

22765. *Mr. Robertson.*] *Q.* You said that one of the back headings was inspected every morning, although standing idle? *A.* Yes.
22766. *Q.* Do you know whether that was the practice, to examine standing places? *A.* I believe we did examine places, even if they were not working.
22767. *Q.* There is evidence that these places were not examined? *A.* I have examined them myself.
22768. *Q.* I mean by the deputies, in the regular course of their examination? *A.* I believe they were examined.
22769. *Q.* If the deputies state that they were not examined? *A.* The deputies did not state they were not examined.
22770. *Mr. Wade.*] Was not that Morrison?
22771. *Mr. Robertson.*] Yes.
22772. *Mr. Wade.*] He only came on after Mr. Leitch left. He was a deputy for six weeks.
22773. *Mr. Roberton.*] *Q.* What was the condition of the outlet from the 4th Right pillars—was it damp? *A.* Yes; wet, muddy.
22774. *Q.* Sloppy? *A.* Sloppy.
22775. *Q.* Would there be any dust there? *A.* No, I do not suppose there would be.

Examined by Mr. Ritchie:—

22776. *Q.* I suppose you are conversant with the Special Rules? *A.* Yes.
22777. *Q.* Do you know that it was part of your duty to instruct those under you? *A.* Yes.
22778. *Q.* Did you instruct the deputies with regard to Special Rule 10, as to the examination of waste workings? *A.* Yes, they were there when the discussion was on.
22779. *Q.* Did you give them instructions as to their duty? *A.* They were present when the discussion took place with the Manager.
22780. *Q.* Did it take place when you first took up your position? *A.* Directly afterwards.
22781. *Q.* Was a deputy present when you found black-damp? *A.* Yes, I believe there was.
22782. *Q.* Do I understand you to say that persons are not compelled to report black-damp? *A.* I did not say that no person was to report it.
22783. *Q.* Did you ever hear of the deputies reporting it before? *A.* No; but I have heard of its being there.
22784. *Q.* Was it known that black-damp had been there previously? *A.* I knew of it previously in the 3rd Right.
22785. *Q.* Have you seen any report that it was there? *A.* No.
22786. *Q.* Was it not strange that it was not reported? *A.* It was not in a dangerous condition.
22787. *Q.* Do you know that the General Rule says nothing about a dangerous condition—it speaks of noxious or inflammable gas, if any is found. There is no qualification whatever? *A.* I said that the Special Rule said so. I do not mean the General Rules under the Act.
22788. *Q.* You know the Special Rules must be in accordance with the General Rules? *A.* We know they should be.
22789. *Q.* You were not surprised to see no report as to the finding of black-damp, although you knew it was there? *A.* I found it once.
22790. *Q.* You heard of its being there? *A.* I heard of its being there, but that was in the old workings.
22791. *Q.* It does not make any difference where it is found. Do you know that there is a possibility of its coming out and killing a number of men. Is that the way you carry out your duties where you are now. Have you no Special Rules? *A.* Yes.
22792. *Q.* Do you allow them to be ignored? *A.* No.
22793. *Q.* Do you have these Special Rules carried out now? *A.* I would have had them carried out before; but I was not allowed.
22794. *Mr. Wade.*] *Q.* Do you know of this Special Rule relating to the under-manager:—

> He shall see that the air-crossings, the courses, and stoppings are in good repair, and that an adequate amount of ventilation is constantly supplied; and, should it be ascertained that any discharge or accumulation of inflammable or other noxious gas has taken place in any part of the mine to a dangerous extent, he or his subordinate officer shall see that the workmen and horses be withdrawn from such part.

Is not that the Rule you refer to? *A.* Yes.
22795. *Q.* The inspection under General Rule 4 would be made by the deputies? *A.* Yes.

[The examination of the witness was concluded.]

22796. *Mr. Bruce Smith.*] Mr. Bower lately produced a letter, pointing out a certain matter referring to dangerous things which he found within the South Wallsend Colliery; and he produced a letter which he received from Mr. Atkinson. This is the original letter which was sent to Mr. Atkinson. In the check inspector's book Mr. Bower did not refer to anything that was dangerous; but in the letter he looks upon certain things as being dangerous. I beg to hand the letter to the Commission.
22797. *Mr. Ritchie.*] This appears to have been a private letter.
22798. *Mr. Atkinson.*] No, it is an official letter.
22799. *Mr. Bruce Smith.*] Mr. Bower treated it as an official letter, and referred to it.
22800. *His Honor.*] Mr. Bower seemed to be in doubt whether it was his duty to mention the matter in the report. Mr. Atkinson thought that it ought to be in the report. I do not see that the matter reflects upon anybody. Mr. Rower afterwards said that Mr. Atkinson's letter was a sort of snub, but it was not so at all.
22801. *Mr. Ritchie.*] Mr. Bower explained that, if the matter was put in the report by the check-inspectors, it might be bad for his companion, who was a working miner there, and might be made to suffer.
22802. His Honor directed that the letter should form part of a previous exhibit on the same matter; and it was ordered that it should be marked part of Exhibit No. 43.

[The Commission, at 4·20 p.m., adjourned until 10 o'clock the following morning.]

WEDNESDAY,

WEDNESDAY, 4 *MARCH*, 1903, 10 *a.m.*

[*The Commission met at the Supreme Court, King-street, Sydney.*]

Present:—

C. E. R. MURRAY, Esq., D.C.J. (President).

D. A. W. ROBERTSON, Esq., Commissioner. | D. RITCHIE, Esq., Commissioner.

Mr. Bruce Smith, Barrister-at-Law, instructed by Mr. Wood, Crown Solicitor's Office, appeared on behalf of the Crown.

Mr. A. A. Atkinson, Chief Inspector of Coal-mines, assisted Mr. Bruce Smith.

Mr. A. A. Lysaght, Solicitor, appeared on behalf of—

(*a*) the representatives of deceased miners, wheelers, &c., (victims of the explosion);
(*b*) the employees of the Mount Kembla Colliery (miners, wheelers, &c.); and
(*c*) the Illawarra Colliery Employees' Association (the Southern Miners' Union).

Mr. C. G. Wade, Barrister-at-Law, instructed by Messrs. Curtiss and Barry, Solicitors, was present on behalf of the Mount Kembla Coal and Oil Company (Proprietors of the Mount Kembla Mine).

(Mr. J. Garlick, Secretary to the Commission, was present to take shorthand notes of the evidence and proceedings.)

Mr. J. C. JONES was sworn, and examined, as under:—

Examination-in-chief by Mr. Wade:—

22803. *Q.* What is your name? *A.* Jacob Carlos Jones.
22804. *Q.* You are at present Manager of Mount Keira Colliery? *A.* Yes.
22805. *Q.* In the Illawarra district? *A.* Yes.
22806. *Q.* How long have you been Manager there? *A.* About eighteen months in Keira.
22807. *Q.* Had you been Manager elsewhere before that? *A.* Yes; I was Manager eleven years at South Bulli, and five years at North Bulli. I was also Manager in South Wales for eighteen months.
22808. *His Honor.*] *Q.* Is that old South Wales? *A.* Yes. Then I was Assistant Manager at Lambton Colliery for about seven years.
22809. *Mr. Wade.*] *Q.* That is in New South Wales? *A.* Yes, in New South Wales.
22810. *Q.* What is your total experience of coal-mining? *A.* Thirty-two or thirty-three years.
22811. *Q.* Did you know Mount Kembla Mine? *A.* Yes, very well.
22812. *Q.* Before the 31st of July last? *A.* Yes, I have known it for eighteen years.
22813. *Q.* Had you been there, in the mine itself? *A.* Yes, frequently.
22814. *A.* Had you an opportunity of seeing the general method of working? *A.* Yes.
22815. *Q.* And the equipment of the mine? *A.* Yes, that was my principal reason for going to see it.
22816. *Q.* Do you remember the occasion of an injury to a man named Brownlee? *A.* Yes.
22817. *Q.* A little over two years ago? *A.* Yes, it must be two years ago; the man lost his leg.
22818. *Q.* That took place in one of the pillars in the 4th Right? *A.* Yes, I examined that.
22819. *Q.* You went into that part of the mine specially in connection with that accident? *A.* Yes.
22820. *Q.* What is the opinion you formed as to the general safety, or as to the management, of Mount Kembla? *A.* I came to the conclusion that it was managed as well as any other mine that I know of, in every respect; it was well equipped; they used every care, so far as I could ascertain, for the safety of the men; and the ventilation was good—in my time, at all events.
22821. *Q.* Did you have any knowledge of its giving off gas? *A.* No. Only on one occasion do I remember hearing anything about gas in Kembla; and that was when they struck some old workings about ten years ago.
22822. *His Honor.*] *Q.* That was Gallagher's case? *A.* I do not know the name; but I know that they struck into some old workings; and a man went in with his light, and it lit the gas.
22823. *Mr. Wade.*] *Q.* That was Gallagher's case? *A.* I do not know; I do not remember the name.
22824. *Q.* Now, with regard to dust in the mine, or the dampness of the mine, what opinion did you form about that? *A.* It was a mine that would not be considered to be a dry and dusty mine—by no means; far from it. There are plenty of mines I know that are much worse than that.
22825. *Q.* You were amongst the exploring party after the disaster on the 31st of July? *A.* Yes. I did not go in amongst the first lot; but I came there and met the late Mr. MacCabe outside; and he asked me to stay outside and prevent the men going in while he went in.
22826. *Q.* You went in shortly afterwards? *A.* Yes, about 5 o'clock.
22827. *Q.* And you were there on a number of occasions afterwards? *A.* Yes.
22828. *Q.* Did you make any special examination on any days? *A.* Yes; on the 4th of August, I think, and on the 27th of August, we made two special inspections of the mine.
22829. *Q.* Putting on one side the occurrence at Mount Kembla, had you had any experience of an explosion in a mine, either of gas, or coal dust, or both? *A.* I have been brought up in gaseous mines; and I have seen one or two slight explosions; and I was at Bulli explosion in 1887.
22830. *Q.* What was the nature of the explosion at Bulli? *A.* There was no doubt it was a gas explosion; and it gave great indications of heat, and burnt timbers ——[*interrupted*].
22831. *Q.* Wait a minute—was there anything else besides gas: did coal-dust play any part in it? *A.* Oh, undoubtedly, coal-dust was a very important after effect. It was a very dusty part of the mine, too.
22832. *Q.* You were in the mine? *A.* In Bulli, yes.
22833. *Q.* Did you see any indications of flame, or of an explosion? *A.* Yes, in the No. 1 Right, they called it, I think, in every bord you could see indications of props burnt, charred; and also the rib sides were charred: you could see a lot of coke, distilled coke.
22834. *Mr. Lysaght.*] Might I take this objection at this stage: that, inasmuch as the report of the Bulli Commission is in evidence, you have the matter there at first hand, as to all the conditions that were seen there; and it is a pity to overload the depositions with this evidence.

22835. *His Honor.*] I take it that Mr. Wade is only going to get it shortly. It is much easier to compare his evidence at this Commission, as to the result of the explosion at Bulli, with the results of the Kembla explosion, than it is to compare his evidence on that Commission.
22836. *Mr. Wade.*] *Q.* What did you say? *A.* The charred timber and coke. There was a great force, of course; I remember one case where, I think, one horse was blown through a brick stopping and into the return from the main wheeling road, the main intake; driven more than 50 yards, through a brick stopping. That was the greatest effect. Of course a lot of the miners were killed.
22837. *His Honor.*] *Q.* The horse really followed the stopping, I suppose? *A.* I would not like to say which went first: they might have gone together.
22838. *Mr. Wade.*] *Q.* Do you mean the stopping was blown down? *A.* The horse was blown 50 yards beyond the stopping, right through.
22839. *Q.* But "blown through a stopping" makes it look as if the solid stopping had been there? *A.* It had been there.
22840. *Q.* You mean the stopping was blown down? *A.* Yes.
22841. *Q.* And the horse was blown through the opening? *A.* Yes; and a lot of men died on the main intake road from the effects of after-damp; and a good many were burnt, near the seat of the explosion, at all events.
22842. *Q.* And do you remember how much of the props was affected by coked dust? *A.* Well, some very very much, from top to bottom: some parts of the timber were not as much burnt as that they had dry dust-like driven on to them and then calcined. Some parts of the props would be coated with this dust; and the heat would have burnt the dust into a coke. There were a lot of cases like that.
22843. *Q.* How thick was this covering? *A.* About one-sixteenth of an inch, I suppose. You could just scratch it off.
22844. *Q.* And on which side of the props: on one side, or more than one? *A.* Oh, you could find them in all directions in the bords, near the entrances of the bords.
22845. *His Honor.*] *Q.* But, as far as the symptoms of force would show the direction, did you find the dust on what you may call the windward side of the props or the lee side of the props, or both? *A.* You would find it nearly surrounding some props, Your Honor, especially in the bords. You see there were a lot of bords in the headings where the explosion was supposed to have occurred; and there is no doubt the effect would go up and down these bords, so you could scarcely tell in which direction the force would be.
22846. *Q.* It may have come both ways, one after the other? *A.* Just so.
22847. *Mr. Wade.*] *Q.* You have told us the effect on the coal in the ribs and the rib sides: was there any coal standing in the path of this explosion? *A.* Yes. If I remember rightly in the first heading of the two, near the nearest cut-through to the face, I think there was a lot of coke on the ribs.
22848. *Q.* But I am speaking of coal that was in the tubs, for instance? *A.* No; I do not remember that. There had been a shot fired in the face of one of the headings; and the coal had been blown away a good deal; but I do not think there were any skips or loaded coal there.
22849. *Q.* Speaking generally, how did the condition which you saw at Mount Kembla correspond with what you saw at Bulli? *A.* I could not see any comparison at all. You could get into Kembla straight away; and men came out alive, scores of them, immediately after the thing occurred; but in Bulli there was not one came out: even in the western section of the Bulli mine, which was a mile away from the seat of the explosion, I think they all got killed there.
22850. *Q.* Were there more than one opening to the Bulli mine at that time? *A.* Only a shaft and a tunnel, I think.
22851. *Q.* Practically there was only one? *A.* One main entrance.
22852. *Q.* And there were several in Kembla? *A.* Yes, four or five.
22853. *Q.* That might make a difference, as far as Kembla is concerned? *A.* Certainly.
22854. *Mr. Robertson.*] *Q.* If there had been only one opening in Kembla, probably very few would have come out of that mine? *A.* I do not know. Bulli was a very extensive mine; and the western section was about a mile away from the seat of the explosion; and they all got suffocated there. I do not think, even if there were three or four entrances out to where the tunnel is now, it would have helped them a bit. If they had tunnels to other parts, other sections of the mine, it might possibly have helped; but if they had had tunnels in the same position as the present tunnel at Bulli it would not have helped them one bit. If I recollect rightly, even with all the effect of the explosion, it did not do as much damage to the main tunnel as Kembla did.
22855. *Mr. Robertson.*] *Q.* That is to say, the explosion at Bulli did not wreck the mine so much as that at Kembla? *A.* No, it did not. It did not seem to have broken the mine so much. There was one heavy fall; but that was a bad roof.
22856. *Mr. Wade.*] *Q.* That was at Bulli? *A.* Yes.
22857. *Q.* Let us come back to Kembla for a minute: do you mean that there were more numerous falls at Kembla than at Bulli? *A.* Yes; there seemed to me to be tremendous forces at Kembla No. 1 Tunnel to knock those rails about and break such a strong roof to pieces.
22858. *Q.* And what would be the explanation of the falls of roof, do you think? *A.* I think it must have been the force of the wind, in knocking these supports out; and a great concussion must have shaken the rocks from the roof.
22859. *Q.* And the immediate cause was the destruction of the supports of the roof? *A.* Yes, and the shock, because there were very long distances of the roof unsupported altogether: it was such a good roof. And the only explanation I can give for this good roof falling was the sudden shock or concussion shaking the strata; and large pieces fell out.
22860. *Q.* Did you trace any central point in Kembla for the indication of forces? *A.* Yes, on the 4th Right there is no doubt about that. That is where a great force came from; and I really believe that that is the first cause of the whole trouble, a fall in that place.
22861. *Q.* A fall in the 4th Right? *A.* The 4th Right.
22862. *Q.* If they were working towards the road pillar in the 4th Right ——[*interrupted*]. *A.* The barrier pillar.
22863. *Q.* The pillar that protects No. 1 Travelling Road, the one on the eastern side of the Travelling Road? *A.* Yes.

22864. *Q.* If they were working all the coal that way (fromwest to east), which end would be likely to give way first when the roof fell? *A.* The goaf end—that next to the goaf. That would naturally fall first. That would be already broken from the prior fall, probably; and then, with such a roof as that, the roof would hang down towards the goaf, and the rib side would break next to the barrier pillar, and that would fall down next to the rib. That is the way I should expect a big fall like that to come down.

22865. *Q.* Could you describe how the roof would present itself, with regard to the mouth of the 4th Right. There is the roof standing; and there is an opening here [*making an imaginary drawing in the air*]: how do you think, if those pillars were worked from the goaf towards the barrier pillar, the roof would probably fall? *A.* [*Witness illustrated this answer with a small note-book held horizontally to represent the roof*]. This is the goaf side [*one end of book*]; and this is the pillar side [*other end of book*].

22866. *Q.* And where is your opening? *A.* The opening is this side, next to the pillar. This [*the goaf end of the book*] would probably hang down a certain distance [*witness illustrated the hanging by lowering the goaf side end of the book till it was at an angle of about* 20 *degrees from its previous horizontal position*]. Then I think the roof would break at the supporting side, the pillar side, and it would immediately go down like that [*bringing the book down quickly on the desk in front of him*]. This [*the goaf side end of the book*] would be falling, hanging, practically closing that end on the goaf side before it fell on the pillar side [*witness illustrated this by holding the book in a horizontal position above the desk, and then lowering the goaf side edge of the book till it touched the desk, so as to illustrate that the roof would have sunk so much on the goaf side as to be touchiny the floor, before the roof at the pillar side started to subside at all*]. And then it would fall like that [*letting the book fall on the desk.*]

22867. *Q.* It would begin to fall on the goaf side first? *A.* Yes. It would hang like that [*one end practically touching the floor*]: and the only support would be the side next the pillar. It would hang until it broke on the pillar side; and then it would fall like that.

22868. *His Honor.*] *Q.* By "hanging like that" you do not mean an inch or so? *A.* No. A roof like that would probably go right to the floor at the distance of the end of this room [*roughly between* 40 *and* 45 *feet*], before it would fall at the other end.

22869. *Q.* Before it would break? *A.* Yes. There would be a series of slabs, laminated always; and it would break all along. I have seen a roof almost touching the floor before it breaks.

22870. *Q.* Without anything in the nature of a crush? *A.* Yes. A good deal would depend on the nature of the strata.

22871. *Q.* What was the nature of the strata there? *A.* It was a fairly strong sandstone, and laminated, with a series of layers: and very strong. I can give you an instance of a similar roof, almost exactly, in Coal Cliff, where there are about 3 acres now unfallen, standing now, without any support of any kind.

22872. *Mr. Ritchie.*] *Q.* You are referring to the Mount Kembla strata, now, particularly, when you talk about its hanging like that? *A.* Yes.

22873. *Mr. Bruce Smith.*] *Q.* I think when he said "I have seen it hanging nearly to the ground" he was speaking generally? *A.* Yes, not of Mount Kembla.

22874. *Mr. Ritchie.*] *Q.* Is it your intention to draw the inference from that that at Mount Kembla it would fall likewise? *A.* I am trying to explain how I think that fall would take place.

22875. *Mr. Robertson.*] *Q.* You think it would sag at the back end? *A.* Yes, sag at the loose end.

22876. *His Honor.*] *Q.* That roof is a laminated sandstone, Mr. Jones? *A.* Yes, it is.

22877. *Q.* An argillaceous sandstone, is it not—a sandstone with a good deal of alumina in it? *A.* Yes.

22878. *Mr. Wade.*] *Q.* If it fell in that way, the roof furthest from the opening being the first to come down, would that tend to drive out more air than if it all fell evenly? *A.* Probably it would. I do not know that it would make much difference. Everything would depend on the time it fell; but I should say that the goaf end would prevent any air going into the old goaf. It would all have to come out.

22879. *Q.* That is, supposing the roof had fallen close up to where these pillars had been worked? *A.* Yes.

22880. *Q.* Then you mean, under those circumstances, the fall of the roof on the goaf side would prevent the air going back? *A.* That is so.

22881. *Q.* Did you see the remains of any canvas screens or doors? *A.* Yes, I saw them on several occasions in different parts of the No. 1 District. There were some at the entrance to the 4th Right, I think. There was a piece outbye of the 4th Right, and a piece inbye.

22882. *Q.* Did you notice any canvas on the rib side of No. 1? *A.* Yes, I think there was a piece of canvas up against the rib opposite the 4th Right.

22883. *Q.* In the No. 1 main road? *A.* Yes, in No. 1 tunnel. There had evidently been a door in the cut-through between the two headings; and the brattice had been cut to pieces and separated.

22884. *Q.* Do you think it would require force, or a great force, to have driven that canvas in to the rib? *A.* Oh no, I do not think it would take very great force, not in pounds per square inch. There is no doubt it has been driven with considerable force, because it stuck it into the crevices of the coal.

22885. *Q.* Do you remember seeing a piece of canvas in a crack in the rib side? *A.* Yes, I did see it. It did not require much force to do that; although evidently it had been driven with immense force up there, the actual fact of the canvas being put there did not show very much force. The actual fact of the canvas being in this coal did not necessarily indicate very great force, because you could put it in with your fingers, to a certain extent, you know. At the same time there may be a tremendous force coming out of that; but the simple fact of the canvas being in the rib would not be a sufficient indication of that force.

22886. *Q.* You would not draw that inference from the fact of the canvas only being driven in the rib—not from that fact alone? *A.* No.

22887. *Q.* Do you know where the 4th Left is? *A.* Yes, inbye of the 4th Right.

22888. *Q.* Two hundred yards from the 4th Right in the main road? *A.* Yes.

22889. *Q.* Supposing the fall in the 4th Right had liberated fire-damp, and driven that out by the 4th Right road; and it had gone up the 4th Right inbye; and supposing there was a naked light, Morrison's light, somewhere about the 4th Left, 200 yards away, do you think that it would be possible for Morrison's light to ignite that gas under those conditions? *A.* I do not think so. I have an idea that the current would come in the opposite direction, really.

22890. *Q.* What do you mean? *A.* I believe that, with the great force coming out from the 4th Right, it would create a kind of suction from the straight No. 1 outbye, momentarily, at all events; and probably put the lights out then that way.

22891. *His Honor.*] *Q.* From the acute angle being on the inbye side? *A* Yes. 22892.

22892. *Q.* You do not think it would split suddenly? *A.* I do not think it would; not at that instant.
22893. *Q.* Not instantaneously? *A.* No.
22894. *Mr. Robertson.*] *Q.* You mean on the principle of the injector? *A.* Yes; or the principle of a railway train, if you like.
22895. *Mr. Bruce Smith.*] *Q.* Why should it prefer to turn outbye? *A.* Because the angle is that way.
22896. *Mr. Robertson.*] *Q.* Do you think the angle is sufficient to cause that direction? *A.* I do.
22897. *Q.* For all practical purposes it is at right angles? *A.* It is a long way off right angles. I suppose that would be about 120 degrees.
22898. *His Honor.*] Do not you see that the enormous instantaneous compression of the ejected air would, in point of fact, instead of causing an instantaneous out-draught, probably rather cause an instantaneous outburst in all directions? *A.* I do not see it that way. I think it is quite the opposite. The more force, the more pressure you have there, the more suction you would create, because it is a piston as it were. If you got it very rapidly it would create a suction, I am sure.
22899. *Mr. Robertson.*] *Q.* And when the blast had ceased there would be a return? *A.* Yes.
22900. *Q.* And whatever came out would be carried in to the 4th Left? *A.* It would—what came out of 4th Right.
22901. *Q.* Yes? *A.* Oh no, that would not be carried in.
22902. *Q.* But when it had expended its force? *A.* When it did expend its force—[*Interrupted*].
22903. *Q.* You know from your own experience that, when the explosion had ceased, the air returned to its natural course? *A.* Quite so; but I would not like to say when this force had expended itself. The indications show that it did not expend itself till it got outside. How it continued I would not like to say; but there is no doubt about the fact that there was a force, and a force that continued right out to the tunnel mouth.
22904. *Q.* Do you mean to say that this tremendous blast continued—[*Interrupted*]? *A.* Right out to the tunnel mouth.
22905. *Q.* Continued with the same force? *A.* And probably with increased force. I would not like to say that; but there is evidence to show that there was great force there.
22906. *Q.* There are a number of openings off the No. 1 main road; do not you think the force would dissipate itself at every opening it came to? *A.* No. There is nothing to show that; and I do not believe it. If you have a pipe at a certain angle like that, and a number of branches on it, and you allow the water to run down that, none of the water would go down the branches.
22907. *His Honor.*] *Q.* You have to be very careful in comparing the action of a gas and the action of a liquid—the action of air and the action of water? *A.* They have a good many of the same principles.
22908. *Q.* And a good many different ones. A liquid is, to all intents and purposes, inelastic; but gas is, to a very great extent, elastic. I am speaking of the air as a gas? *A.* I see.
22909. *Mr. Robertson.*] *Q.* Do you think the force went right out to the tunnel mouth without being dissipated in any way? *A.* Supposing one-quarter of an acre of that goaf fell. I was reckoning the opening as 10 ft. x 5 ft. If the air came out of that opening, the rate of speed would be 742 miles per hour.
22910. *Q.* How do you know what rate it would be? *A.* I am only assuming that a quarter of an acre fell 5 feet in one second. I am only assuming that, to show the speed. I am quite willing to admit that that speed would expend itself long before it would get to the tunnel mouth, if it had not some other force to follow it on. How that came about is a mystery. Probably it would come from a dust explosion; but I cannot explain how it got ignited.
22911. *Q.* That is a different story; a moment ago you said it would continue undiminished to the tunnel mouth? *A.* I did not. I said that the evidence went to show that there was force right out to the tunnel mouth; but I did not say that this force itself would continue. I still say that I do not believe that air travelling at a rapid speed would dissipate through these cut-throughs, as you think; if it is going very rapidly. The tendency would be to go straight out. That is my sound opinion.
22912. *Mr. Ritchie.*] *Q.* Do you think it would travel in the same way as a bullet or a bolt that you might shoot by some force? *A.* Yes, but if you had branches from the barrel of a gun, and you put a projectile into it, you would not expect pieces of the projectile to come out of the branches, would you?
22913. *Q.* But you surely do not compare that mass of air to a bullet in a gun? *A.* I do not know; it comes as a projectile when it knocks down rails, and that kind of thing.
22914. *Q.* Of course, you know the bullet would not expand and chip off at different openings; but air might, and probably would? *A.* Oh no, I would not like to undertake to explain how the power continued right out, from that volume of air.
22915. *Mr. Robertson.*] *Q.* Have you ever seen the gas arrangements in a blast furnace? *A.* I have no doubt I have.
22916. *Q.* Do you know the gas mains that lead the gas away from the blast furnaces are, some of them, about 7 feet in diameter and ½ a mile long? *A.* Yes.
22917. *Q.* Do you know that they were provided with explosion doors about every 10 feet or so? *A.* That is so.
22918. *Q.* When an explosion occurred, according to your theory, it would go right forward and refuse to relieve itself at the explosion doors? *A.* Oh no. I did not say "explosion doors"; I did not speak of an explosion at the time. I spoke of a volume of air—I think it is 54,000 cubic feet, or something like that—that is almost in one ball; and it is forced through this narrow place.
22919. *Q.* But what is the difference whether it is a force created by the explosion of gas, or an immense force created by a fall—the velocity of the gas and the velocity of the air are just the same? *A.* No, it cannot be. An explosion occurs in this way: the flame gathers itself all round in a ball, and it has equal force all round, I have no doubt—an explosion; but a column of air driven in one direction has not got equal force all round. You may as well say, if this column of air can dissipate itself so easily as you think, that it would have a backward pressure as well as forward. It would come backwards afterwards, actually.
22920. *Mr. Ritchie.*] *Q.* Would it not come backwards afterwards? *A.* No.
22921. *Q.* Immediately after the fall took place would it not go backwards? *A.* The air?
22922. *Q.* Yes? *A.* No, certainly not.
22923. *Q.* Would not go back? *A.* No.

22924. *Q.* What would fill up the vacuum created by the fall? *A.* It would fill the vacuum, if you like; but that would not generate the force.
22925. *Q.* I was not speaking of the force; I was speaking of the air going backwards.
22926. *His Honor.*] *Q.* Do you not see that the forward force is only momentum; and the momentum varies directly as the absolute weight of the body moving forward, and the absolute weight of the air is a very small quantity? [*Witness did not answer.*]
22927. *Mr. Robertson.*] *Q.* Anyway, I understand from you, Mr. Jones, that you do not contend that this force continued undiminished to the tunnel mouth; it must have had a fresh access of energy from some force? *A.* Certainly. The volume of air would not be large enough to extend that distance; it would come back to its natural pressure again.
22928. *Mr. Wade.*] *Q.* If the air were driven out of the 4th Right, and rushed past the back heading of No. 1, do you think that would cause any suction in No. 1 travelling road, the back heading? *A.* Yes probably; I should think it would. It must have crossed a current there. There would be a small current at the time, and some few thousand cubic feet would be going up that travelling road; would they not?
22929. *Q.* Going outwards—not up? *A.* Going outwards, yes; and this force would go across that.
22930. *Q.* Leaving the question of vacuum on one side—with regard to the front heading at present, supposing there was air driven out under compression, and it went inbye towards the 4th Left, do you think that Morrison's light would have been able to live until the mixture of gas got to it? *A.* No. I cannot see how it could, possibly.
22931. *Q.* But supposing there was a body of ignitable gas stretching from the 4th Left to the 4th Right, and that it lit without an actual explosion, would you expect to find any signs or indications of flame or heat in that passage afterwards? *A.* I should say yes, and very strong indications should be shown there.
22932. *Q.* And if this blast, or rush of air that came out of the 4th Right, stirred up coal-dust and drove it along to the 4th Left with the mixture of gas, and the ignition took place at the 4th Left, would you expect more signs of force and energy? *A.* I should think you would, with coal-dust and gas. It would have made considerably more damage than you could see there.
22933. *Q.* And, supposing there was no actual explosion, would you expect to find a big indication of flame; supposing the force was not sufficient to cause an actual explosion—say something less than 8 or 9 per cent.—then, if you got a light of the gas, and the air was full of coal-dust, would you expect a big indication of flame? *A.* Oh, naturally you would, the same as other cases; it may be milder, having less gas in it.
22934. *Q.* Supposing this flame came back to the 4th Right junction with the main road, and that a real explosion took place there, some travelling inbye and some travelling outbye? *A.* It would show different indications from those shown there.
22935. *Q.* What would you expect to find? *A.* There would be surely some indication of heat and flame; and more damage at the seat of the explosion. There is practically no damage done there at all.
23936. *Mr. Ritchie.*] *Q.* I do not quite understand that; you say there was practically no damage at the seat of the explosion? *A.* Mr. Wade assumed an explosion at the 4th Right.
22937. *Mr. Wade.*] *Q.* I said outbye of the 4th Right. I said, supposing the 4th Right became the centre of a substantial explosion, would you expect to find indications of that on the outbye side. You said you expected to find much more damage? *A.* Oh, very much more in the close vicinity of the seat of the explosion, I think.
22938. *Q.* Would you expect anything else? *A.* I would expect to have indications of heat and flame.
22939. *Q.* Do you remember a heap of coal just by the 3rd Left? *A.* Yes, that is one of the things I could not get anybody to explain—how it came there.
22940. *Q.* Did you see any sign of that coal being distilled? *A.* No; I did not see any indication of heat down there at all. Those pieces of brattice cloth—we found two or three pieces close by—there was not the slightest indication of heat amongst them.
22941. *Q.* Going farther out from the 4th Right towards the tunnel mouth, did you travel all that road? *A.* The No. 1?
22942. *Q.* Yes? *A.* No. I do not think I travelled the main tunnel out all the way.
22943. *Q.* How far did you go? *A.* I went up beyond the overcast on the No. 1 main road. I went beyond that a few chains.
22944. *Q.* A few chains beyond that? *A.* Yes.
22945. *Q.* That is farther outbye? *A.* Yes, farther outbye.
22946. *Q.* Do you remember noticing the beams or bars? *A.* Yes. There were three or four right at the overcast.
22947. *Q.* Bent outwards? *A.* Yes, bent outwards.
22948. *Q.* Did you see any signs of coked dust deposited on them on either side? *A.* No; there were particles of fine dust on some of them; but not the slightest bit of indication of heat. It was quite soft and floury.
22949. *Q.* Coming back to this question of a vacuum in the 4th Right; supposing this roof in the 4th Right fell heavily, would that tend to fill up more space than it had been in before? *A.* I do not understand you.
22950. *Q.* Does the roof, after it has fallen, occupy a bigger space on the floor than it did in the roof? *A.* Yes, naturally. The more compact it fell the less space it would occupy.
22951. *Q.* Suppose it did fall heavily, and filled up close to the edge of the goaf, would that have any contrary effect to the tendency of the vacuum. *A.* I do not think so, if I understand the question aright.
22952. *Q.* Would the air have the same chance of getting in to fill this place up? *A.* Oh, no. I think the opening was practically choked up when I saw it.
22953. *Mr. Bruce Smith.*] You are speaking of the 4th Right? *A.* Yes.
22954. *Mr. Wade.*] Did you notice any timber or props on the 4th Right road? *A.* Yes, there were a good many props there. I think they must have carried a lot of the props out—you know they do, generally, when they are abandoning places. I think they must have carried them out from the 4th Right, and put them into this narrow place, and left them there. Some of them were knocked about in different directions; and some of them were covered with debris which had come out from the 4th Right; but none of them were burnt.
22955. *His Honor.*] *Q.* It did not appear to you that they had been blown out of the 4th Right? *A.* No. In addition to my observation of the place, my practical knowledge of mines would tell me that they put them there in a heap. I have not the slightest doubt but that is what occurred. 22956.

22956. *Q.* They were taken out and put there to save them? *A.* To save them, of course, in case of a fall. They would stack them up in a heap tidy on one side of the road; and the force of the fall would disturb them. There were some leaning this way and some leaning that way (*indicating*); and the feet of some of them were buried in debris, a foot or 18 inches of dirt; and there was water lying in that place.

22957. *Mr. Wade.*] *Q.* Did you see anything there that you would say was an indication of force going inbye? *A.* Certainly not. I cannot say that I saw any indication of an inbye force.

22958. *Mr. Robertson.*] Did not you see any props in the 4th Right with their bottom halves in the slack, and their heads leaning inbye? *A.* I saw them almost in all directions; but I would not take that as any indication of where the force went to. I would not depend on those props on any account as indicating the direction of force.

22959. *Q.* Did not you see four or five slanting, with their heads knocked away from the roof, and their bottom halves in slack—if you did, would not you consider that an indication of the direction of the force? *A.* You do not say there were props supporting the roof there?

22960. *Q.* Supposing you saw some props with their bottom halves in slack, and their heads leaning inwards, would not you say that was an indication of force? *A.* Certainly not.

22961. *Q.* Why not? *A.* It may be an indication of force; but certainly not an indication of the direction of the force. A very mild force would blow them like that; but if it were a heavy force it would blow them all to pieces.

22962. *Q.* If the bottom half were buried in slack originally? *A.* There could not be slack there when that was a wheeling road.

22963. *Q.* On the side of the road? *A.* There was no slack there; and there were no props supporting the roof there.

22964. *Q.* If you did not see slack there, you did not see all that ought to be seen? *A.* I saw slack, from a foot to 18 inches deep. I went up nearly to my knees in mud and slush.

22965. *Q.* On the right-hand side as you go up, there was a heap of slack that had been thrown there; and props that had been there supporting the roof. The slack was thrown all round about the props? *A.* If you think that that would be an indication of the pressure or the force, or the direction of the force, then it would be a very poor force that would come out.

22966. *Q.* Why? *A.* You could knock a prop down with your finger almost; and what force would it require to do that, I would like to know? If you took the prop as an indication of force, then there would be no force at all, because you could knock a prop down with your finger.

22967. *Q.* Do you think you could knock down with your finger a prop buried half way up in slack? Do not you know that the timber drawers have great difficulty in drawing those props? If you saw three props buried half-way up in slack with their heads leaning inbye, would not that be an indication of the direction of the force? *A.* No, I do not think so.

22968. *Q.* Did you see a chock up there near the edge of the fall? *A.* I cannot say that I saw a chock. I have heard some people speak of it; but I never saw it.

22969. *Q.* Did you see a large stone about 6 feet long about 5 yards in from the back heading? *A.* There was one right at the mouth.

22970. *Q.* About 5 yards in, or 6 yards? *A.* I do not remember that. There was one right at the mouth, a big slab.

22971. *Q.* When were you there? *A.* I was there the same day as you were there.

22972. *Q.* And did I not point out those things to you? *A.* I do not remember. I do not think I was with you there on the same day.

22973. *Q.* You said you were with me? *A.* No; but I was there the same day. I saw you in the mine; but I do not think we went together.

22974. *Q.* You were not with me in the 4th Right? *A.* No; I do not remember it.

22975. *Mr. Ritchie.*] *Q.* You do not mean to say, Mr. Jones, that you can usually knock props out with your hand? *A.* No; I am simply referring to the props as standing in slack without being held fast at the roof. If a prop is standing as Mr. Robertson says it is, then very little force would knock that down.

22976. *Q.* I think Mr. Robertson meant that they were supporting the roof.

22977. *Mr. Robertson.*] They had been supporting the roof: they were put in to support the roof? *A.* This is my idea: if a prop stood there and had been wedged in with a lid, as is the usual custom, it would take a little force to knock that down; and that force would knock the prop clean down: it would not leave it standing up.

22978. *Q.* That would be so, if it had been left without anything round about it to hold it up; but if it was supported half-way up by slack, would not you expect it to remain in its place? *A.* You are presupposing that the slack was there before the force came?

22979. *Q.* I am not presupposing anything: I am telling you what was there? *A.* You are presupposing that the slack was there round the prop before the force came?

22980. *Q.* Yes, of course? *A.* But you do not say that slack is put round props that way on a wheeling road?

22981. *Q.* It was on the side, in off the road? *A.* I cannot understand it at all. What would they want a prop in a place like that for, against the rib?

22982. *Q.* I am not saying it was against the rib? *A.* If it was not against the rib, the slack would be on the road in a 10-foot place.

22983. *Mr. Ritchie.*] *Q.* Surely, in your own practice, you have seen thousands of props in 10-foot places? *A.* Yes; but you do not follow me. If that prop was of any value, it would not be on the rib side.

22984. *Q.* I do not think it was said that it was on the rib side? *A.* If it was not on the rib side, how could the slack be around it; because, in a 10-foot place, it would be on the rails.

22985. *Q.* In a 10-foot place the props would be placed probably 18 inches from the rail, in order to allow the skips to pass; and if there were sufficient slack made to have to cast it aside, they would have to cast the slack around the prop? *A.* I would like you to show me how you could put 2 feet or 3 feet of slack around the prop without its going on the road in an 18-inch place.

22986. *Q.* Have not you seen slack built up almost to the roof? *A.* Certainly I have.

22987. *Q.* You know it does not take very much to hold it up for some considerable distance?

22988. *Q. Mr. Robertson.*] *Q.* Did you observe a chock on the right hand side? *A.* I do not remember that.

22989. *Q.* And was not there a space between that chock and the rib side? *A.* You may have been in there after I was in there. When we went in there, we could scarcely hold the light down at all. I went up to the fall as much as ever I could with the light; but there was so much black-damp that as soon as we got the light near the floor it went out.
22990. *Q.* You are not in a position to contradict what I say? *A.* No; but if the props were that way, the force would knock them down, if it was a great force.
22991. *Q.* Never mind the nature of the force,—would not these props indicate something? *A.* It would indicate the way they would fall, anyhow. I am simply giving you my opinion as fairly as I can. Looking at it from a practical point of view of what I would do, I would put this heap of props there—— [*Interrupted*].
22992. *Q.* I am not referring to the heap of props at all—I am referring to the props that were put up there to support the roof, and that had been surrounded with slack.
22993. *Mr. Ritchie.*] *Q.* I suppose you have in your practice seen props very close to the rib side? *A.* Oh, yes, especially where there is a cap over, or a bar. Then the props are on the rib side.
22994. *Mr. Wade.*] *Q.* Were there other props in this 4th Right—other props standing supporting the roof? *A.* No; I do not remember seeing props standing supporting the roof anywhere.
22995. *Mr. Robertson.*] *Q.* You could not get in for black-damp? *A.* I could not examine it down to the floor anywhere. I had to keep my light up to get in to the fall.
22996. *Mr. Wade.*] *Q.* You say that, if the force went on undiminished to the tunnel mouth, you think there must have been some other element? *A.* Yes, I think there would be another element coming in afterwards.
22997. *Mr. Bruce Smith.*] *Q.* You mean there was another element causing this disaster besides the force of the air?
22998. *Mr. Wade.*] *Q.* You mean another element besides the air? *A.* Yes.
22999. *Q.* Can you see any way of accounting for that? *A.* I really cannot explain it to my own satisfaction; but I think that the coal-dust that was raised would be pretty well heated with the compressed air coming out of the 4th Right; and, by some means, either by the force [friction?] of the rails, or the skip wheels, or something of that kind, striking fire, it would be ignited.
23000. *Mr. Ritchie.*] *Q.* Ignite what, the gas or the coal-dust? *A.* Ignite the heated gases, or coal-dust. It might be an electric spark. There are some wires there; and, though I do not think the voltage was very great, possibly they would get mixed up together and cause a short-circuit.
23001. *Mr. Robertson.*] *Q.* What would cause the heated coal-dust? *A.* The compressed air. There is no doubt the initial temperature would be pretty high there. There is no doubt it would be nearly 100 degrees Fahrenheit.
23002. *Q.* How could it be above the temperature of the strata? *A.* Oh, it is, I can assure you—— [*Interrupted*].
23003.] *Q.* If there were no men working there, how could it be above the temperature of the strata? *A.* I could show it to you many degrees above the temperature of the strata in South Bulli. Water was lying on the floor—I could not explain it; but it certainly raised the temperature some degrees above the temperature of the mine; and the same thing applies there—in Mount Kembla 35-acre goaf; wherever carbonic acid gas is, there seems to be a rise in the temperature.
23004. *Mr. Wade.*] *Q.* Were there any men working in the places you speak of in South Bulli? *A.* No; it was filled up with black-damp.
23005. *Q.* Do you know whether coal-dust would undergo distillation at a point lower than the igniting point? *A.* I saw some author the other day—I forget who it is now—who stated that coal-dust distilled at about 200 degrees temperature, and the ignition-point is 290 degrees, I think.
23006. *Q.* The ignition-point is 291 degrees? *A.* Yes, 291 degrees. It is in one of the reports of one of the Inspectors at Home.
23007. *Q.* So, if you had a temperature of 200 degrees, you might get gas given off? *A.* Yes.
23008. *Q. Mr. Robertson.*] *Q.* Could you get that authority? *A.* I will produce the paper for you. It is in the *Colliery Guardian*. It is in the evidence of one of the Inspectors before the Commission on Coal-dust.
23009. *Mr. Bruce Smith.*] *Q.* How long ago? *A.* I think it was in 1890 or 1891.
23010. *Q.* Do you mean the Commission of which Mr. Chamberlain was chairman? *A.* I do not know.
23011. *Q.* Do you mean a Colonial Commission? *A.* No, the English one. I think it was Mr. Stokes who was giving evidence as to the experiments they had made in the explosion of coal-dust. Perhaps it was Mr. Hall. At all events I will produce the paper. It is in the *Colliery Guardian*, if that will do you?
23012. *Mr. Robertson.*] *Q.* Yes, it will be very interesting? *A.* I have got a note here. This is it—"Coal-dust begins to distil at temperature of 200 degrees; see Inspector Stokes' evidence on Royal Commission on Colliery Explosions, *Colliery Guardian*, March 25th, 1892."
23013. *Mr. Wade.*] *Q.* Have you heard of any case of a fall of roof when a mine was absolutely empty, and sparks being struck by the concussion of the roof with the floor, and igniting gas? *A.* There was one case that I saw an account of, where an explosion took place with nobody in the mine; but I really do not remember it now. There was another case that I saw the other day, where an electric spark caused an explosion which killed nine men in the shaft, simply by one of the men putting an iron shovel so that it touched the two wires and formed a short-circuit.
23014. *Q.* Can you show me whether it is possible or likely, if the sandstone grit were hurled out against these iron bars on the main road, there would or would not be a spark or sparks? *A.* I should say there would surely be a spark. I have seen sparks often from picks striking sandstone.
23015. *Mr. Robertson.*] *Q.* Do you think those sparks ingnited the coal-dust? *A.* I could not say. I am rather in favour of the idea of the skip wheels striking something.
23016. *Mr. Wade.*] *Q.* If this gas was distilled, and if this spark was struck in that way, do you think the spark would ignite the gas? *A.* I think a good spark would ignite distilled gases; either an electric spark or those sparks struck by steel wheels.
23017. *Mr. Robertson.*] *Q.* Do you think they would ignite coal-dust? *A.* Not at an ordinary temperature; it might ignite distilled coal-dust [gas distilled from coal-dust?] at 200 degrees temperature.
23018. *Mr. Wade.*] *Q.* I want to ask you some questions about your own mine, Mount Keira. There was some complaint made by Wynn with regard to the check-inspectors' reports? *A.* Yes. 23019.

23019. *Q.* In connection with Mount Keira? *A.* Yes. I was ordered to produce the book and the reports. Mr. Garlick wrote me a letter about it, asking me to produce this book. If I recollect aright, Mr. Wynn was check-inspector for a couple of years, and he said, in his evidence at Wollongong, that he had reported something dangerous in Keira Mine, and that report was not sent forward to the Inspector according to Act of Parliament. Of course I was not at Keira at the time myself.
23020. *Q.* But that is the official book? *A.* Yes, this is the actual report made by Wynn himself in his own handwriting. [*The book was handed to Mr. Wade.*]
23021. *Witness.*] I have been reading this report; and I can see nothing that should be reported to the Inspector.
23022. [The Report Book was then put in and marked Exhibit No. 47.]
23023. [Mr. Wade read the two reports.]
23024. *Mr. Wade.*] *Q.* Is there anything in this second report? *A.* I do not think so. There was nothing, at all events, to warrant sending a report to the Inspector.
23025. *Q.* In the second report they say, "We wish to call attention to General Rule 15 of the Coal Mines Act, which provides for two entrances to all engine-houses." Then there is a note by you, "This rule now complied with." That has been complied with since you went there? *A.* Yes.
23026. *Q.* And that is the last report? *A.* That is the last.
23027. *Q.* In this first report of the 5th and 6th June, 1900, they speak about the working places being driven in excess of the distance for cut-throughs. Was there any regular distance fixed by Act of Parliament, or special rule in 1900? *A.* No, there was no regular distance.
23028. *Q.* Was there any Regulation or law at that time to compel you to put in cut-throughs at certain distances? *A.* No.
23029. *Q.* Do you know anything about this suggestion that the smoke of gunpowder after a hanging shot can be lit? *A.* I think it is a very common occurrence.
23030. *Q.* What do you attribute it to? *A.* Well, the resulting gases from the explosives—there is no doubt about that. I have papers here to show.
23031. *Q.* Resulting gases from the explosion of what? *A.* Of gunpowder, explosive powder. I have seen it in many instances myself; and it occurs nearly daily in the mines in the Illawarra District. If a man goes in immediately after a shot, if that shot has not scattered the coal away, you can ignite the heated gases in the crevices.
23032. *Q.* Where the coal is hanging still? *A.* Yes; and you would see a big crevice like that (*indicating*) going right across, down to where the shot hole was. And if you go in with a naked light before the heated gases have cooled you will ignite it there.
23033. *Q.* Have you any instances of explosions traced to that? *A.* Yes; I have an instance of an explosion here traced to that exactly, explaining the whole thing. It was in Iowa; where there was a Commission appointed to inquire into the disaster.
23034. *Q.* Have you the report of the accident there, first of all? *A.* Yes; I have the report of the accident here, and the sketch, and all. [*Witness handed a book to Mr. Wade.*]
23035. *Q.* That is in a publication called "Mines and Minerals." Is that a recognised scientific publication? *A.* Yes; the best published in the world now, I think.
23036. *Mr. Wade* (*reading*).] "In accordance with a resolution passed by the Legislature, Governor Cummins, of Iowa, has appointed the following Commission to investigate the causes of explosions in Iowa coal-mines."
23037. *Mr. Ritchie.*] What is the date of that?
23038. *Mr. Wade.*] March, 1902. The explosion was in the Lost Creek Mine, Iowa. And in this publication there is a statement that there is no gas in the Iowa coal-field. The statement of the case is this, page 364:

> Mine Inspector Verner has very kindly sent us a sketch, which we reproduce, showing the position of the drill-hole in which the shot was located that caused the catastrophe. The sketch also shows the relative position of this hole with respect to another 2-foot hole previously drilled. The positions of these holes are such that the end of the 2-foot hole was only 7½ inches from the hole fired. Mr. Verner says that the shot causing the explosion (5-foot hole) had been charged the second time, and states that it is his present opinion that the old 2-foot hole was the means of allowing the force of the exploded powder and gases to be thrown out upon the air of the mine workings with their vigour almost unimpaired.

23039. *Mr. Robertson.*] I do not see anything there about the gas. It was a blown-out shot, as far as I can understand.
23040. *Mr. Wade.*] I am coming to it directly.

> Mr. Verner draws attention, as he has often done before, to the fact that holes fired the second time always contain a factor or element of uncertainty, and are dangerous. The reason for this is that the first shot may very possibly have crevieed or fissured the coal. In any event the first shot would, as we say, "spring" the hole, or increase its diameter in the region of the charge. The springing of the hole in blasting coal may prove a serious element of danger, even if no fissure or crevice is produced in the coal. A considerable amount of fine dust, or powdered coal, will be produced in the hole by the first shot. This may remain in the hole when the second shot is fired; but the enlarged diameter of the hole is apt, in many cases, to lead to an overcharging of the hole in the second firing. Mr. Verner draws attention to the fact that the gases, carbon monoxide (CO), and to some extent sulphuretted hydrogen (H_2S), produced in the firing of the first charge, may be driven by the force of the explosion into the fissures and cracks of the coal at the back of the hole, and there remain until expelled by the firing of the second charge, thereby increasing the danger of the second shot.

Now, that is the statement of the case; and the Commission give a specific report upon it. In the April number of the same publication, "Mines and Minerals," there is an extract from the report of the Commission, on page 397:

> The Commission's conclusions regarding the so-called dust explosions in Iowa and elsewhere are briefly as follows:—The explosion of blasting powder produces, not only a great amount of flame, but of the gases resulting from such explosion about 49 per cent. are combustible and explosive; hence there is danger in allowing these gases to escape into an atmosphere which is heavily charged with dust.
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> The report states that fully 70 per cent. of the disastrous and extensive explosions in Iowa mines have been caused by shots charged and fired the second time, or by shots whose explosive force was thrown into the mine air in their immediate vicinity through the remaining parts of an old hole which had failed to do effective work. The reason for this is stated to be that the gases generated by the first explosion not only remain in the hole, but they penetrate the crevices and cracks in the surrounding hole, and then, when the second charge is fired, these gases act first to increase the force of the second explosion, while they also serve as a buffer from which the gases of the second explosion rebound, causing them to be projected outward more violently.

23041. *Mr. Bruce Smith.*] *Q.* What date is that? *A.* April, 1902.

23042. *Mr. Wade.*] There is a diagram here, if the Commission care to see it, showing the locality of those two shots.
23043. [The journal was then handed to the Commission. The two articles referred to, respecting the explosion at the Lost Creek Mine, Iowa, on the 24th of January, 1902, are copied in the Appendix as Exhibits Nos. 48 and 49].
23044. *Mr. Ritchie.*] *Q.* Was this first shot exploded? *A.* Yes; but it did not do its work.
23045. *Mr. Wade.*] It forced the gas into the fissures. That is how he puts it.
23046. *Mr. Bruce Smith.*] Your Honor will remember that Mr. Jubb, Mr. Jones' under-manager, gave evidence on this very question from Pamely's Text-book.
23047. *Mr. Robertson.*] *Q.* Did you ever have any experience of the same nature in Wales, or in your previous experience? *A.* Yes, I have. I have seen occurrences similar to that; that is, the ignition of powder fumes by a naked light, in the old country and out here; and I think I would be able to demonstrate it in a bed of clay, if you like, where there is no possible means of allowing any fire-damp in.
23048. *Q.* It is so very extraordinary, it seems to me, that people with great experience in the old country have never heard of it at all? *A.* No; but it is a very common thing amongst the miners here, anyhow. Plenty will tell you of it.
23049. *Q.* But you would think, if it is a daily occurrence here, that it must have been very well known to every mining man in the old country, where gunpowder was used so extensively in all mines? *A.* A good deal would depend upon the circumstances, the nature of the coal, and the way they prepared the shots. They prepare them better at home than here, there is no doubt about it; and, if the shot has once blown the coal down, of course you could not ignite the gas. It is only when the shot has failed to knock the coal down, and there is this accumulated heated gas in the fissures. It must be heated, or it would not ignite. It must be heated vapour.
23950. *Q.* If this is so, it is another nail in the coffin of gunpowder? *A.* It is, undoubtedly.
23051. *Mr. Wade.*] *Q.* Or else the miners must keep away from the face after a blown-out shot? *A.* Yes; but, even if you keep away from the face, the gas is still in the mine.
23052. *Q.* Some suggestion has been made that people never heard of gas in Keira, but that it was easily enough found after the Kembla disaster? *A.* Yes.
23053. *Q.* What is your experience of that yourself? *A.* I never saw gas there, only in one place, as a matter of fact; but they have discovered a little by the hydrogen lamp, the Inspectors have; and on one or two occasions, I believe, the deputies reported that they could detect something like gas in the lamps; but not exploding in the lamps, or anything like that.
23054. *Mr. Robertson.*] *Q.* But did not I understand you to say that you had detected it every day? *A.* No; that is the ignition of the powder fumes that happened every day, not the fire damp. The men say they find it.
23055. *Q.* I thought you said you had found it! *A.* No; I only saw it in Keira once myself, only in one place.
23056. *Mr. Bruce Smith.*] *Q.* And that is since the Kembla disaster? *A.* Yes.
23057. *Mr. Wade.*] *Q.* And under what circumstances was that? *A.* It was in the face of one of the headings, going up a very steep rise, about 1 in 6, I think.
23058. *Q.* Is that where Mr. Watson found it? *A.* Yes, that is the same place.
23059. *Q.* Have you tried there since? *A.* Yes; I have not found it since, though.
23060. *Mr. Bruce Smith.*] You said "with a hydrogen lamp"? *A.* I think Mr. Watson found it.—[*Interrupted.*]
23061. *Q.* Did you find it? *A.* Not with an ordinary hydrogen lamp. Mr. Watson, I think, the Inspector, found a trace of gas with the hydrogen lamp in one place.
23062. *Mr. Wade.*] I think, Mr. Robertson, that you said that it was an extraordinary thing that men of experience had not heard of the lighting of powder smoke. I have got a recollection, but I am not quite clear about it, that this question cropped up before the English Royal Commission in 1879.
23063. *Mr. Robertson.*] I put it to Mr. Atkinson, as to whether he had ever heard of this question having been raised at any Royal Commission; and he said it was entirely unknown to him.
23064 *Mr. Wade.*] I do not say that I am correct; but I have an impression that I have seen it in one of the text-books. I will see if I can find it.
23065. *Q.* Were you with anybody else, with any of the Inspectors, on the recent occasions when you have looked for gas in this heading in Keira? *A.* Yes, I was with the Chief Inspector and Inspector Watson. They went right through the mine with the hydrogen lamp, and could not find a trace anywhere.
23066. *Q.* It has been said that the air at Mount Keira is frequently reversed, with the wind blowing from the west? *A.* That is an erroneous idea altogether.
23067. *Q.* And it is put in this way, that the effect is to drive the return air on to the men working at the faces? *A.* I would like to have a bit of paper and make a sketch.
23068. (The witness then drew a rough sketch on a piece of paper, showing the main ventilation of Mount Keira Mine. The sketch was put in, and marked Exhibit No. 50).
23069. *Mr. Wade.*] *Q.* Just explain that sketch to the Commission? *A.* The main tunnel is that long one right opposite the edge of the paper, nearly; and the next one this side is what we call MacGoldrick's tunnel. That is an intake; and these others on this side are intakes; and the workings are at the foot of the paper, as it were. There is a furnace there. When a strong south-west wind is blowing into MacGoldrick's tunnel, it blows the air in there, and actually takes it out to the main tunnel; whereas, similar winds blowing into the other two tunnels would supply the workings with air. So that the evil is simply a circuit made by these strong south-westerly winds.
23070. *Mr. Robertson.*] *Q.* As a matter of fact the mine is not dependent on the main tunnel for its ventilation? *A.* No.
23071. *Mr. Wade.*] *Q.* And the wind never comes near the face? *A.* Not at all.
23072. *Mr. Robertson.*] *Q.* And the men coming out would meet the air? *A.* Yes, they would naturally.
23073. *His Honor.*] *Q.* The main tunnel, where the wind ought to be blowing in, the wind blows out of? *A.* Yes. It has not happened since I have been there. It does not happen often.
23074. *Q.* But what is blowing out is particularly good air? *A.* Yes.
23075. *Mr. Wade.*] *Q.* What is the extreme length of that part? *A.* Half-a-mile.

23076. *Q.* And how far are the working places away? *A.* They are a mile beyond the junction of those two roads.
23077. *Q.* And under what circumstances does that happen? *A.* When there is a strong stormy south-west gale. I think sometimes a very strong westerly might possibly affect it; but it does not really affect the ventilation of the mine. As a rule, the ventilation of the mine is better on those days than on any others.
23078. *Mr. Robertson.*] *Q.* What is the depth of your colliery shaft? *A.* About 350 feet. One of the witnesses actually said I think that the furnace was reversed. That is absurd. It would burn all the coal round it, and kill all the men if it reversed.
23079. *Q.* Such a thing is not absolutely unknown? *A.* Oh, no, I do not say it is unknown; but it is certainly a very dangerous thing to happen.
23080. *Q.* But, with a furnace shaft 350 feet deep, it ought to be fairly independent of atmospheric conditions? *A.* So it is, I think.
13081. *Q.* I was under the impression that it was a short shaft? *A.* Oh, no, it is 350 feet.

Cross-examination by Mr. Lysaght:—

23082. *Q.* The air, I take it, then, is good at Kembla? *A.* At Keira you mean?
23083. *Q.* Yes. *A.* Yes; it is better now than ever it has been, at all events.
23084. *Q.* Then what are you getting up the fan for? *A.* To employ more men, certainly.
23085. *Q.* To improve the ventilation? *A.* To employ more men.
23086. *Q.* You are putting up the fan primarily to improve the ventilation? *A.* No, to have greater ventilation.
23087. *Q.* When were you in Kembla before the disaster? *A.* I really do not know; probably three or four months. I do not know exactly the time.
23088. *Q.* Can you remember being there in 1902 at all, before the disaster? *A.* I think the last time prior to the disaster was that Brownlee case, when I was up here. I am not sure.
23089. *Q.* The inspection you made when Brownlee was hurt was the last occasion? *A.* Not when he was hurt.
23090. *Q.* The inspection you made shortly after he was hurt was the last occasion before the disaster? *A.* It was a week or two prior to your coming up here on the case, whenever that was; and that is not long ago.
23091. *Q.* Did you make any notes of your inspections on the 4th and 27th August? *A.* Yes, I have got them here in some book, just rough notes.
23092. *Q.* Was it on the 4th of August that Mr. Vickery, junior, was with you? *A.* No.
23093. *Q.* Was it on the 27th of August? *A.* No.
23094. *Q.* When? *A.* I really could not tell you: it was between the two dates, I think.
23095. *Q.* Was not that an inspection also, on the day he was with you? *A.* I do not say that it was an inspection; we did not make any notes, anyhow.
23096. *Q.* Do you say that between the 4th and the 27th of August you were in with Mr. Vickery, junior? *A.* I believe it was between those two dates.
23097. *Q.* As a matter of fact, did not you try the 4th Right pillars for gas? *A.* Well, of course, we might try. We did not go there for an inspection. It was not with a view to making notes.
23098. *Q.* On the occasion that you were in with Mr. Vickery, did not you try for fire damp at the edge of the 4th Right pillar? *A.* We went in there, I know.
23099. *Q.* Did not you try for fire-damp? *A.* We went up on the top of the fall; and I believe we did.
23100. *Q.* And did not you then tell Mr. Vickery that your theory was that there was an accumulation of fire-damp in that goaf? *A.* Not at all, certainly not; I never said such a thing.
23101. *Q.* I will give you the route you went. You went in this daylight heading. *A.* Yes.
13102. *Q.* Up the cross-cut heading? *A.* Yes.
23103. *Q.* Along the 5th Right? *A.* Right.
23104. *Q.* And down the travelling road? *A.* I do not know. I think we went up the other way first.
23105. *Q.* Very well, along the 5th Right to the back heading, up to the face of the back heading, and down the travelling road into the 4th Right? *A.* Yes.
23106. *Q.* That is your route, is it not? *A.* Something like that.
23107. *Mr. Wade.*] Tell him who dogged his footsteps?
23108. *Mr. Lysaght.*] Never mind who dogged his footsteps.
23109. *Witness.*] You must have dogged them, to know it.
23110. *Mr. Lysaght.*] *Q.* Will you swear that you did not tell Mr. Vickery that there had been an explosion of fire damp? *A.* No, I did not.
23111. *Q.* Do you remember mentioning fire-damp to Mr. Vickery? *A.* Quite probably.
23112. *Q.* Do you remember mentioning that there had been an explosion of fire-damp? *A.* I do not know; I simply discussed several theories. Of course I made no notes. We discussed several theories that were submitted about that time.
23113. *Q.* Was the explosion of fire-damp one amongst the theories you discussed? *A.* I think so. I think that was the theory put forward by some of the people; by Mr. Atkinson, I think.
23114. *Q.* Mr. Atkinson was not with you then? *A.* No; but I am speaking of all the theories spoken of at that time, trying to explain to Mr. Vickery what this one thought and what that one thought.
23115. *Q.* Did not you say to Mr. Vickery that there must have been an explosion of fire-damp? *A.* Yes.
23116. *Q.* Do not you tell the Commission now that there was an explosion of fire-damp in Kembla? *A.* I have not the slightest doubt that there was fire-damp in Kembla. I am quite willing to admit that there was a little gas in Kembla; but it was the fall that was the primary cause of the disaster, no doubt. That is what my contention is.
23117. *Mr. Robertson.*] *Q.* I think you said you were willing to admit that there had been an explosion of fire-damp? *A.* Let me explain before Mr. Lysaght mixes me up. My contention is this: That the big fall created a kind of vacuum in No. 1, around that part somewhere; and gas would exude from the coal through want of the natural atmospheric pressure—just a little gas would exude momentarily. And I believe none of the men were killed at that time; but, probably, their lights might have gone out, and they would strike a match, and would ignite this explosive mixture. That is the only explanation I can give for the indications of fire up in the No. 1 section. 23118.

23118. *Q.* That is to say, the atmospheric pressure being relieved from the coal, the gas would come out? *A.* Yes, in small quantities.
23119. *Q.* It must have been only momentarily? *A.* Yes.
23120. *Q.* And then, at the psychological moment, somebody would strike a light? *A.* Yes; but the lights may not have gone out.
23121. *Mr. Lysaght.*] *Q.* I want to keep off psychological moments. Is it your theory that there was an explosion of fire-damp causing the Kembla disaster? *A.* No, not causing it; it was as the result of it.
23122. *Q.* Is your theory that fire-damp was a factor in the initiation of the disaster? *A.* No.
23123. *His Honor.*] *Q.* I understand you to suggest that there was, probably, actually a second explosion? *A.* Well, you would not call the first an explosion, Your Honor.
23124. *Q.* I mean that there was an explosion after the big outburst from the goaf? *A.* Yes, nobody could go beyond that fact, that there was an indication of a fire-damp explosion in the No. 1 section; but it was to a very small extent. Some people would say the damage was very considerable; but I am sure I have seen ten times more damage done by a rope breaking, or skips breaking away.
23125. *Mr. Robertson.*] *Q.* Ten times more damage? *A.* Yes. I mean in the No. 1 section, in the faces past the 4th Left. There is no damage done there. There was not a fall inbye of the 4th Left; and only a few skips tumbled about.
23126. *Mr. Ritchie.*] *Q.* I understand you to say that the initial cause was a fall? *A.* Yes.
23127. *Q.* But that probably through that fall there was no one killed whatever? *A.* On the main tunnel there would be.
23128. *Q.* You think there would be on the main tunnel? *A.* All those on the main tunnel would be killed, of course.
23129. *Q.* I understood you to say that probably from the initial cause of the disaster there would be nobody killed? *A.* No.
23130. *Q.* But the subsequent explosion, which you now speak of as gas, has really been the cause? *A.* That would kill the men inbye—I mean in the shaft section—from the after-damp.
23131. *Q.* That explosion of gas would kill the men inbye; and the fall, or the result of the fall, would kill the men outbye? *A.* There is no doubt about it.
23132. *His Honor.*] *Q.* Then, according to your theory, what was the cause of the great exhibition of force inbye from somewhere about the junction of the 4th Right with the No. 1 main heading? *A.* The force was only comparatively small, Your Honor, in a mine. And you must also consider this fact: when that great force of air was going outbye, it had some effect on the skips which were attached to the ropes; and the skips inbye were attached to the same ropes, and the action of the force going outbye would show on the skips inbye. They were all attached.
23133. *Q.* Then you do not attach any importance to the fact that there was really a great exhibition of force inbye from a point near the 4th Right? *A.* The only exhibition of force I could see was a few skips knocked about, and that would be explained either by the connection on the same rope that was attached to the skips outbye—and they were knocked about frightfully by this process—or probably, by the force passing outbye, there might be an intake afterwards, as the result of the vacuum.
23134. *Mr. Robertson.*] *Q.* The evidence of the skips inbye shows that they were driven inbye? *A.* That might be caused by the return of the air to fill the vacuum. There would be a return of air.
23135. *His Honor.*] *Q.* That return would show itself as a great force inbye from the very mouth of the tunnel; not from a point a long way up, like the 4th Right. The exhibition of force going inbye, as you say, would be from what is called a back lash: well, a back-lash would not begin at the 4th Right, surely. You cannot account for it in that way?
23136. *Mr. Bruce Smith.*] He might say what would cause the return of the force from outbye, considering it was an open tunnel.
23137 *His Honor.*] Mr. Jones has not answered my question.
23138. *Witness.*] What was that?
23139. *His Honor.*] *Q.* How on earth could a back-lash begin to operate in the tunnel from a point near the 4th Right, and operate for a short distance in a northern direction, whilst there was no sign of a back-lash—that is, a force inbye—to the southward of that point near where the 4th Right comes in? *A.* There is that 5th Right; there would be a connection round there through the travelling road. There may be a back-lash that way.
23140. *Q.* I do not see it.
23141. *Mr. Ritchie.*] *Q.* Where do you say this explosion of gas would take place? *A.* I would not like to locate the spot. I could not do that; but I should imagine it would be somewhere near Aitken's place, somewhere that way—some place near there. I forget the name of the place where I saw some indication of flame and intense heat; but that is the only place I know of that would be indicative of a slight explosion—and only a slight one at that.
23142. *Mr. Robertson.*] *Q.* I understand from you that your idea is that there was a fall causing a great blast of air that killed the men all the way out to the tunnel-mouth; and then the vacuum caused by that rush of air caused a momentary disengagement of gas from the coal? *A.* That is right.
23143. *Q.* And that, in its turn, was ignited in some way by a light or by a match? *A.* That is right.
23144. *Q.* And that caused the explosion and the after-damp from which the majority of the men were killed; is that it? *A.* That is about it. Of course, it is one of those things of which nobody can say where it occurred, nor what occurred. You can only assume the nearest approach to the evidence.
23145. *Mr. Lysaght.*] *Q.* While your mind is on that view put by Mr. Robertson, do not you know that Inspector Bates was in the travelling road outbye of the 4th Right, and escaped—he was not killed by the blast? *A.* He was not in the main-tunnel.
23146. *Q.* He was in the travelling road? *A.* There was no blast at all in the travelling road. There is no evidence of one.
23147. *Q.* Regarding the point put by His Honor, do not you know that a horse at the junction of the 5th Right was blown some distance; and the boy Hammon was blown right up against the rib by the force—the wheeler? *A.* At the 4th Right?
23148. *Q.* At the 5th Right. The horse was blown right over, and the boy Hammon was blown right up against the rib? *A.* I do not see how you could say that the horse was blown over.

23149. *Q.* The witnesses have described that; the witness Hammon has described that he was blown some distance up against the rib? *A.* I do not know. There are a lot of things that you cannot account for.
23150. *Q.* Let me leave that for the present; I want to keep you to this gas business. Did not you see signs of burning by flame in other places about Aitken's? *A.* Yes, I saw a little charred prop, I think, in No. 1 Right.
23151. *Q.* But, besides that, did you see anything else? *A.* No.
23152. *Q.* Do not you remember seeing the canvas at the top of the back heading here burnt? *A.* No; I do not think it was burnt.
23153. *Q.* Did you notice the canvas? *A.* There was a hole in it.
23154. *Q.* Do you mean to say it was not burnt? *A.* It was just like caked.
23155. *Q.* In your opinion it was not burnt? *A.* It was not burnt: it was not consumed, anyhow.
23156. *Q.* Do you know that men were burnt at the tunnel mouth? *A.* Very likely. I do not say they were not.
23157. *Q.* How do you account for the flame coming down the main tunnel? *A.* I do not say there was any flame there at all.
23158. *Q.* What burnt the men at the tunnel mouth? *A.* Heat.
23159. *Q.* Only heat? *A.* It is no use to argue that there was flame out there, unless you can show where it did its work.
23160. *Mr. Robertson.*] *Q.* What is that, please? *A.* Mr. Lysaght says that somebody was burnt out there. You can get witnesses to say anything. You would want to show evidence of it, anyhow.
23161. *Q.* But what about the bodies? *A.* I never saw any bodies there, at the tunnel mouth.
23162. *Q.* Not at the tunnel mouth? *A.* I am speaking of the tunnel mouth now. If there had been flame at the tunnel mouth, there would have been plenty of oxygen there to have ignited all the timber and everything else.
23163. *Mr. Lysaght.*] *Q.* Do you know that Dr. Wade gave evidence at Wollongong of a man at the tunnel mouth having been burnt by flame? *A.* I think he gave contradictory evidence. I think his evidence was contradictory as to that.
23164. *Q.* Listen to this (*reading from page* 24 *of the depositions taken at the Coroner's inquest*) :—

I went in as far as Mat's Flat; as we penetrated we met a number of men coming out; I do not know the men s names; I could not swear whether Hartley's hair was singed all over; to the best of my recollection some of Hartley's clothing was burnt or scorched; there was blood and coal-dust on his face; I believe his face was burnt too; that is, by a flame, as distinct from intense heat; I was the first medical man to render assistance; the first man I attended to was John Clark; that was about 3 o'clock; he was badly burnt; his head, ears, face, arms, and hands, were burnt; he is living still; the front of his chest was slightly burnt; he was suffering from shock; I did not know about carbon monoxide then; I had forgotten it at that time; but I have read it up since; I would not expect to find any signs of carbon monoxide about him, as he was outside the mine in a shed; his burns were burns from a flame.

A. Where did he come from?
23165. *Q.* From the tunnel mouth: outside the tunnel mouth. *A.* Well?
23166. *Q.* Now, can you account for Clark, outside the tunnel mouth, being burnt by flame, unless flame came out of the tunnel mouth? *A.* I cannot: I am quite sure the flame did not come out.
23167. *Q.* Do you know that witnesses saw the flame? *A.* No.
23168. *Mr. Wade.*] We have not got that evidence here.
23169. *Mr. Lysaght.*] I will get it in reply.
23170. *Witness.*] Do you mean to argue that flame comes out. —— [*Interrupted.*]
23171. *Mr. Lysaght.*] Do not argue with me: I want to save time.
23172. *Q.* Now, speaking of the air that would be forced out of the goaf, do you know that, according to a plan that we had drawn yesterday (*Exhibit* 46), there was but a very small area left to fall? *A.* I did not know.
23173. *Q.* Just look at that plan, drawn by Mr. Leitch. [*Plan was shown to witness.*]
23174. *Mr. Wade.*] He made it 1,250 square yards.
23175. *Mr. Lysaght.*] *Q.* You see that plan? *A.* Yes.
23176. *Q.* This represents the amount of coal remaining in the 4th Right pillars on the 6th of June? *A.* That is six weeks before the disaster?
23177. *Q.* Yes. *A.* Well, you can take twice as much as that out in six weeks.
23178. *Q.* We have evidence that all the coal that it was practicable to take out was taken out, and the timber was drawn, some week before the disaster? *A.* You have not got evidence to show how much coal there was not taken out: you have not got the area.
23179. *Q.* Now, you stated that those props would probably have been withdrawn from the pillars, to let the pillars fall, and the props would have been stacked in the 4th Right? *A.* Not necessarily drawn: but there might have been props lying in there ready to support the roof.
23180. *Q.* Now, Morrison has told us that the timbers were drawn at least ten days before the disaster. This 30-yard pillar adjoining the back heading would not be touched at all? *A.* No.
23181. *Q.* This 16-yard pillar was surrounded by a fall, because the bords had fallen in, according to Leitch? *A.* Yes.
23182. *Q.* All those had been worked out before Leitch had left: that is as shown on Leitch's plan: so that all the coal to be taken out was from this 16-yard pillar on each side: do you see that (*explaining the question by pointing to the plan, Exhibit No. 46*)? *A.* I do; assuming that this had fallen, you say?
23183. *Q.* Mr. Leitch said that the bords had fallen. Now, that being so, do not you see that, with these bords down, the roof down, there would only be this small aperture inside of the 4th Right for any fall to operate on, because the fall of the bords would stop any force from the fall that might come from the 16 yard pillar. *A.* Yes, on certain assumptions you put there.
23184. *Q.* Exactly, on the evidence of Leitch; now, that being so, how could there possibly have been any air forced out?
23185. *Mr. Robertson.*] I do not quite follow that.
23186. *Mr. Lysaght.*] The 8-yard bord having already fallen before these pillars were extracted, and there only being this opening down here, when this would fall, it would be falling against a place already down, against the bords; and therefore there would not be that scope for it to force anything from there.
23187. *Mr. Robertson.*] It would still have its outlet.

23188. *Mr. Lysaght.*] Only a small outlet, and only a small area to fall inside; the only portion that could fall would be this here, which would force the air, not straight out, but from each side at right angles.
23189. *Witness.*] But why could not another portion of the bord fall?
23190. *Mr. Lysaght.*] Mr. Leitch stated that the whole of the bord had fallen; that all the roof behind the 16-yard pillar had fallen heavily and was tight.
23191. *Mr. Wade.*] He did not; he said there were 20 yds. x 7 yds. that had not fallen.
23192. *Mr. Lysaght.*] Yes, I am aware of that.
23193. *Mr. Wade.*] You had better tell him that.
23194. *Mr. Lysaght.*] That had not fallen; but at this side [*pointing to the sketch, Exhibit* 46] it had fallen solidly. Now, do not you see that, having fallen solidly, any fall from the 16-yard pillar face would force the air out at right angles there, and not directly out? *A.* But it would have to go out certainly.
24195. *Q.* But it would not go out with any degree of force? *A.* Oh yes, it would.
23196. *Q.* Do you know that Mr. Leitch admitted yesterday that, in his opinion, there would not be sufficient pressure of air from the fall to even blow out the canvas stoppings between the two headings?
23197. *Mr. Wade.*] That is not correct, once again.
23198. *Mr. Ritchie.*] I think he said there would not be sufficient air to force it to any appreciable extent.
23199. *Witness.*] Then Mr. Leitch did not know what he was talking about.
23200. *Mr. Robertson.*] I do not think he said that. I think he said it would not force out the stoppings, not the canvas door.
23201. *Mr. Lysaght.*] I took Mr. Leitch to mean the stopping between the front and back headings.
23202. *Mr. Robertson.*] A door is not a stopping.
23203. *Mr. Lysaght.*] *Q.* Mr. Leitch stated that there was not sufficient force to blow out the stoppings in the 4th Right. Now, your theory is that there was not only force sufficient to blow out stoppings but also to bend the bars? *A.* Undoubtedly the force was there right enough.
23204. *Q.* Do you say that that force came from the 4th Right pressure of air? *A.* I do not know of any other place.
23205. *Q.* And then you go on to say that Mr. Leitch knows very little of what he is talking about? *A.* No. I say that, if Mr. Leitch said that in the way you put it to me, he does not know very much about what he is talking about; because I have seen stoppings a good many yards back fallen down from a shock, the concussion of a powder shot even.
23206. *Q.* Look at this plan; will you tell me, considering that this bord had fallen, and that there was only this 16 yard pillar to be taken out, where you are going to get a fall sufficient to force out air in any quantity? *A.* It does not give the lengths here or anything else.
23207. *Q.* It is measured—that is 16 yards? *A.* That is the width; when he left, there was some more to take out; there was six weeks' work.
23208. *Mr. Lysaght.*] And the roof was falling down from day to day.
23209. *Mr. Wade.*] There is not a word of evidence of that.
23210. *Mr. Lysaght.*] *Q.* That being the position on the 6th of June, and we having got evidence that all the coal that could be taken out was taken out, and the men withdrawn, and the timber drawn ten days before the disaster, and evidence that 2 feet 6 inches in height of a fall had taken place a week before the disaster, so that Morrison could not go in beyond the edge of the goaf to inspect it safely, will you tell me where your force is going to come from?
23211. *Mr. Wade.*] That is not the evidence at all. Morrison never said that he could not go beyond there because the fall was not safe. He said that, once the fall took place, there was no occasion for him to go in; it was barred off.
23212. *His Honor.*] He said it would be risky to go in, because of the chance of another fall.
23213. *Mr. Ritchie.*] He said it was possible to go in, but not safe.
23214. *Witness.*] It is possible that it would not be safe. There are 3 acres now of roof standing in Coalcliff? without a pillar of any kind.
23215. *Mr. Lysaght.*] *Q.* What have we to do with Coalcliff? I want you to keep to this for a minute. Did you know that 2 feet 6 inches had fallen a week before the disaster? *A.* No, I did not.
23216. *Q.* Does that at all affect your calculation of force? *A.* It depends upon the area: you are assuming that the whole area fell.
23217. *Mr. Robertson.*] *Q.* What area did you assume? *A.* Just a quarter of an acre.
23218. *Mr. Lysaght.*] *Q.* Where did you get that from? *A.* One of the witnesses told me.
23219. *Q.* Who? *A.* One of them said it was about a quarter of an acre.
23220. *Q.* Who? *A.* That is very near a quarter of an acre there [*pointing to the area on the sketch, Exhibit* 46].
23221. *Q.* Who told you that there was a quarter of an acre standing? *A.* I know there was somebody talking about it that way.
23222. *Q.* Do you tell me that you base your theory on what somebody told you outside? *A.* I think that what you have been showing me is just about a quarter of an acre.
23223. *Mr. Robertson.*] Yes.
23224. *Mr. Lysaght.*] *Q.* The 2½ feet fall on the edge of the goaf having been a week before the disaster, does that affect your calculation of the forces? *A.* I do not think it would.
23225. *Q.* In view of that knowledge, do you still say that? *A.* I can only say that, assuming that there was an area of a quarter of an acre of roof falling all at once, there would be a certain amount of force and a certain velocity.
23226. *Q.* Taking it that there were 2½ feet already fallen at the goaf edge? *A.* That would not necessarily alter the calculation, because there might still be 5 feet of a fall.
23227. *Q.* Then do you mean to say that, it having split like that, and fallen 2½ feet, the next fall would be one solid fall, and not split also? *A.* It might be.
23228. *Q.* So that it is essential for your theory that it should have been a solid fall of at least about 5 feet? *A.* Yes, not necessarily to do that damage; but to make that velocity that I have given.
23229. *Q.* Do not you see that that solid fall of 5 feet would shut up the edge of the goaf entirely? *A.* Of course it would; and in the meantime the air has gone out.

23230. *Q.* And do not you know that the stones at the edge of the goaf were clean after the disaster; in fact that they had not fallen until after the disaster? *A.* I do not know.
23231. *Q.* Did you look? *A.* I did not see it.
23232. *Q.* Do you mean to tell me that the stones at the edge of the goaf were not clean? *A.* They were dusty enough. If you crept over them you would get dust on your clothes; but it was not black dust.
23233. *Q.* Where did you get the statement that it fell 5 feet heavily? *A.* Taking the height of the seam as being 5 feet.
23234. *Q.* But still you did not know anything about the fall of 2½ feet? *A.* No; but that would leave a space of 2½ feet above, and would give just the same room again; so that there would still be 5 feet of space on top of that 2½ feet fall.
23235. *Q.* Where did you say the force came from that was accelerating this first force? *A.* Probably it would be coal-dust.
23236. *Q.* You mean the ignition of coal-dust? *A.* Yes; it is very hard to demonstrate it though.
23237. *Q.* You do not approve of that theory that the coal-dust was not ignited at all? *A.* Well, it would be expanded considerably, and would get to a great heat; but I do not know whether it would get to a flame or not, because there is no indication of flame.
23238. *Q.* Do you know Mr. Seller's theory of heat being generated by the expulsion of air, and that there was no flame at all? *A.* Yes.
23239. *Q.* Do you approve of that? Do you adopt that theory? *A.* No, I do not: not exactly: I cannot.
23240. *Q.* And you are satisfied that there was flame in some part of the mine? *A.* Yes; I believe up in this No. 1 there would be flame.
23241. *Q.* And you are satisfied that that flame came from the ignition of fire-damp? *A.* I think so, and coal-dust.
23242. *Q.* And where do you say the fire-damp came from? *A.* I have already explained that I think that through the action of this big fall, there would be a kind of vacuum round the faces somewhere, and gas would exude.
23243. *Q.* You do not suggest that it came out of the 4th Right waste? *A.* No, I do not; although it is possible. I know a case that occurred shortly afterwards in Corrimal, which indicated that in some of the old goafs there is gas in the floor. It is possible that something like that may have occurred in the 4th Right in Kembla. The floor cracks. It appears that in Corrimal a man threw his light on the floor, and it ignited gas, and the light ran along 30 or 40 yards into the goaf. It is possible there might have been gas there on the floor of the 4th Right.
23244. *Q.* But would not it want a naked light to ignite it? *A.* Yes.
23245. *Q.* You told Mr. Wade you only remembered hearing of gas once in Kembla, and that was when Gallagher was burnt? *A.* Yes.
23246. *Q.* Did you ever read the report of the evidence taken before the Coal mines Commission in 1895? *A.* Yes.
23247. *Q.* Do you know that Mr. Ronaldson, the then Manager of Kembla, admitted that Kembla gave off gas in all parts in small quantities? *A.* I do not remember that.
23248. *Q.* That alters your opinion, does not it? *A.* I would like to hear the way he said it; because all mines give off gas.
23249. *Q.* Coming back to that first question, I understand that you say that, once the gas was ignited, the coal dust then carried on the explosion to the various parts of the mine? *A.* There is no doubt about it.
23250. *Q.* And it is the coal-dust that, in your opinion, would account for the skips being blown about and men injured about Price's flat? *A.* Yes.
23251. *Q.* And the coal dust explosion would account for some of the signs of force in the main level? *A.* Heated coal-dust, expanded coal-dust—it is possible.
23252. *Q.* Did you not see evidences of coked dust all along the 4th Left travelling and rope roads? *A.* No, I did not. I saw some near here, near Aitken's place and the top of No. 1 back heading.
23253. *Q.* It being clear to your mind that the explosion was carried on by coal-dust, it is clear that, in the parts where the dust did carry it on, they were dusty parts of the mine? *A.* Well, the dust had been raised by the force of the wind.
23254. *Q.* The dust was raised from where? *A.* From that disturbance, from the fall.
23255. *Q.* Do you mean that the dust would be raised from the floor and sides? *A.* Yes.
23256. *Q.* As ——[*Interrupted*]—— *A.* As in all mines. It was not a dusty mine.
23257. *Q.* Listen to me, please; you say the dust would be raised from the floor wherever the blast might be travelling? *A.* That is so.
23258. *Q.* That being so, that dust was a dangerous condition present in the mine? *A.* Oh, I do not know; you would not consider it dangerous.
23259. *Q.* It turned out to be dangerous? *A.* It may have turned out to be dangerous.
23260. *Q.* Have you been accustomed, before the Kembla disaster, to water the dust in Keira? *A.* No, Keira is naturally damp.
23261. *Q.* Then, in your opinion, had the mine been free from the dust that apparently did accumulate along there, the extent of the disaster would have been considerably reduced? *A.* You mean if the mine had been swept out.
23262. *Q.* No; if it had been kept clean or watered? *A.* Well, if you had some means of preventing the dust from rising, it would not have been so bad.
23263. *Q.* If means had been taken to prevent the dust rising, the extent of the disaster would have been considerably reduced, in your opinion? *A.* It would not have reduced the force much, down there [*pointing to the plan outbye 4th Right*].
23264. *Q.* Along the 4th Left it would have been considerably reduced? *A.* There would not have been so much carbonic oxide afterwards.
23265. *Q.* Is it a fact that, as the result of your inspections, you told Mr. Vickery, junior, that you were satisfied that the main factor in the explosion was fire-damp? *A.* Certainly not.
23266. *Q.* You made a statement about there being a long stretch of roof in the main level unsupported because it was strong? *A.* Yes.

23267. *Q.* What was the longest stretch that you know of unsupported? *A.* I do not know; probably 200 or 300 yards.
23268. *Q.* And that was the part that afterwards fell? *A.* Some parts of it.
23269. *Q.* But we may take it that there were several stretches of from 200 to 300 yards unsupported along the main level? *A.* Yes, it is a very good roof there. There were a few falls here [*pointing to the plan.*]
23270. *Q.* Do you consider that allowing such a stretch of roof without support is dangerous? *A.* Certainly not.
23271. *Q.* While you were going round that goaf, did you notice whether there were stoppings at the North side of it? *A.* Yes there were stoppings.
23272. *Q.* Were there any openings without stoppings? *A.* I believe there were some openings; but they were not connected with the goaf. There were openings off the side of the 5th Right here [*indicating the plan*]. I remember going in: but they were not connected.
23273. *Mr. Ritchie.*] *Q.* What would those places open into at all? *A.* I believe it was this that I am referring to [*pointing to the openings out of the western side of the cross-cut rope road.*]
23274. *Mr. Lysaght.*] *Q.* I am talking about the top, the north end of the 35-acre goaf? *A.* I do not know whether there were any openings there at all.
23275. *Q.* Is not this a fact, that you met Mr. Humble and Adam Frost inspecting right in the goaf there, in one of those openings at the north end; and had a conversation with them? *A.* No, I do not remember meeting them there at all.
23276. *Q.* Do not you remember meeting Inspector Humble and Adam Frost about the fourth or fifth opening along here [*south side of the 5th Right*]? *A.* We were stopping some of these up [*west side of cross-cut heading*] with bratticing when we met Humble.
23277. *Q.* Did not you meet them here, on the north side? *A.* I do not think so.
23278. *Q.* Had not you a conversation with Humble when you met him? *A.* I do not remember it.
23279. *Q.* You say you were putting in bratticing? *A.* Yes, we came here for the purpose of carrying the ventilation with us right round; and, of course, being in ignorance of the mine here, we thought we would stop up every place as we went; but we found that we stopped a lot of places that did not require stopping.
23280. *Q.* Do you remember that Adam Frost was with you? *A.* One of the Frosts.
23281. *Q.* Do you remember stating then that it was clear that there had been an explosion of fire-damp? *A.* I do not think so.
23282. *Q.* Will you swear you did not? *A.* No, certainly not.
23283. *Q.* Do you know that after the disaster the Chief Inspector found fire-damp in the top heading with the safety-lamp? *A.* Yes, I do know that.
23284. *Q.* Did not that indicate that the face was giving off fire-damp? *A.* It indicated that the gas got there after the explosion somehow.
23285. *Q.* Did not it indicate that it was coming from the face? *A.* I do not know.
23286. *Q.* Where do you suggest that it was coming from, if it did not come from the face? *A.* It might have come from the face.
23287. *Q.* Where would you suggest it came from? *A.* From the top of the back heading.
23288. *Q.* Do not you know that the Inspector also found gas in various bords on the left of the No. 1 Main Road? *A.* No.
23289. *Q.* With the hydrogen-lamp? *A.* No.
23290. *Q.* If he did, did not that clearly indicate that the faces were giving off gas? *A.* That it had been given off somewhere.
23291. *Mr. Wade.*] Tell him the ventilation was deranged.
23292. *Mr. Lysaght.*] *Q.* And did not that lead you to the conclusion that it was giving off gas before the disaster? *A.* No, not to any appreciable extent.
23293. *Q.* You said something about your own miners finding gas every day in Keira? *A.* No; I said the miners were reporting it; but we could never find it. By saying that, I mean that the men, since the disaster, think that everything they ignite must be fire-damp.
23294. *Q.* Do not you know perfectly well that, in your own deputies' report books, gas has been reported there nearly every month? *A.* No; it has been reported by the miners.
23295. *Q.* No, reported by the deputies? *A.* No.
23296. *Q.* Do I understand you to say that your deputies have not themselves reported finding gas in Kiera since the Kembla disaster? *Q.* I did not say that.
23297. *Q.* Do not you know that your own deputies have reported finding gas in Keira nearly regularly every month? *A.* No, they have not regularly. They have only found gas in a very few instances; and then they say it is not appreciable: they can scarcely detect it.

Examination by Mr. Bruce Smith:—

23298. *Q.* You have come here as an expert, have you not, professing to be able to give an opinion, based on a large coal-mining experience, on this explosion? *A.* Opinion on the explosion?
23299. *Q.* Opinion on the cause of this explosion? *A.* No; I do not say I am an expert.
23300. *Q.* Then what did you come here for? *A.* I came here to give evidence, so far as my own observation went.
23301. *Q.* Have you formed an opinion as to the cause of this explosion? *A.* The fall, I have said already.
23302. *Q.* Have you formed an opinion, a clear opinion? *A.* That is my opinion, as far as I can make out.
23303. *Q.* I do not want to know what your opinion is; I asked you have you formed an opinion? *Q.* Not a satisfactory one.
23304. *Q.* You do not feel satisfied? *A.* No, I cannot satisfy myself.
23305. *Q.* I understand you to say that the fall has been one element in this? *A.* There is no doubt about it.
23306. *Q.* And gas has been another element? *A.* Yes.
23307. *Q.* And coal-dust has been another element? *A.* Yes. Well, there was no original element in the coal-dust.

23308. *Q.* I did not ask about an original element. I said coal-dust has been an element in the disaster? *A.* Yes, undoubtedly.
23309. *Q.* Coal-dust, gas, and the fall? *A.* Yes, that is right.
23310. *Q.* Have you an opinion as to which of those was the first? *A.* I think the fall.
23311. *Q.* You do not feel at all confident about it! *A.* I could not think otherwise than that the fall fell first.
23312. *Q.* And after that you think there were gas explosions, and coal-dust explosions? *A.* Yes.
23313. *Mr. Robertson.*] *Q.* I understand the evidence to be that, after the fall there was wreakage; and then there was explosion, wreakage, and men killed? *A.* Yes.
23314. *Mr. Bruce Smith.*] I want to see what his evidence amounts to. Now, we have got it that there are three things, a fall, gas, and coal-dust; and he puts the fall first.
23315. *Q.* Now, all the information you have about the fall, the extent of the fall, you have got outside, from people talking—the fall being a quarter of an acre in extent? *A.* Well, Morrison, I think he was with us when we first saw the fall.
23316. *Q.* Then you got it from Morrison? *A.* Yes, as near as I can make out.
23317. *Q.* The opinion you formed about the forces in the 4th Right is that they were outbye? *A.* No.
23318. *Q.* Did not you say that from the 4th Right up to the 5th Right there were no evidences of force inbye at all? *A.* No.
23319. *Q.* You admit there were evidences of an inbye force? *A.* Yes; but I think those would be after the outbye force. It would be like a suction.
23320. *Q.* Did not you say, "I saw no indications of an inbye force between the 4th Right and the 5th Right"? *A.* That is wrong.
23321. *Q.* Will you tell me what are the indications of force inbye of the 4th Right? *A.* That is the rollers and skips.
23322. *Q.* Going which way? *A.* Going inbye, as far as I could see.
23323. *Q.* Did not you tell the Commission that, in your opinion, the effect of the fall would be to drive the great force outbye, and by a process of suction to draw things from inbye of the 4th Right outbye? *A.* No, I did not attempt to convey that at all.
23324. *Mr. Ritchie.*] That is what I took him to say.
23325. *Mr. Robertson.*] I understood him to say that.
23326. *His Honor.*] He said it would blow Morrison's light out in that way.
23327. *Mr. Bruce Smith.*] Yes, by suction.
23328. *Q.* Did not you say this—I took it down—"I believe that the great force coming out of the 4th Right would act as a suction, and draw the air off No. 1 outbye, instead of forcing it inbye"? *A.* I do not remember saying "instead of forcing it inbye."
23329. *Q.* Do you know now that the whole of the forces from the 4th Right to the 5th Right are inbye? *A.* They would be very light, I am sure. It would not be much.
23330. *Q.* Do you know that they are all inbye? *A.* Yes.
23331. *Q.* Explain to the Commission what you mean by this suction? [*Interrupted.*]
23332. *Mr. Ritchie.*] He has made it perfectly clear that, on account of the angle of the 4th Right with the main heading, the force coming out of the 4th Right would be sent outbye.
23333. *Witness.*] *A.* It caused a momentary suction backwards.
23334. *Q.* What do you say, now about this Mr. Jones; because you are posing as a scientific witness? *A.* I would like to see the scientific man to explain that, though.
23335. *Q.* Do you mean to say you cannot explain it? *A.* Certainly; I have said that from the very beginning.
23336. *Q.* I thought you came here to explain it to the Commission. You cannot explain it. *A.* No.
23337. *Q.* You have really come here without any knowledge of the extent to which people were burnt? *A.* I did not examine that.
23338. *Q.* But do not you know that, in trying to arrive at any scientific conclusion, you want all the data before you? *A.* You cannot get it.
23339. *Q.* You know that it is necessary, in order to arrive at a conclusion of any value at all, you ought to have all the data before you? *A.* Yes; but you cannot get it.
23340. *Q.* And you had not it? *A.* No.
23341. *Q.* And you did not know, when you went into that box, the extent to which men were burnt? *A.* Certainly not; it is not known yet, as far as I know.
23342. *Q.* You did not know that men had had all the hair burnt off their heads? *A.* No.
23343. *Q.* You did not know that all the forces were inbye from the 4th Right to the 5th Right? *A.* I know that.
23344. *Q.* What did you mean by your suction theory then? *A.* I meant what I said.
23345. *Q.* Tell us what it is? *A.* I believed, and I still believe, that the strong force going up from that direction would cause a momentary movement like that [*illustrating it with his hand in the air*] would cause a lull.
23346. *Q.* You tell the Commission that the effect of this great force coming out of the 4th Right would be to drive things outbye, and inbye to bring the things down to the 4th Right? *A.* Well, it would be practically a standstill, like a shock.
23347. *Q.* Will you tell me what force it was that drove things inbye afterwards?
23348. *His Honor.*] I think it is a quarter to 1; and Mr. Jones may think that out during the adjournment.
23349. *Mr. Wade.*] I have found the passage I had in my mind, with regard to the statement being made previously that carbon-monoxide was known to be given off from blasting-powder. It is in Mr. Donald Stuart's book "The Origin and Rationale of Colliery Explosions," pages 98 and 99. The evidence of Mr. J. Dickenson, the late Chief Inspector of Mines in England, before the Royal Commission upon Accidents in Mines in 1879, is cited, thus:

Q. Do you in your district meet with any other deleterious gases besides fire-damp, any black-damp? *A.* Yes; all mines, if not well ventilated, are subject to black-damp, and, rarely, to what we call white-damp, which is probably carbonic oxide.

Q. Not given off from the measures? *A.* Yes, sometimes, I think; but more particularly from the gunpowder; and more frequently you meet with it near a fire in the mine. It is a nasty gas to deal with, is the white-damp, because your

your light burns, and you can only judge of its effects upon the human frame by perhaps your legs trembling, or your head getting out of sorts; and, unless you retire, you will be struck down and killed. But the black-damp nearly always gives ample warning; and unless you get suddenly into it, you generally have time to escape. The light goes out, Dr. Angus Smith, the Chemical Inspector, says when there is about 2 per cent., and that 4 per cent. would suffocate.

23350. *Mr. Robertson.*] Oh, yes, that is well known.

23351. *Mr. Wade.*] That is what I was referring to.

[The Commission then adjourned until 1·45 p.m.]

AFTERNOON.

(On resuming at 1·45 p.m. Mr. W. R. Pratt attended to take shortened notes of the evidence and proceedings.)

JACOB CARLOS JONES, previously sworn, was further examined, as under :—

Examination by Mr. Bruce Smith (*continued*) :—

23352. *Q.* You were telling me before lunch that, in your opinion the force which came from the 4th Right consisted of air, gas, and coal-dust; and that these were the three elements in the explosion. I am not saying to what extent each one operated, but there are the three elements; and I ask you in what order you think they operated. I think you said the air came out first—where did the gas come in? *A.* I should think the gas would come a few seconds afterwards.

23353. *Q.* Before the coal-dust? *A.* I should think they would come out simultaneously. Probably that would occur almost directly after the big force came outbye. It would create heat. It would accumulate with sufficient force as it came on; and while this was going on——[*Interrupted.*]

23354. *Q.* You think it was a sort of dead heat, and that the gas and coal-dust came out simultaneously? *A.* Yes.

23355. *Q.* And you were told that a quarter of an acre fell? *A.* Yes.

23356. *Q.* You do not know how far it fell? *A.* It must have fallen to the floor.

23357. *Q.* From how far above? *A.* From the height of the seam.

23358. *Q.* You did not know that there had been a fall of 2 ft. 6 in. the week before? *A.* Practically that would not alter the fall.

23359. *Mr. Ritchie.*] *Q.* Do you say it may, or it might, or it would not? *A.* The fact that 2 ft 6 in. fell first would still leave 5 feet for another fall. It does not alter the depth of the fall.

23360. *Mr. Bruce Smith.*] How high does a fall extend. I suppose there is no rule. Does it not depend upon the nature of the formation above. Why do you assume 5 feet? *A.* If it were only a foot in thickness it would still have a stroke of 5 feet.

23361. *Q.* Would it not matter whether it was 1 foot or 10 feet in thickness? *A.* No, it would not matter. I think you are taking a wrong view.

23362. *Q.* No, I am a mere mark of interrogation? *A.* And an antagonistic one.

23363. *Q.* I will assume you are correct? *A.* Well, what would it matter how thick the piston would be in falling.

23364. *Q.* Then weight had nothing to do with it? *A.* No.

23365. *Q.* Then, if a big slate $\frac{1}{8}$ of an inch thick had fallen over a quarter of an acre, it would have the same effect as if rock 10 feet deep had fallen? [*No answer.*]

23366. *His Honor.*] *Q.* Mr. Jones is only speaking with regard to the effect of the first fall on the height of the second fall. You have got him now on the question of weight; which is another element in the case. If the height of the opening was 5 feet, and another fall took place, the size of the opening that remained would only be affected by the expansion of what fell.

23367. *Mr. Bruce Smith.*] *Q.* If 2 feet fell, what height would it be? *A.* There would be a little debris underneath.

23368. *Q.* When you said 730 miles an hour, you did not know there had been a first fall? *A.* No.

23369. *Q.* You tell the Commission that, whether an inch or 10 feet fell, it would make no difference? *A.* Not if it fell in the assumed time.

23370. *Q.* Is not the assumed time dependent on the weight of the fall? *A.* No, certainly not.

23371. *Q.* Then it is not an element at all. It does not matter whether it is an inch thick or 10 feet thick? *A.* Not if it falls in one second.

23372. *Q.* Where did you get the second from? *A.* You must assume something. It would be something—say a second.

23373. *Q.* Are you assuming that it all fell at once? *A.* Probably. The inner end was crushed a little.

23374. *Q.* You assume that the inner end was—what? *A.* I assume that it was hanging.

23375. *Q.* You say that it did not all fall at once—that the inner end fell first? *A.* It hung.

23376. *Q.* If it hung, it must fall? *A.* It must lower.

23377. *Mr. Robertson.*] *Q.* You mean sag? *A.* That is the expression.

23378. *Mr. Bruce Smith.*] *Q.* The inner part sagged before the whole came down? *A.* I think so.

23379. *Q.* How long before the outer part fell did the inner part fall? *A.* It was gradually sagging all the time from when they took the coal out.

23380. *Q.* It might have been going on for a month? *A.* It could be sagging until it broke.

23381. *Q.* According to your theory where did the gas come from? *A.* I never fixed any spot; all along the faces.

23382. *Q.* Why have you assumed that gas was an element? *A.* There was gas, from the appearance of the burnt props.

23383. *Q.* From the appearance of the burnt props you assume there was gas? *A.* Yes.

23384. *Q.* Have you formed any opinion as to where it came from? *A.* No, only from the solid face. Of course, I go upon this ground—all coal, if you can relieve it from the pressure of the atmosphere, would probably exude gas more or less.

23385. *Q.* It is simply from the burning that you conclude that there was gas in this explosion? *A.* Yes.

23386. *Q.* Did you not find out whether people were burnt in this mine? *A.* If I simply say yes, you will draw a wrong conclusion from it.

23387. *Q.* You do not know that men were actually burnt, according to medical men's opinion, at the very mouth of the pit? *A.* I knew what medical men had said in some cases, but I do not know where the men had come from. I have seen the medical men's evidence in the newspapers, which I did not take much notice of.
23388. *Q.* If you did not see a man, and the medical man said that he was burnt, you would not take notice of it? *A.* Under the circumstances, you see——[*Interrupted.*]
23389. *Q.* Do you take notice of what the doctors say? *A.* I can only say under these circumstances. I want to explain why. I was there all the time the bodies were coming out. My son was in the room where the medical men were; and they did not make a medical examination for the purpose.
23390. *Q.* You set your own opinion concerning what you saw against the medical evidence? *A.* I do not.
23391. *Q.* Why do you conclude that you take no notice of what medical men say? *A.* Because I think it is fallacious.
23392. *Q.* Do you know that no less than three doctors said that there were evidences of flame? *A.* I do not know.
23393. *Q.* According to your theory, how did the coal-dust get on fire? *A.* There are many theories. I cannot explain it.
23394. *Q.* How did you arrive at a conclusion on the matter? *A.* Simply from experience in other places, and from what I read.
23395. *Q.* You began your evidence by telling the Commission that you had had a good deal of experience in the Bulli disaster, and there was no comparison between that and the Kembla disaster? *A.* I meant as to the question of extent.
23396. *Q.* Did you not say there was no comparison between Kembla and Bulli, and that in Bulli no men came out, but in Kembla scores. Did you say that? *A.* Yes.
23397. *Q.* Do you say there is no comparison between them? *A.* If you want to compare the appearance of the coal-dust in Kembla, and the damage done there——[*Interrupted.*]
23398. *Q.* Tell me a single point which was not present in the Kembla disaster but was present in the Bulli disaster? *A.* It is a question of extent now.
23399. *Mr. Wade.*] It was a question of extent before. Do not say "now," please.
23400. *Mr. Bruce Smith.*] *Q.* Until this morning you never heard of gas being found in the Kembla Mine, except in the case of Gallagher? *A.* On one occasion.
23401. *Q.* You do not know that Mr. Atkinson found hundreds of feet of gas there? *A.* After the explosion, I met Mr. Atkinson on the spot.
23402. *Q.* Does that not convince you there was gas in the mine? *A.* I met Mr. Atkinson myself. The ventilation was deranged then.
23403. *Q.* It showed that there was gas in the mine; and, if the ventilation was deranged, it would accumulate instead of being carried off? *A.* Yes, that is all right.
23404. *Q.* Will you explain your second theory again. I could not understand it. You say that the immediate effect of the passage of air out of the 4th Right would be, not to drive everything inbye, but to draw things out? *A.* I think it would be so, on the principle of the injector.
23405. *Q.* How do you account for the fact that a great many objects, like skips and so on, were driven inbye? *A.* You cannot account for everything. It is folly to try.
23406. *Q.* Are they not factors in coming to a conclusion? *A.* You would have to carefully consider them; or else you would be misled.
23407. *Q.* Are you aware that the evidence of the surveyors who took measurements and made plans of the mine is to the effect that everything was travelling inbye, and that there were no indications whatever outbye of force above the 4th Right. I will read the evidence:—

> *Q.* One conclusion which you arrive at is, from that part of No. 1 heading, opposite the 4th Right, up to the 5th Right, everything was travelling inbye, and all the signs of force were inbye? *A.* All the evidence I got between the 4th and 5th Right was that the force travelled inbye.

How does that fit in with your suction theory? *A.* I do not say that the suction was so strong as to remove skips and everything. What I want to try to explain is this——[*Interrupted.*]
23408. *Q.* I want you to answer the question. You must excuse my curiosity on this point. You have raised my curiosity by your theory. How do you account for the fact that the force drove all the objects inbye and none of them outbye? *A.* I do not go to the extent of saying that the suction was so powerful as to make an actual vacuum; but momentarily there was a vacuum.
23409. *Q.* How were all these things driven inbye? *A.* I would like to know a good many things too. I would like to know how these terrific storms commence above us.
23410. *Mr. Robertson.*] *Q.* Did you not say that a vacuum was created? *A.* For a moment.
23411. *Q.* I understand that the vacuum permitted the escape of gas from the coal? *A.* I will give you an explanation of what I mean by this momentary vacuum. We all know that, in a mine, if you fire a shot, the shot will put the lights out, even without a current of air. It will strike you on the heart as if you were actually struck—that is, if you are in close vicinity to the shot. I am assuming that something like that occurred. It was practically a vacuum—a concussion that would put a light out.
23412. *Q.* I do not see the resemblance between concussion and a vacuum arising from sudden shock? *Q.* It creates a vacuum—any sudden shock creates a vacuum.
23413. *Mr. Bruce Smith.*] *Q.* You have arrived at your opinion irrespective of the forces in No. 1? *A.* Yes.
23414. *Q.* Do you read mining literature from time to time? *A.* Certainly.
23415. *Q.* You have read some reports relating to the different explosions in England! *A.* Yes.
23416. *Q.* Do you not know that one of the first things to be studied is the direction of forces, as indicated by the objects in a mine? *A.* I have seen points of difference on that question.
23417. *Q.* I am talking of the experts who investigate these matters. Do they not look to the direction of the forces to show them the centre? *A.* There is a difference of opinion about that.
23418. *Q.* Tell me about it? *A.* As to the reliability of that evidence.
23419. *Q.* Do you differ yourself? *A.* Yes.
23420. *Q.* What is the first thing you look for? *A.* I look for heat first.
23421. *Q.* After the explosion is over? *A.* You cannot look before.
23422. *Q.* How would you look for heat? *A.* By going into the mine to see the results of flame.

23423. *Q.* You mean the effect of flame. How would you determine where the explosion originated? *A.* I suppose the different circumstances would guide me.
23424. *Q.* How would you determine where the thing took place? *A.* By the position of the mine
23425. *Q.* The mine would not change its position? *A.* I mean the seat of the explosion.
23426. *Q.* How would you get at the seat? *A.* By the examination of the position.
23427. *Q.* The position of what? *A.* I would look all over the mine.
23428. *Q.* What at? *A.* The faces.
23429. *Q.* Would you expect the faces to change their position? *A.* I mean the appearance of the roof and the floor.
22430. *Q.* Would that tell you where the thing originated? *A.* It might.
23431. *Q.* Would you ignore all indications of force? *A.* No.
23432. *Q.* Why did you not consider them here? *A.* I have.
23433. *Q.* You did not know of them? *A.* I did.
23434. *Q.* Did you not tell the Commission that the forces were going outbye between the 4th and 5th Right? *A.* I say there is no force outbye; but I say that there was—— [*Interrupted.*]
23435. *Q.* "Suction," use your own words. You cannot give me any indications of things being driven inbye? *A.* No.
23436. *Q.* You do not think it of much importance? *A.* The damage in that particular part is very little.
23437. *Q.* I am talking of the evidence of the direction of forces? *A.* In some cases they might be of importance.
23438. *Q.* In this case, what do you think? *A.* In this case I am a little bit doubtful. I am trying to connect the force on the skips going out.
23439. *Q.* How do you know there was force going out from the 4th Right? *A.* I could see the effects.
23440. *Q.* On what? *A.* On the road.
23441. *Q.* The road does not move? *A.* On the rollers, the props, and things of that kind.
23442. *Q.* Do you think that important? *A.* Yes.
23443. *Q.* That is what you rely on. You saw forces that went outbye? [*No answer.*]
23444. *Q.* That is what you relied on—you say that forces went outbye from the 4th Right? *A.* Yes.
23445. *Q.* And yet you see a whole lot of objects driven inbye, and still you ignore those? *A.* Not exactly.
23446. *Q.* Have you counted them in? *A.* I say that these skips may have been tossed about by the force. It is an endless rope system. If they went up the road, how do you account for it? *A.* I do not say I account for it.
23447. *Q.* You take no account of it? *A.* No, I do not say that.
23448. *Q.* Do you not know that Mr. Cambage gave evidence that the whole of the forces were inbye? *A.* No.
23449. *Q.* Would that have any effect on your suction theory? *A.* I do not know.
23450. *Q.* You told me that the gas in the coal was forced out simultaneously with the coal-dust. How do you think it was lighted? *A.* I think inbye. The gas exuded from the face of the coal, and came across a light.
23451. *Q.* You have a light now—you have gas, coal-dust, air, and a light? *A.* Yes.

Re-examined by Mr. Wade:—

23452. *Q.* When you were going through Mount Kembla after the disaster, did you try for gas yourself in places besides the 4th Right? *A.* Yes. I think we tried over a portion of the fall on the left of No. 1. We tried there, but could not find any gas.
23453. *Mr. Ritchie.*] *Q.* What lamp did you use? *A.* The ordinary safety-lamp.
23454. *Mr. Wade.*] You said there might be an ignition of gas near Aitken's place? *A.* Somewhere in that vicinity; there was heat there.
23455. *Q.* Would there not also be signs of force? *A.* It is an open space. There would not be much force.
23456. *Q.* What I want to know is this—the signs of force from No. 1 road to Aitken's place were all going inbye. Would you expect to find them inbye, if there had been an explosion at the end of the passage where Aitken's place was? *A.* The only signs of force are near where the explosion may have occurred at Aitken's place.
23457. *Q.* Would you expect to find force going towards No. 1 road [*Witness looked at plan, Exhibit No. 29*]? *A.* It would depend on the back rush.
23458. *Q.* Would you expect to find signs of force going towards the main road? The back rush may have destroyed other signs of force.
23459. *Q.* If you have force on one side of the props, how could force going on the other side of the props destroy the signs of that force? *A.* I do not remember seeing anything on the props; but I saw some slightly charred coal on the ribs.
23460. *Mr. Wade.*] Look at plan [*Exhibit* No. 38]. If the indications of force shown by that plan are correct, would that be consistent with an explosion starting at Aitken's place? *A.* Not very readily. I cannot say that that is so.
23461. *Q.* If the explosion started at Aitken's place would you expect to find signs of force going towards the main road? *A.* The force radiates all round; and I should expect to see signs of force all round.
23462. *Q.* There is only one way to the main road? *A.* Yes.
23463. *Q.* If there was an explosion at Aitken's place, would you expect the force to go towards the main road? *A.* Yes, the first effect would be along that way.
23464. *Q.* Would you expect, when you come to examine the mine, to find indications of force from Aitken's place to the main road? *A.* I would look for them.
23465. *Q.* Would you not be surprised to find the force going towards Aitken's place, if it were the centre? *A.* The first effect would be forward—there is no doubt about that.
23466. *Q.* You spoke about some shots, the result being that they blew out stoppings. Have you had any actual experience of it? *A.* Often.
23467. *Q.* Under what circumstances. *A.* After we have fired a shot at the face, it would knock the stoppings out of the second cut-through from the face.

23468. *Mr. Robertson.*] *Q.* What sort of stoppings were they? *A.* Brick stoppings. I have seen them knocked down in Lambton Colliery, we could not build them near the face. They were 4½ inch work.
23469. *Mr. Ritchie.*] *Q.* How far would they be from the face? *A.* Forty or 50 yards.
23470. *Mr. Robertson.*] Have you had any experience of that in the Southern collieries? *A.* I always keep the brick stoppings back now, for fear of the same thing occurring. Of course, everything depends on the charge in the shot. If it is a heavy shot, especially in stone or anything of that kind, it will do it.
23471. *His Honor.*] *Q.* These brick stoppings are simply built up, and are not let into the sides of the rib at all? *A.* They are simply built up and are not let into the sides at all; but they are made air-tight.
23472. *Mr. Wade.*] *Q.* Do you know whether a large or a small quantity of coal-dust will propagate a dust explosion—will a small quantity? *A.* The theory is that with a strong flame an explosion will take place.
23473. *Q.* I am talking about dust—will a small quantity tend to propagate an explosion—suppose there was a shovel full stirred up? *A.* Certainly not. From experience it requires a large quantity; so much that no one could breathe in it.
23474. *Q.* If you got the air thick with dust, and the concussion from a gas explosion mixed up with it, do you think that would be sufficient to bring about the distillation of the coal and lead to an explosion? *A.* I think so.
23475. *Q.* Would it require very much dust? *A.* The least amount would very probably be 1 lb. of dust for every 150 cubic feet of air.
23476. *Q.* If a shovel full of dust was in suspense in the air, it would do? *A.* Yes.
23477. *Q.* Then the only means is to sweep your mine with a broom every day? *A.* Yes, clean it up; and big falls like this would make it dusty again.
23478. *Q.* Did you follow Dr. Wade's evidence at the inquest to get the effect of his theory?
23479. *Mr. Lysaght.*] I object to that question.
23480. *His Honor.*] I do not see how the witness can analyse Dr. Wade's evidence.
23481. *Mr. Wade.*] Mr. Lysaght put to the witness one half of Dr. Wade's evidence.
23482. *His Honor.*] The witness said that the reason he did not believe in the doctor's evidence was that because his son was in the room when the doctors examined the bodies, and they did not seem to pay much attention to them.
23483. *Mr. Wade.*] Dr. Wade at the inquest said:—"My principal reason for thinking so was the burnt hair and the curling up of the outer skin, especially about the exposed parts."
23484. *Mr. Ritchie.*] The witness did not set up his theory as against that of the doctors.
23485. *Mr. Wade.*] I want to ask the witness about what Dr. Wade said concerning Clark. He says:—"My memory does not enable me to swear positively whether Clark's hair was singed; I took no notes of the case." The one part of the evidence which Mr. Lysaght read out was that Clark was burnt.
23486. *Q.* Were you in the shed when the doctors came in? *A.* I was there on several occasions. I was there when the first body came out. Dr. Lee was there at the time. He made no examination; but he simply looked to see whether a man was dead or alive. All the men were black.
23487. *Q.* If a man was alive he was taken one way; and if he was dead he was taken another? *A.* Yes, that was all the examination that was made.
23488. *Q.* Did you see Dr. Paton and Dr. Nash there? *A.* I was in the room. I saw them come there; but I did not stop.
23489. *Mr. Ritchie.*] *Q.* Were not the doctors able to make an examination when you were not there? *A.* Certainly.
23490. *Q.* And when your son was not there? *Q.* I think my son was there night and day.
23491. *Q.* When did he go there? *A.* At 4 o'clock on the same day.
23492. *Mr. Lysaght.*] *Q.* Are you aware that Dr. Nash stated this in his evidence at the inquest:—

> The burns I saw on the bodies indicated to me that some flame of a very high temperature had rapidly passed over the skin . . .; all the burns that I saw were produced by some flame of a very high temperature passing across the body rapidly.

[*No answer.*]
23493. *Mr. Ritchie.*] I may say that I examined all the bodies myself and I do not know whether Mr. Jones was there.

Examined by Mr. Robertson:—

23494. *Q.* You have given us two theories to account for the disaster. The first was that a great blast of air escaped from the 4th Right with such force, and at such a temperature, as to ignite coal-dust? *A.* Pressure would increase the temperature.
23495. *Q.* You say that it issued at such a temperature as to ignite the dust? *A.* Not to ignite it, but to distil it.
23496. *Q.* If it was not ignited, how do you get the after-damp? *A.* I do not say there was no ignition. I do not know how it was ignited.
23497. *Q.* Do you not think that ignition did take place, because there was after-damp present? *A.* Yes.
23498. *Q.* Another theory was that a blast issued from the 4th Right, causing a partial vacuum, and during this time gas was exuded from the coal and ignited? *A.* Yes.
23499. *Q.* Which of these theories do you adopt? *A.* I am speaking of possibilities.
23500. *Q.* Do you give them as alternatives? *A.* Yes. You must remember the cause of the fire at Corrimal. There may be gas coming out of the floor. I only put them forward as possibilities; I am not putting them forward to work them out.
23501. *Q.* Have you any preference for either of them? *A.* I could not get evidence to show it. I may say that I noticed a kind of zone of after-damp across the main tunnel. There would not be enough after-damp to kill a man, unless he was in one particular district there. One man came out of the tunnel two hours after it occurred practically uninjured.
23502. *Q.* That is not an answer to my question. I asked which theory you would prefer to give us? *A.* If I were to say which theory I preferred, I should have to explain why. That is the trouble. I cannot possibly say; I can only give you possibilities.
23503. *Q.* Coming to this first theory by which you calculate to get this high temperature by reason of a force of 700 miles an hour. Your data for that is the period of time—a second for the stroke of the piston? *A.* Yes.
23504. *Q.* And the area a quarter of an acre? *A.* Yes.

23505. *Q.* Did you compare notes with Mr. Sellers? *A.* No. I have seen part of his evidence; but I did not read it.
23506. *Q.* It is somewhat curious that you both arrive at the same velocity from totally different data? *A.* That is why it is worth considering.
23507. *Q.* Mr. Sellers assumed double your piston space and only half a second, and he says that, if the period had been increased from half a second to three quarters, the temperature would have fallen to 94 degrees. You take a second, and have only half the size for the piston? *A.* And I think the orifice is different.
23508. *Q.* The orifice was the same? *A.* We did not measure them. I took it to be ten by five; the width ten and the height five.
23509. *Q.* You arrived at the same velocity from totally different data? *A.* It is not the same velocity, mine is 742 miles an hour.
23510. *Q.* Mr. Sellers takes the same opening—the opening is the same for both? *A.* Perhaps Mr. Sellers took his opening as twelve by six.
23511. *Q.* Mr. Sellers takes double the area and half the time, and yet he arrives at the same conclusion. He takes 44 yards square; which is a great difference? [*No answer.*]
23512. *Mr. Wade.*] A difference of 300 yards.
23513. *Mr. Robertson.*] *Q.* Do you remember whether the outlet from No. 4 Right was at all wet? *A.* I remember falling in the mud.
23514. *Q.* There is a lot of evidence that it is muddy; I take it that there could not be much dust? *A.* No, in that place there is not very much. You could not see the water; it was covered over with dirt; but if you went to walk on it you would slip in.
23515. *Q.* You said that you did not consider Kembla a gassy mine? *A.* I certainly never did.
23516. *Q.* There has been no definition of a gassy mine? *A.* I do not know it.
23517. *Q.* Do you not think there ought to be a definition? *A.* I should not be surprised that there will be some day. We also ought to have the term dry and dusty defined. Every mine is more or less dry and dusty.
23518. *Q.* Men may be aware of the danger arising from coal-dust and fire-damp, and yet be of a different opinion as to whether a mine comes within the definition of being a gassy mine, or being a dry and dusty mine? *A.* I would define a gassy mine as a mine with gas—if you can detect the gas.
23519. *Q.* In what quantity? *A.* If you can detect it in the mine.
23520. *Mr. Richie.*] *Q.* For how long? *A.* If it is constantly exuded.
23521. *Mr. Robertson.*] *Q.* Detected with the most delicate gas tester? *A.* I do not know about some of them.
23522. *Q.* We have heard that Kembla was a safe mine, and that it was free from gas; and yet we have this disaster? *A.* There are scores of disasters which occur in non gaseous mines.
23523. *Q.* In view of what has occurred at Kembla, would you suggest the desirability of designating such mines as gaseous mines? *A.* Yes; you can call them such, and introduce safety-lamps.
23524. *Q.* If a mine is designated a gaseous mine, would you suggest that it should be worked with safety-lamps? *A.* Undoubtedly. In fact we are finding out so much about mines now-a-days that, whether a mine gives off gas or no, we shall have to use safety-lamps. Evidently it does not require gas to cause an explosion.
23525. *Q.* Has not this Kembla explosion been a eye-opener to many men, experts in mining, who probably held the opinion that such a mine should not be worked with safety-lamps? *A.* Yes.
23526. *Q.* It is not a reflection on such men that this occurrence has caused them to alter their opinion? *A.* I should say not. It is the only way people do alter their opinion—it is only by actual experience that you can gain such knowledge.
23527. *Q.* Do you consider that gunpowder is a safe explosive to use in mines giving off gas? *A.* No, I do not. But from all I have read there is scarcely any explosive which is safe in a gassy mine.
23528. *Q.* Some of the others have a comparative degree of safety? *A.* Yes. I would like to see such an explosive manufactured here. You cannot obtain them here now.
23529. *Q.* I have got them for years? *A.* We could not get them. There is some talk of a firm manufacturing such explosives. I wish they did.
23530. *Q.* Do you think that the firing of shots should be taken out of the hands of miners? *A.* Under certain conditions it should be.
23531. *Q.* Under what conditions? *A.* Where there is gas.
23532. *Q.* Or where a mine is dry and dusty? *A.* Yes.
23533. *Q.* Would you allow miners to fire shots only where a mine is naturally wet and free from gas? *A.* Yes.
23534. *Q.* Do you approve of deputies and shot-firers having to obtain certificates of competency? *A.* Do you mean by examination?
23535. *Q.* By examination. It has been suggested that they should obtain them in the same way as Managers do? *A.* I think it would be undesirable. I do not think the ordinary working man ought to pass an examination. They ought to be subject to the Manager for appointment.
23536. *Q.* Who would have the best knowledge of their qualifications? *A.* No one more than the Manager. He takes good care to get competent men to do the work, for his own sake and for the good of the Company. Passing an examination would not make them more competent.
23537. *Q.* The Manager when appointing a deputy has to consider his own interests? *A.* Yes.
23538. *Q.* And the more competent the official he appoints the better it is for the Manager? *A.* Yes; the Manager is actually responsible for the appointment, and his interest is at stake if he appoints an incompetent man. The fact of a man holding a certificate may mislead some Managers. A man may be a perfectly careless man, and yet hold a certificate. It requires more than a certificate to fit a man for an appointment. The Manager knows the character of the men he appoints.
23539. *Q.* Do you think there is a fear of men with an aptitude for book knowledge passing an examination, but not having the necessary practical knowledge? *A.* There is. There are plenty passing now who have no practical knowledge.
23540. *Q.* It has been suggested that ventilation by furnace should be prohibited and fans substituted? *A.* It goes without saying that fan ventilation is better than furnace ventilation; but I do not think it

should be made compulsory for a mine to do away with the furnace. A mine might do away with the furnace, and put in a fan that is ineffective. A good furnace is better than a defective fan.
23541. *Q.* It is all a matter of power. Are not furnaces gradually going out? *A.* Yes, furnaces are gradually giving way—they are more expensive than fans.
23542. *Q.* Such a provision might work a good deal of hardship to small mines? *A.* That is so.
23543. *Q.* Do you approve of waste workings being sealed off? *A.* Certainly not.
23544. *A.* What is your view? *A.* A Mining Manager will work his pit so that the return airways will be always skirting round the waste workings; but in the old mines we cannot do that. You cannot possibly seal up the waste workings.
23545. *Q.* Is it good practice to surround them with return airways? *A.* Yes.
23546. *Q.* Would you approve of a provision being made in a new Mining Act providing for that; and also forbidding waste workings to come into contact with the intake? *A.* I would leave the matter of arrangement open to the Manager.
23547. Would you leave the wastes open to the intake? *A.* No. The matter should be left to the Manager and to the Inspector to arrange. It might be hard to work to any special rule on the subject.
23548. *Q.* There ought to be no trouble about making waste workings so that they will not come into contact with the intake, but with the return airways? *A.* There may be exceptional cases even for that.
23549. *Q.* Is it undesirable that waste workings should be in contact with the intake airways? *A.* They should not be in contact with the intake airways.
23550. *Q.* There is a proposal that cut-throughs should be only 30 yards apart? *A.* That is absurd, in all cases.
23551. *Q.* In that case would a Manager be limited in the size of the pillars—to 30 yards? *A.* Yes, it could not be otherwise. You limit the size of the pillars.
23552. *Q.* Should there be any limitation in the size of pillars? *A.* Certainly not.
23553. *Q.* Is the tendency to increase the size of pillars? *A.* Yes, in the main engine road, Managers are generally increasing the size of the pillars. A good deal depends on the superincumbent strata. You could not work some mines with cut-throughs at 30 yards distance. It would be practically impossible.
23554. *Q.* The suggestion is made to improve the ventilation conditions. If adequate ventilation is provided at the working faces, do you consider that meets all requirements? *A.* Of course it does. Take a pillar of 40 yards length betweeen two headings—you would have to brattice for 70 yards in that case.
23556. *Q.* If you have sufficient ventilating power to give ventilation in a bord, is that sufficient? *A.* Yes; and with proper bratticing that can be done—it is just like having two headings.
23557. *Q.* Have you had any experience of testing with the hydrogen flame? *A.* I have seen it with the Inspectors, but I have not got one.
23558. *Q.* Do you think it is a proper lamp to place in the hands of deputies? *A.* No.
23559. *Q.* Do you think there is danger with it? *A.* Yes.
23560. *Q.* Do you know how long it takes to make a test? *A.* It takes a good many minutes.
23561. *Q.* How many tests could you make with an ordinary lamp, while you were making one with the hydrogen lamp? *A.* Five or six, at least.
23562. *Q.* You approve of double doors, of course? *A.* Yes.
23563. *Q.* Do you approve of an extra supply of safety-lamps being kept at a mine in case of accidents? *A.* I think so.
23564. *Q.* Do you see any difficulties in the way of watering travelling and haulage roads? *A.* A good deal.
23565. *Q.* Mention some? *A.* There is no water, in the first place.
23566. *Q.* First catch your hare? *A.* First get your water. The great length of roads would make the difficulty very great. It would get very muddy with travelling; and you would have to take up the mud.
23567. *Q.* It would involve piping a mine, and putting hose there? *A.* Yes.
23568. *Q.* Would that be a serious first cost, and the cost for upkeep afterwards? *A.* Yes, it would be a serious item.
23569. *Q.* Water has a great effect on the floor? *A.* It has a great effect on the Illawarra seam; and on some roofs too.
23570. *Q.* Do you consider that the watering of roadways is of any practical value unless it is done thoroughly? *A.* Not unless the mine is kept done, with a view of preventing dust being raised at all; otherwise it would be of no value.
23571. *Q.* Did you observe that the explosion at Mount Kembla jumped many lengths of wet road? *A.* No.
23572. *Q.* You know the tunnel mouth there—the tunnel mouth to No. 1 junction? *A.* Yes.
23573. *Q.* Is that not wet? *A.* Yes.
23574. *Q.* The explosion jumped that? *A.* I suppose so.
23575. *Q.* Even if the travelling and haulage roads were watered, do you not think there are many mines in which sufficient dust is in suspension in the air to carry on an explosion? *A.* I have no doubt there are. In the old South Wales coal mines I have seen enough dust to blacken you in a minute.
23576. *Q.* The air carries dust, probably sufficient to cause an explosion? *A.* Yes.
23577. *Q.* Now, taking it generally speaking, the systematic watering of a large colliery is impracticable? *A.* I think it is quite impracticable to do it thoroughly, as it should be done.
23578. *Q.* It has been suggested that Managers should give more time to the management of their colliery. Do you find your time fully occupied? *A.* Yes.
23579. *Q.* Have you any time for fooling round? *A.* I think that it depends on circumstances. If circumstances prevent a man attending fully to the mine, there should be another man appointed.
23580. *Q.* I take it that some people think that a Manager is not doing his duty unless he is trudging all over the mine all day long. Do you think that a Manager can do more effective work while sitting down and thinking out problems? *A.* He has to do it often. Other officials are appointed to look after the mine.
23581. *Q.* What is the good of having instruments at the bottom of the upcast shaft to determine the temperature of the strata? *A.* I do not know. My experience is that the temperature never alters excepting through artificial means.
23582. *Q.* What is your idea about instructing men as to the means of escape? *A.* Have travelling roads.

23583. *Q.* It has been suggested that the men should be told of the means of escape? *A.* Men find out the means of exit very quickly.
23584. *Q.* In an explosion it is all a toss up which way you are going in a mine? I do not think it is practicable to learn the men all the means of escape.
23585. *A.* Do you know anything about a black-list? *A.* I used to keep a black book.
23586. *Q.* What did you keep in the black book? *A.* All the faults found with the men—cautions, warnings, dismissals, or fines. The black-list which you refer to I have never heard of.
23587. *Q.* Have you ever known of any black-list, with a view of preventing men obtaining employment at other collieries? *A.* There is none at all.
23588. *Q.* Have you ever heard of it? *A.* Never.

Examined by Mr. Ritchie:—

23589. *Q.* Have you ever had any inquiries about the character or misdoings of any applicant for work? *A.* Oh, sometimes, if I have wanted a man specially, if I did not know him personally I would write to the manager he came from and ask about his character. It is seldom done now, because men are plentiful.
23590. *Q.* Have you ever had word from a manager not to employ so-and-so because he was a strong union man? *A.* Not word of that kind.
23591. *Q.* You never did? *A.* I do not remember one instance. Of course we know the characters of the men ourselves, without being told.
23592. *Q.* You know whether they are union men or not? *A.* We know their characters. We never inquire whether they are union men or not.
23593. Have you ever sent information to other managers warning them not to employ certain individuals? *A.* I do not remember one case.
23594. *Q.* Have you ever yourself given work provisionally to a person who applied for it, and then asked him to get a reference from a manager? *A.* That is what I would do, if I had any doubt in the matter.
23595. *Q.* You do not generally adopt such a course? *A.* No.
23596. *Q.* You have done it? *A.* I cannot say, but it is one of the things I would do if I had any doubt about a man's character.
23597. *Q.* Do you believe in keeping a black-list at all—do you believe that you should be posted freely in, and noted of, all the men who take a prominent part in union matters? *A.* I keep a list of the weaknesses of men; but not whether they belong to unions or not.
23598. *Q.* Would you regard any person whom you had in your employ, or whom any other adjoining manager had in his employ, as annoying if he brought forward grievances? *A.* No. If a man is careless, or found without his sprag, or sends dirty coal out, I think note of it should be made.
23599. *Q.* The only thing is to note defects in regard to workmanship? *A.* That is the object of it.
23600. *Mr. Robertson.*] *Q.* Or his general character? *A.* His general character, of course.
23601. *Mr. Ritchie.*] *A.* How often are you in the mine yourself? *A.* I could not say—probably three or four times a week.
23602. *Q.* Are your visits in any way extensive? *A.* It depends on the object for which I visit. As a general rule, I take one district on each visit.
23603. *Q.* That takes you how long? *A.* Three or four hours; every visit. I go in and measure the work of the men all round every fortnight.
23604. *Q.* You are in two or three times a week? *A.* Yes, I make it a practice to go in as often as I can. We have new work going on, and it takes me in more than the general work of the mine.
23605. *Q.* Have you a way of examining all the waste workings? *A.* We examine all the waste workings we can get into every week.
23606. *Q.* Do you ever take it on yourself to examine the work of the examining deputies, and see if they do go in to examine the wastes? *A.* Yes. I have been all round myself in every possible part. I have been in the mine following a deputy in the early morning without his knowledge at all.
23607. *Q.* Do the deputies leave an impression, giving their initials and the date of their visit? *A.* They do—on a large slab of rock or coal. They put the date and their initials, and they also make reports.
23608. *Q.* You examine the dates, and see that the deputies have been there? *A.* Yes.
23609. *Q.* What mines would it be impossible to work if there were cut-throughs 30 yards apart? *A.* What I say is that you would then have more length of cut-throughs than of headings.
23610. *Q.* Did you not say that it would be impossible to work certain mines with these cut-throughs? *A.* I do not say impossible, but impracticable.
23611. *Q.* You say it is impracticable to have cut-throughs 30 yards apart? *A.* In all deep mines.
23612. *Q.* What do you call deep? *A.* Mines like the Helensburgh Mine or the Balmain Mine. They will have to have 100-yard pillars there. We can work with 30-yard pillars; but there would be no benefit in it. It would be impracticable and unprofitable in many cases.
23613. *Q.* With the exception of this—the two cases you have mentioned—it would be quite practicable? *A.* Yes. But it would add to the cost considerably.
23614. *Q.* With regard to the examination of the deputies, you say that the Manager is the most competent person to judge of the deputies and shot-firers? *A.* Yes.
23615. *Q.* Would the fact of these men having to qualify before examiners at all interfere with your discretion? *A.* It would not interfere with a manager's discretion; but it is possible that the Manager might take the fact of a man's having passed an examination into consideration, and think that he was competent, and employ him, without making a fresh examination for himself.
23616. *Q.* If you regard the post as an important one, would you not put a person to some examination or through some tests of your own? *A.* I know what I should do myself.
23617. *Q.* The fact of a man's having a certificate would not interfere with your discretion? *A.* I say that some managers might make an excuse in the way I have stated.
23618. *Q.* Do you think any manager would do so? *A.* Perhaps, but it is not likely.
23619. *Q.* Then there is nothing in the answer that managers might be lax in their duty when making such appointments? [*No answer.*]
23620. *Mr. Robertson.*] *Q.* Would your choice of men be limited? *A.* Yes.
23621. *Mr. Ritchie.*] *Q.* Would not that depend on the examination which they went through. *A.* Yes.

23622. *Q.* If the examination was not quite so severe as that for a second-class certificate, probably you would have a good number of persons pass? *A.* Yes.
23623. *Q.* Is your choice limited so far that you have to appoint incompetent persons? *A.* It is not limited so far.
23624. *Q.* As under-managers or shot-firers? *A.* No.
23625. *Q.* You have a good surplus of them? *A.* Yes.
23626. *Q.* Of competent persons? *A.* I cannot say.
23627. *Q.* You would have no difficulty in selecting officials if they held certificates? *A.* There are a good many managers who hold certificates of service.
23628. *Q.* Your under-manager is one of these? *A.* Yes.
23629. *Q.* And you have an assistant with a first-class certificate? *A.* Yes.
23630. *Q.* You thought that necessary for the safety of the mine? *A.* The under-manager is an aged man; and the mine is a big one.
23631. *Q.* You thought it well to put on a man with a first-class certificate? *A.* He was at the mine before he got his certificate.
23632. *Q.* Not as under-manager? *A.* He is assistant to the under-manager.
23633. *Q.* You have told us that the miners are duly instructed to report all cases of gas. Do they report it? *A.* Frequently, at all events.
23634. *Q.* Who to? *A.* The deputies.
23635. *Q.* Do they report that? *A.* Yes.
23636. *Q.* You tell us that a mine should be described as being gaseous if it gives off a perceptible quantity of gas below? *A.* Yes.
23637. *Q.* When you talk of the miners who saw gas, the gas was not seen by the deputies? *A.* No. It was an ignition after firing a shot.
23638. *Q.* They were not all cases of ignition after firing shots? *A.* I believe in ninety-nine cases out of a hundred they were.
23639. *Q.* Have you had those many shots fired which did not complete their work, to give you as many reports as that? *A.* I think so. I do not know whether it is a failure of the work—but there is the fact that the men report gas and the deputies cannot find it.
23640. *Q.* You say that it is only found if a shot has not done its work properly? *A.* Yes.
23641. *Mr. Robertson.*] *Q.* Are these all reports after shots have been fired? *A.* Ninety-nine out of a hundred are.
23642. *Q.* Have you had reports in other cases? *A.* Yes; a deputy has reported that he found a little gas.
23643. *Mr. Ritchie.*] *Q.* How many reports would you have before you declare the mine to be a gaseous one? *A.* That would depend on circumstances.
23644. *Q.* You mean, if you take a safety-lamp and can go in and detect it? *A.* I think, when anybody can go in and detect it.
23645. *Q.* We have had a case put forward where a mine is always giving off gas? *A.* I have said that, if a mine is giving off gas, but if it is not perceptible, it is not gassy. I think a good deal should depend on the nature of the reports of the deputies.
23646. *Q.* Supposing you find that a deputy has reported gas in a heading, would you regard that as sufficient? *A.* Certainly not. I would not call that gassy. It should be found in more than one place.
23647. *Q.* How many places? *A.* I cannot say—a small mine would be different from a large one.
23648. *Q.* You have said that you would have it declared a gassy mine if it were giving off a certain quantity of gas constantly. I want to know what that amounts to? *A.* If the examining deputies report it, I do not think it should be looked upon as a gassy mine, if the gas was only found in one particular heading—you might find it in a prospecting heading.
23649. *Q.* You see, if the Commission think fit to make a recommendation as to gassy mines, they want to know what managers themselves think should be called gassy mines? *A.* It is one of those cases which it is hard to define.
23649½. *Q.* Have the managers defined it? *A.* The definition in the English Act is, if the gas is detected in the previous three months.
23650. *Q.* You have told us there should be a definition. Can you limit the period or the number of times. Do you say daily? *A.* I do not see how I can.
23651. *Q.* You think that it is sufficient, if gas is found constantly, that it should be declared a gassy mine? *A.* Yes.
23652. *Q.* You do not define it any more? *A.* No.
23652½. *Q.* I will now take you back to Aitken's place. You gave an opinion that an explosion of gas took place there; and in answer to Mr. Wade you seemed somewhat confused as to the evidences of force. Did you suggest that a second explosion may have taken place and obliterated the signs of force going easterly. The evidences of force described by Mr. Wade pointed in a westerly direction; but you think a second explosion took place? *A.* That has occurred where an explosion of gas has raised sufficient dust to cause another explosion.
23653. *Q.* You think that an explosion took place at Aitken's place which probably left evidences of force in an easterly direction; but a subsequent explosion took place which obliterated the marks of the first one? *A.* I said that something like that may have occurred.
23654. *Q.* Do you think it occurred? *A.* I cannot say.
23655. *Q.* You have no opinion beyond that. You think an explosion occurred at Aitken's place? *A.* Yes, about there.
23656. *Q.* Do you know there are evidences of burning in the back heading? *A.* No; I saw it in the front heading.
23657. *Q.* Did you see the canvas? *A.* Yes, a large portion of the brattice was charred; but all the rest was untouched.
23658. *Q.* Did you notice any evidence of coking on the side? *A.* Only in the front heading.
23659. *Q.* Do you think there was flame where you saw the canvas? *A.* I think there was, in the front heading, where the burnt coal was.

Witness—J. R. M. Robertson, 4 March, 1903.

JAMES ROBERT MILLAR ROBERTSON was sworn, and examined as under :—

Examination-in-chief by Mr. Wade :—

23660. *Q.* What is your name ? *A.* James Robert Millar Robertson.
23661. *Q.* What are you by profession ? *A.* A mining engineer.
23662. *Q.* How long have you been in New South Wales ? *A.* Twenty-two years.
23663. *Q.* Have you been engaged in mining all that time ? *A.* Yes.
23664. *Q.* What experience did you have before you came out here ? *A.* About the same experience.
23665. *Q.* Before you came out here ? *A.* I was fully fifteen years managing mines.
23666. *Q.* Have you held positions on Royal Commissions in this country ? *A.* Yes, on two—the Bulli Commission and one at Lithgow.
23667. *Q.* Were you chairman ? *A.* Yes.
23668. *Q.* How long have you known Mount Kembla Colliery ? *A.* More or less, I have known it for about twenty years. I have been connected with it for about eighteen years.
23669. *Q.* Have you known it from the date it was first opened up ? *A.* I have known it since it has been been opened up. It was opened up by reason of a suggestion of mine, when I was out here on a visit.
23670. *Q.* How long has Mr. Rogers been at Kembla ? *A.* I think twelve or thirteen years.
23671. *Q.* What was his position, first of all ? *A.* Under-manager.
23672. *Q.* Did you know him before he came there ? *A.* I have known him since 1874.
23673. *Q.* Did he work under you ? *A.* He came out to Greta after my brother came to Greta. He was under-manager for my brother in Wales. After that he went to large collieries, outside Glasgow, belonging to the Carron Iron Company.
23674. *Q.* Do you know how he came out to New South Wales. Was it on your suggestion ? *A.* Not on my suggestion. My brother came to this country ; and Mr. Rogers came out a few months later along with a number of other workers.
23675. *Q.* And went to Greta ? *A.* Yes.
23676. *Q.* And from Greta he went to Mount Kembla ? *A.* Yes. He has only been in two mines in this colony.
23677. *Q.* Do you know how those mines were worked in Scotland or in Wales. Were they worked with safety-lamps ? *A.* Yes. When he was in Wales—and I think that the Carron Company also worked with safety-lamps.
23678. *Q.* Have you been at the Mount Kembla Mine from time to time as long as he has been there ? *A.* Yes. At irregular, but pretty frequent intervals or visits.
23679. *Q.* I suppose you have had an opportunity of seeing the way the mine was managed and carried on ? *A.* Yes.
23680. *Q.* You have got the endless rope method ? *A.* That was installed as soon as Mr. Rogers took full charge.
23681. *Q.* How long has it been there ? *A.* Probably seven or eight years. I think it was coincident with Mr. Rogers.
23682. *Q.* Can you say whether the output has risen during the last few years ? *A.* The capabilities of the mine have vastly increased since Mr. Rogers took charge ; and the output has been steadier and greater as well.
23683. *Q.* The year before last you did good work ? *A.* The southern trade has not been a regular trade ; and it is only since the large new lines of steamers came here that it gave a manager a chance of going on with steady work.
23684. *Q.* Apart from the defects caused by shipping are there other defects in the way of keeping up the output ? *A.* Kembla is surrounded with physical difficulties. During the wet weather which we had several years ago the difficulties were simply almost unsurmountable. For two or three years there were continual floods, and thousands of tons of sand and drift were washed down ; and in one case a coal train and engine were buried. The wear and tear of the creek washed away the middle of the incline ; it was slipping away at the rate of 20 inches per day, and we had to put piles there, 62 feet long, on one side of the line, and 12 feet on the other.
23685. *His Honor.*] Is not this evidence very remote ?
23686. *Mr. Wade.*] If there are certain defects connected with the output, and if a good output has been maintained, this has not been done by incompetency but by good management.
23687. *His Honor.*] It is only indirectly relevant, if at all. It is only a question of time.
23688. *Mr. Wade.*] What time ?
23689. *His Honor.*] We do not want to take more evidence than is of use to the Commission.
23690. *Mr. Wade.*] It has been suggested that the mine was starved ; if I could show that there is a good output, and that it was not done without skill on the part of the management, and that a good deal of money was spent on the mine, that should be of value to the Commission.
23691. *His Honor.*] I think you might confine yourself to matters having relation to the safety of the mine, as far as possible.
23692. *Mr. Wade.*] *Q.* Has there been any stinting of money for the carrying on of the mine in a safe and proper manner ? *A.* There has been no stint of money. There is not a single brick of Old Kembla remaining which has not been remodelled.
23693. *Q.* Do you remember when the new furnace was put in ? *A.* Yes, very soon after Mr. Ronaldson and Mr. Rogers went to Kembla—about twelve or thirteen years ago. A number of irregularities were discovered at the time ; and we thought that we would start a new furnace with the new management. Very soon after they came we re-started sinking
23694. *Q.* You know of Gallagher's being burnt ? *A.* I do not know of the matter.
23695. *Q.* During your association with Kembla, up to the 31st of July last, had you ever heard of gas being found in the mine ? *A.* Never.
23696. *Q.* Have you any reason to believe it was what is called a gassy mine ? *A.* Oh, no ; the very contrary.
23697. *Q.* With regard to dryness and dustiness ? What do you say about that ? *A.* It was neither a dry nor a dusty mine. In ordinary weather it was rather a wet mine. The roads were wet, especially in No. 1 Right.

23698. *Q.* Where did the water come from? *A.* It came from the roof, where it had fallen after taking out the pillars.
23699. *Q.* In what district? *A.* There was a good deal of surface water from the outcrop; and large quantities of water came down at the shaft district. That was stopped by Mr. Rogers adopting a suggestion of mine; that, instead of taking out single pillars, he should take them out in pairs or breasts and then possibly the superincumbent strata would settle gradually. It evidently had the effect; because we were never troubled with water afterwards.
23700. *Q.* Are you including the 4th Right? *A.* That is, between the outcrop and No. 1.
23701. *Q.* Have you had any opportunities of seeing from time to time the way the roof came down? *A.* I have frequently seen the way the roof has fallen. I have never heard of any difficulty in getting it down, until this very last event.
23702. *Q.* Just suppose that gas had been in the 4th Right—what would be the likelihood of finding it after the place had been worked for three years and the pillars taken out? *A.* You are asking me to assume something which I know not to be the case. I know there has never been gas found in the 4th Right; I should have to assume something that is not a fact.
23703. *Q.* Would it have drained away? *A.* Yes, I think so.
23704. The superincumbent strata there do not contain gas; it is nearly all sandstone strata. In sinking a shaft 405 feet or 410 feet we only found 3 or 4 feet of shale. The rest was sandstone and conglomerate, which give off no gas. In none of the falls from the pillars being taken out has gas been given off. They are not strata that contain gas.

(The Commission, at 4 p.m., adjourned until 10 o'clock the following day).

THURSDAY, 5 MARCH, 1903, 10 a.m.

[*The Commission met at the Supreme Court, King-street, Sydney.*]

Present:

C. E. R. MURRAY, Esq., D.C.J. (President).

D. A. W. ROBERTSON, Esq., Commissioner. | D. RITCHIE, Esq., Commissioner.

Mr. Bruce Smith, Barrister-at-Law, instructed by Mr. Wood, Crown Solicitor's Office, appeared on behalf of the Crown.

Mr. A. A. Atkinson, Chief Inspector of Coal-mines, assisted Mr. Bruce Smith.

Mr. A. A. Lysaght, Solicitor, appeared on behalf of—
(*a*) the representatives of deceased miners, wheelers, &c. (victims of the explosion);
(*b*) the employees of the Mount Kembla Colliery (miners, wheelers, &c.); and
(*c*) the Illawarra Colliery Employees' Association (the Southern Miners' Union).

Mr. C. G. Wade, Barrister at-Law, instructed by Messrs. Curtiss and Barry, Solicitors, was present on behalf of the Mount Kembla Coal and Oil Company (Proprietors of the Mount Kembla Mine).

(Mr. J. Garlick, Secretary to the Commission, was present to take shorthand notes of the evidence and proceedings.)

Dr. J. R. M. ROBERTSON, previously sworn, was further examined as under:—

Examination-in-chief by Mr. Wade:—

23705. *Q.* There is one other question I want to ask you with regard to the dampness of Mount Kembla Mine: did you have any communication from Mr. Rowan with regard to that matter just before he left? *A.* Yes; Mr. Rowan spoke to me in the train before he left, and stated that he had been having a lengthy examination of the mine, and found everything in a very satisfactory state; but, if I would speak to Mr. Rogers to dry No. 1, he thought it would be an improvement.
23706. *Q.* Do you know Mr. Wight? *A.* The late under-manager?
23707. *Q.* The late under-manager, Mr. Wight? *A.* Perfectly well, yes.
23708. *Q.* When was he there: before Leitch went? *A.* Yes.
23709. *Q.* Leitch's predecessor? *A.* Yes.
23710. *Q.* He is in New Zealand now? *A.* He went to take the management of some mines in New Zealand.
23711. *Q.* Have you received a communication from him? *A.* Yes, I did: during the inquest. I think before the inquest was over, he wrote saying that he was horrified to hear ——[*interrupted*].
23712. *Q.* Did you receive a letter from him with regard to the condition of Mount Kembla? *A.* Yes.
23713. *Q.* Is this it? *A.* Yes, I gave it to you this morning. [*The letter was then handed to His Honor.*]
23714. *Mr. Bruce Smith.*] Personally I do not object to this; but the principle of admitting irresponsible letters received from people who are not on oath and not subject to cross-examination is a doubtful one.
23715. *His Honor.*] The value would be infinitesimal.
23716. *Mr. Bruce Smith.*] Supposing a letter of that sort contained a direct denial of something that was in the evidence.
23717. *His Honor.*] Of course, in the usual order of things, it is not evidence.
23718. *Mr. Wade.*] It is in the same position as Mr. Hebbard's letter.
23719. *His Honor.*] But, apart from its not being legal evidence, its actual value is so small that it is practically at the vanishing point. The Commission feels confident too that the probability is that, when Wight left, he had no idea that anything like this disaster would ever happen.
23720. *Mr. Wade.*] It is with regard to the question of gas, and the question of the dampness of the mine.
23721. *Mr. Bruce Smith.*] I shall propose that His Honor will look at the letter first.
23722. *Mr. Wade.*] I tender that letter on the same ground as Mr. Hebbard's letter was tendered on. The letters are not legal evidence in either case. Mr. Bruce Smith tendered Mr. Hebbard's letter to disprove certain

certain statements made in a paper, *The Colliery Guardian*. This letter, Mr. Wight's, bears all the indications of *bonâ fides*. It comes from Mr. Wight; and it purports to be authenticated by a Justice of the Peace, before whom it was signed. If those are not *primâ facie* indications of good faith and truthfulness, I cannot say what is.

23723. *Mr. Bruce Smith.*] Mr. Hebbard's letter was not about the Mount Kembla disaster: it was about the fall at Broken Hill South.

23724. *Mr. Wade.*] I tender Mr. Wight's letter to the Commission.

23725. *His Honor.*] Well, Mr. Wade, the letter would practically be of no value at all. We do not wish to keep anything out on purely technical grounds; and, for what it is worth, it may appear amongst the proceedings. That is all we can say. And then Mr. Lysaght may ask any questions he may wish to ask, founded upon that letter. [*His Honor then read the letter.*]

23726. *His Honor.*] I see these are direct statements. We were under the impression that it was a letter voluntarily written by Mr. Wight, who had read about the explosion and wrote what came into his mind, without suggestion or without inquiry. That would have been, in the nature of things, of some little value; but these are direct answers to questions directly put, evidently by Dr. Robertson; and under those circumstances it really seems almost improper that these answers should appear as if they were treated by us as evidence of facts. Mr. Wight could be brought over, of course, if necessary.

23727. *Mr. Wade.*] Yes, if the Commission cares to subpœna him; we have no objection.

23728. *His Honor.*] Yes; but it is a question whether the Commission would care to subpœna witnesses from a remote distance.

23729. *Mr. Wade.*] That is just the difficulty we are in. The Company did not care for the expense of bringing him over here. If the Commission think, from that letter, that his evidence would be of value, they might call him.

23730. *His Honor.*] We have already said that it may appear on the proceedings; but we qualify that by saying that we shall guard ourselves against giving anything in the nature of weight to this, as we would if it were anything like legal evidence.

23731. *Mr. Bruce Smith.*] Does your honor think it ought to appear in the proceedings, together with the evidence of a large number of witnesses. If the principle is once admitted, they may simply write letters to a multiplicity of people, who will not take the responsibility of the oath, and who will not subject themselves to cross-examination. These people might make statements of a very drastic, reckless, character, which we should be quite unable to test in the usual way by cross-examination or by oath. The principle seems to me to be quite wrong. In answer to Mr. Wade, who has sought to create a parallel between this and the letter put in from Mr. Hebbard, Mr. Hebbard's letter was with regard to an accident that occurred in the Broken Hill Mine, in relation to which it had been stated that men were burnt; and that letter was put in with regard to that, but not bearing directly upon the facts of the Mount Kembla disaster, which this Commission is deputed to inquire into. This letter of Mr. Wright's is just such evidence as a man could give if he went into the box and submitted himself to the oath, and to cross-examination; and yet he gets it in in this way, standing a thousand miles off. My objection is to its being printed in the proceedings.

23732. *His Honor.*] If it appear at all, it will appear, certainly, directly connected with a note that the Commissioners do not treat it as evidence of the facts stated.

23733. *Mr. Wade.*] Does your Honor treat Mr. Hebbard's letter in that way?

23734. *His Honor.*] Mr. Hebbard's letter was put in merely to balance a statement which had been got in in some way, a statement in some paper. There a statement had been made; and a much more reliable statement was allowed to come in among the proceedings, practically to counterbalance that statement which had crept into that paper.

23735. *Mr. Bruce Smith.*] And Mr. Hebbard's statement was supported by the depositions.

23736. *His Honor.*] Yes; and the depositions are there; and they are evidence. They are rather vague on that point; but, as far as one can see, from the depositions, there was no suggestion of any burning; and Mr. Hebbard confirms that in his letter, which appears to be supported by the depositions. There is no analogy between the two cases.

23737. *Mr. Bruce Smith.*] I understand that Mr. Lysaght has three letters which he proposes to ask the Commission to accept.

23738. *Mr. Lysaght..*] Your Honor will permit me to say, with regard to those West Maitland witnesses, whom I do not consider I would not be justified in putting the Commission to the expense of bringing down, I have certain letters from them that I propose to put in.

23739. *Mr. Wade.*] They can be got. They are not at remote distances.

23740. *Mr. Lysaght.*] No; but I wanted to save time.

23741. *His Honor.*] The remoteness of a witness cannot be considered. It might be different if the writer of the letter were dead. [*The Commissioners conferred together.*]

23742. *His Honor.*] The Commission decides that, instead of rejecting this letter absolutely, they will let the matter of admitting it as part of the evidence stand over, so that, if they choose, the mine management may, at their own expense, produce the witness themselves before the Commission closes, and make this letter, which is now not evidence, absolutely admissible evidence.

23743. *Mr. Bruce Smith.*] May I see the letter, your Honor?

23744. *Mr. Wade.*] No, I object, unless it goes in evidence.

23745. *His Honor.*] As evidence, then, it is not more than provisionally admitted. The Commission having seen it, they cannot say they have not seen it; but, as I have said before, it will have no weight at all; and, therefore, they will direct that at present it do not appear in the proceedings.

23746. *Mr. Wade.*] Very well, your Honor, I will withdraw the letter altogether. We certainly cannot go to the expense of calling a witness from New Zealand.

23747. *His Honor.*] As Mr. Bruce Smith puts it, from a quite independent point of view, it would be too dangerous to admit it; and it would make it look as if it were being treated—even though it is not being treated—as evidence.

23748. *Mr. Wade.*] Do I understand that the only condition upon which it will be admitted is that the Company, at their own expense, bring this witness from New Zealand.

23749. *His Honor.*] Then, of course, it will not be necessary to produce the letter. We know the Commission do not feel justified in bringing him at the expense of the country; but we suggest that any person interested may bring the witness over at his own expense,

23750. *Mr. Wade.*] I do not quite know where the line is to be drawn. I thought that a material witness could be called at the expense of the Commission.
23751. *His Honor.*] The peculiar way in which the letter is written emphasises the objection to its being admitted as evidence, being absolute hearsay.
23752. *Mr. Wade.*] *Q.* Have you had any experience yourself of explosions in coal-mines? *A.* I have been at mines where explosions have taken place.
23753. *Q.* Would you name some of them? *A.* In this colony?
23754. *Q.* Yes. *A.* I have been in several since I came to this colony, and several in the old country—in Scotland, and in England. Immediately after the Oaks explosion I was there—I was a student at the time—and at the first Blantyre explosion; and at several of the minor explosions in the neighbourhood of our own collieries.
23755. *Q.* Where would that be, in Scotland? *A.* In Scotland, in Sterlingshire.
23756. *Q.* Were you in the Bulli Mine in this colony? *A.* Yes.
23757. *Q.* What were those explosions attributed to;—what were those supposed to be? *A.* Well, Blantyre explosion and the Oaks were long before the theory of dust explosions became prominent. All explosions were attributed to gas at that time; but looking back, in the light of subsequent evidences and discoveries, to my mind there can be no doubt or question that the Oaks was a dust explosion. Of course, the Oaks gave off gas, and dust was always present; and also at Blantyre; but in another colliery in Stirlingshire it was a pure gas explosion; and there could be no question of dust at all, because the roads were very wet, and there was no dust.
23758. *Mr. Robertson.*] *Q.* Where was that? *A.* In Duntocher Colliery.
23759. *Mr. Wade.*] *Q.* You said that it was before the theory of gas became prominent? *A.* No, dust.
23760. *Q.* Can you describe generally the results and indications after the explosions in the mine? *A.* Yes.
23761. *Q.* What were they? *A.* Charring, coking of dust in cases where dust was present, and extensive damage to the mine, and the roads; props charred, props broken, skips burnt, and the outside charred, and the general evidences of the passage of flame at a very high temperature, and a very hot condition of the mine.
23762. *Q.* Have you seen any of the bodies in those explosions? *A.* Yes.
23763. *Q.* What condition were they in? *A.* In Scotland, of course, partly owing to the climatic conditions, nearly all miners wear very heavy plaiding and clothing. In one case that I recollect, that was quite charred; and, in Blantyre, they (the bodies) were very badly burnt.
23764. *Q.* Have you had any experience of the effect of falls of roof in mines? *A.* Yes, I have known falls causing a good deal of damage, one especially in a narrow road in a colliery in Stirling, where a fall took place in a narrow horse-road, and killed the horse, and drove it over the skips it was drawing, and smashed up the skips—piled them up one on another. I have known of falls blowing open doors and doing damage at considerable distances, where, in the interval, there would be no apparent transmission of force.
23765. *Q.* Let us come to Kembla now;—when did you first go into the mine after the disaster? *A.* I was in bed when I heard of the trouble—I was very unwell at the time—and I got down by the first train, the 6 o'clock train, I think.
23766. *Q.* You got to the mine that night? *A.* I got to the mine, I think, about half-past 9 or 10 o'clock—at all events, as fast as I could get.
23767. *Q.* From time to time you have been all over the mine, have not you? *A.* Yes.
23768. *Q.* What are the first things that struck you as noticeable about the condition of affairs at Kembla? *A.* The very great damage—I noticed that there was very great damage done. The outer works were practically a wreck.
23769. *Q.* That is, at the tunnel mouth? *A.* Yes. The boilers were dislodged; the steam-pipes all shorn away; the engine a wreck; and great logs taken from the mouth of the tunnel and from under the top and jambed between the engine. Even the workshops, a good many yards to one side, and behind the boilers—the compression of the air had broken all the uprights and dislodged them to one side. The first night, of course, I only went down the tunnel for a certain purpose, a specific purpose; but there was very great damage done to the roadway, as much as you could conceive possible; but it was perfectly cool, and there was no appearance of flame, no appearance of fire having passed over it, and I had my suspicions about them—indeed, I think I mentioned about my suspicions; but, in proceeding down the main tunnel, the force rapidly diminished, until, before coming to the shaft, there was no damage done at all.
23770. *Q.* The main tunnel is the one going to the shaft;—is that the one you mean? *A.* Yes.
23771. *Mr. Bruce Smith.*] *Q.* Have you been describing the No. 1 or the main tunnel? *A.* The main tunnel, as far as the junction of the No. 1, and from the junction of the No. 1 to the shaft.
23772. *Q.* But when you spoke of the great damage? *A.* That was as far as the junction of the No. 1.
23773. *Q. Mr. Wade.*] When did you first get through the No. 1 main road? *A.* I could not go into the mine except just now and again during the recovery operations. I was required to organise the parties outside. I had more than my work cut out. I did not get in to make a thorough examination until either the Monday or the Tuesday. I have got the date.
23774. *Q.* It would be the 4th of August? *A.* Yes. Of course, I was in half-a-dozen times short distances to give orders to parties, and such like; but I made no thorough examination until the 4th of August.
23775. *Q.* Did you make a further examination subsequently, after this Monday? *A.* Yes, on many occasions; but specially on two occasions subsequent to that. I can give you the dates.
23776. *Q.* You might do so if you have got them there? *A.* On the 4th of August was the first occasion; and the 27th of August; and on the 19th September.
23777. *Q.* You have seen these plans prepared by Mr. Warburton? *A.* Yes, it was at my instance that they were prepared. I did not know at that time that the Government were preparing one, or else I do not know that I would have caused it to be done.
23778. *Q.* You gave instructions for this to be done before you knew anything about the Government surveyors? *A.* Yes; and then afterwards I understood that the Government were preparing a similar one.
23779. *Q.* You say you have gone through these three *Exhibits* Nos. 37, 38, and 39, these three different sections made by Mr. Warburton? *A.* The one is just in continuation of the other.
23780. *Q.* That is what I mean? *A.* Yes.
23781. *Q.* Does your recollection agree with these, so far as the signs of force given are concerned? *A.* Yes.

23782. *Q.* Were there any other things that you yourself noticed at any time;—jnst take the No. 1 faces [*Exhibit 38 was handed to the witness*]? *A.* No, I think that that pretty well embodies all the salient features.
23783. *Q.* All the indications of force? *A.* Yes.
23784. *Q.* Did you see any paper anywhere? *A.* Oh, yes, and torn brattice.
23785. *Q.* You see that is not marked on the plan; only forces are marked there? *A.* Yes. At this point, where the brattice cloth was burnt (bord 87), near a fall, there was some brattice burnt; in fact I believe it was on account of the brattice burning at the time that I first went into the shaft section along with my brother. It was on account of a report made to me, I think, by him, on my arrival, that he thought there was a serious fire in the face of the No. 1 working. It is Thomas and Jones' bord, No. 87, in the first cut-through down from the face.
23786. *Q.* What did you see there? *A.* I did not see that, of course, until after, on the 4th. My brother and myself and others on account of the conflicting evidence, and as it was most material that, before any extensive rescue operations should be undertaken, we should clearly ascertain the state of the workings in No. 1 went down to the shaft with a party for the purpose of ascertaining whether any of the smoke or products of combustion could be discovered. We concluded that it was quite a partial fire; and that some credence should be given to the conflicting reports by some other subsequent explorers who passed that place, and that the fire was out.
23787. *Q.* When you came to examine that locality? *A.* We found that to the dip side was a fall, a pretty close fall; and to the cut-through side was a chock, a large square timber chock; and that there were lunch papers, food papers, scattered about contiguous to that chock. A suggestion was made on the Monday that the fire must have been lit from the flame from exploded gas. Of course no discussion ensued, save that I made a remark that I thought it would require a good deal of proof to convince me that that was so, inasmuch as the dry bark on the chock was perfectly untouched by fire, and that, if there was any fire, it must have come through that cut-through and two dry battice; but it had no traces of flame or burning.
23788. *Mr. Bruce Smith.*] *Q.* Which do you call "that"? *A.* The chocks at the first cut-through from the face. There were unmistakeable evidences of the force going through these cut-throughs, and that cut-through; and that it must have passed over dry brattice which was teased almost to oakum; it must have passed over greasy paper; and it must have passed through the chock and bark and left no traces whatsoever; so that the presumption was that the firing of that brattice must, to my mind, have been caused by something different from the flame of an explosion; and I suggested at the time that it might be due to men smoking, or a match, or such like. Well, no lengthy discussion followed; but subsequently, under the ashes that resulted from the combustion of the brattice, a pipe was found; so that I think there can be no doubt about it that the men had been sitting there at the time smoking, and had lit the brattice.
23789. *Mr. Bruce Smith.*] Does not your Honor think that that pipe might be produced here. We have heard a good deal about it.
23790. *Witness.*] Oh, certainly.
23791. *Mr. Bruce Smith.*] *Q.* Have you got it? *A.* I have not got it; but it is at the mine, I will telegraph for it.
23792. *His Honor.*] There does not seem to be any doubt about the existence of it.
23793. *Mr. Bruce Smith.*] But one would like to know, because we now hear that it was in the fire.
23794. *Witness.*] No, it was down on the floor, covered by the debris from the fire.
23795. *Mr. Ritchie.*] *Q.* Would not that indicate that the fire had actually been on top of the pipe? *A.* No, it only indicated that the ashes from the brattice had fallen over the pipe.
23796. *Q.* The fire must have been actually at the pipe when it commenced at all events? *A.* It does not follow; the brattice may not have been down to the floor.
23797. *Q.* How would it light? *A.* Very likely men were there smoking just at the time.
23798. *Q.* Before they put the pipe there at all? *A.* I think at the very moment of the accident.
23799. *Mr. Robertson.*] *Q.* That is to say, the brattice was lit by the men smoking just at the moment of the explosion? *A.* Presumably, very likely. At all events I could see no connection between the lighting of that brattice cloth and the flame from an explosion; inasmuch, as, if it had been the result of the flame from an explosion, that flame left no visible trace on the brattice that it passed through, and swept away over the lunch papers and bark.
23800. *Mr. Wade.*] *Q.* That is, before it got to this brattice? *A.* Yes. It had to pass over the lunch papers, that were in a large quantity on the spot; and it left no trace on them nor on the dry bark of the chock that was within a few feet of the brattice.
23801. *Q.* Now, coming to the line of cut-throughs near the face, did you see any signs of paper there? *A.* You are pointing to those to the left of the face?
23802. *A.* Yes, between Purcell's and Aitken's working places? *A.* There were lunch papers all over. I did not pay particular attention to the exact position of the lunch papers; but they were all over the bord. I felt rather annoyed at it; because I have given very distinct orders to all the colliery managers that I have anything to do with, and have advised other colliery managers that I have nothing to do with, that they should be very particular in getting the men to take out all their lunch-papers; and have told them that a fire had been caused in a colliery in the north, presumably from that cause; and I think, soon after that, Mr. Atkinson issued a similar letter.
23803. *Q.* Did you notice the nature of the bark on any of these props near those faces? *A.* Except on one prop, doubtfully on two, within a space of, probably, 2 inches from the roof, we could get no evidence whatsoever of heat; but on one prop, just near the corner of a pillar and a bord, there were certainly a few pellets of what we took to be coked dust; but the space could be covered by your two fingers. On the other hand, there was not the slightest evidence of any flame having passed through or touched the brattice that the force displaced, in getting to that prop. The brattice in all these faces to the left of No. 1 Right was all displaced or blown outwards from No. 1.
23804. *Q.* That would be in Purcell's bord? *A.* Yes, and the adjoining ones to the left.
23805. *Q.* Tost and Bunn's bord? *A.* Yes.
23806. *Q.* Supposing the force came from the No. 1 main road, going west, would the brattice in those bords I have spoken of be right in the face of the blast? *A.* Oh, yes; they would catch the blast. They were

torn

torn away off the timber and displaced, and carried from the back of one prop to the front of the others in the bords; but the part of the brattice that was directly in front of the road was entirely carried away, torn to ribbons in some cases, and twisted round props, and teased out, as if you were teasing it for oakum. You observe it is shown twisted round the different props.

23807. *Q.* On the inbye side? *A.* Yes.

23808. *Q.* Now, I want you to listen to this; and see if you agree with this. Page 6 of the report on the circumstances attending an explosion which occurred at the Universal Colliery, Glamorganshire, on 24th May, 1901,—see if this description of the explosion corresponds with your experience of explosions in coal-mines:—

> No. 2 plan shows by means of special colours the extreme limits to which the explosion extended. By a careful personal examination I ascertained that the flame had passed through all the roadways and working places coloured pink; and that it had not penetrated into those coloured yellow. The proof that the explosion had passed through any part of the mine was afforded by the presence of crusts of coked coal-dust adhering to the timbers and coal; brattice cloths burnt to a cinder; timbers scorched and blackened superficially by heat; deposits of soot; small globular particles of intumesced coke lying upon and mixed with the dust; manifestations of violent disturbance in the form of numerous falls of roof, some of great magnitude; timbers driven out and carried some distance from the points at which they were originally set up; mine waggons, both full and empty, derailed, swung round at a greater or less angle to the rails upon which they had been standing, and, in one case, an empty waggon turned completely upside down; air-doors and their frames torn from the brick walls to which they had been attached, and the doors broken into small fragments; brick walls shattered, and the bricks strewn along the floor; and so on. The proof that the explosion had not passed through, or penetrated into, any particular roadway or working place, on the other hand, was afforded by the complete absence of every one of these phenomena.

Does that description agree with your experience? *A.* That is a general description of what you might expect to find after an explosion of gas, or of dust and gas. I think, in a neighbouring colliery to that, a little prior to that explosion—I do not know that I can give you the Welsh pronunciation; but I think the English would be Senghenydd—I think that the description of that explosion is much more graphically told.

23809. *Q.* This is the same one? *A.* I understand that in one part there it said—I read it at the time—that the very gum or resin in the spruce props was distilled out and was found in globules.

23810. *Mr. Wade.*] *Q.* Is this it? On page 7 of this report, at the bottom:—

> Evidences of very great heat were, however, visible at many points in every district; and at several points in the main roadways; consisting of scorched bark, charred timber, and coats of resin which had been drawn to the surface of the barked timber by the heat, and hardened by the evaporation of its more volatile constituents.

A. Yes, the resin.

23811. *Q.* That is what you are referring to? *A.* Yes.

23812. *Q.* Do you know of your own knowledge what the percentage of volatile matter was at Bulli? *A.* I have seen several assays of Bulli. We have got several southern coals assayed on various occasions. It varied from 22 to 23, or 24, and probably 25. I think South Bulli is 25.

23813. *Q.* What is the percentage of volatile matter in the South Wales coals? *A.* About the half of that, about 13 or 14—in some cases, I think, a little less. I think in the Merthyr Collieries it is a little less than that.

23814. *Q.* Where did you find that force originated from in the case of Mount Kembla? *A.* The 4th Right.

23815. *Q.* And what was its course after leaving the 4th Right? *A.* It is quite clear. The course was perfectly clear to me; that it came out of the 4th Right with very great force, impinged against the solid barrier of coal on the dip side of No. 1 Right; and divided, one portion going straight in to the face, and the other portion going to the adit mouth.

23816. *Mr. Bruce Smith.*] *Q.* That is one inbye and the other outbye? *A.* One in and the other out.

23817. *Mr. Wade.*] *Q.* Look at this [*Exhibit* 26], Mr. Cambage, the Mining Surveyor, traced some wire that was round a skip between the 4th Left and the 5th Right to that point marked 250 yards, between the 4th Right and the 4th Left. The wire was broken; and the skip was found inbye of the 4th Right? *A.* That is right.

23818. *Q.* You say that a great force came out of the 4th Right? *A.* Yes.

23819. *Q.* You say it split inbye and outbye when it got to the main road? *A.* Yes.

23820. *Q.* Do you think that force would be sufficient to drive that skip, if it were standing between the 4th Right and the 4th Left, to the point marked 250 yards? *A.* It was sufficient.

23821 *Q.* Do you think that skip would move at that time? *A.* Certainly. From the 4th Right inwards the whole evidence and the facts point to a continuous force going in towards the face.

23822. *Q.* It has been suggested that the explosive mixture came out of the 4th Right, and ignited at Morrison's light somewhere about the 4th Left? *A.* Yes.

23823. *Q.* I want to know whether, from what you saw, you think that would be practicable? *A.* No, I do not think it. I do not think it occurred.

23824. *Q.* Supposing a blast of air rushed out from the 4th Right and went inbye, what do you think would be the condition of Morrison's light? *A.* I do not think it would be alight whenever that force came out of the 4th Right. I do not think it would be possible for a light to exist on the main road.

23825. *Q.* If a blast of air came out of the 4th Right and went inbye to the 4th Left, you say Morrison's light would be put out? *A.* Yes.

23826. *Q.* What would put it out? *A.* Either the blast pushing the fresh air before it, the air that was coming in No. 1, or the transmission by percussion of the vibrations of the air. It travels with great rapidity something like 1,100 feet per second. No. 1 Right was an intake; a force came out and divided the intake current, and pushed it both ways. Therefore, the first force that would pass over the 4th Left would be fresh air.

23827. *Q.* You mean fresh air, quite apart from what came from the 4th Right? *A.* I could hardly say that; what would come from the 4th Right was scarcely fresh air, because it was not being renewed with such rapidity that you could say it was fresh air; but No 1 Right was an intake. This body here is in the intake (Morrison's body). The force coming out (from the 4th Right), and impinging against the solid barrier to the dip of that intake, would simply divide the intake current, and push it both ways (inbye and outby from the 4th Right)—push what was in the road both ways.

23828. *Q.* Do you think, from what you saw, that there could have been an explosion at Morrison's light; and that the explosion then travelled outbye from the 4th Left right out to the tunnel? *A.* That, to my mind, is utterly impossible.

23829. *Mr. Robertson.*] Would you repeat the question, please?

23830. *Mr. Wade.*] *Q.* Could there have been an explosion in the neighbourhood of the 4th Left, at Morrison's light, and then that explosion travel out from that point right out to the tunnel mouth? *A.* I say it is utterly against the facts.
23831. *His Honor.*] Nobody suggested that.
23832. *Mr. Wade.*] That is what Mr. Atkinson said.
23833. *Mr. Robertson.*] Does he mean to say that, if an explosion started at the 4th right, it would not go out to the tunnel mouth?
23834. *Mr. Wade.*] No. We are talking of the 4th Left. I will put it in another way.
23835. *Q.* Did you see any signs between the 4th Left and the 4th Right of an explosion having come out from the 4th Left to the 4th right? *A.* No.
23836. *His Honor.*] Mr. Atkinson suggested that it was possible for a light at the 4th Left to cause an explosion near the 4th Right, the light running back, or flashing back to the main body of gas coming out of the 4th Right. The theory was worked out in this way, that Morrison's light, meeting the inflammable end of the body of gas, flashed back to the centre of the body of inflammable gas, which was near the 4th Right. That was the suggestion; not an explosion at the 4th Left, operating as from a centre at the 4th Left. There was a question put by Mr. Bruce Smith at one stage of the proceedings which, perhaps, most clearly described the theory.
23837. *Mr. Bruce Smith.*] *Q.* Did you say it was utterly impossible for the explosion to extend to the tunnel mouth? *A.* No.
23838. *Mr. Bruce Smith.*] I thought you did. Your Honor, Mr. Garlick might read that portion of the evidence.
23839. Mr. Garlick then read the following question and answer:—"*Q.* Do you think, from what you saw, that there could have been an explosion at Morrison's light, and that the explosion then travelled outbye from the 4th Left right out to the tunnel? *A.* That, to my mind, is utterly impossible."
23840. *Witness.*] I did not hear that word "tunnel."
23841. *Mr. Bruce Smith.*] *Q.* Do you want that corrected? You do not say that is impossible? *A.* I see no evidence of the forces having travelled from Morrison's body at the 4th Left towards the 4th Right.
23842. *Q.* It is what you said, that it was utterly impossible for an explosion from Morrison's light to extend to to the tunnel? *A.* I did not hear the word "tunnel."
23843. *Q.* Where did you think it extended to? *A.* I thought it meant to the 4th Right; Mr. Wade was speaking about the 4th Right in the previous sentence.
23844. *Mr. Wade.*] This is the passage I had in my mind's eye, para. 12821. Mr. Bruce Smith asked a question in the examination in chief of Mr. Atkinson, talking about the contradictory forces towards the face of the No. 1 Right:

> "*Q.* How do you account now for that apparent contradiction; how do you reconcile those apparent contradiction? *A.* Well, assuming that ignition took place near to the 4th Left road end, or junction the explosion would radiate from that point in all directions. Going inbye from the 4th Left, the two stoppings referred to are respectively distant about 100 and 150 yards."

23845. *Q.* Did you see any signs of the force radiating from the 4th Left and going towards the 4th Right?
23846. *His Honor.*] There is no necessity to ask that, because nobody does see anything; nobody sees any forces outbye from the 4th Left; all the evidence negatives that.
23847. *Mr. Wade.*] *Q.* Supposing the force had radiated from the 4th Left, going outbye, would you expect to see some signs of it? *A.* Yes, certainly—from an explosion of gas—oh, yes.
23848. *Q.* Now, look at the plan again (Exhibit 38); you see there is something like a swirl or eddy of dust on the 4th Right junction of the No. 1 road? *A.* Yes.
23849. *Q.* When do you think that swirl would be caused? *A.* It would be swept out with the force from the 4th Right.
23850. *Q.* That is a force coming out from the 4th Right? *A.* Yes.
23851. *Mr. Robertson.*] *Q.* Is not the same appearance consistent with a force going in?
23852. *Mr. Wade.*] I was just going to ask that.
23853. *Q.* Supposing that had been caused by a force coming from the 4th Left and going into the 4th Right—sweeping it down like that? *A.* But all the facts are against that supposition between the 4th Left and the 4th Right. The whole of the evidences are that the force travelled from the mouth of the 4th Right towards and beyond the 4th Left.
23854. *Q.* If there had been dust blown out from the direction of the 4th Left towards the 4th Right, and if that dust had been sufficient to cause this deposit of dust inside the 4th Right, would you expect to have found indications of dust along against the obstacles in the road between the 4th Left and the 4th Right? *A.* I would have expected to find all these indications of force travelling from the 4th Right towards the 4th Left reversed.
23855. *Q.* Well, there were indications of dust heaped up against the outbye side of the roller seatings, were there not? *A.* Showing that the force came from the 4th Right and went inwards.
23856. *Q.* Would you expect to find any signs against those rollers if that dust had been blown from the 4th Left outwards? *A.* I would have expected all the indications in that road reversed.
23857. *Mr. Robertson.*] That is not an answer to your question, Mr. Wade, as to whether, as I suggested, the appearance of the small coal at the entrance to the 4th Right might be consistent with a force going in.
23858. *Mr. Wade.*] *Q.* Supposing you shut your mind up to everything else, and you saw this swirl of dust there, would that be consistent with a force going in the 4th Right? *A.* I would have to shut my mind to all the other evidences.
23859. *Mr. Robertson.*] That is not an answer.
23860. *Witness.*] There are a lot of these things that you never can properly explain. It is impossible to ascertain all the facts of the case at the moment of an accident.
23861. *Mr. Robertson.*] *Q.* Look at that little heap of small coal at the entrance to the 4th Right, is not the appearance of that on the plan just as consistent with a force going inbye as with a force going outbye? *A.* Well, of course, I go more upon the other forces; I have to take all the forces in the 4th Right. This did not strike me—I saw that—but it did not strike me as anything inconsistent with a force coming out. I took it as coming out of the 4th Right. It seems to me that it has just been swept out of the 4th Right and swirled round here at the canvas across the cut-through between the main No. 1 and the travelling road.

road. Everything in the 4th Right shows an outward force; and everything from the 4th Right towards the face shows a uniform inward force. I saw this, and it did not strike me as inconsistent with an outward force. It appeared to me as if it had been swept out of the 4th Right. Of course, in all these goafs there are large quantities of dust and debris and small coal. I saw it; but it did not appear to me to be at all remarkable or strange.

23862. *Q.* The point I want to get at is this: whether that heap there, as it appears on the plan, or on the ground in the mine, is not perfectly consistent with a force going inbye as well as outbye? *A.* I cannot see it, for this reason, that all the other innumerable facts——[*Interrupted*].

23863. *Q.* But I want you to shut out from your mind everything else? *A.* I cannot do it. You ask me to do an impossible thing.

23864. *Q.* Well, of course, if you will not.

23865. *Witness.*] I object to that; there is no "will not" about it. I am not here to boom anything. I am here to give a plain exposition of the facts as they appear to me. I advocate no theory. I am not here to submit any theory. I object to anybody saying I will not; it is not right.

23866. *Mr. Wade.*] *Q.* Do you remember the 4th Right roadway near the goaf edge;—did you notice any props there? *A.* Yes. I travelled over props; but it was very difficult to distinguish anything until we had got a brattice put up, until about a month or six weeks afterwards, inasmuch as the black-damp was so strong that we could not retain a light. There was great difficulty in getting into the edge at all; but when we did get a brattice put up, and got to the edge of the fall, we saw there evidently had been a couple of ehocks, one on each side of the roof; and they were tumbled down and swept from their position partially into the mouth of the road and outward.

23867. *Q.* You mean that the direction of the force was outbye? *A.* Yes, from both sides. There were evidently one on the right hand side and one on the left-hand side; and evidently the force of the fall had forced these out, the one from the right-hand side in towards the road, all pointing to a force coming down the 4th Right road.

23868. *Q.* Did you see any of the props which were pointing so as to indicate that the force drove them inbye? *A.* No, I saw no evidence of forces going inbye. I do not see how it is possible that any force could go inbye, for the reason that the fall was cut quite close up against the rib of coal. It was practically full of debris. I quite admit that, in all these cases, there are a number of little incidents, little appearances, that seem to be conflicting; but it is impossible, without having the correct data, to satisfactorily account for everything. This particular swirl of dust—I saw it—it did not strike me that there was anything about it inconsistent with a force coming out from the 4th Right; because all the surroundings point towards the force coming from the 4th Right, and down the 4th Right.

23869. *Q.* Can you form any conclusion as to the cause and the direction of an explosion in a mine by taking otherwise than a general view of the whole thing? *A.* You must take the general facts of the case. You must take them all, and examine them with as open a mind and as large a view as possible. We do not know all the facts. It is impossible for anybody to get at the facts. We are working, in almost every case, without sufficient data. We are only left to piece together the appearances as they present themselves; and leave it to our common sense to attest the cause.

23870. *Mr. Wade.*] *Q.* Now, take this case: if there had been an ignition of gas about the 4th Left, and the flame had run back to the 4th Right, and the real explosion took place there—if those were the actual facts, are the signs which you saw in the neighbourhood of the 4th Right in the No. 1 road consistent with them.

23871. *Q.* Were you able to account for this disaster on the theory of a gas explosion at all? *A.* No, I could see no evidence of it.

23872. *Q.* Then, what other possibilities occur to your mind? *A.* Apparently a great wind blast. It appears to me that all the appearances can be reconciled by that.

23873. *Q.* Would force be transmitted to distant parts? *A.* Oh, yes.

23874. *Q.* In what way? *A.* In the case of a sudden development of energy, of course it would be transmitted by percussion by waves to a distant part, in the same way that a blown out shot often opens doors, and causes a good deal of destruction at distant parts without apparently any transmission of force. In the same way the disturbance from a cannon often causes a good deal of damage to a window at a distant part; and yet a person standing between the window and the cannon can perceive no passing of the force. It is simply the percussion of the air by rapid vibrations—the transmission of the waves of sound. Almost every day in this world I get the pictures in my room displaced by the 1 o'clock gun; but if you are standing out on the lawn you can perceive no transmission of force—no force seems to pass you, as it were—but still the windows have to be left loose, or else they would be cracked, I suppose; and I have to adjust the pictures almost every day. The gun points straight that way; and it is at a distance, I suppose, of three-quarters of a mile.

23875. *Q.* Do you know whether that percussion theory has been laid down by any of the Inspectors? *A.* Yes, subsequently to this [meaning the Kembla disaster] we were very much disturbed in our minds to account for the phenomena of this disaster, and were naturally casting about in every possible way to account for it; and I received a hint from a very eminent mining engineer in the North of England, that the late Chief Inspector for Mines, Mr. Dickinson, was rather taken with the notion that some rather obscure colliery explosions could be attributed to the percussive force of the air displaced by a large fall; and, about the same period that I received that information, I read in some of the mining journals about some remarks made in connection with the Udston explosion. Udston is a large colliery in the Lanarkshire coal-field, on the margin of the Hamilton coal field, adjoining Blantyre. It seemed to me that, in that colliery, the origin of the evil was found to be in rise workings, where they had commenced pillaring; and, in that coal-field, the roof was a very tender roof indeed. A very large fall had taken place; and, in the absence of any other cogent reason, Mr. Dickinson, and, I think, Mr. Atkinson, the Inspector, and, possibly, other Inspectors—possibly Mr. Donaldson, the Inspector: I think he was there—Mr. Dickinson, at all events, in his report, attributed the probable cause of the disaster to the effect of that large fall; inasmuch as, immediately after the first explosion took place—this was to the rise—simultaneously, and in different parts of the mine to the dip, other explosions took place, which he could only account for by the percussive force of the air. And a curious thing in that explosion was this, that the only two men—of course I speak under correction, because it was an explosion that took place since I came here; in fact only

about

about twelve years ago, I think—the only two men that were saved were two men that were in the dip road between the first explosion and the explosions that occurred in the dip workings. Their light was smashed; they were stupefied by the concussion; but otherwise they were not injured; and there was no flame transmitted. It was, simply, evidently the percussive force of the air. Then, later on, a very serious explosion took place in the Talk-o'-the-Hill Colliery, where there was, practically speaking, no one in the pit at all. They were repairing the pumps; and there were two men in the bottom; but there were no men in the pit at all; and in a very exhaustive report which another brother of Mr. Aitkinson's made—he was the Inspector for the District—among a number of conclusions that he arrived at, he stated that, in the absence of any other proof, the cause might be put down to gob fires. Now, in that colliery gob fires were not an unusual thing: they occurred, and had been known. But, after the colliery was cleared up, and everything was restored to its original state, they found that there was no gob fire at all; but that there had been a very large fall of the sandstone roof; and again the suggestion was that the accident was caused by this large fall of roof compressing the air. In Talk-o'-the-hill of course there was always gas in the air, and there was an abundance of dust. Then again, in the Fernie Colliery in British Columbia, last year, a very similar explosion occurred. No doubt it was a dust explosion in the air; but, almost simultaneously with the first explosion, there were other six or seven explosions in the extreme dip workings a long distance away, and the intervening roads were wet.

23876. *Mr. Wade.*] *Q.* Is this the passage you are referring to, in the *Colliery Guardian*, 21st of February, 1902: it deals with what you said that Mr. Atkinson's conclusion was, viz., that in the absence of any other probable cause to account for the explosion, it was put down to the existence of a gob fire:—

When considering any other probable cause, it must be borne in mind that, at the time of the explosion, the ventilation of the mine was reduced to its minimum quantity, and therefore, as it was a fiery mine, gas would be present in larger volume than usual, and highly inflammable coal-dust would also be present, floating in the air and accumulated on all parts of the roadways. Thus, when the origin of the gases which formed the after-damp and gave it the peculiar smell of gob stink is looked for, it must be remembered (1) that the intake air roads were highly heated by the explosion, and (2) that there was no mechanical force to overcome this heated state of the air; (3) that the upcast had been cooled by water winding and had therefore little or no suction power, and therefore the air of the mine was stagnant until (4) the time when the fan was re-started and the stoppings and doors were restored. It is doubtlesss a fact therefore that the residual heat was sufficiently high and continuous to have a carbonising effect on the fine coal-dust, and to produce that peculiar smell, as of gob-fire, which was so distinctly in evidence, particularly when it is noted, as proved by Professor Bedson, that coal-dust will ignite at a heat of 291 degrees Fahrenheit if the heat is continuous for a time, as it would be in this case. Seeing then, that the mine (8-feet Banbury), did not possess a gob fire before the explosion, some other reason for the initiation of the explosion must be looked for; and it must be one which will agree with the indications of force and effect so realistically described by Mr. Atkinson.

Firstly then it is to be observed that the roof of the Eight-feet Banbury is one of the best in the world, viz., a thick rock which will hang for a long time over a very large area of gob before it breaks down, and it is the fall of a large mass of this roof to which we must look for the origin of the explosion. The dangers arising from heavy falls of rock roof have often been a matter of serious discussion amongst practical mining people—for instance, as to whether or not there is any real danger attachable to such falls—and some aver that one mass of rock striking against another may produce sparks of sufficient heat to ignite fire-damp. However, it is not this direct means to which the writer would attach the cause of the explosion, because the gob in the immediate neighbourhood of such a fall would be filled with fire-damp so little diluted with air as to be uninflammable, but rather to the sudden percussive action and force exerted by the falling masses of rock on mixtures of fire-damp dust and air at a distance. The reversal of the air current in the afternoon, which was noticed by the men working in the downcast shaft, was probably caused by a first breaking down of the roof in one of the gobs; (and, as) this would probably be examined by the official in the pit, and, if he found on examination that the movement had ceased, his not coming out of the pit to report is accounted for; whereas, had it been an explosion of gas, he certainly would have come out to report. But, supposing that this reversal of the ventilation was actually caused by a gas explosion ignited by a gob fire, and the official did not report it, then we can only assume that he and his mate were killed by an explosion so caused. That the men were thus killed does not appear to be supported by the facts disclosed by the examination of the pit after the explosion. Explosions have in a few instances occurred whilst there have been no men in the pit; but there are others of a more similar character which may be cited to better exemplify the effect of air percussion, such as Udston in Scotland, Llanerch in South Wales, the South Mine of the Broken Hill Company in South Australia, and the firing of shots in districts far removed from the point of origin, as at Tylorstown.

At Udston Colliery on May 28th, 1837, an explosion wrecked every district of the mine; and it was clear from the indications of force and flame that the explosion, which originated on the rise side of the pit, did not pass down into the dook section by either the intake or the return air roads, which were the only connections with the rest of the pit; and, though every man was killed, and some very badly mutilated in the dook section, the chainman, who was about midway down the dook, was neither burned nor mutilated. All the evidences of force were towards the shaft, and not inbye; and the heat and force effects were practically simultaneous with those in the rise section. Coking effects were observable in many headings, and particularly in one at the foot of the dook where the floor was covered with water.

At the Llanerch Colliery, on February 6th, 1890, an explosion occured in the dip workings of the Meadow Vein. Open lights alone were used throughout the workings; and yet through the accidental ignition of a small pocket of gas in a hole in the roof above some timber which had only just been erected, and closed up before the fireman made his morning inspection, every man in the mine was killed. The extraordinary part of this explosion was that those in the narrow headings on the lower side of the levels, and in the ends of the levels, were killed instantaneously, and burned by the great and sudden air pressure, whilst those in the stalls on the higher side, being protected by a larger cushion of air, were able to make an atempt at escape, and would have escaped had it not been for the strong after-damp created by the ignition of coal-dust. Doubtless the large volume of after-damp was largely due to the partial combustion of coal-dust set up by the sudden and great air pressure, and the residual heat of the explosion.

23877. *Mr. Wade.*] And then it refers to the Broken Hill South case, and speaks of that on the assumption that the men were singed; but Mr. Hebbard says that that was not so:

Mr. Dickinson, in his report on the Udstone explosion, remarked that it was in the rooms which were not cut-through and least dusty that there were the greatest signs of coking, extending not quite up to the face, and not in the main roads; some of the principal coking effects being in rooms which were not at work. Udston and Talk-o'-th'-Hill have much in common as to the mode of working, viz, by pillar and stall, and afterwards the removal of the pillars; and the narrow headings to the south of Millington's level were, as in the dook section at Udston, apparently traversed by fire (the effect of sudden air compression.

It is worth notice that the old south return air road in the 8 feet Banbury, which was naturally wet, and though used for haulage purposes, was not traversed by the explosion.

In conclusion, the suggestion that the Talk-o'-th'-Hill explosion was originated by the percussive effects of a heavy and sudden fall of roof, probably in a large mass, acting on air charged with fire-damp and a normal quantity of coal-dust, is almost confirmed with absolute certainty by the indications of force which Mr. Atkinson has so carefully recorded as found in Millington's level, particularly the apparently contradictory indications of the direction of force at points 35 and 37; because the effects would be exerted down all the openings between Millington's level and the gob practically simultaneously.

23878. *Mr. Wade.*] I tender that sheet.

23879. A sheet torn from the *Colliery Guardian*, dated 21/2/'02, containing an article entitled, "Notes on the Talk-o'-th'-Hill Explosion," was put in and marked *Exhibit No.* 51.

23880. *Mr. Wade.*] I tender the report of Mr. Dickinson on the Udston explosion in June 1887.
23881. The Report was put in and marked *Exhibit No.* 57.
23882. *Mr. Wade.*] *Q.* Listen to this :

> As regards the air being impregnated with fire-damp, and an explosion being spread over a wide area by pressure we would refer to a paper read before the Manchester Geological Society by Dr. Angus Smith, late Chief Inspector of Alkali Works, in which he described an apparatus (which he also exhibited to the Society), by which he then thought that the mixture of small quantities of fire-damp in atmospheric air might be detected by percussion. Soon afterwards, however, an improved instrument of the same nature, made by Mr. Dancer, optician, proved that the same result could be arrived at by the pressure of ordinary air without gas, on the principle of lighting tinder by percussion. This would afford a more likely solution of the widespread nature of the present explosion, with the force coming towards the shafts from different extremities, than that afforded by the supposition that it was the dust alone that carried the flame throughout the workings ; especially into the dook, which it would have to enter quietly first, and then return, leaving the indications of force outwards. The pressure of air, both in the dook and Blantyre sections, had been so strong as to draw every shred of clothing off some of the bodies, and to tear up tram roads there and elsewhere.

Well, in those cases you have spoken of, there was the evidence of small quantities of fire damp in the mine ? *A.* Yes.
23883. *Q.* But what I want to ask is this : do you think the principle applies the same in the conditions at Mount Kembla ? *A.* I think so.
23884. *Q.* Would you get the percussive force ? *Q.* I think so. I do not see anything inconsistent. The difficulty is to obtain proper factors and data ; and those are the things we cannot obtain, so far as I can see. But the outstanding features of Mount Kembla are these : that, while a large amount of damage was done to these particular roads in the mine, there was practically no evidence of flame at all. Practically the only evidences of flame are confined to about two or three props ; and you could almost cover those evidences with two or three fingers of your hand. Practically you have to examine most minutely to discover any evidences of heat at all ; but, in an ordinary gas explosion, the evidences are all around you, everywhere ; or in a gas and coal-dust explosion. In Bulli they were all around you everywhere ; you could not go wrong ; you could almost follow it like a line.
23885. *Q.* Now, I want to ask you about some of these recommendations that have been put forward. Recommendation No. 1 is—" Managers, under-managers, deputies, and shot-firers, to hold certificates of competency by examination, and to have had five years practical mining experience, before being eligible for respective positions." I only want to ask you about the deputies and shot-firers at present. Do you think that it would make the matter any more certain than it is now if the deputy had to pass a written examination ? *A.* No ; I do not think so. We draw our deputies now from the same class that we would draw them from in the case of examinations. They (the Managers) take the men who have had the most experience, the most cautious, and sober-minded men at present. They look for men of experience. As a matter of fact, I do not know how any one miner brought up here can get experience in shot-firing and testing with safety-lamps, except in those one or two mines they have used safety lamps, such as the Metropolitan. I do not see the possibility of getting men to pass an examination in shot-firing and testing with safety-lamps. They have had no experience here. You must draw the deputies from the class who have come from the mines in Great Britain, where safety-lamps have been in use practically for all time since the introduction of safety-lamps. I think you would simply fail to get the men.
23886. *Q.* Will you say whether, in some cases, or often, the deputies are middle-aged or elderly men ? *A.* In almost all cases I should think so ; but in the case of Mount Kembla the deputy had a first-class certificate. I do not wish to make an invidious remark, or to hurt anybody's feelings ; but I consider that William McMurray was one of the best men that I ever knew. He was conscientiousness itself : he was honesty personified in a man ; and he had had large experience—he was brought up with myself : as boys we were brought up together. I do not think that the man exists in New South Wales, or south of the Line, that could have made that man swerve from the right path.
23887. *Q.* And would you think it would be necessary for the Manager, in spite of any certificate that the aspirant for a deputy's position might hold, to examine the man himself ! *A.* I think the Manager always, practically, puts them through an examination : that is to say, he never would propose, I should think—at all events I will state my own feelings in the matter :—I never would propose for a moment to appoint a fireman whom I had not personal experience of, or in whom I had not confidence that he would do everthing that was required of him, and would do things in a proper way.
23888. *Q.* And does the element of managing his fellow beings come in ? *A.* Of course. You can get people to pass an examination, there is no doubt ; and it is very useful in its way ; but it does not follow that the man who passes would ever be a manager. A manager is born. The administrative faculties are born in a man. They are not prominently brought out by any examination. As a matter of fact the most successful managers, not only of coal-mines, but of all other mines, throughout the world, have been drawn from a class whose education has not been of a very serious description. I say nothing against education, not a word ; but I simply say this, that the most successful men, both now and in the past age, have been drawn from people who have had practically no primary education.
23889. *Q.* Do you know if there are many men, say, in New South Wales, holding Service Certificates gained in England, Scotland, or Wales ? *A.* Oh, I think the majority of the Managers in New South Wales hold Service Certificates. There are a few I know that got them in the old country ; and there are one or two who have got them since examinations were instituted here ; two, that I know of.
23890. *Q.* Would you say that the experience which they gained under such conditions in the old country would be of great value to them ? *A.* Certainly. The conditions of mining in the old country are, in a general way, totally different from the conditions ruling here. We have practically no difficulties at all. In the old country, what we would call experienced miners would be miners that you could put to any sort of work whatever ; everything would come handy to them : but the miners that we have here are simply miners trained to blast out the coal. They really do not know mining as people educated in the old country do. In a manner, it is not their fault at all : the difficulties that exist in the old country do not exist here ; and, if they did exist, we could not work our mines.
23891. *Q.* Another suggestion is [Recommendation No. 4.]—" Waste workings to be absolutely sealed off." Do you agree with that : do you think that would be safe ? *A.* I think waste workings generally are pretty sealed off.
23892. *Q.* In what sense would you say that ? *A.* Well, it is almost too general a question for anyone to answer in an intelligent way. I should like to have the promulgators of that put that question in a particular

particular way. It is almost impossible to answer it in a general way. I think waste workings, that is, goaf workings, absolutely abandoned workings, are generally sealed off. They seal themselves off: the roof falls and seals them off.

23893. *Q.* Yes, but supposing there was gas being given off in abandoned workings, do you think it would be wise to seal them up so as to make it a kind of gasometer? *A.* It might in some cases; but here again we are going into the generality. You have to deal with the particular case on its merits as it arises; but, that being so, I should say that the connecting roads should be filled up so as to avoid gas lodging as in a gasometer, as it were, or reservoir. In the waste itself, that is in the goaf, I take it that, the roof having fallen, you can do no more. In time, if the subsidence goes to the surface, as it generally does, I take it that it forms a mass as hard as the coal itself. In Longwall workings, for instance, the roof that falls, and the rubbish and debris that you put in to fill up as you take out the coal, when the pressure comes on it, in a year or two, it is just as hard as the coal itself.

23893½. *Q.* The next suggestion is that all places, except prospecting drives, should have cut-throughs not more than 30 yards apart [Recommendation 5]. Do you think that would work? *A.* It is a suggestion, I should say, of men that are totally ignorant of the physical forces brought into play in mining. No man would make a recommendation like that who knew his business. Of course, it is not difficult to reach a depth, in fact a very moderate depth, at which 30 yard pillars would be totally inadequate: in fact at comparatively moderate depths it would be inadequate; simply because the statical pressure so soon is in excess of the cohesive strength of the coal. There are no such limitations in Great Britain, where there is such a vast quantity of coal mined every day; and where the finest talent of the day exists. It is only in this insignificant Colony where you find these limitations; they are bound to be swept away in time: and that time is not far distant.

23894. *Q.* How do the depths in England compare with the depths here—I mean in the old country generally? *A.* I cannot say. We have one instance of just as deep a mine here as in the old country; but, as a rule, the depths there are greater than they are here at present; but we have very much more limited fields; and I question whether we shall get such great depths. The present rules that guide the miners and mining here have originated at a time when all the collieries were working a crop seam; that is, a shallow seam, with a very exceptionally fine roof. It has been the ruination of coal-mining in New South Wales, because it has introduced a system of wide bords and small pillars and high yardage that will be most detrimental to the expansion of the industry.

23895. *Mr. Robertson.*] *Q.* You appear to be under the impression that there are such restrictions in existence at present? *A.* Where?

23896. *Q.* Here. There are no restrictions as to distance of cut-throughs at present? *A.* No, not at present. I think it was in the last Act. In the present Act there are no restrictions, if you put in brattice. I am glad you corrected me. I was thinking of the last Act.

23897. *Mr. Wade.*] There is the alternative, that you must use brattice? *A.* But it is carried out at the present time.

23898. *Q.* Do you think the practical purposes are met, if sufficient ventilation is carried up in all cases, no matter how you get it? *A.* I think it is a mistake to limit and restrict the management of mines. I think it would be very much better if you would take a cue from the old country, and simply be content with "an adequate amount of ventilation."

23899. *Q.* The next recommendation is No. 6, that the inspection by the firemen shall be made in all cases with a locked safety-lamp? *A.* I do not think that anybody would object to that; at all events I would not object to that.

23900. *Q.* The next suggestion (Recommendation No. 7) is that, all through the year, one fortnight there should be an examination of the mine with the hydrogen lamp by the deputies of the mine, and the next fortnight there should be an examination by a Government Inspector under the same condition? *A.* I think it is quite unnecessary. I do not think that any Manager—I speak under correction—would be content to put a hydrogen lamp into the hands of every deputy. It is a very delicate and a very costly instrument; and the hydrogen flame goes to a very high temperature indeed; and I think then it might be productive of very grave results. At all events, I should not like to put a delicate instrument like a hydrogen lamp in the hands of anybody I was not sure about. I think it would be very dangerous. Besides that, at the present moment it is a very difficult matter to keep hydrogen lamps in order. At all events that is our experience. I have got out a consignment recently with two cylinders to each lamp, so that one cylinder could be getting filled while the other was in use; but I find that the makers of hydrogen lamps, like the makers of safety-lamps, do not work to a standard size; and the cylinders do not fit any lamp. They do not standardize their parts; and it is with very great difficulty that we can get hydrogen lamps that will be of any service. The hydrogen is under very high tension; and the little screw that regulates it cannot be repaired here. We have tried several instrument makers; but they cannot repair it. It leaks. I do not know very well what to do, because if you send it home, you have to send home the lamp with it, because they evidently do not standardize the screws. The same way with safety-lamps. You get out a consignment; and you want some of the parts that have been broken, or have got out of repair; and you send home for a repetition of certain parts; and you find, when they come back, that they will not fit either. And the excuse that the makers give is, "Well, we have altered the design of the lamp." We are under very great disabilities here.

23901. *Q.* But what would be the difference in time if a man had to examine the whole of the mine with a hydrogen flame? *A.* A man never could do it. It would require several men continually doing it. It would be very much better in the hands of the Manager, to go occasionally into the returns, to ascertain the nature of the returns; or, in any special case where he had reason to suspect anything. It would be very much safer that way. I should think it should be confined to that. I do not see why we should be so anxious always to fly into everything that is new. Because things are new, it does not follow that they are a bit safer. I do not see why we should get ahead of great mining communities such as England. I think we should follow them. They have hydrogen lamps; and they know the way to make them. They have people who understand these things, who are quite as reputable as any we have here. I think we should be quite content to follow them. I think a colony that produces about 4,000,000 tons of coal a year should be quite content to follow a country that produces about 250,000,000 tons.

23902. *Q.* Supposing the deputies carry out their inspections with the safety-lamp, and the Government Inspector makes his examination, and the check-inspectors make their inspection, and the Manager, at his discretion, examines with the hydrogen flame, do you think that is sufficient to secure the safety of the mine? *A.* I think it is quite sufficient.

23903. *Q.* Then the eighth suggestion is—"Minimum of 500 cubic feet of air per minute to be provided for every horse, instead of 100 as at present"? *A.* Yes. It is a large order.

23904. *Q.* Do you see any need for it? *A.* I do not see any need at all. I do not know how we are to carry on mining if such requirements as that are enacted. I think the word "adequate" covers everything. If, in the opinion of the Government Inspectors, there is not sufficient air passing over every horse, or every man and horse, in a district, he will give his reasons why he thinks so. If the Manager disagrees with him, they can meet and discuss it. I take it that the Managers find the Government Inspectors very reasonable, sensible men. I take it that the Government Inspectors as a rule find the Managers the same. If there were any special requirements, special efforts would be made to give what was necessary; but the word "adequate" covers everything.

23905. *Q.* Then, if the Inspector asked for more ventilation, and the Manager did not agree with him, what course would you suggest for settling the question? *A.* Simple arbitration, I suppose, would be the result. I can hardly fancy that any Manager could be found who, if he were convinced that the reasons adduced by the Government Inspector were right, would refuse to give the necessary ventilation. It is the boast of every Manager how much ventilation he can give. Of course it depends: all mines vary: it may be easy to circulate 500 feet in one mine producing a given output; but it may be next to impossible to circulate 500 feet in another mine producing the same output.

23906. *Q.* Without further expense? *A.* Yes; and the difference in the heat of the coal and the drag of the mine varies so much.

23907. *Q.* The eleventh suggestion is that a weekly measurement be taken of the air in each section? *A.* I do not object to frequent measurements of the air. I do not consider it is worth objecting to. At the same time, it is very much in the position of the thermometer and the barometer at the mouth of a mine. If they are not there, the Manager is punished: if they are there, the men do not look at them. It is the same with the special rules: if there are no special rules, the Manager will be punished; if you give them galore to the men, they never read them.

23908. *Q.* The next recommendation is No. 12—"Extra supply of safety-lamps, equal to one-third of number of persons employed below ground, to be kept constantly in good order and ready for use." Mr. Atkinson suggested that, in a mine working with naked lights, a number of safety-lamps equal to one-fifth of the workmen employed would be sufficient, and, in a mine working with safety-lamps, an extra number equal to one-tenth of those working would be sufficient? *A.* Yes, I am quite sure that Mr. Atkinson has given that a good deal of thought. I know of no Managers in the country who, if Mr. Atkinson asked that provision, would not comply, without any enactment. It stands to reason. The difficulty, of course, up to the present, is in getting safety-lamps. We cannot get them. I have had 1,200 safety-lamps ordered since the early days of September, and they are not yet to hand.

23909. *Q.* The next suggestion (No. 13) is—that the travelling and haulage roads, and other places necessary, should be properly watered? *A.* If they are dry and dusty, certainly, if you can get water: but there are some mines in the country where there is no water, and it cannot be got. There are some mines in the south, where, last year, if you had asked them to water the roads, they would have been glad to do it; but they had no water, and there are some mines in the north where they had to raise steam with water purchased from the Government, and taken there in the train.

23910. *Mr. Bruce Smith.*] *Q.* Which mines? *A.* Seaham and Wallsend and the Metropolitan, in the south; and Mount Kembla had no water to spare. Mount Kembla had no surface water; and all the water used for the purposes of raising steam in the boilers had to be pumped from a small reservoir inside. Of course, in ordinary seasons that would not be so.

23911. *Q.* That water came from the mine? *A.* We were at our last extremity, when a little rain came. South Bulli was in the same position: they had to bring down water in the steamers' holds, and pump it on to the jetty, and run it to their reservoirs. We were reduced to the very last extremity.

23912. *Mr. Wade.*] *Q.* When was that? *A.* Last year. A few months ago. Until this last rain came, we were just reduced to that extremity in the north that we were just about to order from the Government again, when we got an intimation that they did not know whether they could supply us, because the Hunter river was so very low. However, rain came and replenished their dam. Of course we have been finding that a great deal of the dust, especially in the northern mines, that is on the roads, has been coming from the shaking screens on the surface; and we have adopted a plan of sending fine sprays of water through the screens, below the screens; and it has perfectly obviated the dust nuisance—there is no more dust.

23913. *Q.* If you are firing a shot, and you water the neighbourhood of that shot, say, for 20 or 30 yards beyond the possible reach of the flame, and you see that there is no gas present, do you think that meets the ordinary requirements? *A.* I think it would require to meet the ordinary requirements; because in exceptional seasons you can do no more, even if you could do that. Of course, it might be that you might order the use of these high explosives; but even some of the high explosives are not devoid of flame or danger. Some of them, I see, have been removed from the permitted category. Some of those that were inclined to use in this colony have been removed entirely, as having caused explosions.

23915. *Mr. Robertson.*] Q. Still I presume the worst of the high explosives offers a greater degree of safety than gunpowder? *A.* Undoubtedly—I must confess that.

23916. *Mr. Wade.*] *Q.* Supposing an explosion takes place, and you have got only patches of road watered—do you know whether explosions have been known to pass over these wet patches? *A.* Well, that depends. Evidently in some recent explosions the explosions have passed over some very wet lengths of road, and long lengths. That depends. If it could be traced to the percussive effect of compression of air, then of course I do not see that wet roads would offer any palliation; but undoubtedly the watering of roads, where they are very dry and dusty, is a very agreeable thing to be done; provided you can saturate them; because a moderate watering is not enough. Of course another thing is the danger of watering roads where the dust is on the roof, because it is not every roof that will stand watering; and it may be that the cure may be very much worse than the disease; in fact, in one colliery that I know of in Newcastle, we had to stop watering the roof; it was bringing it down; and we had to confine our attention to thoroughly watering the sides and the floor.

23917. *Mr. Robertson.*] *Q.* But, if the roof has sufficient dust to carry on an explosion, what is the use of watering the floor? *A.* Well, of course, I do not know of any case where there was sufficient dust in the roof. I do not know of any case at present, anyway, where there was sufficient dust in the roof to raise an explosion or to carry on an explosion.

23918. *Q.* But, apparently, it does not require very much dust to carry on an explosion? *A.* No, under favourable circumstances. It is one of those things that we have yet to learn a good deal about, I daresay.

23919. *Mr. Wade.*] *Q.* And are the deposits of dust very much less with the endless rope haulage? *A.* Oh, very much less. It practically reduces it to a minimum. The close, tight, and well kept, skips that we have in this colony, permit no dust to escape. Of course, in South Wales, in those deep dry mines, the skips are without ends. The intervals between the side bars and plates are often 2 and 3 inches wide. The whole device is to carry no small coal up to the top at all. The proportion that has been inadvertently thrown into the skip by the men, or that may be made by the attrition of the skip in travelling, falls through readily; and you are travelling up to the ankles in dust. A mine in South Wales is known by—you do not see the mine readily; but you see a great black cloud of dust round about it that points to the situation of the mine. It is simply a great cloud of dust.

23920. *Q.* The next suggestion is No. 14, that the Managers should be compelled to give more personal time and attention to the management of the colliery? *A.* It is impracticable.

23921. *Q.* Have the Managers got duties besides their underground work? *A.* A Manager is simply a man placed there by the owners to do the whole business in and about and pertaining to the mine. He has a large amount of secretarial duties; and he has a large amount of time taken up by managing the different operations in or about or connected with the mine.

23922. *Q.* And is he taken away from the mine? *A.* Oh, yes. During the late Arbitration Courts the Managers of the southern mines were rarely at the collieries, except on the days that the Arbitration Court did not sit; for months they had a large amount of work to do outside the mine, and not connected with the mine, and neglected it.

23923. *Q.* Can you lay down any hard and fast rule as to how often they should go underground? *A.* As a rule, I suppose the Managers rise in the morning, and they really do not know what work they have to do. They may have cut out a course for the day; but some little thing may intervene that may alter their course for the whole day. The Manager of a southern mine might find that an accident had occurred at the jetty, miles away, that required him there. There are many things; going to the Government to arrange for waggons, and a lot of things over which he has no personal control. These are only instances that suggest themselves to me; but there are a great many more.

23924. *Q.* As far as you know is there any Manager that intentionally keeps away from the underground workings? *A.* I do not know of any. I have always found the Managers intensely interested in the mines that they manage. They take a great deal of interest in the mines that they manage. The whole care and responsibility of all the operations are upon themselves.

23925. *Q.* And, with a competent underground manager, do you think the Manager has a satisfactory deputy when he happens to be away? *A.* Oh, yes. A Manager must naturally go through his mine as often as possible; and, so far as I know, they do so. Nothing occurs more frequently, when I go to a mine without giving any notice, than that I find that the Manager is inside the mine; and, if I want to see him particularly, I have to go in to see him. I have always found the Managers to be very anxious, and very interested in the well-being of their mines. Their whole care and attention, their whole thought, is given to it.

23926. *Q.* Suggestion No. 18 is—"Instruction to employees regularly on means of escape"? *A.* Well, as a rule, a mine has only one escape, over and above the adit of the ordinary travelling road. They have only the two openings. It is only the accident of the situation that Mount Kembla had more; and it was a very fortunate thing.

23927. *Q.* Take a case like Mount Kembla, with four or five different openings, and where it would mean travelling some miles to show the men the ways out? *A.* You would not get the men to do it. It is all very well to say "do it"; but the men would not turn up to do it. Besides, I do not see any reason why you should not confine the traffic to the regular travelling road. I do not see why, because a mine has four or five openings, which, in an emergency, men may walk out by, they should be trained to these roads, any more than in the case of a colliery where there are only downcast and upcast shafts. At Mount Kembla there were travelling roads; the men did not travel on the main roads at all. They had a separate travelling road all through the mine. You would not get them to do it.

23928. *Q.* This case has been put; the case of a shaft colliery, where there are only the upcast and downcast shafts, and a number of roads totalling 20 miles in length leading to them? *A.* Well, the men from each district would come out by the travelling road. I do not see that you want anything more. It may be that I am particularly dense; but I cannot see that you want anything more. As a matter of fact, the men make for the shortest road; they follow each other; and I do not see that it would be any better if they had this tuition. Take the case of Mount Kembla, where there are four or five alternative routes; in the case of cavilling for the allotment of places every three months, it may be that some of the men will be in districts that are strange to them. Well, how could they be expected to find their way out if you had not time to teach them? They would simply go their usual travelling road; and that is the way you want them to go. That is the proper way because, although a mine has several openings, there always ought to be locked gates at the mouth of these openings; so that they would be no further forward. We do not want the men to go any way but in the regular travelling road.

23929. *Q.* I do not think the suggestion quite means that; it means that perhaps, periodically, under the supervision of a deputy, the men, say, on the cross-cut side of Mount Kembla, might be taken out round by the Longwall workings—not that they should be let go out indiscriminately by any opening they liked any day? *A.* Yes; but what would be the advantage of that for men who would not be at their work that day. What would be the good of it to them. There is nothing simpler than the travelling road at Mount Kembla. It is a good, high, well-kept travelling road.

23930. *Mr. Robertson.*] *Q.* I think the suggestion was made in view of a serious explosion blocking some of the usual exits? *A.* If Mr. Atkinson says to the Manager of Mount Kembla that he would like the men on a certain day taken out certain roads, the Manager would do that, and be glad to do it; but my knowledge of the men is this—that they would not be working that day, as the men would not go to work; the large number of them would not go.

23931. *Mr. Wade.*] *Q.* Then you have no personal objection to it, but you do not believe it would be effective? *A.* I have no personal objection to it.
23932. *Q.* But you doubt the efficacy of it? *A.* Yes.
23933. *Q.* And do men pick up their way from their mates, even if they are strangers? *A.* Oh, yes; there is no difficulty about it. As a rule, men accustomed to mining have a pretty well-developed organ of locality, something like bushmen. You would be lost in the bush where a bushmen would think it as plain as the streets of Sydney.
23934. *Q.* Would there be any advantage, do you think, in putting up something to indicate the turnings? *A.* None. There is so much destruction down below—boys tearing them down. I know I have given instructions several times to put a finger-board up; but, in a very short time, it was all battered to pieces. There is no accounting for the malicious character of some of the boys. They are out of all control. I have no objection to that, at any rate.
23935. *Q.* Recommendation No. 19. Did you ever know of a black-list of employees being kept in this country? *A.* No, I have never heard of it.
23936. *Q.* Can you say whether or not the men get their pay from the Managers when they apply for employment—from your experience? *A.* I am quite sure they do.
23937. *Q.* With regard to that previous question of instructing men to find their way out, do you think that whitewashing the corners, or marking the roof, would be any help? *A.* No, it would not; and it would involve an enormous amount of labour; and there is no need for it, because it is simply like a road through the bush—you can follow the track. When a number of people go, they leave their impress on the floor of the mine, and you can follow that; and, in the case of the Southern Mines, where there are a number of openings, and they are all intakes, you can go against the air. There is no possibility of a man losing the road if he has his wits about him.
23938. *Q.* Now, with regard to this suggestion from Newcastle, that all the roads on which the men travel at all, whatever the road is, should be brushed 6 feet high, do you see any necessity for that? *A.* None whatever.
23939. *Q.* Would it be a question of expense, do you think, where the seam is less than 6 feet? *A.* It is a question of so much expense that a good many of the owners would never think of doing it. As a rule, the coal trade of New South Wales is not under the same conditions as the coal trade at home; where such a provision would simply be scouted; it never would be proposed by a man. We here work for practically no profit; there are coal-mines here employing large numbers of men, spending no end of money in wages—and great wages, phenomenal wages too—that have never paid a dividend. We have no adequate profit here, such as they have at home. Notwithstanding the enormous, almost incomprehensible, output—250,000,000 of tons of coal, is almost impossible to conceive—notwithstanding all that, they have an abundant sale, and they get much higher prices, with much less cost of production, than we have here. We here pay the highest wages in the known world for production; and we get the lowest price in the known world for our coal.
23940. *Q.* Now, another suggestion from Newcastle is that there should be appliances in the upcast shaft sufficiently strong to haul up all the men within an hour? *A.* Well, that is pretty sweeping. There are, at present, appliances for drawing up men; but the appliances in the collieries of New South Wales cannot be excelled by any modern colliery in any part of the world. The chances of an accident are practically reduced to nil; but, notwithstanding, and very properly, all the outlet shafts have appliances for raising the men; but, probably, not in an hour. I suppose it would take half an hour, or three-quarters, to lower the men, with the large appliances of the downcast shaft. Men are disposed to be very rowdy; and they have to be kept in hand with a very strong hand at the bottom of the pit; and, of course, where the necessity arises to draw them up by an upcast pit, they are generally in an agitated state, the one pushing on before the other; and it is a work attended with a good deal more difficulty. I think that would be quite an unnecessary provision.
23941. *Q.* Do you know if there are small cages attached to the upcast shafts? *A.* I think so; small cages suited for the lighter engines that are provided.
23942. *Q.* You would want a stronger engine and a bigger cage to meet these requirements? *A.* Oh, of course, in the best of cases, in the upcast shaft they have only one cage, whereas in the downcast shaft they lower the men with both cages; the one batch of men are going down in one cage when the other cage is coming up; but in the case of the upcast shaft the haulage of the men would only be done with one rope and one cage. Some of the upcast shafts are rather small for two cages.

[At 12·45 p.m. the Commission adjourned until 1·45.]

AFTERNOON.

(On resuming at 1·45, Mr. W. R. Pratt attended to take shorthand notes of the evidence and proceedings).

Dr. JAMES ROBERT MILLAR ROBERTSON, previously sworn, was further examined as under:—

Examined by Mr. Bruce Smith:—

23943. *Q.* I understand that you say you have had thirty-seven or thirty-eight years experience in connection with coal-mining; and I take it that you appear before the Commission as an expert on the subject? *A.* No, as a witness.
23944. *Q.* You know you can be both? *A.* I do not come as an expert at all.
23945. *Q.* Have you never heard of an expert witness—he is a compound individual? *A.* That is an equivocal term.
23946. *Q.* You know, an expert witness is allowed to give his opinion; an ordinary witness can only give facts that come within his personal knowledge. You have given a good many expressions of opinion? *A.* In answer to questions.
23947. *Q.* You have not said "I do not know," "I could not say," or "If I did know"? *A.* If I could give an answer to a question, I have given it.

23948. *Q.* You gave evidence of importance, this morning, which you did not know of your own knowledge. For instance, you were not in the mine when the explosion took place? *A.* No.
23949. *Q.* You have given opinions as to the probable cause of the accident? *A.* I suppose any witness might do that. It does not take an expert to do that.
23950. *Q.* I want you to recognise that you are an expert, and that you have come to express opinions as the result of thirty-seven or thirty-eight years' experience in connection with coal-mining, a large part being as a mining engineer? *A.* Yes.
23951. *Q.* Did I understand you to say this morning that it was really impossible to explain the thing—that we do not know the facts? *A.* In connection with what?
23952. *Q.* With the explosion? *A.* I did not say explosion.
23953. *Q.* Do you say "accident"—that it is really impossible to explain it—we do not know the facts? *A.* In connection with what?
23954. *Q.* In connection with the accident? *A.* If I said that, it would be in answer to some particular question.
23955. *Q.* Do you profess to be able to explain the thing? *A.* I can explain so much of it —— [*interrupted*].
23956. *Q.* I want to know whether you said it was really impossible to explain the thing, because we do not know the facts? *A.* I cannot answer that, unless you answer me.
23957. *Q.* I mean this disaster and its cause? *A.* I said, in my opinion, it was a wind-blast.
23958. *Q.* I am coming to that by-and-bye—it will be half-an-hour before I get to that. Did you not say, "It is really impossible to explain the thing; we do not know the facts"? *A.* In connection with what?
23959. *Q.* This disaster? *A.* In connection with this disaster, I did not.
23960. *Q.* Then I misunderstood you, and took your words down wrongly. [*No answer.*]
23961. *Q.* Do you undertake to explain it, and to give your opinion as to what cause led to it? *A.* I think so. In my opinion I can give you the cause.
23962. *Q.* Now, in your opinion, what was the primary cause of this disaster? *A.* A wind-blast.
23963. *Q.* Was there any other cause but a wind-blast to lead to all the damage that took place in this mine? *A.* I think a wind-blast would account for the damage. There are some particular points in connection with the phenomena which are difficult to explain. When you come to them, I will tell you.
23964. *Q.* You can account for almost the whole of it by a wind-blast? *A.* Yes.
23965. *Q.* You said that in your opinion gas, after-damp, did not play a part in it? *A.* That is one of those matters that must be explained. Carbonic oxide did play a part in the after-effects.
23966. *Q.* What part—that is the same as carbon monoxide? *A.* Yes.
23967. *Q.* Did fire-damp play a part? *A.* No; I see no evidence of that.
23968. *Q.* What, in your opinion, would be the evidence of fire-damp playing a part? *A.* You would see in some parts evidence of flame and force emanating from the centre where it had been ignited.
23969. *Q.* Apart from that, I understand you to say that you would expect to find evidence of flame? *A.* If it were an explosion.
23970. *Q.* If you saw evidence of flame yourself, and were satisfied that there had been flame in different parts, would that alter your opinion as to the probability of fire-damp having been an element in the disaster? *A.* I know what you are coming to—you may as well come to it at once.
23971. *Q.* I want it to appear correctly on the notes? *A.* I say yes, with a qualification.
23972. *Q.* What qualification? *A.* It is impossible to shut our eyes to the fact that carbon monoxide was produced. That could only be produced in one way; by incomplete combustion of coal—or coal-dust in this case.
23973. *Mr. Wade.*] I do not think Dr. Robertson has finished his sentence.
23974. *His Honor.*] I think you should allow Dr. Robertson to finish his qualification.
23975. *Mr. Bruce Smith.*] *Q.* You had finished? *A.* Yes.
23976. *Q.* That is not an answer to my question. If you were convinced yourself that there had been flame—distinct flame—in different parts of the mine, would that satisfy you that there had been gas? *A.* No, not quite.
23977. *Q.* What would you require to satisfy yourself that there had been gas involved in that disaster, as an element? *A.* To account by a gas explosion for this accident, there must have been a large body of gas—to account for the damage done.
23978. *Q.* I did not ask you that. I am passing over your statement, and admitting for the time being that a blast of wind was the temporary cause of the trouble. I ask you—was fire-damp an element in it; and you say "Yes, with a qualification"? *A.* I quite confess I have been in error. I refer to carbon monoxide.
23979. *Q.* You said that it would cause the suffocation of men. I am asking you whether fire-damp was an element in the disaster? *A.* I saw no evidence of it.
23980. *Q.* What evidence would you require to satisfy you that there had been fire-damp? *A.* I would require to know that an explosion had taken place—an explosion of gas.
23981. *Q.* What would be the evidence of an explosion of gas? *A.* The coking of dust, the charring of timber, and the forces all towards the mouth of the tunnel.
23982. *Q.* I want to know apart from the forces? *A.* I am trying to answer you.
23983. *Q.* You told me of the causes which would lead to the evidences of force. I want to know what phenomena there would be to indicate fire-damp in the disaster? *A.* You cannot have fire without the appearance of flame.
23984. *Q.* Would you expect to see evidences of fire? *A.* Yes, if a room were burnt out you would see evidences of fire. If destroyed by a hurricane, evidences of wind force.
23985. *Q.* What evidences? *A.* You would see the timbers burnt and the inflammable material consumed, probably.
23986. *Q.* Probably—not necessarily? *A.* Yes, necessarily. You would see the brattice burnt. You would see evidence on the props, the bark would be burnt; and you would see evidence on all the inflammable material.
23987. *Q.* What would you expect to find on the men in the mine? *A.* Severe burning.

23988. *Q.* If you were satisfied that a number of men in the mine had been severely burnt, and that there were other evidences of burning, although not of complete consumption of articles, would you then believe that gas was an element in the disaster? *A.* Yes; but I did not see any such evidences.
23989. *Q.* I do not care what you saw? *A.* I should like to tell what the facts are which I saw; there is no object to be gained by assuming certain things.
23990. *His Honor.*] *Q.* If you will answer the questions as they are put to you, it will be better? *A.* I am trying to do it.
23991. *Q.* Mr. Bruce Smith is only putting a hypothetical case? *A.* Is there any need for it, when there are so many evidences of fact.
23992. *Mr. Bruce Smith.*] *Q.* I am coming to evidence which you have taken no notice of. I want to know, if you are satisfied in your own mind that a number of men have been severely burnt, would you then come to a conclusion that gas was an element in the disaster? *A.* I might, or I might not. It would depend on circumstances.
23993. *Q.* Have you read the evidence given at the inquest by the doctors? *A.* Not one word.
23994. *Q.* I am glad of it, because it will give me an opportunity of putting some fresh evidence before you;—you did not see any men burnt? *A.* I was not in the mine to see them. Nobody saw them burnt.
23995. *Q.* Do you claim a monopoly in the matter? *A.* No one came out who saw anyone burnt.
23996. *Q.* Did you see anyone burnt? *A.* I saw evidence of slight burning.
23997. *Q.* On whom? *A.* On several men.
23998. *Q.* What evidence? *A.* The epidermis raised, it was entirely confined to that.
23999. *Q.* You do not claim that nobody else saw anything you did not see? *A.* I do not know. I only claim to know what I saw myself.
24000. *Q.* I suppose, in approaching a problem of this kind with a view to its solution, you are not unprepared to hear the evidence of other men as to what they saw? *A.* Certainly not.
24001. *Q.* I suppose, if there are credible witnesses against whom there can be no suspicion of partiality, you would take their evidence as part of the data on which you would base your opinion? *A.* I should attach more importance to the evidence of persons who had seen the effects of explosions elsewhere.
24002. *Q.* You told Mr. Wade this morning, in connection with the Duntocher explosion, that there was evidence of an explosion from gas;—there was charring of timber, the burning of cloth, and men were badly burned? *A.* Yes.
24003. *Q.* These are evidences of burning by gas? *A.* Yes.
24004. *Q.* Supposing somebody else saw distinct evidence of severe burning on men's bodies, would not that affect your conclusion? *A.* With the surroundings.
24005. *Q.* What surroundings? *A.* How am I likely to know where they were.
24006. *Q.* You would look upon it as part of your data? *A.* Yes.
24007. *Q.* It would be important data in relation to the question of whether fire-damp was present? *A.* Or flame was present—yes.
24008. *Q.* Your reason is that you saw no evidence of flame? *A.* Yes.
24009. *Q.* You never read the evidence given at the inquest? *A.* Not a word.
24010. *Q.* I am glad to hear it, because I would not like to bother you with what you have read before. I am going to read to you the evidence of the medical men, and see whether that will alter your mind.
24011. *Mr. Wade.*] It must be done thoroughly. The only way would be to read the whole of it. The answers given are subsequently qualified.
24012. *His Honor.*] How did you know that Mr. Bruce Smith was not going to read the qualifications?
24013. *Mr. Bruce Smith.*] I have marked a number of passages in the cross-examination by Mr. Wade. An element of value with regard to the evidence would be the man himself who saw this; and, therefore, I am going to give you the names. The first is Dr. Nash, who, in cross-examination by Mr. Lysaght, said—

> The burns I saw on the bodies indicated to me that some flame of very high temperature had rapidly passed over the skin.

A. I would say from some other cause.
24014. *Mr. Wade.*] I object.
24015. *Mr. Bruce Smith.*] If my friend is going to interrupt, I will not proceed. If he takes exception to anything which I quote, he can quote other evidence.
24016. *His Honor.*] Mr. Wade can mark down any place which he thinks Mr. Bruce Smith ought to read, and call attention to it afterwards.
24017. *Mr. Wade.*] I wanted Mr. Bruce Smith to read the next sentence.
24018. *Mr. Bruce Smith.*] The next sentence has nothing to do with it. It is—

> The smarting of the eyes might arise from some compound of sulphur.

That has nothing to do with it. What I was reading was—

> The burns I saw on the bodies indicated to me that some flame of very high temperature had rapidly passed over the skin.

That is a clear-cut expression; and he continues—

> I could not express an opinion as to whether the burns were caused by the ignition of coal-dust alone.

—bringing under the notice of the witness the medical evidence as to the existence of flame in the mine. That is what he looks for, to say whether or not there was fire-damp present. I will read next—

> The burns I saw were produced by some flame of a very high temperature passing across the body rapidly.

A. Is that given as the result of the flame?
24019. *Q.* As the result left on the skin? *A.* Does he say the true skin was destroyed?
24020. *Q.* Further on he goes on to describe that? *A.* Yes.
24021. *Q.* Further on, in answer to Mr. Wade, the Doctor goes on to say:—

> The driving of coal-dust against the skin with great heat might produce a loosening of the skin, but not such a loosening as I saw: I did not remove the coal-dust off the loosened skin; I judged that the skin was charred, because it was black and wrinkled; I do not think one is apt to believe, from the loosening of the skin and the wrinkling of it, and the presence of coal-dust, that there has been charring when there really has not been; I judged that the bodies I saw had been burned, because of the charred and detached skin; I got the indications of charring from the coal-dust on the skin and

Witness—Dr. J. R. M. Robertson, 5 March, 1903.

and the curling up and wrinkling of the skin; the superficial skin on the hands and legs, and in some cases the trunk, was black and curled up; I judged that the men had been burnt, by the appearance of the loosened skin; the appearance referred to was black, loosened, and curled up; both sides of the loosened skin were black; that was so whenever the skin was curled up.

Further on, the Doctor says:—

The clothes were burnt on two small bodies.

A. That says nothing.

24022. *Q.* Did you see anything of that sort? *A.* I saw nothing like it.

24023. *Q.* Did you see anything like that? *A.* Yes; but I drew different conclusions.

24024. *Q.* Did you see any evidence of flame? *A.* I will explain by-and-bye.

24025. *Q.* I will now read what Dr. Paton says. He states:—

I have no doubt two small bodies had been burned by flame.

A. Which bodies?

24026. *Q.* The bodies of two boys? *A.* Where were they got from?

24027. *Mr. Wade.*] Outside the tunnel mouth.

24028. *Mr. Bruce Smith.*] *Q.* I will ask you, in parenthesis: supposing there was gas; where would you expect to find the highest temperature, inside or outside the mine? *A.* Along the whole course of the explosion.

24029. *Q.* Under cross-examination by Mr. Wade, Dr. Paton said:—

There was also the singeing of the hair; the hair had actually burnt, and I am inclined to think that it was caused by flame; because if the heat had been so intense as to cause the hair to burn, otherwise I would have expected very much more destruction of the body. I place more reliance on the condition of the hair than the skin to prove a flame; if a flame passed very rapidly over a body, I would only expect the exposed parts to be injured; if there was any inflammable material in the working place of a man whose hair was so burnt, I would expect to find it burnt also. . . . . It must have been rather a hot flame to cause the condition of the skin I saw; I should say that it was a very much hotter flame than an ordinary gas stove. . . . . The only real evidence of flame was the hair, and in some cases the clothing; there may have been eight men out of the fifty-eight upon whom there was evidence of burning; in my opinion the two small bodies had been burnt by flame.

Dr. Wade makes the following statement:—

I noticed signs of burning on some of the bodies, but I do not know whose bodies they were.

In answer to questions asked in cross-examination by myself, he says:—

I am of opinion that some of the bodies I saw were unmistakably burnt by flame, as distinguished from great heat.

In cross-examination by Mr. Lysaght, he says:—

Some of Hartley's clothing was burnt or scorched. . . . . I was the first medical man to render assistance; the first man I attended to was John Clark; that was about 3 o'clock; he was badly burned; his head, ears, face, arms, and hands, were burnt; he is still living; the front of his chest was slightly burned. . . . . His burns were from a flame.

In cross-examination by Mr. Wade, he said:—

I could not tell you whether there were any signs of burning on Clark's back; I do not believe there were—no; I think the hair was burnt all over, and his ears were badly burned, particularly the right ear; I cannot swear that the hair at the back of his head was burnt, but I believe it was; it was singed very much more than the hair singed by a barber; I am speaking now particularly of the right side of his head; there was hair left on his head. . . . . I do not think the condition of the hair could have been brought about by steam; I will not swear whether the condition of Clark's hair when I saw it could or could not have been brought about by steam. . . . . Outside, before I went in, I saw a man named Tom Smith, and a boy named Stone, and another man; Smith and Stone were burned; Smith's hair was burned, and particles of coal were ground into him like; I had difficulty in picking them off; his neck, and face, and hands were burnt, and there was an injury to his leg.

In answer to myself, he said:—

I am distinctly of opinion that there has been flame at work in causing injury to some of the men; I cannot say whether the coal-dust had been on the man's face and then a flame driven on to it, or whether hot coal-dust had been precipitated against his skin.

Dr. Lee, in cross-examination by myself, said:—

The effect of burning with a flame is to make bulbous ends on the hair; my impression is that the hair was burnt by flame. . . . . Richards appeared to be burnt by flame, except one place under the arm, which might have been burnt by his clothes burning; he did not tell me how he was burnt; I saw Hartley in his hut; he had been put to bed, and I did not see his wounds, and cannot express my opinion about them; Purcell was burnt—his face, and his arms up to the elbow; I only dressed him on the face and arms; he was employed outside the mine, so I am told; he also presented the appearance of having been burnt by flame; he has told me since that he was burned, and not scalded; he says he was never in the steam; he said he was standing at his engine, and found that something had gone wrong and would not work, and he stepped on one side, and the explosion, or whatever it was, carried away the engine, and he slipped through the floor into another place.

The same witness said:—

I was satisfied that his hair had been burnt by a flame.

In answer to myself, the same witness said:—

Some of the dead bodies appeared to me to have been burnt by flame. . . . . I am clearly of opinion that the burns I have mentioned were caused by flame.

Here is the evidence of medical men, looking at the matter in a scientific spirit;—do you mean to say that their evidence as to the appearance of flame on these bodies would have no effect on your conclusion as to the presence of fire-damp in the mine? *A.* I can see no evidence of an explosion by fire-damp.

24030. *Q.* I ask you, would not the evidence have any effect? *A.* It would have its effect; but you do not mean to say that I am not to have an opinion myself. I have seen Purcell and Clark since; I do not think they were burnt by flame—I think by steam. The steam from the boilers was roaring out of the broken steam-pipes.

24031. *Q.* Were you there? *A.* No.

24032. *Q.* Do you know that one boy says that he was not affected by steam, but was burnt? *A.* He would not know.

24033. *Q.* Not as well as you? *A.* Certainly not; I should know the difference between burning and scalding.

24034. *Q.* That evidence does not affect your mind a bit? *A.* I have heard it.

24035. *Q.* Does it modify your opinion? *A.* No.
24036. *Q.* You told us of the Duntocher explosion; you were not present? *A.* Yes; I was present immediately afterwards.
24037. *Q.* You said it was a gas explosion? *A.* Yes.
24038. *Q.* Where did you get your information from? *A.* It was in the days when we did not think of explosions by coal-dust; besides, it was a wet fire-clay floor, and there was no dust in the mine—no dust at all.
24039. *Q.* Did you see the bodies? *A.* Yes.
24040. *Q.* They were burnt? *A.* Yes.
24041. *Q.* That brought you to the conclusion that there was gas in the mine? *A.* Yes; and I said that the props were charred and that the woodwork was charred.
24042. *Q.* How many hours altogether were you in the Kembla Mine? *A.* I suppose, in those three examinations on 4th August, 27th August, and 19th September I was in the mine eight or nine hours each day.
24043. *Q.* Did you take notes? *A.* Yes.
24044. *Q.* Where are they? *A.* Here they are. [*Witness handed Counsel the notes he made on the occasions of his visits. They were put in and marked Exhibit No.* 70.]
24045. *Q.* These notes are dated 4th August, 27th August, and 19th September? *A.* Yes.
24046. *Q.* You have them in typewriting? *A.* Yes.
24047. *Q.* You do not mind my looking at them? *A.* No.
24048. *Q.* This is the extent of the notes which you took on the occasion of your visits? *A.* Yes; and I was in the mine at intermediate times.
24049. *Q.* Everything important is put down there? *A.* All the salient features.
24050. *Q.* Did you make any notes about the bodies you saw? *A.* No; that was when I was outside. I was organising on the surface; and I had no time to take any notes.
24051. *Q.* Did you see the indications which I read to you as having been noticed by the doctors? *A.* Some of them.
24052. *Q.* You did not see as many as they saw? *A.* No; I was organising night and day.
24053. *Q.* You do not pretend to have seen everything? *A.* No.
24054. *Q.* Is it not an important element, in coming to a conclusion, that you should have all the possible data that is at hand? *A.* Yes.
24055. *Q.* A little extra data will —— ? *A.* Influence you.
24056. *Q.* Will not one fact sometimes upset the whole of your conclusions? *A.* Sometimes.
24057. *Q.* You had not seen enough evidence of burning to lead you to the conclusion that there had been flame? *A.* No, not continuous flame; I have seen evidence in one or two limited areas of just puffs of flame.
24058. *Q.* You think there was flame? *A.* I think a little incandescent dust.
24059. *Q.* Will you admit there was flame? *A.* I do not know whether I can admit it or not; I think there was evidence of the incandescence of the coal-dust.
24060. *Q.* That was red heat;—will you admit there was flame? *A.* I saw no evidence of flame.
24061. *Q.* You do not admit the conclusions of any one of these four doctors? *A.* No.
24062. *Q.* Do you admit their evidence? *A.* I saw some of these men; Dr. Paton and I saw four or five bodies. I said to him that the incrustation of dust is one of the features of an explosion. Every person gets his face, and all the exposed parts, entirely incrusted with coal-dust.
24063. *Q.* He had the benefit of your opinion? *A.* Yes. At the same time, the effects of a coal-dust explosion can be easily exaggerated in cases of that kind. Dr. Nash evidently exaggerated the matter.
24064. *Q.* Do you say that all the appearances in the mine can be reconciled with a wind-blast? *A.* Yes.
24065. *Q.* How do you reconcile the evidence of flame with wind? *A.* No, I do not say there was flame.
24066. *Q.* There was no flame? *A.* No, I doubt it.
24067. *Q.* If you believe the doctors, you would say there was flame? *A.* No; I have had more experience of these things than the doctors have had.
24068. *Q.* If you had seen the indications yourself, would you believe there was flame? *A.* I saw Purcell.
24069. *Q.* If you saw the skin peeled off, and curling up, and the hair with bulbous ends, would you believe in flame? *A.* No; the hair will go in that way without any contact with flame.
24070. *Q.* What effects on the body would you consider as evidence of flame? *A.* The clothing and the skin charred.
24071. *Q.* I read about that to you? *A.* Yes; and you said burnt.
24072. *Q.* What else? *A.* The true skin destroyed.
24073. *Q.* Do you mean completely? *A.* Carbonised, say. That is evidence of flame, with surrounding circumstances on inflammable material and on the props.
24074. *Q.* I am talking about the bodies? *A.* That would be it. I have mentioned one or two things.
24075. *Q.* You have mentioned the charring of the clothing and the burning of the skin? *A.* Of the true skin.
24076. *Q.* What would be the effect of the burning of the true skin? *A.* It would be left in the form of carbon.
24077. *Q.* The skin would be gone? *A.* No, destroyed.
24078. *Q.* Not curled up? *A.* No. In the case referred to, there were only small bits of the epidermis loosened from the true skin.
24079. *Q.* How many bodies did you see? *A.* Perhaps a dozen.
24080. *Q.* Can you reconcile all these evidences with a wind theory? *A.* Yes.
24081. *Q.* I will ask you about coal-dust. What evidence would you require to satisfy you that there had been a coal-dust explosion as an element in the disaster? *A.* There was practically no evidence.
24082. *Q.* I am asking you an abstract question. What sort of evidence would you require? *A.* I would expect to find, from the outlet of the 4th Right, evidences of flame traversing the road, and incrustation of dust on props.
24083. *Q.* You would not believe there was a coal-dust explosion in the mine, unless you saw evidences of flame? *A.* Evidences of coked dust.
24084. *Q.* And flame? *A.* Yes; evidences of a gas and coal-dust explosion.

24085. *Q.* If you are once satisfied that there was flame in the mine, would you think that the presence of gas and the operation of coal-dust are feasible? *A.* All the presumptive evidence is against it, and the facts also.
24086. *Q.* I am putting a hypothetical case to you? *A.* I would rather you did not. I came here to give you the facts as they presented themselves to me.
24087. *Q.* You came here to give your opinions? *A.* I do not think hypothetical questions have any bearing on the case. It only drives you into corners. I do not think they have any bearing on the case at all.
24088. *Q.* You do not mind my having an opinion? *A.* Not at all.
24089. *Q.* You have answered a great many hypothetical questions? *A.* I am not aware that I have.
24090. *Q.* I think you did? *A.* I would be glad to change my opinion if you give me the instances.
24091. *Q.* If you set out to investigate this thing, and you were satisfied that there had been flame in this mine, would that make the presence of gas and the action of coal-dust, as an explosive, perfectly feasible? *A.* I really do not know at what you are driving.
24092. *Q.* If you were satisfied that there had been flame in that mine, would that make the presence of gas, and the action of coal-dust, feasible? *A.* If I saw evidences of flame, I should be satisfied that there had been flame. If I saw coked dust deposited on the props, I should be satisfied that it came from coal-dust.
24093. *Q.* Supposing that you had never visited the mine, and were investigating this question; and supposing you were convinced from the evidence that there had been flame in that mine, would you think the presence of gas and the operation of a coal-dust explosion perfectly feasible? *A.* If there had been flame, there would be evidences of flame; and, if there were evidences of coal-dust, it would be evidence that coal-dust had been present.
24094. *Q.* I ask you, supposing you were satisfied, in investigating this question, that there had been flame, what conclusion would you draw as to the presence of gas or coal-dust? *A.* I should like to see the evidence.
24095. *Q.* It is a purely intellectual question? *A.* If there were evidences of flame, it would be put down as such; and, if there were evidences of coal-dust, you would say that it was coal-dust, probably accelerated by gas.
24096. *His Honor.*] *Q.* Probably initiated by gas? *A.* Yes.
24097. *Mr. Bruce Smith.*] *Q.* My question suggests that you have not seen any evidence at all, and that you had never been in the mine; but that the evidence is brought before you by other people. If you were satisfied that there had been flame in that mine, what deduction would you draw from it as to the presence there of gas or coal-dust? *A.* I would draw no deductions at all.
24098. *Q.* What would you think that the flame had been caused by? *A.* It would depend on the evidence.
24099. *Q.* What would it be caused by? *A.* Do you mean a general flame, filling the road.
24100. *Q.* A flame in any part of the mine? *A.* There was flame in this mine, as, for instance burning the brattice.
24101. *Q.* What could cause the flame? I appeal to your thirty-eight years' experience? *A.* Do you mean a flame by gas?
24102. *Q.* Supposing a flame had passed through the mine at the time of the disaster, what conclusion would you draw? *A.* I should say that it was caused either by coal-dust or gas.
24103. *Q.* Either by the one or by the other? *A.* Yes.
24104. *Q.* Would it not be probable that both were present? *A.* There would be evidences of both.
24105. *Q.* Whether there was one or the other would depend on further evidence? *A.* Yes.
24106. *Q.* I suppose you are satisfied now that there was gas in that mine? *A.* No.
24107. *Q.* You remember the Gallagher case? *A.* No; I was not here. It was years ago.
24108. *Q.* Do you know anything about it? *A.* Nothing further than what I have heard.
24109. *Q.* You heard that it was a burning by gas? Dy you accept it? *A.* I think I must accept it.
24110. *Q.* Do you know that Ronaldson reported that there was gas in the mine? *A.* No; he never reported it to me.
24111. *Q.* Do you know that Mr. Atkinson found some hundreds of feet of gas at the top of No. 1? *A.* Yes; I told M'Geachie to tell him to go there to the face of No. 1, the highest part of the mine.
24112. *Q.* It was the highest part of the mine? *A.* Yes.
24113. *Q.* How do you think it came there? *A.* From the distillation of the coal-dust.
24114. *Q.* That is your explanation? *A.* That is one of the difficulties I see about the whole thing.
24115. *Q.* With a knowledge of Gallagher's case, and with the knowledge that Mr. Atkinson found gas, you still refuse to believe that the mine gave off gas? *A.* I do.
24116. *Q.* Supposing you were satisfied that there was gas exuding from parts of the mine, would that affect your opinion as to the probability of gas or fire-damp being an element in the disaster? *A.* If I knew the mine gave off gas?
24117. *Q.* If you believed it? *A.* Yes.
24118. *Q.* Supposing you were convinced from other people's evidence, as these gentlemen might be—supposing you were convinced that gas were given off from the mine, would it affect your opinion? *A.* If I believed it, it would.
24119. *Q.* You would require evidence from other people? *A.* I would hear their evidence, and satisfy myself.
24120. *Q.* Supposing you went to the mine for evidence of gas and did not find any, would you believe the evidence of other people; or would you continue to think that there was no gas? *A.* Yes, I would, knowing the history of the mine.
24121. *Q.* What is your reason for saying that you do not believe that coal-dust was an element in the disaster? *A.* I do not say it was not.
24122. *Q.* Do you think it was? *A.* I think it was to some extent. The distillation of coal-dust was an element in the disaster.
24123. *Q.* Do you think it exploded? *A.* No; I think it distilled.
24124. *Q.* You do not think there was any coal-dust explosion? *A.* No.
24125. *Q.* Supposing you were satisfied that an explosion by coal-dust was feasible? *A.* You would then see evidence of it in the mine.
24126. *Q.* Everything would depend on your being satisfied that there was flame in the mine; it comes to that? *A.* Does it?
24127. *Q.* Did you not tell me before that an explosion of coal-dust was perfectly feasible? *A.* Yes.

24128. *Q.* Did you say that you were satisfied——[*Interrupted*]. *A.* I do not think this is a proper way to get at the bottom of the matter, by confusing me in this way. This case has caused me no end of anxiety, and I do not think it is the proper way to examine me. I think it is reducing the matter to Criminal Court procedure, and you are trying to twist words out of me that I do not say,
24129. *Q.* You have no right to say that. You came into this Court to express opinions? *A.* Did I say so?
24130. *Q.* I say that you did. You have been expressing opinions all the morning; and I want to see by what process you have arrived at your decisions? [*No answer.*]
24131. *Q.* Now take the Oaks and Blautyre theories. The explosion was from coal-dust? *A.* And gas. I said that it was before the day that coal-dust explosions were thought of.
24132. *Q.* You did not see these yourself? *A.* I went afterwards.
24133. *Q.* Where did you get your conclusions from that the explosion was from coal-dust? *A.* It was the Oaks Mine that I saw. I could not get to Blantyre.
24134. *Q.* How do you arrive at the conclusion that the explosion was from gas and coal-dust? *A.* It was in this way: There was so much coke——[*Interrupted*].
24135. *Q.* How do you know what the phenomena of it were? *A.* I know five pits exploded at once—spontaneously.
24136. *Q.* Were you there? *A.* No.
24137. *Q.* Did you read about it? *A.* Yes, and saw it immediately afterwards.
24138. *A.* Do you accept the conclusions of the experts? *A.* Yes.
24139. *A.* If you have never seen a mine at all, would you accept the conclusions of experts? *A.* Yes, to some extent.
24140. *Q.* Yet you refuse to accept the conclusions of four doctors? *A.* They gave no opinion as to the cause of the accident.
24141. *Q.* I am not talking about the cause of the accident? *A.* You refer to the Oaks and Blantyre disasters, and then you refer to the appearance of bodies as described by the doctors.
24142. *Q.* You told Mr. Wade that you had had an experience of falls? *A.* Yes.
24143. *Q.* Where? *A.* In the Cowden Hill Colliery.
24144. *Q.* What were the effects there? *A.* A horse was going in with ten or dozen skips; and he was driven over the skips; and the skips were all piled up and smashed.
24145. *Q.* That is all? *A.* That is all; it was a limited fall on a wet road.
24146. *Q.* Was there evidence of burning? *A.* No; it was wet.
24147. *Mr. Robertson.*] *Q.* What became of the driver? *A.* He was seriously injured.
24148. *Mr. Bruce Smith.*] *Q.* By the concussion? *A.* Yes.
24149. *Q.* No one was burnt? *A.* No; there could be none.
24150. *Q.* That is the greatest fall you have known? *A.* It is the one that I have most knowledge of at present.
24151. *Q.* You have read of the effects of large falls, but personally you have no knowledge of them? *A.* Yes.
24152. *Q.* You have told the Commission about the Universal Colliery? *A.* Yes.
24153. *Q.* Do you know anything of it? *A.* Yes.
24154. *Q.* The flame passed through some parts of it? *A.* The report of the investigation showed that.
24155. *Q.* You have no reason to doubt it? *A.* The names of those who investigated the matter are quite sufficient warranties for their accuracy.
24156. *Q.* Do you think that the presence of naked lights in the Mount Kembla Mine, at the time of the disaster, throws any light on the possibility of a gas or coal-dust explosion? *A.* None whatever.
24157. *Q.* You would not consider it in investigating the circumstances? *A.* In an investigation of the circumstances you would consider everything.
24158. *Q.* It would have no effect on you. You know where the lights were. You know where Morrison was with the light? *A.* Yes.
24159. *Q.* You attach no importance to it? *A.* None.
24160. *Q.* Did you say that it depends upon whether you were a Commissioner or not? *A.* No; I wish you would not make such insinuations.
24161. *Q.* Now, Mr. Wade read you an article from the "Colliery Guardian." You had evidently read it? *A.* Yes, I had read it.
24162. *Q.* You keep yourself fairly well up in colliery literature; as much as your numerous business engagements will admit? This was an article—"Notes on the Talk-o'-th'-Hill Explosion"—from a correspondent. It is not an article by the "Colliery Guardian" itself? *A.* No, it is some contributor who gives his opinion.
24163. *Q.* This was on 21st February. Do you know in the very next number ——. Is this a monthly publication? *A.* No, weekly.
24164. *Q.* Do you know that in the number of the journal for 7th March, the Manager of the mine replied? *A.* I did not see it.
24165. *Q.* Do you not think it is fair, when a correspondent gives his opinion of a mine, that the Manager should be heard in reply?
24166. *Mr. Wade.*] I take the responsibility of that; at the time the views of the correspondent were read, we had not a file of the paper.
24167. *His Honor.*] To show how little dependence you can place on these matters, I may say that I have never read such an utterly unscientific statement as one that was first published in an American scientific paper, and was afterwards copied by the *Sydney Morning Herald.* It was on a question of meteorology.
24168. *Mr. Bruce Smith.*] *Q.* My object is to see that the whole of this correspondence is placed before the Commission. It was an article written by a correspondent, who had not the courage to put his name to the article; and the Manager answers that article by a letter in which he says:

> If your correspondent's theory is to be given credence, then we are to believe that a fall of roof will generate such a wave of compression and heat in a mine as to ignite coal-dust or gas at that or some distant point; that it is not necessary for active flame to travel the roadways to carry the explosion throughout the mine, but that compression alone is sufficient, and

and that this will operate through return airways free from dust, or wet roads, and eventually again ignite gas and dust in another extremety, until devastation is complete. Your corresponpent is a bold man thus to rush into print; and, with myself, I am sure that many of your readers would like to see his name.

The correspondent answers that letter, and signs himself "Your Correspondent."
24169. *Mr. Robertson*] Did he give an answer?
24170. *Mr. Bruce Smith.*] I will read it.
24171. *His Honor.*] Is it worth while to read it.
24172. *Mr. Bruce Smith.*] I will hand it to Mr. Robertson.
24173. *Q.* You told Mr. Wade that you considered that the Kembla Mine was neither dry nor dusty? *A.* Yes.
24174. *Q.* What is your standard of dustiness which would become a danger? *A.* It is difficult to define any standard. No. 1 road for instance, where the damage has taken place, was a wet road.
24175. *Q.* I want to know, apart from the amount of moisture, what is the standard of dustiness that becomes a danger? *A.* When the dust is hanging moderately thick on all parts of the sides, and the roof, and the props.
24176. *Q.* You know, according to the latest authorities, that a sufficient amount of dust would be a total of 7 oz. for every foot of road? *A.* I have heard that stated.
24177. *Q.* Would you accept it? *A.* It would depend very much on the activity of the dust—what activity it was subjected to.
24178. *Q.* You know that at the Woolwich experiments Kembla dust was found to be the second most explosive? [*No answer.*]
24179. *His Honor.*] The result was "Violent explosion." It was found that the dust was not more easily exploded than other dust; but that, when it did explode, it went off more vigorously.
24180. *Mr. Bruce Smith.*] *Q.* You saw a list giving the different degrees of explosibility? *A.* Yes; but I do not think the tests were fair. The tests were not such as would be likely to occur in a mine; and the dust which was exploded did not come from the interior of the Kembla Mine. It came from the beams on the coal bunkers.
24181. *Q.* The Manager of the mine was duly advised, and asked to supply a fair sample of the coal-dust? *A.* He could not get it in the mine, so he went to the coal bunker and took it from that.
24182. *Q.* Was that stated in the answer? *A.* I do not think it was. When Mr. Atkinson spoke to me about getting some dust, I said, "I will try to; but I do not know where you will get it from."
24183. *Q.* You do not accept a standard of dangerous dustiness? *A.* I can hardly do that. At the same time I am not in a position to deny the danger of the dust.
24184. *Q.* If you found dust in the quantity you stated, would you consider that a standard of dangerous dustiness? *A.* How could you.
24185. *Q.* If you knew that there was that quantity present in a mine, would you consider it dangerous? *A.* It would not be so dangerous in a non-gassy mine as in a gassy one.
24186. *Q.* If it were in a gassy mine? *A.* I would remove the dust.
24187. *Q.* If the mine were gassy, you would consider the dust dangerous? *A.* I would immediately take steps to quench it with water.
24188. *Q.* Now, you told Mr. Wade something about the water question—— [*Interrupted*].
24189. *Mr. Ritchie.*] *Q.* Did I understand the witness to say that the dust which was sent to Woolwich to be experimented upon did not come from the Mount Kembla Mine, but from the bunkers? *A.* Yes; it is from the small coal, which is more dusty than the other. It is very fine dust, and more bituminous, more so than any dust in the mine.
24190 *Mr. Robertson.*] *Q.* Can you tell me where the dust came from? *A.* It came from off a bunker beam. It is the dust which you see flying in the air and mixing with it, when the sun is shining, but which afterwards subsides and settles on the bunker beams.
24191. *Mr. Bruce Smith,*] *Q.* Was it not a fair sample of Kembla dust? *A.* I think you could not say so.
24192. *Q.* Was it or was it not? *A.* I hardly think so. It would be much finer on the bunkers than in the mine.
24193. *Q.* Do you doubt, if tests were made from dust taken from the mine, that the dust would be found to be equally explosive? *A.* I think it would be less explosive, because it would be naturally coarser dust. The fact is, Kembla was not a dusty mine. You could see no dust on the sides.
24194. *Q.* You said that Kembla had no water to spare? *A.* I said that last year there was none to spare.
24195. *Q.* Do you know Mat Frost. Did you read this evidence given by him at the inqmest, on page 13—

In wet weather there is an unlimited supply of water in the mine; even in this dry season there are thousands of tanks full of water come into the mine and go out in a week. There is no stint of water in the mine?

A. That is what he supposes.
24196. *Q.* Is not that true? *A.* No; we were much concerned as to whether we could hold out. I may tell you that we water regularly now.
24197. *Q.* You have tanks with sprays on them? *Q.* There was no necessity to water before.
24198. *Q* Before you had tanks with holes in the bottom? *A.* There was no necessity for watering, except in one road, and that only on the floor.
24199. *Q.* With regard to that plan made by Mr. Warburton. Did you see it? *A.* Yes.
24200. *Q.* Are you aware it misrepresented the angles? *A.* I pointed that out to him; and he said it would make no difference.
24201. *Q.* It was not you who said it would make no difference? *A.* No.
24202. *Q.* How long did it take him to make it? *A.* A goodly time.
24203. *Q.* Did it profess to record all the objects which existed in the different ways? *A.* From the mouth of No. 4.
24204. *Q.* Does it show anything like the number of objects which are shown upon Mr. Cambage's plan? *A.* Mr. Cambage's plan is more complete in detail so far as it goes.
24205. *Q.* It contains more data? *A.* Yes.
24206. *Q.* You saw Mr. Warburton's plan, after he had finished it? *A.* Yes, I saw it. It contains the salient features—that is all.
24207. *Q.* You were satisfied from what you saw that there had been fire in the mine? I saw canvas at one spot consumed into dust.

24208. *Q.* The only way you reconcile any flame in the mine, in connection with that fire, was that the fire was originated by a different cause? *A.* I thought so; and I think so still.
24209. *Q.* Do you know, in the mine in regard to which Mr. Wade read the letter - do you know that, in the report with regard to that disaster, it was found that there was a gob fire in the mine. That report states—

> The existence of a gob fire . . . . was observed on the 16th July would, I believe, account for every hing observed.

A. That does not state that there was a gob fire. It was found afterwards there was none.
24210. *Q.* Mr. W. N. Atkinson reported that as his belief? *A.* It was afterwards found that there was none.
24211. *Q.* Do you know that he reported the indications satisfied him there was one? *A.* There was no evidence of it.
24212. *Q.* If there were, would that do away with the whole theory? *A.* There was no theory.
24213. *Q.* Mr. W. N. Atkinson concluded there was? *A.* He was wrong.
24214. *Mr. Ritchie.*] *Q.* Was there any official report later proving that there was not a gob fire? *A.* I am not aware.
24215. *Q.* Is that the quotation from the official report? *A.* Yes.
24216. *Mr. Bruce Smith.*] *Q.* The report states—

> The existence of such a fire was not actually proved, nor would it have been safe to attempt to prove it; but the following considerations offer valid support to the conclusion that the explosion was due to a gob fire in the locality named.

And then Mr. W. N. Atkinson gives five different reasons—— [*Interrupted*].
24217. *Mr. Ritchie.*] That is in the report.
24218. *Mr. Bruce Smith.*] Yes.
24219. *Q.* Do you say that, subsequent to the issue of this report, any Blue Book or report has been issued dealing with the matter? *A.* I do not know; but articles have been published in the different magazines; and the statement has been made that there was no fire.
24220. *Q.* Will you tell me what is the relationship between yourself and Mr. Rogers, with regard to expenditure in connection with the Mount Kembla Mine? *A.* Mr Rogers and I generally have a consultation; and he suggests so and so. He is very cautious. As a rule, I might suggest a different way of meeting a thing; but really I never stint any expenditure.
24221. *Q.* Has he any authority to expend money without the matter being first referred to you? *A.* Oh, yes; I have perfect confidence in his judgment.
24222. *Q.* That is, where the safety of the mine is concerned? *A.* Yes; in fact, if I knew he was wrong, after he showed it to me, I should know that he was doing it for a good end, and I would not say a word to him.
24223. *Q.* Is it not a fact that, before he spends any money, he makes it a practice to come to you? *A.* He very often says that he would like so and so, and he gets liberty to get it at once.
24224. *Q.* There is no unreasonable restriction put on him in the expenditure of money for the safety of the mine? *A.* I will take a suppositious case. Say an alteration of haulage—I would say, "You work out a scheme, and let me see how it pans out."
24225. *Q.* I mean as to ordinary expenditure? *A.* There is no limit at all.
24226. *Q.* If he spent money without consulting you, he would have nothing to fear from you? *A.* No—if it were not useless expenditure.

Cross-examined by Mr. Lysaght:—

24227. *Q.* I see you are Consulting Engineer for the mine? *A.* Yes.
24228. *Q.* Have you any financial interest in the Kembla Mine? *A.* Practically none.
24229. *Q.* You are under no statutory responsibility regarding the Mount Kembla Mine? *A.* What do you mean by statutory liability?
24230. *Mr. Wade.*] That is a question of law.
24231. *Mr. Lysaght.*] I will not press it.
24232. *Q.* I think you are Managing Director? *A.* No.
24233. *Q.* If Mr. Rogers stated that you were? *A.* It would be incorrect.
24234 *Q.* If Mr. Rogers said you were the viewer? *A.* That is equivalent to being Consulting Engineer.
24235. *Q.* These notes, which you made on your inspections. I take it that they only show things which you yourself observed when you were inspecting on the day mentioned? *A.* Yes.
24236. *Q.* These notes in my hand are dated 19th of September, 1902? *A.* Yes.
24237. *Q.* Everything they contain was observed on 19th of September? *A.* Yes.
24238. *Q.* What does this mean:

> This road had no dust before accident.

How could you observe that on the 19th of September? *A.* I observed it before the accident.
24239. *Q.* I asked you if the notes you made were notes of things made on the day of which the notes bore the date? *A.* That statement refers to a previous statement.
24240. *Q.* Yes?

> Work of ridding No. 1 Right proceeding vigorously; already road, where cleared, damp with water in places. This road had no dust before accident.

A. Yes.
24241. *Q.* You had several copies made of these notes? *A.* Two or three.
24242. *Q.* You gave one to Mr. Sellers? *A.* Yes.
24243. *Q.* You gave one to Mr. Warburton? *A.* I do not think so.
24244. *Q.* Do you state that he did not get a copy of it? *A.* I do not think he did.
24245. *Q.* Did Mr. Rogers have a copy? *A.* No.
24246. *Q.* Who else? *A.* I do not think anybody but Mr. Sellers—but probably Mr. Jones had a copy of it too.
24247. *Q.* This memorandum contains not only notes of what you observed, but also the deductions you have drawn? *A.* No. 1 does.

24248. *Q.* Is that the only one? Let me read you this:

The force, however, going up the back heading to cut-through was considerable.

That is the last of a series of notes.
24249. *Q.* "It is an absolute impossibility that this was a centre. No dust, no gas, no shot—no appearances of fire." That refers to fire? *A.* That is so.
24250. *Q.* Which part? *A.* No. 1—the travelling road.
24251. *Q.* Do you not know that in No. 1 heading Mr. Atkinson found fire-damp with an ordinary safety-lamp? *A.* Yes. I sent Mr. McGeachie with him to that spot.
24252. *Q.* Where you mark "no gas"—so that the statement of "no gas" would be incorrect? *A.* There was no gas on any day except the Sunday and Monday following the disaster.
24253. *Q.* Do you not know that Morrison admitted he never inspected that place? *A.* Other people might have done so—Nelson might.
24254. *Q.* How do you know it? *A.* I think Mr. Hay told you so.
24255. *Q.* Do you not know that in the report made by Mr. Nelson there is no such inspection mentioned? *A.* Mr. Hay will tell you that he visited it a few days before the accident.
24256. *Q.* This note "No appearances of fire." Was it not in that back heading that the canvas was burnt that you spoke about this morning? *A.* No.
24257. *Q.* Did you observe that canvas had been burnt in the back heading? *A.* No; I observed a small strip of canvas was perished; but it was not burnt.
24258. *Q.* Other witnesses stated that it was burnt? *A.* I have a little in my pocket—the substance is not destroyed, and here is another piece perfectly destroyed taken from a spot 1¼ miles off where no fire was near.
24259. *Q.* Does this paragraph sum up your observations:

Force going inbye compressed air against face increasing pressure and getting O. at cut-through was distilled involving gas.

What is "O"? *A.* Oxygen. That was put in by Mr. Sellers; I had no idea then whether the air, when compressed, would produce heat enough.
24260. *Q.* Do those sentences sum up the theory you place before the Commission as to how you account for the disaster—as emanating from yourself? *A.* Hardly.
24261. *Q.* In what way do you want to modify it, "Force going inbye compressed air against face"? *A.* Apparently so. That is to say, in some way that I cannot explain, it received the oxygen, and was distilled at that point. I cannot altogether hold to the opinion of the force pointing inbye, doubling compression, and increasing the force.
24262. *Q.* You do not hold to what you put down here, as the whole of your deductions? *A.* No; I do not.
24263. *Q.* Then you have this:

From dust on main road or nearest bords possibly no flame, only heat sufficient to distil dust, or from direct concussion.

Do you mean that the heat was so great without flame that it distilled the coal-dust? *A.* Yes; that is the suggestion.
24264. *Q.* In your opinion, was the heat generated sufficiently high to distil coal-dust, and how? *A.* By the great compression that the air was subjected to by the fall in No. 4.
24265. *Q.* Do you know that, according to the evidence of Leitch, the fall in the 4th Right pillars would not be sufficient to force out the air to blow down the stoppings? *A.* I am not aware Leitch could offer the information. He had left the mine two months before.
24266. *Q.* Did you know that? *A.* I did not know that.
24267. *Q.* Do you know that Leitch would have, up to the time that he left the Colliery, a thorough knowledge of the pillars? *A.* Yes.
24268. *Q.* You know that, ten days before the disaster, the pillars in the 4th Right had been extracted as far as practicable. You also know that before the large pillars were extracted, the roof had fallen down weightily? *A.* I do not know that.
24269. *Q.* That is the evidence given by Leitch? *A.* Leitch could not give an opinion; we was not there up to two months before.
24270. *Q.* Taking it as a fact that the pillars had been extracted as far as practicable, and the timber withdrawn for the roof to fall, does your theory assume that there was one big fall? *A.* Yes; all the evidence goes to prove that.
24271. *Q.* It is essential for the maintenance of your theory? *A.* I do not think you can put it as a theory. You can put it as a suggestion.
24272. *Q.* Your suggestion depends on one big fall over a large area? *A.* I think it does.
24273. *Q.* Do you not know that, a week before the disaster, the very roof in those 4th Right pillars had taken a first fall of 2 feet 6 inches? *A.* I do not think that makes any difference.
24274. *Q.* Would not that remove the pressure from the second fall? *A.* I do not think it would.
24275. *Q.* Have you made any calculation as to what height the fall would require to be from, to force out this air? *A.* I do not think you would require anything to fall any considerable height at all to force out air.
24276. *Q.* Have you made any calculation? *A.* Yes; a test calculation, that the velocity would be over 700 miles an hour.
24277. *Q.* From what facts did you get it? *A.* We had to assume. We had no data. There was something wanting that we could not supply.
24278. *Q.* Your suggestion is based on data which you imagined? *A.* To some extent.
24279. *Q.* Your suggestion is based on data which you were forced to imagine? *A.* No; it was based on the best possible data available.
24280. *Q.* What data? *A.* Morrison suggested 2 chains square. Rogers suggested a little more. He had been away a few days; he could not tell me how much more.
24281. *Q.* Do you know that, at the time Leitch left, there was only about a 16-yard pillar on each side of the 4th Right to be extracted? *A.* I think Mr. Leitch must be wrong. We were working for two months continuously after that.

24282. *Q.* Do you know that the bords surrounding the pillars had fallen before Leitch left? *A.* I know that the roof, as well as the pillars, had been falling for the previous three years.
24283. *Q.* And had, up to that time, settled solidly? *A.* Up to the time of the disaster they fell pretty solidly.
24284. *Q.* Weight would be removed from the roof that had not fallen, by reason of the fall all round? *A.* Yes.
24285. *Q.* If there were only an area represented by a 16-yard pillar on each side? *A.* You represent more than one pillar on the sketch you have in your hand.
24286. *Q.* Between the 16-yard pillar and the other pillar nearest the goaf, you know that the pillars between had fallen and settled down solidly? *A.* I do not think so.
24287. *Q.* Leitch said so? *A.* I do not think so.
24288. *Q.* There would be an area at the most of 30 or 40 yards square to fall? *A.* Yes.
24289. *Q.* And, the first fall having come down a week before the disaster, is it not possible that the roof would continue to fall in small pieces? *A.* The evidence is that it came down all at once.
24290. *Q.* Do you not know that an inspection revealed the fact that the stones were clean—in fact they fell afterwards? *A.* Some of the stones had certainly fallen between the time of my first and second visit; but I do not think that that indicated anything. I do not see how in falls of that large extent the stones can be coated with dust, because the fall would expel the whole of the dust with the air.
24291. *Q.* Assuming that there was a fall, it would force the air up the 4th Right towards the heading, at right-angles on each side? *A.* It had nowhere to go in that direction.
24292. *Q.* Would not a fall of the roof of the 16-yard pillar force the air at right-angles to the 4th Right? *A.* No doubt a portion of the air would be driven into the interspaces of the previous fall; but that would be a small amount.
24293. *Q.* There would be a possibility of some of the air going by the escape afforded by the back heading? *A.* Yes.
24294. *Q.* That would considerably reduce the pressure of the air? *A.* Yes, if it got to the back heading; but the smallest area of No. 4 was at the mouth of No. 4 with the back heading.
24295. *Q.* What I want you to tell me is—if the pressure of the air generated heat, how do you account for men being burnt at the tunnel mouth? *A.* Men were burnt at the tunnel mouth, as far as I can see, by steam issuing from the broken steam-pipes.
24296. *Q.* We have positive evidence that they were burnt by flame? *A.* How do you account for the force going over a mile of road and leaving no trace whatever of flame?
24297. *Q.* I am not here to account for anything. How do you account for men being burnt on Price's Flat?
24298. *Mr. Wade.*] There is no evidence of men being burnt at Price's Flat.
24299. *His Honor.*] There were some signs of heat there.
24300. *Mr. Wade.*] There is no evidence of burning.
21301. *The Witness.*] Price's Flat is the place to which the fugitive men ran.
24302. *Mr. Lysaght.*] *Q.* If the doctors' evidence is correct, you cannot account for the burning? *A.* Any burning which I saw could be caused by hot air.
24303. *Q.* If the doctors' evidence is correct, you cannot account for the burning? *A.* Evidently Dr. Nash supposed the blackened condition of the skin to be connected with, or evidence of, burning.
24304. *Q.* There are four doctors—if their evidence is correct, you cannot reconcile it with your suggestion? *A.* It is just possible, of course, I tell you frankly. I was asked to read Mr. Dickenson's report of an explosion. I was relieved, because I could see in that a similar state of matters, as regards the incandescence of the dust in Kembla; but the entire absence of flame or coked dust in Kembla is one of the outstanding features you cannot ignore.
24305. *Q.* One of the witnesses says that he saw flame coming towards him ——[*Interrupted*].
24306. *Mr. Wade.*] And outran it easily.
24307. *Mr. Lysaght.*] *Q.* I want to ask you of your knowledge of gas in the Kembla Mine;—you have admitted a knowledge of the burning of Gallagher? *A.* A knowledge which I have not got.
24308. *Q.* You gave evidence on that before a Parliamentary Select Committee? *A.* I do not know of it; Mr. Ronaldson did.
24309. *Q.* At a meeting of the Select Committee on the 4th of April, 1894, concerning the workings of collieries, you were asked by Mr. Nicholson, a member of the Committee—

Q. Do you remember a man getting burnt at Mount Kembla? *A.* Yes. That was when they were driving through some old workings.

Q. Did you have bore-holes ahead? *A.* Yes; we knew that there would be no water, and gas issued from the bore-hole.

Did you give that evidence? *A.* Yes. It was only from hearsay. I had forgotten it.
24310. *Q.* Do you not know that Mr. Ronaldson gave evidence before the Commission on the Coal Mines Bill, and, in answer to Mr. Curley, admitted that the Kembla seam gave off gas in small quantities in all places? *A.* He may mean by the Kembla seam that it was given off in the same seam in other collieries.
24311. *Mr. Robertson.*] Did he say "in all places"? I do not think he did.
24312. *Mr. Lysaght.*] I have a quotation here on the notes.
24313. *Mr. Wade.*] "In various forms."
24314. *Mr. Lysaght.*] On page 37 of the report of the inquest the words are—"In all sections in Kembla Mine fire-damp was given off rarely." But Mr. Ronaldson, before the Commission, said—"In all places." I will bring you the quotation.
24315. *Mr. Wade.*] "In all sections rarely."
24316. *Mr. Lysaght.*] I will bring you the book where it is given as "in all places." He was asked if it was in all places; and he said "In all places."
24317. *Q.* Do you know that? *A.* No.
24318. *Q.* Do you know that David Evans admitted that he had reported fire-damp to Mr. Rogers? *A.* No, I do not know that.
24319. *Q.* At page 31 of the evidence given at the Inquest he says:—

When I found gas some years ago, I reported it to Mr. Rogers, who was then underground manager; I also reported it in the book; at that time we kept at Mount Kembla a special report book for gas.

[*No answer.*]

24320. *Mr. Wade.*] I object. That is simply an answer to a long string of questions which were asked the witness. The book was the ordinary book kept under the Coal Mines Act.
24321. *His Honor.*] The only object of this evidence would be to induce the witness to modify his own opinion.

[The Commission, at 4 p.m., adjourned until 12 o'clock the following Monday.]

MONDAY, 9 MARCH, 1903, 12 NOON.

[*The Commission met at the Supreme Court, King-street, Sydney.*]

Present:—

C. E. R. MURRAY, Esq., D.C.J. (President).

D. A. W. ROBERTSON, Esq., Commissioner. | D. RITCHIE, Esq., Commissioner.

Mr. Bruce Smith, Barrister-at-Law, instructed by Mr. Wood, Crown Solicitor's Office, appeared on behalf of the Crown.

Mr. A. A. Atkinson, Chief Inspector of Coal-mines, assisted Mr. Bruce Smith.

Mr. A. A. Lysaght, Solicitor, appeared on behalf of—
(*a*) the representatives of deceased miners, wheelers, &c., (victims of the explosion);
(*b*) the employees of the Mount Kembla Colliery (miners, wheelers, &c.); and
(*c*) the Illawarra Colliery Employees' Association (the Southern Miners' Union).

Mr. C. G. Wade, Barrister at-Law, instructed by Messrs. Curtiss and Barry, Solicitors, was present on behalf of the Mount Kembla Coal and Oil Company (Proprietors of the Mount Kembla Mine).

(Mr. J. Garlick, Secretary to the Commission, was present to take shorthand notes of the evidence and proceedings.)

Dr. ROBERTSON, previously sworn, was further examined as under:—

Cross-examination by Mr. Lysaght:—

24322. *Q.* You told Mr. Wade that "subsequently to the disaster we were naturally casting about in every possible way to account for it";—when did you fix on this suggestion about the heated blast of wind? *A.* I do not think that I could give you any particular time; but I began to think about it—I began to study it very earnestly; and then I wrote to some friends in the north of England; and they suggested that I might see Mr. Dickenson's suggestion as to the Udston explosion.
24323. *Q.* It is clear, then, that you could not have had this wind theory until after the month of September? *A.* Yes. The very day that we examined, we could see nothing beyond the effects of a wind blast; but we could not account, Mr. Lysaght, for the carbonic oxide. We knew that there must have been heat; and, probably, some of the examiners thought that there must have been fire.
24324. *Q.* You said that the day you examined the mine you formed the theory of the wind blast? *A.* No theory at all—the opinion.
24325. *Q.* Do you mean the first day that you went in? *A.* Yes.
24326. *Q.* The night of the disaster? *A.* No.
24327. *Q.* The 4th of August? *A.* The 4th of August.
24328. *Q.* But on that day you had not seen one-quarter of the evidences of force? *A.* I had seen them all.
24329. *Q.* Did not you tell Mr. Wade that it was owing to the suggestion you got from a friend in the north of England that you looked into this theory of Mr. Dickenson's? *A.* No. I do not know how it may have been conveyed; but I did not quite mean that. I suggested the matter to Mr. Foster, of Newcastle-on-Tyne; and, in replying, he said that it was not a new matter, but that it had been rather a favourite theory of Mr. Dickenson's, by which he had accounted for, or suggested the reason of, some of the great colliery explosions.
24330. *Q.* Now, you have no other suggestion to make to the Commission concerning the cause? *A.* No, I have no other suggestion.
24331. *Q.* Let me clearly understand, now, what it is you do suggest: it is that the fall, you say, of 44 square yards —— [*Interrupted*]? *A.* Forty-four yards square.
24332. *Q.* The fall of 44 yards square in the 4th Right forced out air at a velocity of 700 miles per hour? *A.* About that.
24333. *Q.* Which generated heat by reason of the friction? *A.* And compression.
24334 *Q.* By reason of the friction and the compression;—do you want to add anything to that? *A.* No.
24335. *Q.* Do you know that that is what Mr. Sellers has told the Commission? *A.* I think it very likely.
24336. *Q.* And do you know that Mr. Sellers admitted that he made his calculation on the assumption that the roof fell *in vacuo*? *A.* No, I did not know that.
24337. *Q.* Did you know that? *A.* No, I did not know that. It would be of no use to make that suggestion, because —— [*Interrupted*].
24338. *Q.* One moment, please;—if Mr. Sellers stated that his calculations were made on the assumption that the roof fell *in vacuo*, the results would be manifestly absurd, would they not? *A.* It is all assumption. In any case, I really cannot understand why anybody could suggest that the roof fell in the 4th Right *in vacuo*.
24339. *Q.* But I am putting it to you that, if Mr. Sellers admitted that he made his calculation on the assumption that the roof did fall *in vacuo*, his conclusions would be manifestly absurd—would they not? *A.* I think in that branch of it probably they would; but that is only one branch of the calculations. In the other branch, of course, he assumed a pressure; and then —— [*Interrupted*].

24340. *Q.* Wait a moment; I want to get it clear;—if he did it on that basis, it would be absurd? *A.* I think Mr. Sellers had better answer that himself.
24341. *Mr. Barry*] I think, your Honor, that Dr. Robertson might be allowed to explain.
24342. *Witness.*] I really do not see how you can do more than assume that that is more than a reasonable suggestion, because you can never get at the factors.
24343. *Mr. Lysaght.*] *Q.* Do you know also, or do I take it that you put it forward as part of your suggestion, that the roof fell in a block solidly, momentarily? *A.* Oh, yes; I think it has all the appearance of that.
24344. *Q.* So that the actual fall of the roof would be something about a quarter of a second in time? *A.* Rather more than that.
24345. *Q.* Half a second in time? *A.* Well, just a little over half a second.
24346. *Q.* In the whole of your mining experience, have you ever known the roof to fall in half a second? *A.* I think any individual part of the roof would fall in half a second.
24347. *Q.* Did you ever know of an instance where an area of 44 yards square has fallen in half a second? *A.* Well, I do not suppose anybody ever took the time of a fall. I would not like to be near 44 yards square falling.
24348. *Q.* Do you mean to say, as a Mining Engineer, that you believe that an area of roof 44 yards square could fall in half a second? *A.* I think so. I see nothing to prevent it.
24349. *Q.* You say that seriously? *A.* Yes, I do.
24350. *Q.* Now, did you work out the speed of 700 miles per hour yourself—the mathematical part of it? *A.* Yes.
24351. *Q.* You did? *A.* Yes.
24352. *Q.* I want to find out how you get this velocity—mathematically? *A.* Yes.
24353. *Mr. Ritchie.*] *Q.* Before you get away from that, do you mean that the falling roof came away square in a body, or one end of it ahead of the other? *A.* Practically, so far as I could judge the fall, it appeared to come away almost bodily. Of course, I could not say whether the free end came away first or not, but probably it would come away first; but it is cut clear off, sharp off, by the side of the rib.
24354. *Q.* Then, your opinion is, that the body came away practically as quickly from one end as from the other? *A.* I think so, pretty nearly that.
24355. *Mr. Lysaght.*] Is it not essential for the maintenance of your suggestion that the whole 44 yards square area should have fallen in a solid body in about half a second? *A.* Oh, no. We allowed about 50 per cent. to have escaped.
24356. If you do not mind, will you kindly follow me while you work it out. I want you to show me how you get the 700 miles per hour. You said you worked it out yourself;—will you kindly tell me how you did work it out to get 700 miles per hour, because I can only get 47 at the outside? *A.* Very well, take the cubical capacity of the air that would be displaced.
24357. *Q.* Will you do it for me: I want the figures from you that you worked out: I want them on record from you? *A.* I only throw it out as a suggestion; I know the frailties of it quite well; it must all be based on an assumption.
24358. *Q.* I am not speaking of an assumption at all; I want it mathematically. Will you just give me the figures, so that they can go down on the notes, whereby you mathematically get 700 miles an hour? *A.* Yes.
24459. *Q.* You had an area of 44 yards square? *A.* Yes; and then the area displaced—6 feet of air.
24360. *Q.* Where did you get 6 feet of air from? *A.* From the vacancy.
24361. *Q.* Did you not know that 2½ feet had already fallen? *A.* No. Still there would have been 6 feet above.
24362. *Q.* Are you aware that Mr. Sellers took it as 4½, and got this? *A.* No.
24363. *Q.* Then, do you say that you took it as 6 feet, and got 700 miles per hour? *A.* Yes.
24364. *Q.* And you never knew that Mr. Sellers took it at 4 feet 6 inches? *A.* Not so far as I am aware.
24365. *Q.* Will you tell me the amount that was displaced? *A.* Something like 2,000 yards.
24366. *Q.* Would you mind giving it to me?
24367. *His Honor.*] After all, it is a calculation that is founded on all sorts of co-efficients, which have to be considered.
24368. *Witness.*] Oh, yes. I would be very glad to hand it in. This is no place to go into a calculation.
24369. *His Honor.*] The air must be compressed before it can acquire the velocity.
24370. *Mr. Lysaght.*] *Q.* Will you admit that, mathematically, you cannot get it to 700 miles per hour? *A.* No; mathematically, you can get it.
24371. *Q.* You will undertake to work that out so that the figures can appear on the record? *A.* Oh, yes.
24372. *Q.* Leaving the mathematical part of it, now, I want you to consider the first datum—that is, if it fell in a solid body; did not you know that 2 feet 6 inches had fallen? *A.* No.
24373. *Q.* When did you first hear that? *A.* I did not hear that until now.
24374. *Q.* Did not I tell you last week, on Thursday? *A.* Well, of course, I meant that I heard it in this Court. If you did tell me, I did not recollect it; but it is since I came into this Court.
24375. *Q.* Did you ask Morrison whether the roof had fallen before? *A.* I did not ask him whether any had fallen; but I asked him the area; he said about 45 or 46 yards; but he certainly did not say that any had fallen.
24376. *Q.* When you went to view that waste, the stones near the edge of the goaf were all broken up? *A.* No, they were in very large flags.
24377. *Q.* But they were not one solid flag? *A.* Well, there were some of them, I could see, very large flags; they were probably 15 inches thick, or perhaps a little less.
24378. *Q.* Did they not indicate that the top stones were clean? *A.* I could not see the top; it was too far up.
24379. *Q.* I mean at the edge of the goaf? *A.* No, I did not see anything to draw my attention to that.
24380. *Q.* Did you not see anything indicating that the fall had not finished before the disaster? *A.* No.
24381. *Q.* Did you not tell me yourself that in one of your examinations you could see that the fall had been completed between the time you first went there and the second time? *A.* Of course, that is a very different thing; all along the roads there were stones falling every day.
24382. *Q.* I am speaking of the goaf? *A.* No.

24383. *Q.* You did not tell me that? *A.* I do not think so.
24384. *Q.* This is it, para. 24290, "*Q.* Do you not know that an inspection revealed the fact that the stones were clean—in fact they fell afterwards? *A.* Some of the stones had fallen between the time of my first and second visit; but I do not think that that indicated anything. I do not see how, in falls of that large extent, the stones can be coated with dust: because the fall would expel the whole of the dust with the air"? *A.* That is a totally different thing.
24385. *Q.* There you say that between your two visits some of the stones had certainly fallen? *A.* Oh, it was falling every day.
24386. *Q.* Do you mean to tell me you were not referring to the waste? *A.* Oh, no; I was never in the waste.
24387. *Q.* Do you mean to tell me that, when you answered that question, you were not referring to the waste? *A.* No, I was not.
24388. *Q.* What were you referring to? *A.* The roads.
24389. *Q.* Now, this is a question before that: "*Q.* And, the first fall having come down a week before the disaster, is it not possible that the roof would contiuue to fall in small pieces?" and you answered, "The evidence is that it came down all at once."? *A.* Yes.
24390. *Q.* That is the roof of the goaf, is it not? *A.* Yes.
24391. *Q.* Then, "Do you not know that an inspection revealed the fact that the stones were clean—in fact, they fell afterwards?" That referred to the stones in the goaf? *A.* I did not take it that way at all. It was impossible for me to answer a question like that, or any other body, because nobody could get in. Oh, no; there were individual stones falling from the roof in that neighbourhood during the whole of the six weeks or two months after.
24392. *Q.* Can you give me any instance of a fall 44 yards square coming in one solid block in your mining experience? *A.* No. I see nothing to prevent it —— [*interrupted*].
24393. *Q.* But you cannot give any instance of it. Now, leaving that part of the data—the solid fall—and coming to the height, do you say that the first fall of 2 feet 6 inches would not make any difference? *A.* I do not know anything about the first fall of 2 feet 6 inches.
24394. *Q.* In your opinion, would a fall, a week before the disaster, of 2 feet 6 inches, make any difference in the suggestion? *A.* Practically none.
24395. *Mr. Ritchie.*] *Q.* Would the first fall of 2 feet 6 inches produce a blast of wind equal to that which you have calculated to be produced by the second fall? *A.* I do not think so. I do not think it would materially alter the second. Besides, I do not know anything about the fall of 2 feet 6 inches.
24396. *Q.* I do not think you quite grasp the question. We have evidence here that there was a fall of 2 feet 6 inches, which has not been contradicted. This evidence has been given by the deputy, who went to see whether it would fall or not. Would this fall, a solid fall of 2 feet 6 inches thick, produce the same volume of wind that you say has been produced by the second fall? *A.* Oh, no.
24397. *Q.* Why? *A.* It would not have the weight to do it. It would not have the weight to force the air out of the narrow, constricted, space. Besides, I do not know anything about the 2 feet 6 inches fall. This is the first I have heard of it. I am sure Morrison and Rogers were there; and they would have told me of it.
24398. *Mr. Lysaght.*] *Q.* Do I understand you to say that the weight of a falling body, in a distance of 6 feet only, is of no great importance upon the volume that would be forced out? *A.* I do not think that 2 feet 6 inches of a fall would be likely to come down all in a piece. That would come down in dribs and driblets.
24399. *Mr. Ritchie.*] *Q.* Do not you know in practice that the first fall is the most likely to be a solid fall? *A.* I do not think so.
24400. *Q.* I suppose you have seen falls yourself frequently? *A.* Oh, yes, innumerable times.
24401. *Q.* And you say the first fall generally comes in dribs and drabs, and the second solidly? *A.* Yes, I think so; in fact I saw some falls in Newcastle a few weeks ago, and they came down very gradually.
24402. *Q.* Is that your experience in the south? *A.* That is my experience altogether. I do not know that it is different in the south from the north.
24403. *Q.* Are the strata the same? *A.* They are very similar strata
24404. *Q.* Do the strata in the north and the south differ? *A.* I think that in the old pits in Newcastle the strata are pretty much the same as in the south.
24405. *Q.* In the falls you have seen, did they come down in a square block, or hoop themselves out in falling? *A.* No; they came down from the outer margins, and came down gradually.
24406. *Q.* Does the fall come in a square block? *A.* There is no rule for that.
24407. *Q.* No rule at all? *A.* No rule at all.
24408. *Q.* Does it appeal to your common sense very strongly to imagine, even if you had not seen it, that the first fall would be likely to come away more solidly than the second fall, which would be a broken surface? *A.* No, I do not think so.
24409. *Mr. Lysaght.*] *Q.* That does not answer the question as to whether you say that a falling body is materially affected by the weight of it forcing out air, in a fall of only 6 feet? *A.* That is to say, the resistance of the air would affect the time of falling?
24410. *Q.* No; whether the weight of the solid body falling has any appreciable difference to the air that is forced out, when the fall is only 6 feet high? [*Witness did not answer.*]
24411. *Q.* Do you mean that a fall 4 feet 6 inches in thickness would have any greater power in forcing out air than a fall 2 feet 6 inches in thickness, when the height of the fall is only 6 feet? *A.* Yes.
24412. *Mr. Robertson.*] *Q.* In other words, the velocity of the air would be governed by the weight of the falling body? *A.* Certainly.
24413. *His Honor.*] It is simply that the fall of that mass of matter is converted into horizontal force of the air.
24414. *Witness.*] If there were no opening to the air, I could conceive that the air would impede the body falling completely.
24415. *Mr. Lysaght.*] *Q.* When you were making your calculations, did you allow anything for the atmospheric pressure beneath the fall of 16·7 lb. per square inch? *A.* 14·7, I think.
24416. *Q.* Did you make any allowance for it? *A.* Yes.
24417. *Q.* And you still got 700 miles? *A.* Yes.

24418. *Q.* Do you know that Mr. Sellers stated that he allowed for it, and he got 700 miles? *A.* No; I do not know what anybody stated here. I have not read a single word of the evidence.
24419. *Q.* But you do know that you both got the 700 miles? *A.* Yes; and you can get it another way.
24420. *Q.* Then those two of the data are wrong. You see that the height is wrong, because there was a fall of 2 feet 6 inches already. Now, coming to the next datum, did you allow anything for the relief that the pressure of air would get from the back heading? *A.* Oh, yes.
24421. *Q.* What did you allow for it? *A.* I allowed in the calculation ——
24422. *Q.* What did you allow for it? *A.* To get the energy of the air you do not require any relief at all. Working out the time the body took to fall, the cubical capacity of the air displaced, and the area of the passage, would give you the velocity.
24423. *Q.* And the first opening in the area of that passage would naturally relieve the pressure, would it not? *A.* I do not quite understand you.
24424. *His Honor.*] That only comes in as far as the compression is concerned.
24425. *Mr. Lysaght.*] Yes.
24426. *Q.* Would not the back heading relieve the compression of the air? *A.* I have nothing to do with that portion of the calculation at all, the back heading.
24427. *Q.* Did you make any allowance? *A.* It does not require any.
24428. *Q.* Did you make any allowance? *A.* In that branch of the calculation you would require to make no allowance.
24429. *Q.* I ask you did you? ——
24430. *His Honor.*] The Doctor is naturally rather troubled by the question, because the allowance for relief would be a negative quantity. The more relief, the more velocity; the more relief, the less pressure.
24431. *Mr. Lysaght.*] *Q.* I ask you did you make any allowance? *A.* No.
24432. *Q.* Taking that current, as I take it you do, that it struck the face of the main level —— [*interrupted*]? *A.* Yes, I understand.
24433. *Q.* Do you make any allowance for the diversion of forces there, and the consequent reduction? *A.* No. It is not required. The damage is done then.
24434 *Q.* Then do I understand that this blast of air you speak of would only travel up and down the main level? *A.* Oh, no; it would dissipate into all the open spaces as it went along, just as any other force would.
24435. *Q.* Can you account for the fact that it did not do any damage down the 5th Right? *A.* At the 5th Right you mean.
24436. *Q.* Where the 5th Right intersects the main level? *A.* It practically did no damage either on the 5th Right or the 4th Left, a dry road.
24437. *Q.* Oh, yes, it did considerable damage in the 4th Left? *A.* No; it did no damage at all in the 4th Left.
24438. *Q.* You know that it did no damage in the 5th Right? *A.* Yes.
24439. *Q.* But it did a considerable amount of damage down at Price's Flat—blew over skips and things? *A.* Well, I do not think the blast of air would do that much. That would be due to vibrations.
24440. *Q.* Will you tell me what it was? *A.* The severe vibration or percussion of the air.
24441. *Q.* Not the initial blast? *A.* I do not think the initial blast did it.
24442. *Q.* And you account for any evidences of force along the 4th Left and at Price's Flat by percussion of air? *A.* I think so. Certainly a little pressure went down—a few yards down—the 4th Left; but it did no damage.
24443. *Q.* That was all done by percussion of air? *A.* Yes.
24444. *Q.* Now, if Frost and Evans have stated that they were blocked, when they were trying to get down to Powell's Flat, by the heat, dust, and smoke, how do you account for the smoke? *A.* It was carried with the ventilation.
24445. *Q.* Smoke? *A.* Yes.
24446. *Q.* Smoke of what? *A.* Distilled dust.
24447. *Q.* Smoke from distilled dust! Do I understand you then to say that all the smoke that was in the mine after the disaster was the result of distilled dust? *A.* Yes. Of course I saw none.
24448. *Mr. Ritchie.*] *Q.* But then you did not get there until pretty late? *A.* It was not before 10.
24449. *Q.* You were not in the mine before 12, were you? *A.* Oh, yes, I was in at a quarter past 10.
24450. *Q.* What time did you arrive in Wollongong? *A.* When does the train arrive? About 9 or 8·30. I went straight away.
24451. *Mr. Barry.*] I may tell you that Dr. Robertson started from Wollongong Station at five-and-twenty minutes to nine. I engaged the trap.
24452. *Witness.*] I was certainly at the mine about 10 o'clock. I think it was about a quarter past 10 when I went in. I know that at midnight I was down at the shaft district.
24453. *Mr. Ritchie.*] *Q.* You admit this, that you got in the mine at 11 o'clock, and the explosion took place at 2, and that, the ventilation going on still, there would not be a great deal of smoke left for you to see? *A.* Oh, yes. Of course I saw none.
24454. *Mr. Lysaght.*] *Q.* I think you told Mr. Wade that you could observe no heat anywhere in the mine? *A.* No, I did not quite say that.
24455. *Q.* But, when you went in, the mine itself was not hot? *A.* No, it was not.

(At 12·45 the Commission adjourned till 1·45.)

AFTERNOON.

(On resuming at 1·45 p.m. Mr. W. R. Pratt attended to take shorthand notes of the evidence and proceedings.)

Dr. JAMES ROBERT MILLAR ROBERTSON, previously sworn, was further examined as under:—

Cross-examination by Mr. Lysaght (*continued*):—

24456. *Q.* Do you know that Mr. Rogers admitted on the night of the disaster that he did not go too far into the 4th Right on account of the heat? *A.* I think rightly so. I do not know a single word of what he said in the colliery. I think it is likely, because he reported it to me.
24457. *Q.* You admit that there was considerable heat throughout the mine? *A.* Only in the 4th Right.
24458. *Q.* At page 41 of the Depositions, taken at the Inquest, Mr. Rogers said:—

I did not think it advisable to go in too far in No. 4 Right on the night of the 31st, because I felt a kind of a heat; that was just at the mouth of the 35-acre goaf.

Do you know that a number of other witnesses have stated that heat was given off in different parts of the mine? *A.* I think in the 4th Right only.
24459. *Q.* At Price's Flat and Stafford's Flat? *A.* I do not know a single word that has been stated in the evidence here.
24460. *Q.* Can you account for that heat? *A.* I cannot account for the heat; I never heard of it before. Probably the derangement of the ventilation may account for it.
24461. *Q.* In what way would the derangement of the ventilation account for it? *A.* Because it would interfere with the circulation of the air, and you would approach the natural heat of the strata.
24462. *Q.* That was only 70 or 80 degrees? *A.* Kembla is only 65 degrees.
24463. *Q.* That is not heat? *A.* Did the witnesses state what extent of heat they found?
24464. *Q.* They said it was very hot —— [*interrupted*].
24465. *Mr. Wade.*] I do not think anyone said it was hot in Price's Flat.
24466. *Mr. Lysaght.*] Broadhead said it was hot in No. 4 Right.
24467. *The Witness.*] I think they were stumbling out as fast as they could, and that made them hot.
24468. *His Honor.*] I do not think, Mr. Lysaght, you should cross-examination a witness on the assumption that certain facts are true, unless you know the exact facts on which you are cross-examining him.
24469. *Mr. Lysaght.*] *Q.* You said that you never heard of any difficulty in getting the roof down until this last event. What was this "last event"? *A.* This 4th Right roof.
24470. *Q.* Do you mean at the time of the disaster? *A.* The roof did not fall with the same freedom that it had done before.
24471. *Q.* Why? *A.* I do not know.
24472. *Q.* You did not know that it had fallen 2 feet 6 inches previously? *A.* No; no one told me. There was no difficulty further than the fact that the roof did not fall.
24473. *Q.* Now, I tell you that Morrison swears that there had been a previous fall of 2 feet 6 inches. Do you still say that there was difficulty in getting the roof down? *A.* Yes.
24474. *Q.* What difficulty? *A.* Because the roof came down in a body, and did not fall immediately we took the props away.
24475. *Q.* What precaution can be taken if a roof is expected to fall? *A.* No further precaution.
24476. *Q.* What precaution can you take? *A.* You can take no further precaution.
24477. *Q.* When you expect a roof to fall over a large area, would it not be wise to withdraw the men inbye? *A.* There were no men in the vicinity. Nobody could expect a fall such as this.
24478. *Q.* You expected it after the disaster? *A.* No.
24479. *Q.* You suggested that the fall forced out air after the disaster? *A.* Yes.
24480. *Q.* Was it not just as easy to suggest it as a probable consequence? *A.* No.
24481. *Q.* Do you say that, where a large area of roof is expected to come down solidly, the men should not be withdrawn inbye? *A.* How can we say how it will come down?
24482. *Q.* You said that you expected a fall of a large block? *A.* I said that it fell in a large block.
24483. *Q.* Was it a remarkable thing for it to fall in a large block? *A.* We never had a similar fall before.
24484. *Q.* You never before had a similar fall to this within your experience? *A.* Not with similar consequences.
24485. *Q.* You have never known a fall over as large an area as this? *A.* I have known a fall over as large an area, but it came down gradually.
24486. *Q.* You never knew of a solid fall over so large an area? *A.* This particular piece of roof is particularly strong.
24487. *Q.* If a fall of any particular magnitude is expected, should not the men be withdrawn inbye? *A.* No.
24488. *Mr. Ritchie.*] *Q.* In view of what has happened, should not something be done? *A.* It depends on the circumstances.
24489. *Q.* If the circumstances were similar, what would you do? *A.* I think we should cast about to do everything we could think of.
24490. *Q.* What would you think of? *A.* As far as I know, we have no area of coal being pillared under the same circumstances.
24491. *Q.* Suppose you had, what would you do? *A.* I think, if the roof were over so large an area, we would withdraw the men. If the circumstances were the same, that is all we could do.
24492. *Q.* The only thing you could do would be to withdraw the men? *A.* I do not think we could do anything else. I should be glad to hear any suggestion anybody could make to me as to what could be done under the circumstances.
24493. *Mr. Lysaght.*] *Q.* What circumstances? *A.* The conditions.
24494. *Q.* What conditions? *A.* I say, if there were pillaring in the neighbourhood of where a number of men were working, and where a blast would affect them, I would certainly withdraw them.
24495. *Q.* These were not the conditions at Kembla? *A.* No.
24496. *Q.* There is no connection between the conditions at Kembla and the conditions under which you say you would withdraw the men? *A.* I think, if you would come to the point, it would be better. If you state what conditions you mean I would consider it.

24497. *Q.* You said that, under similar conditions to what took place at Kembla, you would withdraw the men? You now say that the conditions at Kembla were not such as would lead you to withdraw the men? *A.* I mean in the light of subsequent events.
24498. *Q.* You would withdraw the men if any large fall was expected? *A.* I think so.
24499. *Q.* Withdraw all the men outbye? *A.* Yes.
24500. *Mr. Robertson.*] *Q.* Supposing you had a large area of roof from which the timber had been withdrawn, and the roof did not fall—how long are you going to withdraw the men for? If it did not come down for ten years, would you keep them away? *A.* You can easily see that it is scarcely possible for a similar accident to occur again.
24501. *Q.* How is it practicable to withdraw the men if the roof does not fall. It would mean stopping a number of collieries altogether. If the roof did not fall, and you had to withdraw the men until it fell, you might have to shut up a colliery? *A.* I can see that it is a difficult question to answer. Unless you put the position exactly before me, I cannot answer it. A supposititious case of this kind cannot well be answered.
24502. *Q.* It often happens that a large area of roof is left standing, where all the pillars have been withdrawn? *A.* Yes. At the Australmer Colliery at North Illawarra, there was a case of that kind; and I inspected it several times within a fortnight.
24503. *Q.* At Coalcliff there are 3½ acres standing now. Should all the men be withdrawn altogether? *A.* I do not understand why that roof has not come down.
24504. *Q.* The suggestion has been made that the men should be withdrawn. That roof has been standing for years. If the men were withdrawn the colliery would have to stop for a number of years? *A.* I think that the case you are referring to is the greatest area I have known. I saw an area at North Illawarra which remained up for a considerable time; but, fortunately, it began to come down from the centre, and came down gradually.
24505. *Q.* At the Greta Colliery there is a large area which has been standing for years? *A.* Yes.
24506. *Q.* In the Greta Colliery the roof has been standing for the last fifteen or twenty years? *A.* Yes, for nineteen or twenty years. There were fourteen bords all holed into one another.
24507. *Q.* And a 15 or 16 feet seam? *A.* Yes; it is a difficult thing; and circumstances must guide you.
24508. *Mr. Ritchie.*] Would it have made any difference at Kembla if the miners had been working with safety-lamps? *A.* Not the slightest.
24509. *Q.* You say that nothing was lighted by the lamps which may have been stirred up by the blast? *A.* No.
24510. *Mr. Lysaght.*] *Q.* Do you think the blast of air stirred up coal-dust? *A.* I think so.
24511. *Q.* Do you think in large quantities? *A.* I think a considerable quantity came out of the goaf, and from the skips.
24512. *Q.* And from the main roads? *A.* Practically there was no dust on the roads.
24513. *Q.* How long before the disaster were you in Kembla? *A.* A short time before.
24514. *Q.* A month? *A.* No, a week. I think that Mr. Ritchie and myself were in there two or three weeks before the disaster.
24515. *Mr. Ritchie.*] *Q.* Now that you have got to hear that a fall actually took place a week before the fall at the time of the disaster, would not the dust be covered up by the previous fall? *A.* It depends to what extent it would be.
24516. *Q.* We have evidence that there was a fall? *A.* There might have been a lot of dust from the stoppings. No. 1 was practically a dustless road.
24517. *Q.* In your opinion, the dust was sent out by the fall? *A.* Yes; or else it would come from the stoppings, the skips, or the roads; but the roads were practically dustless.
24518. *Q.* Would the fall have a large quantity of dust to play on in the goaf? *A.* It would drive out a large quantity of dust.
24519. *Q.* Where would it come from? *A.* We have evidence that a large amount of dust came out of the goaf.
24520. *Q.* You see the first fall would force out dust? *A.* I would like to know more about that first fall. I am not satisfied. I should like to know much more about it. You are asking me to give an opinion on a subject which I have not investigated.
24521. *Q.* If a fall took place a week before the disaster surely the dust, previously adhering to the roof, would be swept away? *A.* I do not think it would come from the roof at all. I think it would be debris from the pillars and dust on the floor.
24522. *Q.* If the evidence as to the first fall is correct, the dust would be covered over? *A.* I do not think so. I cannot say it would be.
24523. *Q.* If that were so where would the dust come from then. You would have no dust to work on? *A.* I can hardly think the first fall would be so complete as to cover the floor; I cannot see it. I very much doubt whether much roof came down at first. The roof was a hard, white sandstone. It is not a roof to fall in portions. It is a different kind of roof from that on the dip side of No. 1. I have doubts about the first fall.
24524. *Mr. Robertson.*] *Q.* The evidence of the first fall seems to be conclusive? *A.* I have seen the roof, and doubt it.
24525. *Mr. Ritchie.*] *Q.* In your opinion, the roof would fall in one block? *A.* The appearance of the fall convinced me of that.
24526. *Q.* The only thing you are in doubt about is the first fall? *A.* The appearance of the roof is such that I very much doubt it.
24527. *Mr. Lysaght.*] *Q.* You said that there was evidence of dust having come from the goaf—where was that evidence? *A.* In No. 4 itself—in the mouth of No. 4.
24528. *Q.* What were the evidences? *A.* There were accumulations of dust swept round the corners.
24529. *Mr. Robertson.*] *Q.* Do you mean the corners of the main road? *A.* Of course, portions may have come out of the stoppings and have been deposited after the air was still. The dust you see on the roof and sides has been deposited subsequent to the accident.
24530. *Q.* On the main road? *A.* Yes.

Witness—Dr. J. R. M. Robertson, 9 March, 1903.

24531. *Q.* As to the outlet from the 4th Right, it was wet? *A.* There was always a little water coming out of the 4th Right.
24532. *Q.* Dust would not be there? *A.* It would come probably from the side and floor of the pillars.
24533. *Mr. Lysaght.*] *Q.* Where was there evidence of dust coming from the goaf? *A.* There was an accumulation of dust at the junction of the 4th Right with No. 1.
24534. *Q.* There was no indication that it had come from the 4th Right? *A.* It is only my opinion.
24535. *Q.* All the indications of force in the 4th Right were that the force had gone inbye? *A.* Certainly not.
24536. *Q.* Did you see any props stuck in slack pointing inbye? *A.* I saw one; but one swallow does not make a summer.
24537. *Q.* It had been a prop supporting the roof? *A.* It might or might not have been.
24538. *Q.* Can you account for it? *A.* No.
24539. *Q.* Did it not show that the force was going inbye? *A.* Everything else pointed the other way. One swallow does not make a summer. It was inclined to go inwards. There was a large stone there.
24540. *Q.* Did that indicate the force going inbye? *A.* No, it did not indicate that.
24541. *Q.* What about the large stone? *A.* The prop had probably been put up against the roof, and a large stone had fallen.
24542. *Q.* Which way was it forced? *A.* It was lying in the middle of the road.
24543. *Q.* Was it not forced inbye? *A.* No.
24544. *Mr. Robertson.*] *Q.* I may say that that prop and several more were pointed out to a number of people who inspected the place; and no one suggested otherwise than that it was pointing inbye, and the chocks there also? *A.* Doctors differ. The chocks were different. They had been taken from the waste; and they were strewn all along the road outbye.
24545. *Q.* It is extraordinary that people can draw different conclusions from the same thing? *A.* I saw it plainly when the brattice was put up. That was on the 19th of September.
24546. *Q.* That was six weeks afterwards? *A.* Yes; but there was nothing to disturb it.
24547. *Mr. Lysaght.*] Have you anything in your notes of 19th September about it? *A.* I do not know, I will look:

Canvas having been paid up to fall in No. 4 Right, proceeded in fall very high: force came out and from sides, props and chocks blown from sides towards entrance, which is wet.

24548. *Q.* We have the evidence of Mr. Atkinson that the force was inbye.
24549. *Q.* With regard to your notes of the 27th of August, Mr. Jones, Mr. Sellers, and Mr. Hay, were with you? *A.* Yes.
24550. *Q.* Mr. Jones was travelling with you all along? *A.* Yes.
24551. *Q.* Do you know that Mr. Jones has stated that in the main level there was an explosion of fire-damp? *A.* He did not subscribe his name to that.
24552. *Q.* Was Mr. Jones with you on the 27th of August? *A.* Yes.
24553. *Q.* He is a competent man? *A.* Yes.
24554. *Q.* Listen to his evidence, paras. 23124, 23130, 23141 of the shorthand-writer's report:

"*Q.* I mean that there was an explosion after the big outburst from the goaf? *A.* Yes; nobody could go beyond that fact, that there was an indication of a fire-damp explosion in the No. 1 section; but it was to a very small extent."

Did he tell you that? *A.* No.
24555. *Q.* Let me read it to you:

"*Q.* But the subsequent explosion, which you now speak of as gas, has really been the cause? *A.* That would kill the men inbye—I mean in the shaft section—from the after-damp.
Q. That explosion of gas would kill the men inbye; and the fall, or the result of the fall, would kill the men outbye? *A.* There is no doubt about it."

A. I do not agree with him.
24556. *Q.* Then Mr. Jones was asked:

"*Q.* Where do you say this explosion of gas would take place? *A.* I would not like to locate a spot. I could not do that; but I should imagine that it would be somewhere near Aitken's place, somewhere that way—some place near there. I forget the name of the place where I saw some indications of flame and intense heat; but that is the only place."

So that you see Jones stated that there was evidence of a fire-damp explosion in No. 1. You do not agree with his conclusions? *A.* No.
24557. *Q.* Although he made the inspection with you? *A.* Yes.
24558. *Q.* And he signed the statement with you? *A.* We all signed it.
24559. *Mr. Ritchie.*] *Q.* Is that evidence by Mr. Jones contradictory, or is it additional matter? *A.* I think it is contradictory.
24560. *Q.* Is it not additional to your report? *A.* Yes, and it is directly contradictory to the report.
24561. *Mr. Lysaght.*] *Q.* This statement which you hold in your hands is not on oath? *A.* No.
24562. *Q.* Mr. Jones was not sworn when he signed it? *A.* No.
24563. *Mr. Barry.*] Dr. Robertson did not hand any statement in. These are his own notes.
24564. *Mr. Lysaght.*] *Q.* Why did you get six managers to sign this statement? *A.* Because we all examined the mine at the same time; and it was thought advisable to get a statement drawn up. I think Mr. Jones was the one who took the notes.
24565. *Q.* Why did you get this statement signed? *A.* It was suggested that it should be done.
24566. *Q.* Mr. D. McGeachie, Mr. Barr, and Mr. Warburton signed it. Did you think that the managers would depart from it? *A.* No.
24567. *Q.* You know Mr. Jones has departed from it? *A.* Yes.
24568. *Q.* Do you know whether Mr. Warburton has departed from it? *A.* No.
24569. *Q.* Those three gentlemen I mentioned signed the statement stating that the facts described were accurate in detail? *A.* Yes.
24570. *Q.* Do you know that Mr. Rogers stated at the inquest, as reported in page 40 of the depositions—

I do not think that had anything to do with the disaster; I cannot mention any other cause for the explosion except gas and coal dust, or gas or coal dust?

[*No answer.*]
24571. *Mr. Wade.*] He refers to a blast, at the end of the evidence. 24572.

24572. *Mr. Lysaght.*] *Q.* That contradicts your evidence? *A.* Yes.
24573. *Mr. Robertson.*] Do you put the notes by Dr. Robertson in evidence? [*No answer.*]
24574. *Mr. Bruce Smith.*] Dr. Robertson produced his written notes of what he saw in the mine.
24575. *Mr. Robertson.*] I understand that this was a report that was being read from.
24576. *Mr. Bruce Smith.*] No; they are his own notes; it is not a report. They are notes of his inspections.
24577. *The Witness.*] They are joint notes.
24578. *Mr. Lysaght.*] You said on the last day you were here that you did not know that gas had been discovered in the mine? *A.* I do not know yet. I do not know that it has been discovered since the disaster. What I said was that I asked McGeachie to take Mr. Atkinson to a certain place in the mine, to see if any gas could be found there.
24579. *Q.* You have on your notes—

Mr. McGeachie, with a hydrogen lamp, reported less than one-half per cent. of gas in this place on Saturday night; to-day it was quite sweet.

Do you not know that McGeachie discovered gas? *A.* I know that. I gave you my opinion how it was accounted for.
24580. *Q.* It is not in the top heading at all? *A.* Where is it?
Q. "At the face of Stafford's working place no gas was found, nor was the brattice cloth displaced . . . . McGeachie, with a hydrogen lamp, reported less than 1 per cent. of gas." That was in Stafford's working place, on Saturday night. It was not in the top heading at all? *A.* Read on.
24581. *Q.*

As it was evident that this locality was in no way connected with the origin of the disaster, we proceeded to No. 1 Right.

A. We went on to No. 1 Right.
24582. *Q.* You know that gas was discovered by McGeachie in Stafford's working place, which was above Stafford's flat, and that it had nothing to do with the gas found by Mr. Atkinson in the back heading? *A.* The report explains it all.
24583. *Q.*

On entering No. 1 Right haulage road, we found indications of a blast proceeding inbye. The ventilation door between No. 1 main and return road was forced open and smashed.

Do you remember that? *A.* I remember everything.
24584. *Q.* Which way was it blown? *A.* Out from the road.
24585. *Q.* From the haulage road towards the travelling road? *A.* If you read on, you will see what Mr. Jones subscribed to. As a matter of fact he was taking notes for the party.
24586. *Q.* When was that report signed? *A.* The same night.
24587. *Q.* On the 19th of September? *A.* No, on August 4, I think.
24588. *Mr. Ritchie.*] *A.* Having had greater length of time to more maturely consider his facts, has he altered his opinion now? *A.* I do not think so.
24589. *Mr. Lysaght.*] *Q.* Did you not say that you did not know that any men had been burned? *A.* I said that I did not know of anybody having been anything more than singed.
24590. *Q.* You have this in the report, "At No. 86 Aitken and son were found slightly burned"? *A.* That is a general statement—it is not very accurate.
24591. *Q.* You signed it? *A.* Yes.
24592. *Q.* Did you find them? *A.* No; this was a statement made by Morrison.
24593. *Q.* I thought they were your own notes?
24594. *Mr. Bruce Smith.*] They are. At this place Aitken and son were reported to have been found.
24595. *Mr. Lysaght.*] *Q.* "We proceeded up this towards the waste, which smelt of after-damp; but no gas was discoverable. Mr. Sellars here reported that when in this locality, looking for bodies, the temperature was high"? *A.* That is in the 4th Right.
24596. *Mr. Wade.*] A little time since Mr. Lysaght quoted the evidence of Mr. Rogers with reference to gas in the mine. If you will turn to page 35 of the depositions at the inquest you will find Mr. Rogers said—

The only thing I have thought about it is what we have heard a good deal about in the last fortnight; that is, that an area of waste fell in the 4th Right, causing a blast, and blowing everything upside down; I cannot say what the blast was; I have no idea; it appears to me that the blast has come from the 4th Right pillars.

24597. *Mr. Lysaght*] *Q.* You told Mr. Wade that you went down the main shaft district for a specific purpose? *A.* Yes, to ascertain whether a fire which had been reported to the Manager, and especially by my brother, was still burning. It was the burning of brattice.
24598. *Q.* Do you know that, on the plan drawn by Mr. Warburton, he showed the stoppings on the front and back headings inbye of the 5th Right, all blown in one direction? *A.* I think so.
24599. *Q.* Do you say they were blown in one direction? *A.* Yes. On the outside, the building stones had slipped down inwards, into the main road.
24600. *Mr. Robertson.*] *Q.* That is beyond the 5th Right? *A.* Yes.
24601. *Q.* Is it consistent with the explosion having knocked down the stuff? *A.* It appeared to us that two or three stones had fallen down, and that the top of the building had been blown into the back heading. I dare say any projections would probably catch the wind.
24602. *Q.* Do you say that the evidence of force was from the back heading or the main heading? *A.* There was a cut-through, and the next place was built up with stones, and some of the stones on the outbye corner had slipped into the heading, but the top stuff was blown into the back heading.
24603. *Mr. Lysaght.*] *Q.* Have you got that pipe that was found? *A.* Mr. Rogers has got it.
24604. *Q.* Who found it? *A.* Mr. Morrison and Mr. Hotchkis some weeks afterwards.
24605. *Q.* It was Hotchkis who found it? *A.* I think it was.
24606. *Mr. Bruce Smith.*] I should like the man who found it to come before the Commission.
24607. *Mr. Lysaght.*] *Q.* Who did you understand found it? *A.* I think Hotchkis found it.
24608. *Mr. Wade.*] The evidence is that Morrison and Hotchkis were together.
24609. *Mr. Robertson.*] *Q.* If that brattice was lit by a pipe, somebody must have been smoking? *A.* The evidence points that way.
24610. *Q.* The man who lit the brattice would extinguish it? *A.* It may have been at the same moment that the disaster occurred. One man was found with a match between his finger and his thumb, just as if he had been striking a match.

24611. *Mr. Ritchie.*] *Q.* That was in a different place? *A.* It was a pillar further up.
24612. *Mr. Bruce Smith.*] This is a very important matter. If the theory of the pipe burning the brattice is set up, it ought to be proved.
24613. *The Witness.*] We did not know what to think of the burning of the brattice. It was mentioned at the time. I said I did not see how it could be the result of an explosion of gas. I cannot imagine how the gas would go over and through one inflammable material and light another inflammable material.
24614. *Mr. Robertson.*] *Q.* Would you be surprised to learn that a piece of newspaper could be exposed to the blast of a gunpowder shot and a dust explosion, and the paper remain unconsumed? *A.* Yes, I think it could; but, if there had been flame to set this brattice on fire, it would have set fire to the paper and to the brattice, which it blew down and twisted round the props. Of course, I know that it is impossible for man to understand all the phenomena of such an accident as this. We were not present and we do not know how it occurred. We do not know the circumstances. In all these accidents there are many circumstances that can never be explained.
24615. *Mr. Robertson.*] *Q.* In all these explosions there is evidence of combustible material being passed over by flame? *A.* It is difficult for me to see how that brattice could be ignited with inflammable gas; because the same force and flame blew down two or three brattice cloths and tore them into shreds. It must also have passed over paper; and then there are the chocks with dry timbery bark. How could it ignite this brattice which is not more inflammable than any other which it passed over? The outstanding feature of this accident is the marvellous absence of even evidence of heat. In all other explosions which we read about, the evidence of flame and charring has been superabundant. In Haldane's report it is pointed out in connection with the incandescence of coal-dust that there are intervals where there is no evidence—and then, when the oxygen has become more abundant, there is evidence of coking.
24616. *Mr. Lysaght.*] *Q.* Did you see the pipe? *A.* I saw it immediately after it was found.
24617. *Q.* When? *A.* I did not take any note of the date.
24618. *Q.* How long ago? *A.* Some months ago—immediately after it was found.
24619. *Q.* Who showed it to you? *A.* Mr. Hotchkis and Mr. Rogers. They told me that it was found on the edge of some white ashes.
24620. *Q.* That was after you had finished making these notes? *A.* Weeks and weeks after.
24621. *Q.* You never embodied it in the notes? *A.* No.
24622. *Q.* You never embodied it in any other notes? *A.* No, they were made before the finding of the pipe.
24623. *Mr. Robertson*] *Q.* Did he give you the circumstances? *A.* The pipe was found under some white debris of the burnt brattice. It had fallen on to the floor. There was a small piece of brattice lying over the pipe.
24624. *Mr. Ritchie.*] *Q.* A small piece of unburned brattice lying over the pipe? *A.* Yes.
24625. *Q.* Was it a clay pipe or a wooden pipe? *A.* I am not a smoker; but it was a wooden pipe. It was a briar-root, with a black monthpiece.
24626. *Mr. Lysaght.*] *Q.* Do you know whether Mr. Rogers has brought it this morning? *A.* I think he has; he told me he had.
24627. *Q.* Did he show it you to-day? *A.* No; he told me he had brought it.
24628. *Q.* Did you know that the waste workings were only being examined once a month? *A.* Where do you mean?
24629. *Q.* In the wastes? *A.* Most of the wastes are travelled over nearly every day.
24630. *Q.* Do you know a special rule that requires them to be examined at least once a week? *A.* I suppose there is such a rule as that.
24631. *Q.* Do you know it? *A.* No.
24632. *Q.* Will you tell me what this special rule refers to—No. 10—

> He shall at least once in every week examine, so far as is practicable, the state of the waste workings –

[*interrupted*].
24633. *Mr. Wade.*] Read the whole of the rule.
24634. *Mr. Lysaght.*] I am not taking my directions from you.
24635. *Mr. Wade.*] The rule adds—

> and main airways.

24636. *Mr. Lysaght.*] *Q.* He says nothing about the return airways. He is to examine the waste workings and the main airways;—the main airways have nothing to do with the waste workings? *A.* I think some of the main airways go right through the wastes.
24637. *Q.* What does that rule refer to? *A.* I should say in Kembla it refers to the unworked pillar workings.
24638. *Q.* Is that all? *A.* It would not refer to anything else.
24639. *Q.* Would it not refer to the goafs? *A.* Certainly not.
24640. *Q.* Would it not refer to the 35-acre goaf? *A.* No.
24641. *Q.* Is there no rule requiring the inspection of the goafs? *A.* No; you cannot inspect goafs.
24642. *Q.* Your construction of the rule is that it only applies to pillars not being worked? *A.* Yes.
24643. *Q.* Those that are standing and not being worked? *A.* That is all.
24644. *Q.* Then, as far as you know—then as far as you knew, or know now—no examination whatever was made of any goaf? *A.* I do not think the man is born who could examine a goaf.
24645. *Q.* As far as you know, as consulting engineer, no examination was made at any time of any part of the goaf? *A.* Oh, certainly not. They could not. The roof is all down, and the spaces closed up.
24646. *Q.* Then the report book that shows the examination of the waste workings refers only to the pillars standing and not being worked? *A.* That is right.
24647. *Q.* And no more? *A.* Yes, no more.
24648. *Q.* Is that your general interpretation of the meaning of waste workings? *A.* Yes, it is. It is a pity it was put in at all; because no man can examine a goaf.
24649. *Mr. Robertson.*] *Q.* What is the morning of "waste workings"? *A.* It is a loose term.
24650. *Q.* Does it not mean temporarily abandoned? *A.* Temporarily abandoned I should say.
24651. *Q.* Was this rule formulated by the colliery officials, or was this one enforced by the Department of Mines? *A.* I cannot tell you.

24652. *Q.* Whom are the special rules drawn up by? *A.* First by the owners' representatives, and then they are submitted to the Department for approval, and also to the miners.
24653. *Q.* This rule, I take it, would be formulated by the Managers? *A.* I fancy it would be. Very likely it would be taken from the old rules.
24654. *Mr. Ritchie.*] *Q.* I take that if you have got a very large area with a very solid roof, from which the pillars have been extracted, which it might be practicable to examine, there would be need to examine that? *A.* Well, even at Clifton, since the workings there were brought under my notice, I should not like to hear of anyone going further in than the edge of it. I do not see what good you can do—you can only run into great danger.
24655. *Q.* Is it necessary to go to the edge? *A.* I do not think it would do any good to go to the edge excepting to see whether it was fallen.
24656. *Q.* You are of opinion that there should be no examination of goafs? *A.* As a rule, you cannot examine them, because the roof has fallen down.
24657. *Q.* Are you still of opinion that it is not necessary to examine wastes of that kind? *A.* I do not think it would be safe or practicable.
24658. *Q.* It may sometimes be safe? *A.* No. When there is an area and you are waiting for it to fall, after the props have been taken away, it would be dangerous. I think the Manager who got a man to go in there—if a man would go—could be indicted for manslaughter if an accident occurred.
24659. *Q.* Should they be examined? *A.* They could not be examined safely.
24660. *Q.* Where it is regarded as safe? *A.* That is a matter of opinion.
24661. *Q.* Do you think they could be examined? *A.* No, not the goafs.
24662. *Mr. Lysaght.*] *Q.* Do you know that Biggers, the present deputy, spent five days examining one of these goafs? *A.* He might spend five years examining one.
24663. *Mr. Robertson.*] No; he said that it would take five days to examine the waste workings.
24664. *Mr. Lysaght.*] *Q.* You take Rule 10 to mean the examination of pillars of coal, standing and not being worked, and nothing more? *A.* Nothing more.
24665. *Mr. Ritchie.*] *Q.* What steps would you take in a mine known to give off gas to examine the goafs? *A.* As a rule, the goafs fall and close up.
24666. *Q.* I am talking of goafs that do not fall—the circumstances may arise? *A.* Where?
24667. *Q.* At Clifton? *A.* That is only a case of weeks. The roof is working now.
24668. *Q.* You mentioned a large goaf that had been standing at Clifton, and which had been standing for years? *A.* No, I did not say so.
24669. *Mr. Robertson.*] I think that it was Mr. Jones who referred to that.
24670. *Mr. Ritchie.*] Was it not pointed out to you, where you said that men might possibly be withdrawn for years? *A.* Mr. Robertson referred to Greta; but that was a different case.
24671. *Mr. Robertson.*] I said that it was possible for pillars to be withdrawn and for the roof to be left standing for years. I was speaking generally.
24672. *Mr. Ritchie.*] *Q.* Supposing you had strong strata and it was possible that it might stand up for years—what would you do to prevent an accumulation of gas in a mine? *A.* In that case you would require to direct a current of air through it.
24673. *Q.* Would you regard it as necessary to do that? *A.* I think anyone would naturally do that.
24674. *Q.* Then goafs which are not safe should have a current of air through them? *A.* Yes.
24675. *Mr. Lysaght.*] *Q.* You know that since the Kembla disaster double doors have been ordered for the main intakes? *A.* Yes, by the Department rule applying to all collieries.
24676. *Q.* Do you approve of the rule? *A.* Yes.
24677. *Q.* You recognise the danger of single doors? *A.* In some cases.
24678. *Q.* I am putting to you the case of doors between the main intake airways. If they are guarded by single doors, that would clearly be a danger? *A.* I do not say so in all cases.
24679. *Q.* I am putting to you now the case of the main intake airways and the main returns? *A.* I do not know—it depends. It may be an advantage to have single doors.
24680. *Q.* Take No. 1 Right main level. That would be a place where, under the new rule, there would be double doors to guard the air? *A.* Yes.
24681. *Q.* Between the back heading and the front heading? *A.* Yes.
24682. *Q.* Would it not require double doors along the 4th Left? *A.* No.
24683. *Q.* But it would require double doors between the front and back heading of No. 1 main level? *A.* Yes.
24684. *Q.* If there were not double doors there before the disaster, would it be evidence of bad management? *A.* No; it would be an advantage to have no doors there.
24685. *Q.* To let the intake air short circuit in the return? *A.* No. In that particular case the air that ventilated the small 5th Right came direct from an adit, and it was practically fresh air when it reached the return, so that it would be an advantage if it went into the next district.
24686. *Q.* The object was to keep the intake air from going into the return? *A.* That is what it would not do. If you took away the double doors altogether, and that door on the right-hand side of No. 5 in the back heading, the whole of the ventilation would go round the face, and not by its return.
24687. *Q.* Do you approve of double doors? *A.* As a general principle.
24688. *Q.* You told Mr. Wade that there was no stint of expense;—do you know that Mr. Rogers has stated that he would not incur any expense without consulting you? *A.* I do not know what he has stated.
24689. *Q.* Do you know that the preceding Manager stated that he could not incur any expenditure without consulting you? *A.* I know that thousands of pounds have been spent without consulting me at all.
24690. *Q.* Do you know that it was given as a reason to the Government Inspector, for not improving the ventilation that it could not be done without consulting you? *A.* If you are telling me what transpired, a lie was told, because I curtailed no expense whatever.
24691. *Q.* There was a report furnished by Mr. Rowan —— [*interrupted*].
24692. *Mr. Wade.*] What is the date?
24693. *Mr. Lysaght.*] *Q.* The 11th of January, 1886. It says that the question of new furnace ventilation was put before Mr. Green, but he could only act through Dr. Robertson;—you hear that? *A.* Yes; I hear that.
24694. *Q.* Was Mr. Green your Manager? *A.* For a few months. 24695.

24695. *Q.* Do you not recollect it? *A.* No; how long is it ago.
24696. *Q.* 1886? *A.* It is pretty ancient.
24697. *Q.* Did you not promise Mr. Rowan that you would put up a fan? *A.* I cannot say.
24698. *Q.* Did you write a letter? *A.* I cannot say.
24699. *Q.* You remember your Manager being prosecuted because of bad ventilation in the mine? *A.* No.
24700. *Q.* Do you know that Green was prosecuted? *A.* No.
24701. *Q.* Did you hear of it? *A.* I may have done so, but have forgotten it.
24702. *Q.* Do you know that the defendant's counsel pleaded guilty to the charge, and produced a letter from Dr. Robertson stating that a new furnace would be built, and a fan would also be erected;—did you write such a letter? *A.* I cannot say.
24703. *Mr. Robertson.*] *Q.* What if he did. I presume that the Manager may change his opinions and put up a furnace instead? *A.* Yes.
24704. *Mr. Lysaght.*] This is on the question of whether the Manager of the colliery had power to incur any expense.
24705. *Mr. Robertson.*] The Manager could not have uncontrolled command of the Company's capital. For ordinary expenses, such as for brattice cloth and for stores, he might be at liberty to spend money; but you do not surely expect the Manager to have control of large expenditure, such as would be necessary for the building of a new furnace or a fan to improve the ventilation.
24706. *Mr. Lysaght.*] *Q.* Mr. Rogers did consult you? *A.* He often asked me if he could have certain things; and I would agree.
24707. *Q.* You changed your opinions as circumstances would arise? *A.* I changed my opinions sometimes.
24708. *Q.* You changed your opinions about the examination of deputies? *A.* I do not see why you should assume that.
24709. *Q.* Did you not give evidence before a Select Committee on the 4th of April, 1894, to the effect that deputies should pass an examination? *A.* I quite forget.
24710. *Q.* Will you swear you did not? *A.* I have no idea whether I was examined.
24711. *Q.* Here is the evidence; I will read it to you. You have stated now that, in your opinion, a deputy should not be examined.
24712. *Mr. Wade.*] He said no such thing.
24713. *Mr. Lysaght.*] *Q.* The question was put to you about deputies passing an examination? *A.* Yes.
24714. *Q.* And you answered—

> The examination should be made as practical and as fair as possible.

A. By the Manager.
24715. *Q.* You were asked whether a man who takes charge of £10,000 worth of machinery should not be a competent man? *A.* Yes.
24716. *Q.* And pass an examination? *A.* Yes.
24717. *Q.* Whom did you mean by? *A.* By the Manager.
24718. *Mr. Robertson.*] That must refer to somebody else above the position of deputy if the person had charge of machinery to that value.
24719. *Mr. Lysaght.*] *Q.* You said that a man who held a service certificate should not pass another examination as Manager —— [*interrupted*].
24720. *Mr. Wade.*] I object; that is not so.
24721. *Mr. Lysaght.*] *Q.* Do you think that a Manager who holds a service certificate should pass an examination? *A.* No.
24722. *Q.* Did you state before the Select Committee that men holding service certificates ought to pass some examination? *A.* I really do not recollect anything about it; I do not know what Select Committee it was.
24723. *Q.* It was a Select Parliamentary Committee, on the 19th of April, 1884? *A.* There have been so many of them that I have forgotten.
24724. *Q.* It was on the working of collieries. Do you say that men who hold service certificates should not pass any examination? *A.* I think not.
24725. *Q.* Have you always held that opinion. Will you state that you did not swear that you thought otherwise? *A.* I will not swear to one thing or the other.
24726. *Q.* I will read it to you. Did you say—

> Our views were pretty much to this effect, that we thought that examinations were necessary, but that under the conditions of the Colony it would be unfair not to make these examinations to a large extent oral, in so far as some very hard-headed men, who probably in their youth had not the opportunity of getting the education that is thrust upon young people now, were acting as mine Managers.

A. That is for persons who did not hold certificates.
24727. *Q.* But now have certificates of service? *A.* No.
24728. *Q.* Then you were asked, do you believe that an examination should be passed by a deputy, and you replied that the examination should be as practical and as fair as possible. Is not that contrary to what you say now? *A.* I do not think that it is at all inconsistent.
24729. *Q.* Did you not say, as regards the first recommendation, fifteen years ago, that you approved of it? *A.* No.
24730. *Q.* You know that a very small accumulation of coal-dust is dangerous? *A.* Under certain circumstances.
24731. *Q.* You have found it necessary to have the coal-dust watered. Will you tell me whether you approve of it? *A.* If I did not approve of it, I should not do it.
24732. *Q.* If the roads had been watered, would that have mitigated the disaster? *A.* There was no dust on No. 1 at all. It was a dustless road.
24733. *Q.* Was it always dustless;—did you not mention that the 4th Right outbye was dusty? *A.* Yes. That was before the disaster.
24734. *Q.* It was not dustless? *A.* No.
24735. *Q.* Where did the dust come from? *A.* I suggested one or two places among the pillars.
24736. *Q.* We have had evidence here that certain parts of Kembla were dusty. We have had it from Morrison and other persons. If any parts were dusty, should they have been watered? *A.* If they were dusty enough.

24737. *Q.* What is your opinion of "dusty enough"? *A.* If the dust is pretty thick on the floor.
24738. *Q.* How thick? *A.* Several inches.
24739. *Q.* You would not water for any dust less than several inches thick? *A.* I would not let you put it that way. You asked me what I thought was a dusty road; and I answered it.
24740. *Q.* When would you water it—what would be the accumulation of dust to make you think it necessary to water it? *A.* If there was any dust at all—to any appreciable extent at all, if impalpable.
24741. *Q.* What is "an appreciable extent at all"? *A.* 2 or 3 inches.
24742. *Q.* That is what you say? *A.* But, even if a place is dry and partially dusty, I would water it.
24743. *Q.* What is "partially dusty"? *A.* Take this road I was speaking of. There was no dust on the side of the road; that was only a dry road.
24744. *Q.* Which one? *A.* The 4th Left.
24745. *Q.* You admit that it was a dry road? *A.* Yes. But the blast missed that, and did not come down it at all.
24746. *Q.* Was not one recommendation of the Bulli Commission that, where dust exists, it should be periodically damped by water? *A.* Yes.
24747. *Q.* Would not dust less than 2 inches thick be favourable to ignition? *A.* Yes, if it were dry and fine.
24748. *Q.* You recommend that the competency of a Manager should be certified to by a specially appointed Board? *A.* That was a recommendation which we were asked to state our opinions upon by the Government.
24749. *Q.* You stated, as a Commissioner on the Bulli disaster, that "The competency of a Manager should be certified by an examination before a specially appointed Board," but now you give evidence as a witness that it should not? [*No answer.*]
24750. *Mr. Robertson.*] *Q.* You excluded men already in positions who had shown by years of service that they were competent? *A.* Certainly.
24751. *Q.* That would only apply to unknown men? *A.* Yes—that had no qualifications.
24752. *Mr. Lysaght.*] *Q.* I will now ask you a few questions about Mr. Rogers—you appointed him, I think? *A.* The Company did.
24753. *Q.* By your advice? *A.* Yes.
24754. *Q.* You know he has admitted that he knows nothing about the composition of gas? I suppose he does not.
24755. *Q.* Do you know he has admitted it? *A.* I do not think he knows anything about gas. I do not think he is singular in that respect.
24756. *Q.* Do you know he admitted that he never himself took the measurement of the air in the Kembla Mine? *A.* I do not suppose he did. He has other persons to do it.
24757. *Q.* Do you know he admitted that he found black-damp and did not report it? *A.* The question is whether black-damp should be reported.
24758. *Q.* It is a noxious gas;—do you not know that there is a General Rule that any noxious or inflammable gas shall be reported? *A.* I think that if a fireman or Inspector found it, he should report it.
24759. *Q.* Then it is right that the firemen should report it? *A.* It is right that the firemen should report it.
24760. *Q.* If the firemen should report it, why not others? *A.* The Manager need not report to himself.
24761. *Mr. Robertson.*] The Manager does not require to report to himself.
24762. *Mr. Ritchie.*] *Q.* Are not the reports written as a guide for those who may visit the mine afterwards? *A.* They are written primarily for the Manager.
24763. *Q.* I suppose you know that when the Inspectors come to the mine they look at these reports? *A.* Yes; so do I.
24764. *Mr. Lysaght.*] *Q.* Do you know that Mr. Rogers admitted that he did not know what the results were in connection with the coal-dust sent from Kembla to Woolwich? *A.* I think I have already told you that I know nothing whatever of the evidence that has been given either here or at Wollongong.
24765. *Q.* Have you made any inquiries as to the way Rogers carried out his duties as Manager? *A.* Yes.
24766. *Q.* And you are satisfied with him? *A.* Yes.
24767. *Q.* Were you satisfied with David Evans? *A.* Yes.
24768. *Q.* Were you satisfied with John Morrison? *A.* Yes.
24769. *Q.* You do not find any fault with any official in the mine? *A.* No.
24770. *Q.* You do not blame anybody? *A.* No.

Examined by Mr. Bruce Smith:—

24771. *Q.* I want to make it clear what these notes are;—they are in type-writing? *A.* Yes.
24772. *Q.* Were they typed from notes which were written out? *A.* From pencil notes.
24773. *Q.* Who pencilled them—there are three sets—4th August, 27th August, and 19th September? *A.* For the first lot, I think Mr. Sellers was the amanuensis.
24774. *Q.* Tell me how he got the authority from all who signed it to commit them to these particular statements? *A.* What statements were those?
24775. *Q.* Any statements contained in these notes; how did you get the authority to commit the people, who afterwards signed the statement, to what it contained;—did you discuss each statement before it was put down in the notes? *A.* Oh, yes; we were sitting down in the mine.
24776. *Q.* It was done after deliberation? *A.* Yes; after deliberation, but in the mine.
24777. *Q.* You discussed what you should commit to paper? *A.* Yes.
24778. *Q.* Each man having taken part in the discussion, and assented to it, that was put down in pencil; it was typewritten; and you afterwards signed it? *A.* Yes.
24779. *Q.* Each man who signed these pages of notes assented to the statements made in them? *A.* Yes.
24780. *Q.* On the 4th of August there were J. Johnstone, George Cater, E. Sellers, J. R. M. Robertson, Thomas Cook, and J. C. Jones; and, after all the signatures are placed to the statement, there is a further subscription by Mr. D. McGeachie, Mr. J. Barr, and Mr. S. W. Warburton, to the effect that they are convinced that the facts described are accurately detailed? *A.* Yes.

24781. *Q.* On the 27th of August there are no signatures? *A.* I believe I took the notes myself on that day.
24782. *Q.* I take it, then, they are your own notes? *A.* I was taking the notes.
24783. *Q.* On the 19th of September they are not signed? *A.* No.
24784. *Q.* On the top of the page of the 27th of August there are the names of J. R. M. Robertson, J. C. Jones, E. Sellers, and William Hay;—although there are no signatures, these purport to be the notes of you four? *A.* Yes.
24785. *Q.* And three gentlemen besides yourselves assent to this as being a correct record? *A.* Yes.
24786. *Mr. Ritchie.*] *Q.* There were Dr. Robertson, and Messrs. Jones, Sellers, and Hay? *A.* Yes; they asked me to send it to them, and they would sign it, but they did not send the copies back again.
24787. *Mr. Bruce Smith.*] *Q.* At the head of the notes on 19th August you have the names of Dr. Robertson, Mr. E. Sellers, Mr. William Rogers, Mr. William Hay, Mr. Warburton, and Mr. J. Morrison? *A.* Yes; Mr. Morrison was taking us round.
24788. *Q.* I take it that all these people assent to this report? *A.* Yes.
24789. *Q.* I had not seen this report when I examined you before, and I want to ask you one or two questions about these notes. I understand you to say, about the cause of the disaster, that you do not think gas or coal-dust had anything to do with it? *A.* I do not think I said that. I think I said I could not get beyond the fact that there was a quantity of carbon-monoxide in the mine.
24790. *Q.* I am speaking of fire-damp. You do not consider fire damp or coal-dust had anything to do with it? *A.* I think coal-dust had.
24791. *Q.* You do not think there was any explosion of coal-dust? *A.* I said that I did not see any evidences of an explosion.
24792. *Q.* I understand you to say that, in your opinion there was neither an explosion of coal-dust nor of fire-damp? *A.* That is so.
24793. *Q.* And your reason further for believing that fire-damp had nothing to do with it is that you had never found it in the mine, and do not believe it was there? *A.* And I did not see any evidences of an explosion from fire-damp.
24794. *Q.* You admit that you found fire-damp on the three occasions of your visits? *A.* I always admitted that, but I stated that I thought it was the product of the distillation of coal-dust.
24795. *Q.* You told the Commission that you did not believe that there was any flame in the mine? *A.* No more than little puffs.
24796. *Q.* You believe there were little puffs of actual flame? *A.* Very much the same as Haldane describes.
24797. *Q.* You do not believe there was actual flame in the mine at the time of the disaster? *A.* I could see no evidence of actual flame.
24798. *Q.* I did not ask you that. I asked you did you believe there was actual flame. I do not care how small. Do you believe there was actual flame in the mine during the time of the disaster, or immediately before it? *A.* Personally I have great difficulty in answering the question. I think there was a little incandescence of coal-dust.
24799. *Q.* I am speaking of flame? *A.* I know you are.
24800. *Q.* Do not your notes of 4th August show this—

> Whilst some flame must have accompanied the blast, this must have been inconsiderable in amount?

A. I may explain, as I pointed out, that we saw no evidence of flame; but Mr. Sellers said that there must have been flame when there was so much carbon-monoxide.
24801. *Q.* You assented to it? *A.* But, since that, we have found out that you can have the production of carbon-monoxide without flame.
24802. *Q.* Do you go back on what you wrote? *A.* I would like to qualify it. At the moment it was written, none of us were aware that carbon monoxide could be produced without flame.
24803. *Q.* As the flame must have been inconsiderable in amount—why did you accede to the conclusion that some flame must have accompanied it? *A.* I was in considerable doubt whether distillation could be unaccompanied by flame, knowing that carbon-monoxide was present. My brother and myself had evidence of that the first night. Subsequently I found that carbon-monoxide could be produced without flame. I may say that we found that out subsequently.
24804. *Mr. Ritchie.*] *Q.* Who is "we"? *A.* Anyone who reads the Transactions of the Federated Institution of Mining Engineers.
24805. *Mr Bruce Smith.*] *Q.* You have altered your opinion as to flame? *A.* To a slight extent.
24806. *Q.* You do not think now that flame must have been there? *A.* It need not necessarily have been there.
24807. *Q.* You have come to the conclusion since that flame need not necessarily be there? *A.* I have. I may say that at the corner of the last pillar there was a little coked dust; and it has occurred to me how very accurately Haldane has described it. But this was in a smaller amount than Haldane described.
24808. *Q.* Have you discussed with Mr. Sellers or Mr. Jones the possibility of there not being any flame there? *A.* Yes; because Mr. Sellers and Mr. Jones were turning up the transactions of the Institute.
24809. *Q.* When did you discuss the matter with Mr. Sellers? *A.* Fifty times—any time we saw each other.
24810. *Q.* Before he gave evidence? *A.* Fifty times before.
24811. *Q.* Are you aware that Sellers has since said—since he described it in the notes, and since he discussed it with you —— [*Interrupted*].
24812. *Mr. Wade.*] Discussed what?
24813. *Mr. Bruce Smith.*] *Q.* Dr. Robertson understands it. Are you aware that Sellers in his evidence said, "My account"—speaking of his account of the disaster—"would suppose dust explosions"? *A.* I suppose he refers to these little puffs.
24814. *Q.* I want to see where the logic of it carries us. Sellers has told us, since he signed the document, that his account would suppose dust explosions? *A.* I suppose that he considered these little puffs as explosions.
24815. *Q.* He said that it would give a flame in the heading of No. 1, and account for the coked dust? *A.* It must have been very slight. I cannot say there was no flame. I saw no evidence of it.

24816. *Q.* If you admit the probability of the presence of flame in the mine, what justification have you for saying that the coal-dust, when raised by the blast, did not explode? *A.* Because I saw no evidence of it.
24817. *Q.* In respect of what? *A.* No evidence of charring or burning—only on one or two props in one corner of a pillar and near to the roof.
24818. *Q.* Caused by what? *A.* You could conceive it to be from the flame of a candle. The outstanding feature of this accident is —— [*Interrupted.*]
24819. You have a knack of going back on anything you say.
24820. *Mr. Wade.*] That is only your opinion.
24821. *Mr. Bruce Smith.*] I want to keep on the line.
24822. *Witness.*] I am extremely anxious to state all the facts, if I was allowed to do so, without all this cross-examination. I should like to answer questions as to facts in a nice pleasant way. It seems to me as if there were partisans in this Court.
24823. *Mr. Bruce Smith. Q.* I ask you, if there was flame in the mine, why it should not ignite coal-dust raised by the blast, and you say that you saw no evidence? *A.* Just little ones; little puffs. I saw too little evidence.
24824. *Q.* You say on your notes—

> At 86 Aitken and son were found slightly burned.

A. That was reported to us by Morrison.
24825. *Q.* Is it down as a report? *A.* Yes.
24826. I will read it to you:—

> At a shunt close by, two (2) skips were forced on the top of each other. At No. 86 Aitken and son were found slightly burned.

A. It was reported to us. As a matter of fact, I saw Aitken myself.
24827. *Mr. Ritchie.*] *Q.* An inspecting party found them? *A.* Yes.
24828. *Mr. Bruce Smith.*] It is in the notes, and signed by them.
24829. *Mr.. Robertson.*] The bodies were removed on the Saturday.
24830. *Witness.*] Aitken was there on the Saturday morning.
24831. *Mr. Bruce Smith.*] *Q.* On 27th August, in the first part of your notes, there is the following:—

> To collect dust from various points and additional evidence of force and fire.

A. That was to see if we could see anything.
24832. *Q.* What had you got beforehand? *A.* I do not think we got any.
24833. *Q.* Then the word "additionall" is not wanted? *A.* No.
24834. *Q.* It is redundant? *A.* Yes.
24835. *Q.* There was not any reason for its being there at all? *A.* No.
24836. *Q.* You admit that you found coked dust at the last cut-through there? *A.* A little coked dust at the corner of the back heading and the cut-through.
24837. *Q.* You say—

> Absolutely no evidence of fire or coked dust beyond last cut-through to face.

Up to there you did find it? *A.* It is not very accurate; it was written down in the mine.
24838. *Q.* But this was written after deliberate discussion, when you returned from the investigation? *A.* Yes.
24839. *Q.* Are you aware that Sellers said that they got gas with a safety-lamp when you were present? *A.* No, they got no gas.
24840. *Q.* Is it untrue? *A.* On what day was it?
24841. *Q.* He says his impression was that you got traces of gas at Stafford's flat? *A.* We got none.
24842. *Mr. Wade.*] The evidence is that the others did not agree with him.
24843. *Mr. Bruce Smith.*] *Q.* What do you understand by "melted dust"? *A.* Coked dust.
24844. *Q.* Are you aware that Mr. Sellers said that the canvas in the back heading was charred? *A.* If he said so, it would not be accurate. I have a small piece of it here.
24845. *Q.* He said that the skin of the bark was undoubtedly burned? *A.* Slightly burned.
24846. *Q.* He said that the splintering was burnt? *A.* It went no distance into the prop at all. Here is a little piece of the canvas from the back heading. The canvas is not destroyed. I should like to hand it to the Court. This is a little piece from a little strip between two props. And here is a piece of canvas the substance of which is absolutely destroyed.
24847. *Mr. Ritchie.*] *Q.* Is that taken off the brattice? *A.* It is off the canvas on the entrance to the back heading through the cut-through.
24848. *Mr. Bruce Smith.*] *Q.* Is that taken by yourself? *A.* Yes. If you bend a little piece of this other canvas, you will find that it will break across, but this piece of canvas came from a point in Kembla Mine 1¼ mile away, and fire was never near it. [*The brattice cloth was marked Exhibit No.* 53.]
24849. *Q.* Is this statement by Mr. Hay in accordance with the conclusions which you generally arrived at. Speaking of the disaster, he says, "I have no doubt there was flame in this disaster"? No; it is stronger than I would put it.
24850. *Q.* He was asked—

> "*Q.* Have you any doubt that flame was travelling? *A.* Something travelled.
> "*Q.* Have you any doubt that flame travelled at that disaster? *A.* There must have been heat to cause it.
> "*Q.* I am talking about flame? *A.* I was not there to see; but there must have been flame if there was burning.
> "*Q.* Have you any doubt at all? *A.* No, I have not."

A. No; it is stronger than I would put it.
24851. *Q.* Mr. Jones was with you; and I will ask you whether his statement is in keeping with the conclusion you arrived at. He said that he was willing to admit that there was an explosion of fire-damp; that he believed that gas would exude from the coal through want of natural atmospheric pressure; and that it was an explosion of gas that killed the men inbye? *A.* That is not in keeping with the deliberate conclusions that we all arrived at.
24852. *Q.* You told Mr. Lysaght that you had written to Mr. T. E. Foster, of Newcastle-on-Tyne, and given him full particulars of the disaster? *A.* Yes.

24853. Have you received a reply from him? Yes.
24854. *Q.* Will you produce his letter? *A.* I will read it to you, I think.
24855. *Q.* Mr. Foster is a man who has had very great experience in coal-mining matters? *A.* Yes; and his father and grandfather before him.
24856. *Q.* You regard his opinion as being valuable? *A.* Yes.
24857. *Q.* You stated the case to him. What does he say in reply? *A.* His letter is dated from No. 3, Eldon-square, Newcastle-on-Tyne, 22nd October, 1902; and he says:—

I have read your letter with interest; and it seems to me that the cause of the accident is most difficult to explain satisfactorily. Mr. Walter Brown has also read the account carefully, and informs me that the possibility of an explosion being caused by the compression of the air has been raised in this country, and that Mr. Dickenson, who was until lately the Chief Inspector of Mines, was much impressed with the idea. Some experiments were at one time made with the view of proving the possibility of such an occurrence, which Mr. Brown remembers to have read of, and has been trying to put his hand upon, but so far without success. I am afraid, without some confirmatory evidence of the possibility of your suggestion, it would be very difficult to carry the point. It was thought by the Coal-dust Commission, if I remember rightly, that an explosion of coal-dust, pure and simple, would not be caused without its being aided by a blown-out shot, or something of that description; and, as far, as I can gather, there does not appear to have been any incidents of this sort.

24858. *Q.* You suggested something as to the cause? *A.* I told him I could see no possible cause for it. I wanted him to put me right. I was in such distress of mind that I could not think properly. If he could put me right I should feel obliged.
24859. *Q.* You do not regard his letter as an endorsement of your views? *A.* Not quite.
24860. *Q.* I want to come now to an entirely different matter. You admitted to Mr. Lysaght that up to this morning you did not know there had been a previous fall of 2 feet 6 inches prior to the last fall? *A.* No, I did not hear of it.
24861. *Q.* You have no reason to doubt it, when Morrison swore to it? *A.* I could not doubt Morrison; I have known him all my life.
24862. *Q.* He swore that there was a previous fall; and do I understand from you that you tell the Commissioners that, if there had been a previous fall of 2 feet 6 inches before the explosion, it would make no difference? *A.* I do not think so.
24863. *Q.* Which is the most likely to be the larger fall—the first or the second? *A.* The second.
24864. *Q.* Supposing the first fall had fallen in the same way that the second one did, would you not expect that to produce a great wind-blast? *A.* No. I take it that Morrison only meant that a portion of the roof would come down. It would not come down 2 feet 6 inches there.
24865. *Q.* Suppose you accept the statement? *A.* I hardly think so.
24866. *Q.* I am asking you to assume that 2 feet 6 inches had fallen the week before. Assuming, also, that it fell in the same complete way you assume the second fall to have fallen, would it not have produced a great wind-blast? *A.* It might, or it might not; it would depend how it fell.
24867. *Q.* You assume that the second fall fell in a block? *A.* To all appearances it has done so.
24868. *Q.* You gave an answer to Mr. Lysaght this morning, that, in order to produce certain effects, the flame would have to go over a large part of the mine, and leave certain inflammable things untouched? *A.* That was in connection with the piece of brattice.
24869. *Q.* That is a common practice in explosions? *A.* I cannot say, but it may be.
24870 *Q.* You know that the testimony of experts is that the flame does do so? *A.* It seeks out the coal-dust, as it were, wherever coal-dust exists.
24871. *Q.* You heard Mr. Robertson say that he made an experiment, in which the flame passed over a piece of newspaper? —— [*No answer.*]
24872. *Mr. Robertson.*] Yes.
24873. *Witness.*] It will depend on circumstances.
24874. *Q.* The fact that the flame did go over certain inflammable things, and reach another inflammable thing which it burned, is no argument against the flame having passed through the roadway? *A.* I cannot conceive it.
24875. *Q.* You had never heard of this pipe which had been found, until all the notes were committed to paper? *A.* It was weeks afterwards.
24876. *Q.* Who told you of it? *A.* I was told when I was down at the mine.
24877. *Q.* You came into constant connection with Morrison when you were making these notes? *A.* No.
24878 *Q.* Morrison was one of the party? *A.* I have not seen Morrison since.
24879. *Q.* You would come across Morrison frequently during the inspections you were making;—did he mention the pipe? *A.* No.
24880. *Q.* Did you come across Hotchkis? *A.* No; he was not in the mine then; he was at Helensburgh.
24881. *Q.* Were you ever told by letter? *A.* Our Kembla people are not much at writing letters. You have to drag news out of them
24882. *Q.* You consider that pipe is a significant thing? *A.* I do. I told Mr. Atkinson that I thought the brattice was set on fire by someone smoking, before the pipe was found.
24883. *Q.* After the pipe was found, would you attribute it to ——? *A.* Smoking.
24884. *Q.* Would it not strike you as a great coincidence? *A.* No; I have seen many instances of brattice being burnt.
24885 *Q.* Do you know that in the Dudley explosion there were two fires afterwards like this? *A.* I think there were a good number of fires there among coal and timber.
24886. *Q.* Does it not occur to you to attribute this fire at the brattice to the explosion? *A.* No.
24887. *Q.* Why? *A.* I do not understand you.
24888. *Q.* Would it not occur to you, apart from the finding of the pipe, to assign that fire to the explosion? *A.* When I saw that brattice, I formed my judgment instantly, and I have never varied it. I told Mr. Atkinson within an hour afterwards that someone had been smoking and lit the brattice.
24889. *Q.* This makes no difference to your firm impression that there was no flame? *A.* No.
24890. *Q.* Supposing you thought there was flame? *A.* I would not think it would be due to the fire at all.
24891. *Q.* Although you know there were many fires in the Dudley mine? *A.* Among the coal-dust and timber.

[The Commission, at 4 p.m., adjourned until 10 o'clock the following morning.]

TUESDAY,

TUESDAY, 10 *MARCH*, 1903, 10 *a.m.*

[*The Commission met at the Supreme Court, King-street, Sydney.*]

Present:—

C. E. R. MURRAY, Esq., D.C.J. (President).

D. A. W. ROBERTSON, Esq., Commissioner. | D. RITCHIE, Esq., Commissioner.

Mr. Bruce Smith, Barrister-at-Law, instructed by Mr. Wood, Crown Solicitor's Office, appeared on behalf of the Crown.

Mr. A. A. Atkinson, Chief Inspector of Coal-mines, assisted Mr. Bruce Smith.

Mr. A. A. Lysaght, Solicitor, appeared on behalf of—

(*a*) the representatives of deceased miners, wheelers, &c., (victims of the explosion);
(*b*) the employees of the Mount Kembla Colliery (miners, wheelers, &c.); and
(*c*) the Illawarra Colliery Employees' Association (the Southern Miners' Union).

Mr. C. G. Wade, Barrister-at-Law, instructed by Messrs. Curtiss and Barry, Solicitors, was present on behalf of the Mount Kembla Coal and Oil Company (Proprietors of the Mount Kembla Mine).

(Mr. J. Garlick, Secretary to the Commission, was present to take shorthand notes of the evidence and proceedings.)

(His Honor handed to Mr. Lysaght and Mr. Bruce Smith a letter received from Mr. Jonathan May, giving particulars of what Mr. May considered to be the operation, in his own case, of boycotting or black-listing. His Honor asked whether Mr. Lysaght or Mr. Bruce Smith wished to call Mr. May to give evidence on this point. Both Mr. Lysaght and Mr. Bruce Smith said that they saw nothing in the letter with which they would desire to supplement the evidence already adduced.)

Dr. J. R. M. ROBERTSON, previously sworn, was recalled, and further examined, as under:—

Cross-examination by Mr. Lysaght:—

24892–3. *Q.* Have you the figures this morning by which you got that 700 miles per hour? *A.* I have not made them up. I will do so. It will only take a few minutes. I will do it before I leave the Court.
24894. *Q.* Could you do it now? *A.* I would rather hand it in.

Examination by His Honor:—

24895. *Q.* There is one phase of the matter that has struck me, on the question of the probability of an instantaneous fall, and I would like to ask you a few questions about it. First of all, I think it may be fairly taken, may it not, that 12 cubic inches of average rock weigh about a pound; that is to say, 1 foot in height of the average strata over the roof of the mine would represent, in actual weight, about 1 lb. per square inch superficially? *A.* Rather more than that.
24896. *Q.* How much? *A.* Oh, probably about one-tenth more than that. I should imagine that it would be 160 lbs. or so to the cubic foot, roughly.
24897. *Q.* One pound would be about 134? *A.* One pound would be 144.
24898. *Q.* Oh, yes; of course. Well, as far as the pressure of the air is concerned, as long as the rock is in an absolutely unruptured state, the whole pressure of the air operates in support of the roof; that is to say, as far as its connection with the superincumbent strata is concerned, as long as the superincumbent strata can be taken as absolutely rigid the connection of the roof with the superincumbent strata is assisted by the pressure of the air? *A.* Yes; that is the case all over the mine.
24899. *Q.* Yes; that is so necessarily? *A.* Yes.
24900. *Q.* Well, that pressure may be taken, allowing for depression of tension of air in westerly winds, and allowing for any cyclone conditions, and allowing also for the altitude of the place, as at least 14 lbs. to the square inch? *A.* Yes, there or thereabouts. Yes, about 14½ lbs. to the square inch.
24901. *Q.* We can take 14 lbs. as a minimum? *A.* Well, I do not know that I would go so low as 14 lbs.
24902 *Q.* We may take it as a minimum? *A.* Yes, an absolute minimum. The altitude is about 900 and odd feet. I did not take that into account.
24903. *Q.* Then, you see, you have also the tensile strength of the rock, which may be taken, I suppose, to be able to support at least 6 feet or so of itself—do you think it would? *A.* I could not say anything about that.
24904. *Q.* Well, it is a pretty considerable element, is it not? *A.* The roof was evidently free on, you may say, three sides, and only held by a solid rib of coal on the road side.
24905. *Q.* Well, if the roof is not free; I am taking it as a hanging roof, but not absolutely free: before it can begin to let go at any point you must have a weight in excess of this 14 lbs. to the square inch, and in excess also of the tensile strength? *A.* Yes, no doubt.
24906. *Q.* You must have that? *A.* Yes, no doubt about that.
24907. *Q.* Well, then, is it not clear that you cannot arrive, going upwards, at the point at which, by mere weight, the roof will begin to let go, until you reach something approaching 20 feet from the under surface of the roof? *A.* Oh, I think it was rather more than that.
24908. *Q.* You think it would be more than that? *A.* Oh, yes; I think so. I think it was more than that.
24909. *Q.* I am not speaking about what was—I am speaking about what would be. You see, you have the roof supported by the tensile strength of the rock added to the pressure of the air. It is hanging, therefore, on the superincumbent strata, and it cannot begin to let go unless some other element comes in, such as the hydrostatic pressure of water, which, I suppose, may be counted out as improbable. It cannot begin to let go at any point except at a point—I am leaving out one element which I am going to suggest to you—which would be something like at least 20 feet from the under surface of the rock; its weight alone, the superincumbent strata being taken to be absolutely rigid, would not allow it to let go except at a point some considerable distance—I suggested about 20 feet—from the under surface of the roof?

roof? Is not that so as a mere mechanical fact, because it is balanced by the pressure of the air underneath, and it is also balanced by the tensile adhesion of the rock above? *A.* I do not quite see that the air helps to balance it; for this reason that the air presses on the top of that rock, just as it does on the bottom.

24910. *Q.* I am going to suggest that to you; I am supposing that the superincumbent strata, the great thickness overhead, was absolutely rigid? *A.* Yes; but there is no doubt that that was not so; these falls in the 4th Right disturbed the surface, came up to the surface.

24911. *Q.* Now, there is another element of support, by the way, in addition to these, which would probably make that 20 feet a good deal more; that is, the lateral support of the surrounding rocks, which may be called friction? *A.* I did not hear you.

24912. *Q.* The support of the surrounding sides. If you consider a body which is going to slip down, you will see that before it can slip down it must overcome the friction of the sides? *A.* It was all down.

24913. *Q.* But supposing that, before the roof comes down, you consider the possibility of its coming down; it must not only overcome the direct tensile strength of the rock itself, but it must also overcome the lateral support, that is the friction, of the surrounding rock? *A.* But there was no surrounding rock; it was all down; the ends were loose, and natural cleavage planes near the rib.

24914. *Q.* Yes; but I mean supposing you are considering the probability of a sudden fall. Well, that is a smaller element in proportion to the greater size of the area which is going to fall, because the friction on the sides varies with the lineal measurements, whilst the weight for a given height of rock varies with the square of those lineal measurements; that is clear enough. But, anyhow, that is a considerable element. That being so, how can a fall begin at any height less than perhaps 20 feet or 30 feet from the surface unless you introduce another element? Now, I am going to suggest this; is not the element which begins to cause a fall really the flexion, probably, of the whole of the superincumbent strata? *A.* The whole of the superincumbent strata, Your Honor, is not in one continuous piece. All these rocks have lines of, not fracture, but —— [*Interrupted*].

24915. *Mr. Bruce Smith.*] *Q.* Cleavage? *A.* Cleavage.

24916. *His Honor.*] *Q.* Stratification? *A.* No; the stratifications are broken by lines of cleavage that go right through them; and that, of course, weakens the roof to a large extent; in fact, in some of the coal-fields, in all the coal-fields everywhere, these lines of cleavage are so —— [*Interrupted*].

24917. *Q.* Admitting the lines of cleavage, they do not affect the question of the barometrical pressure; they do not allow the introduction of air pressure, although they separate the strata of the rock? *A.* Oh, yes, the line of cleavage would make it like a loose end. There is nothing more common in working coal than, when one of these lines of cleavage is relieved, that a piece just drops out.

24918. *Q.* Yes; that in point of fact, explains a good deal in those cases where the line of cleavage proves the line of weakness—the assistance of the air underneath is lost? *A.* That is a view of the case that did not present itself to me; but I think, if your Honor will just look at it, you will see that the air pressure is balanced, inasmuch as this roof had come away, and had been disturbed to the surface.

24919. *Q.* I am not speaking of any particular roof; but I am speaking of the general question of when a roof will begin to fall. Now, you can easily see that, on simple mechanical principles, as long as you keep your superincumbent strata absolutely rigid and without flection, you cannot mechanically have a fall even of 2 or 3 feet. Do not you see that it is impossible? But you can easily see this, that the slightest, and absolutely inappreciable—in measurement—flection of the whole superincumbent rocks will then easily result in a break, which will allow air to get in over the top of the rock which is to fall; and that will relieve altogether the resistance by the pressure of the air underneath; and there would be pressure on each side. Looking at it from that point of view, is it not a fact that every fall in a mine, unless it happens to be an enormous fall of 30 or 40 feet thick in one piece, must involve a flection of the superincumbent rocks in order to allow it to start at all? *A.* In this case we know that the rocks were not only in a state of flection, but that the flections had been so great that they actually broke, and broke up to the surface.

24920. *Q.* In this fall? *A.* Not after this fall only, but before.

24921. *Q.* Before it? *A.* Yes; the surface was disturbed.

24922. *Q.* That being so, is it really possible that a fall of roof can take place without the fall itself being broken across in a great many different places and pretty well fractured throughout; being, in point of fact, a curve, and stone having very little elasticity to avoid fracture in case of curvature? *A.* In this case, Your Honor, I saw it. It was cut clean away; and there were only a few inches between the edge of the coal and the sandstone beds.

24923. *Q.* Where did you look up and see that? *A.* At the entrance to the 4th Right goaf.

24924. *Q.* Looking right up? *A.* Yes, when the brattice was put in, so that we could get up there easily.

24925. *Q.* How far did you see that? *A.* I am quite satisfied that I could see over 20 feet; but I did not see the end of it.

24926. *Q.* Of the fracture or of the fall? *A.* It all came down in a body, and apparently great flags of stone.

24927. *Q.* But it was all in flags and broken pieces? *A.* No; flags about probably 1 foot to 15 inches thick.

24928. *Q.* But all that comes back to this, that, in point of fact, it is a mechanical impossibility to get one great slab of roof, extending pretty well all over where the taken-out pillars were, to fall in one unbroken mass at once? *A.* I could not say that, because I know to the contrary. I know that it would be traversed by a large number of these lines of cleavage. Those cleavages down in the south are every 3 or 4 feet.

24929. *Q.* Well, you know it would be broken all over? *A.* Yes, practically; but out on the main road, where a similar roof fell after the fall, very likely after the compression and the removal of the natural supports, the timber and such like, we measured one of these flags, and the size seemed only to be determined by the size of the road, and it was 12½ yards by 5½, about as long as this room is broad.

24930. *Q.* And that fell in one piece? *A.* That was all in one piece.

24931. *Q.* And what thickness? *A.* About 1 foot or 15 inches thick, probably.

24932. *Q.* About 1 foot or 15 inches thick only? *A.* Yes; of course, it is in beds; and it would separate after it fell.

24933. *Q.* It would split?

24934. *Mr. Robertson.*] *Q.* Did you say it would break after it fell? *A.* It was about 6 or 7 feet high. It was about the height of the road.

24935. *Q.* I understand you to say that you found one slab 12½ yards by 5½ yards? *A.* Yes, one slab.
24936. *Q.* Then, I understood you to say it would break after it fell? *A.* Really, these are questions no mortal man could answer.
24937. *Q.* I want you to reconcile the two? [*Witness did not answer.*]
24938 *His Honor.*] Take the greatest fall you can imagine—would not it come to be, in effect, one great, but not instantaneous, storm of rock, as you might call it; a great storm of rock, in the course of the falling of which, the inter-spaces formed up above would be instantaneously filling from the pressure of the air squeezed down below by the falling mass; compensating, in point of fact, for the enormous pressure which was being put on the air down below, by the inrush of the air from below up above, though no doubt expelling a large quantity of the air which had not time to distribute itself into the new interspaces; but nothing like expelling it as one great body, or as a large proportion of one great body of the air, in almost an instant of time? *A.* I do not propose to say that it would expel all the air; but I think, from the nature of the rock that fell, and from the large solid slabs that we could see, it would allow a smaller proportion of the air below it to be driven into the interstices than if it had been soft brittle rock.
24939. *Q.* Oh, there would be partial vacuo in places, no doubt? *A.* Yes; but I am quite sure, even allowing for that, that it would not displace the whole of the air; that is to say, that a portion would work round and get over the top and through the crevices.
24940. *Q.* And then, again, you see, do you not, that this great fall, or whatever it is, is, mechanically, a fall beginning from rest, gradually acquiring motion until in 4 feet of direct fall, it would acquire a rate of about 8 feet a second, and that would probably be the limit of the fall? *A.* Yes, I see. These are the points that we can never discover. We can only speculate upon them; but I put it down, myself, that about three-quarters of a second would be the time. I admit it is one of those points we can never ascertain.
24941. *Q.* In calculating how long the fall would take to take place, did you take into account the retarding effect of the air down below, which your calculation assumes must have been enormously compressed, and must have, therefore, been made much more enormously retarding? *A.* Your Honor, the calculation necessarily must be crude, because, as I say, we can never ascertain the factors. We can never get at the actual conditions. I only made the calculation to assure myself that, when I asked the question of my friend in the North of England, I would not be asking an absurdity; and he recognised that, and stated that Mr. Dickenson was very sweet upon a similar opinion, and had put it forward as the cause of some colliery accidents that could not otherwise be satisfactorily explained.
24942. *Q.* Of course, his letter does not go for very much? *A.* Oh no; further than that I was thinking on the same lines, unknowingly, as Mr. Dickenson—nothing more than that.
24943. *Q.* Then again, as far as shock is concerned, you suggested that a shock of air, vibrations as from a fall or a blow, will cause fractures at a very long distance, and may cause the breaking down of a wall even? *A.* Yes.
24944. *Q.* But that shock is quite different from the compression necessary to cause a sudden exhibition of heat: to do that you must get an actual compression of a body of air? *A.* Oh yes, the two are quite different.
24945. *Q.* Of course, you might understand a shock at a distance of half a mile throwing down a brick stopping, for instance? *A.* Yes.
24946. *Q.* And yet that shock would not have the slightest effect in raising temperature? *A.* Oh, yes; it need not necessarily be accompanied by the transmission of air at all. It is merely the transmission of waves of air. In the same way I have often seen brick walls 3 feet thick actually rent all ways, made perfectly loose, by the vibration of riveting hammers in riveting boilers.
24947. *Q.* An old public-house was knocked down in Sydney once by a clap of thunder without being struck by lightning? *A.* Yes; but this was by the actual vibration shaking the walls. The walls were knocked perfectly loose.
24948. *Q.* So that it all comes back again to this, that the calculation is one which, although certainly the sudden shutting down of the lid, as it were, of a mine would, if it could happen all at once, completely force out the air through an opening at a most enormous rate, still there are so many uncertain data that it is very difficult to suggest even that the calculation could be approximately correct? *A.* I must admit that I would leave that to physicists who have the proper instruments and who have devoted their lives to it. It is not for me to do that. Still, I only suggest that it is quite reasonable and quite feasible; and, moreover, that it is a suggestion that is rapidly gaining ground among the leading lights at Home.
24949. *Q.* The suggestion that falls have directly caused catastrophes? *A.* Yes.
24950. *Mr. Bruce Smith.*] It ought to occur to Dr. Robertson that, before he propounds a theory of that kind, it is his duty to ascertain its feasibility.
24951. *His Honor.*] *Q.* I understand you are an engineer, Dr. Robertson? *A.* Oh, yes.
24952. *Q.* Have you gone through a regular course of engineering? *A.* Oh, yes.
24953. *Q.* Involving the higher mathematics? *A.* Oh, well, not, perhaps, the higher mathematics; mining engineering does not embrace that.
24954. *Q.* Such ordinary mathematics as run up to and include the differential calculus? *A.* No; that is not included in mining engineering; that is more civil engineering.
24955. *Q.* I thought that the differential calculus was looked upon as a sort of thing for average engineers to play with. I confess I cannot play with it myself.
24956. *Mr. Bruce Smith.*] *Q.* In those notices of yours, you and the gentlemen who visited the mine came to the conclusion that the evidences of force increased as they got outbye? *A.* Well, apparently.
24957. *Q.* That is in your note? *A.* Apparently.
24958. *Q.* That the force increased as you got outbye, instead of decreasing; it has an important bearing on your theory? *A.* Evidently it did; but whether that was due to the weaker roof along the roads, or whether it was due to the increased velocity of the blast, is a different matter.
24959. *His Honor.*] *Q.* I thought you suggested that there was an increase of energy through the compression raising the temperature sufficiently high to finally cause something like an explosion of coal-dust.
24960. *Mr. Bruce Smith.*] No, no explosion; he will not admit that.
24961. *His Honor.*] Do not you admit that there was an explosion of coal-dust? *A.* I cannot see any appearances of an explosion at all.

24962. *Q.* Then, if there was no explosion but a simple expulsion, must it not necessarily, and absolutely necessarily, follow that, except in the case of possibly running against a dead end, the force of the explosion must diminish as the distance extends: is not that an absolutely necessary result? *A.* I cannot say whether the force was accelerated on the outside or not. The damage was considerably greater some distance away from the 4th Right; but whether that was due to the weaker roof among the falls and among the faulty ground that the road went through, or —— I do not know what it was due to. The falls were certainly greater, probably after 100 yards from the 4th Right; but I do not know that that is any proof of the acceleration of the force.
24963. *Q.* Then it appears that, not only does the force appear to have been accelerated, but also that a large quantity of carbon-monoxide was evidently driven outwards as far as the junction of the two main roads of the mine; and then went in the main tunnel up towards the upcast shaft towards the furnace with the air? *A.* Not so much went down there as from the inside.
24964. *Q.* Well, it went up there anyhow? *A.* I do not know that there was so much there as came round the course of the ventilation.
24965. *Q.* Well, there was a large quantity of carbon-monoxide generated; and it could only be caused by the distillation of the dust? *A.* It just occurs to me that the girders taken out of that road (*referring to the No. 1 main level*) nearly all had the same bend on them. If there was any difference at all, it was due to the fact that the girder was weakened through some cause or another at one particular point. The girders were all disused permanent-way rails; and, in any case where the flange was eaten away, or the crown of the rail had been eaten away by the flange of the locomotives, the bend was different; but in all the cases where the rails were of equal strength they were equally bent; so that, in thinking it over I do not see that that showed any evidence of increased velocity.
24966. *Mr. Ritchie.*] *Q.* It does show that the force had been the same and had not weakened? *A.* It shows the same, but not any increase in force.
24967. *His Honor.*] *Q.* But your theory would involve an enormously decreasing energy, do not you see? If you compress gas—by gas, of course, I mean air, which is a gas—and then let it out through a tube after compression, the effect, the compression, as it passes along the tube, must necessarily, absolutely necessarily, decrease. You have no supply of force from behind—you simply have one shot, as it were—you have no continuing force supplying force behind. If you had an engine working behind compressing the air, you would have a continuous supply of force; but as you have not that, you have compressed air continually expanding itself, and therefore the force would be less and less? *A.* Probably it would be less. Mr. Bruce Smith's question just put me mind of these girders. We put them on top of one another on the surface just to see; and we found that they were practically all bent with, as nearly as possible, the same force; any difference was due to the weakening of the girder.
24968. *Q.* Well, the fact that the force continued equal, if it did continue equal, shows that there was a reinforcement as it went outwards? *A.* That, of course, I could not say?
24969. *Q.* Every girder struck represents an expenditure of force?
24970. *Mr. Bruce Smith.*] *Q.* Did not these nine people testify to this fact:—

As the evidences were so abundant that the blast was developing in intensity as it proceeded outbye, and feeling convinced that we had discovered the focus.

——[*Interrupted*]. *A.* Oh, they did not travel all the main No. 1 outbye at all. They went to well beyond the point where the girders were bent and the roof down. Of course, that expression of opinion was put down in the mine, and without any particular consideration.
24971. *Q.* I understood that you told me that the whole of this was put down after careful deliberation and assent? *A.* Yes; it was as clear as possible under the circumstances of examining the mine.
24972. Notes of this kind are awkward things. I would like your Honor just to listen to the whole of this sentence, because it shows, in my opinion, that this discovery of the increased intensity of the forces outbye led them to doubt their theory.
24973. *Witness.*] There was no theory at all then.
24974. *Mr. Bruce Smith.*] [*Reading from notes handed in by the witness on the previous day.*]—

As the evidences were so abundant that the blast was developing in intensity as it proceeded outbye, and feeling convinced that we had discovered the focus from whence the force proceeded, we thought it inadvisable to further continue the inquiry, and proceeded to the surface by the No. 1 travelling road.

24975. *His Honor.*] *Q.* Why was it inadvisable? *A.* There was no theory at all then: there was a simple examination of the mine. It really meant this, that the evidences of force were so abundant from that point outwards, and the hour so late, that we thought there was no great object to be gained by travelling along a road that was practically one mass of falls.
24976. *Mr. Bruce Smith.*] I think, your Honor, as these notes may be needed to be referred to again, Dr. Robertson might be asked to leave them in charge of Mr. Garlick, because there are several points there that I have directed attention to. [*With Dr. Robertson's consent the notes were handed to the Secretary.*]

Re-examination by Mr. Wade:—

24977. *Q.* What was the nature of the damage outbye from the telephone cabin? *A.* The roof down.
24978. *Q.* The roof fallen? *A.* Yes, evidently caused by the knocking out of the girders, that were supported by or at each end.
24979. *Q.* And would the extent of the falls there depend on the nature of the roof? *A.* Yes; there was a zone of rather faulty ground there; and the roof was much worse than over the generality of the mine. They were very bad falls.
24980. *Q.* You said that the roof, or the strata, had broken up to the surface? *A.* Disturbed the surface, yes.
24981. *Q.* Did you have any indications of that, any actual proof? *A.* Oh, yes, it brought down the surface waters: we had to cut drains to take the surface waters off. The seam is not very deep there.
24982. *Q.* You were asked yesterday if you had made inquiry as to whether Mr. Rogers had carried out his duties. Do you remember being asked that question by Mr. Lysaght?
24983. *Mr. Lysaght.*] I did not put that question.
24984. *Mr. Wade.*] *Q.* Mr. Lysaght asked you if you had made inquiries as to whether Mr. Rogers had carried out his duties? *A.* I am quite satisfied.
24985. *Mr. Lysaght.*] I did not ask that question: I asked was he satisfied with what Mr. Rogers and other people have done.

24986. *Mr. Wade.*] *Q.* Now, I want to ask you, as that question has been put by Mr. Lysaght, what opinion did you form with regard to Mr. Rogers as Manager? *A.* I have not been disappointed with him. I was told, before he got the management, that I should find that he would be very zealous and attentive to his duties, and quite able; and I have not been disappointed. He has been a careful, methodical, cautious, man: not a business man at all; but, in the performance of his duties, he has been very careful and cautious—a very cautious man, and exceedingly orderly and methodical.
24987. *Q.* Would you agree with this statement of Mr. Rowan's—" Mr. Rogers is an able and experienced man, cautious, reliable, and conscientious in the discharge of his duties —— [*Interrupted.*]
24988. *Mr. Bruce Smith.*] Does Your Honor think this inquiry any occasion for going into this aspect of the matter?
24989. *Mr. Wade.*] Why do you want to exclude it? How can it possibly affect you, you appear here in a neutral position.
24990. *Mr. Bruce Smith.*] I ask His Honor whether it is really apropos to this inquiry—the opinion of this witness as to the statement of a second man with regard to the character of a third.
24991. *Mr. Wade.*] I have kept clear of these questions until Mr. Lysaght introduced the matter yesterday afternoon.
24992. *His Honor.*] The question is what Dr. Robertson thinks of Mr. Rowan's opinion of Mr. Rogers.
24993. *Mr. Wade.*] No, it is a question whether he agrees with that definition of Mr. Rogers.
24994. *Mr. Lysaght.*] I submit to your Honor that it does not matter whether he does or not. It is not for this witness to give an opinion on Mr. Rowan's opinion; but to give his own opinion.
24995. *His Honor.*] He can give his own opinion: Mr. Rogers was immediately under him, and under his eye for years.
24996. *Mr. Lysaght.*] He has said already that he was satisfied with everything that Mr. Rogers did.
24997. *Mr. Wade.*] *Q.* Now, you were asked a number of questions about the evidence given by these medical men, do you remember? *A.* Yes, I think so.
24998. *Q.* You were asked this, whether, if you had been told by a medical man that he came to the conclusion that the indications of burning were caused by a flame of high temperature, would that affect your opinion. Now, supposing you heard that some medical man did not believe in combustion spontaneously, and did not know anything about it, would that tend to add value to his opinion, or to weaken it?
24999. *Mr. Bruce Smith.*] But you are paraphrasing part of the witness' evidence: why not read what he said?
25000. *Mr. Wade.*] *Q.* Suppose he says this, "I do not believe in spontaneous combustion: I do not know anything about it: I do not know that if you subject coal to intense heat it will give off oxygen"? *A.* That is on a par with some other medical man who said that he did not know what carbon-monoxide was, and wanted me to tell him what it was.
25001 *Mr Lysaght.*] I submit that this is really wasting the time of the Commission, putting to this witness, who does not pose as a chemical authority, these questions.
25002. *His Honor.*] Mr. Wade, it is much better to argue these matters before the Commission than to get them in by asking Dr. Robertson what he himself may think to be invidious questions.
25003. *Mr. Wade.*] Your Honor, Mr. Bruce Smith asked this witness certain questions from a part of the evidence; and I asked to have the whole of the evidence put before the witness.
25004. *His Honor.*] You can put it before the Commission. It is much better to do that than to get it in indirectly by means of the examination of this witness, although he is an expert; for, although Dr. Robertson is very modest as to his position and qualifications as an expert, of course he is an expert. If he were such a thorough expert as some of the University Professors, such questions as these, even then, might be objectionable, but they would come with some force; but, in the case of Dr. Robertson, they come, he himself will admit, with very little weight, and very little effect. If you wish to ask Dr. Robertson medical expert questions, I believe that he would have a right to express an opinion; but that is because I think his degree is a medical one.
25005. *Mr. Bruce Smith.*] No doubt; but certain witnesses have given their opinion as to whether a man's skin had been burnt, as distinguished from being affected by great heat; and now he is asked by Mr. Wade whether the fact that he knew that one of those witnesses knew nothing of spontaneous combustion would affect his opinion of the qualification of the witness to say whether a man's skin had been burnt.
25006. *His Honor.*] That is a question to be put before the Commission directly, and not indirectly by the examination of another witness.
25007. *Mr. Wade.*] I admit, your Honor, that the strict legal course would be to do that; but I did not understand that the Commission would hear any addresses.
25008. *His Honor.*] The Commission will not decline to hear any addresses. The Commission will leave it to Counsel to say whether they wish to address or not; and of course they will ask Counsel to cut it as short as possible, if they do address.
25009. *Mr. Wade.*] Well then, your Honor, if it comes to dealing with the medical evidence in detail it must go to great length.
25010. *His Honor.*] The most useful way would be to mark off certain passages and call the attention of the Commission to them, stating the reasons why you call attention to them. Orating for three-quarters of an hour on each of them will not increase the effect of calling attention to them.
25011. *Mr. Wade.*] Very well, Your Honor, I will take that course, if necessary.
25012. *Q.* You were asked some questions about double doors: supposing you have an explosion which blows out one door, would the probability be that it would blow out both the doors? *A.* The chances are that it would blow out both doors.
25013. *Q.* Then where does the advantage come in: in the ordinary working of the mine? *A.* Yes, in the ordinary working of the mine. If you are limited for air, and it is exhausted air, then, naturally, the less communication you have between the return in one district and the intake in the other the better.
25014. *Q.* It prevents leakage? *A.* Yes, it prevents leakage.
25015. *Q.* But it is no special protection in case of an actual explosion? *A.* No, they need not be any special protection.

25016. *Q.* Of course you have had hundreds of falls of roof, I suppose, in Kembla—may be thousands—did you ever hear of any report of gas being found after the roof had fallen in Kembla? *A.* No, never; and I have examined after a large fall in the shaft district, when we commenced the pillars there, and I found no gas. In fact I do not think it is a roof that could contain gas; it is almost solid sandstone; it is as near as possible solid sandstone; there is no bituminous matter in the roof.
25017. *Q.* You spoke, just now, about waves of vibration caused by a shock—would you get those waves as the result of a fall and the displacement of air? *A.* Oh, yes.
25018. *Q.* Do you know what pace these waves travel at? *A.* About 1,100 or 1,200 feet a second.
25019. *His Honor.*] *Q.* About the same pace as sound? *A.* About the same.
25020. *Mr. Wade.*] *Q.* Somewhere about a mile in five seconds, is it not? *A.* Yes, under a mile in five seconds.
25021. *Q.* Can you say what effect you think those waves would have on, say, a light at the 4th Left? *A.* It would be extinguished; a sharp wave would extinguish it.
25022. *Q.* Would that be quite apart from the actual rush of air which came out of the 4th Right? *A.* It might be.
25023. *Q.* And, if the air were travelling at 700 miles per hour, of course there would be pretty well the same pace? *A.* Yes. In any case it would carry the pure air before it at an enormous pace; and I do not see any possibility of any lights existing in the main road at all; in fact the lights were put out in some of the workings a considerable distance off the No. 1, and the miners re-lit their lamps and made their escape.

Examination by Mr. Robertson:—

25024. *Q.* In the 4th Right—that is, the roadway from the fall to the back heading—there was at least one prop, you admit, found with the head leaning inwards? *A.* Leaning inwards—yes.
25025. *Q.* How do you account for that prop being found there at all, leaning inwards or outwards, in a roadway through which a blast had passed with a velocity of 700 miles per hour? *A.* I do not know. I understand that there were two props with a cross girder put there to—I understand that there were two or three props put there to support the brattice. Of course, they would be wedged tight; but I only saw the one in the position that you state, and I can give no explanation of it.
25026. *Q.* Well, we will stick to the one;—the moment that this velocity of 700 miles per hour reached the back heading, there would be an expansion of the compressed air and a reduction of velocity? *A.* At the back heading?
25027. *Q.* Yes? *A.* There were all the appearances of an enormous force outwards—tons of stones, and rubbish, and brattice, and props driven into the crevices of the coal.
25028. *Q.* I know that; but when this velocity of 700 miles per hour reached the back heading it would spread in other two directions? *A.* Yes; but it evidently did not spread very much. I think that you can see other evidences coming out of the first cut-through outbye from the 4th Right, but not beyond.
25029. *Q.* Well then, when it reached the main heading, unquestionably, according to your own evidence, it spread outbye and inbye? *A.* It went both outbye and inbye. There were distinct, unmistakable evidences of that.
25030. *Q.* Then the velocity would be very much decreased—decreased by half—neglecting the return airway? *A.* Probably.
25031. *Q.* And yet this reduced velocity going outbye, in your opinion, accounted for the bending of iron bars, and the destruction generally, right out to the tunnel mouth? *A.* Yes.
25032. *Q.* Well, if there was such destruction with a reduced velocity of, say, 350 miles per hour, how is it that anything was left in the 4th Right roadway at all? *A.* Oh, towards the last, I suppose, the velocity would be a little less. I cannot answer—you are asking enigmas. I am only stating facts. It is impossible to answer these things; you must take the facts as they are there.
25033. *Q.* Well, I think it is a fair question to ask, and I think it is a very easy one to answer: can you give an idea of the lateral pressure of air with a velocity of 700 miles an hour? *A.* Yes; something like 37 lbs. or 38 lbs. per square inch.
25034. *Q.* Well, then, a light prop, or any light material, would not offer very much resistance to that force? *A.* Probably not.
27035. *Q.* Well, when the velocity of 700 miles per hour—which gave you the estimated pressure, I think, of 37 or 38 lbs. per square inch—reached the back heading, there would be expansion? *A.* Undoubtedly there would be expansion.
25036. *Q.* Well, with expansion there would be reduction of temperature? *A.* Probably there would.
25037. *Q.* But would not it be so inevitably? *A.* Probably it would.
25038. *Q.* But more than probably;—can you have expansion without reduction? *A.* At that particular point you see no evidences of heat at all. There are absolutely no evidences of heat at all at the back heading.
25039. *Q.* I am not asking for the evidences of heat;—I simply want to know whether if, for the sake of argument, we had a temperature of 291 degrees at the orifice, would that temperature not be enormously decreased when it reached the back heading? *A.* Probably it would.
25040. *Q.* I think you must admit that with expansion you get a decrease in temperature? *A.* Probably.
25041. *Q.* Now, the 4th Right being wet, and there being no dust, the ignition of dust could not take place there? *A.* No; you see no evidences of heat or flame there at all.
25042. *Q.* Well, then, if there was no ignition of dust in the 4th Right, and the temperature was reduced—I think Mr. Sellers gave the temperature, with a half of the velocity, at 94 degrees—if the temperature was reduced after the air left the 4th Right, before it reached any place where dust could be ignited, there could be no ignition of dust? *A.* I do not see that there could be any ignition of dust on the main roads, simply because there was no dust on the main road except the dust that might come from among the pillars in the 4th Right.
25043. *Q.* But, then, we have the evidence, you see, that any dust, or any small coal, that may have been in the 4th Right pillar workings, was covered by the first fall? *A.* Yes—that is, if you can believe that it was entirely covered, which is a thing which I very much doubt. It is not a roof that would fall in that way.
25044. *His Honor.*] To give some idea of the force of this blast, I might mention that I think it works out, on the Doctor's evidence, at somewhere about forty times the force of the "Dandenong" gale as registered by Mr. Russell.

24045. *Mr. Wade.*] I think it is five times. In the "Dandenong" gale the instrument broke at 120 miles an hour.

25046. *His Honor.*] Of course, the pressure varies as the square of the velocity, approximately. The "Dandenong" gale blew rather hard.

25047. *Mr. Robertson.*] *Q.* You know, I think, that the difficulty in accounting for this disaster is the comparative absence of flame? *A.* Yes.

25048. *Q.* But is not that a feature in most colliery explosions? *A.* No; the feature of most colliery explosions—gas explosions—is the prevalence of flame, and the evidences of flame.

25049. *Q.* But I think, if you will read accounts of most colliery explosions, you will find that there are portions of the mine where there are very few indications of flame—portions? *A.* Yes, oh, yes; quite right—dust explosions especially. Dust, apparently, seeks out dust. The evidences, apparently, of the Udston explosion and the Fernie explosion, in British Columbia, are these: that the explosion occurred at one portion of the mine, and that, almost simultaneously, there were other explosions in very distant portions of the mine, without apparent passage of flame.

25050. *Q.* But do you know whether, in the Udston explosion, it is not a fact that there were very few indications of flame beyond dust being coked? *A.* Well, I do not know, further than reading the extracts from Mr. Dickenson's report. If I had had the whole report to read I would have been in a better position to answer.

25051. *Q.* Well, touching upon that feature of colliery explosions—viz., the apparently simultaneous explosions in different parts of the mine—there would be conflicting radiation of forces? *A.* Yes; but there has been no conflicting radiation of forces here; there has been no breach in the continuity of forces here. It commenced in the 4th Right, and went inbye and outbye from the 4th Right, and there was no breakage in the continuity of the forces.

25052. *Q.* I did not suggest so; I merely referred to some remarks of yours on Mr. Dickenson's report. Have you read Mr. Donald Stuart's book on "Colliery Explosions"? *A.* Yes; I have.

25053. *Q.* Mr. Stuart is rather an able man? *A.* I suppose he is; I do not know him.

25054. *Q.* We can only judge of men by their books? *A.* Apparently he is.

25055. *Q.* Do you know how he accounts for the independent explosions, as it were, in a mine after a large explosion? *A.* No; I do not recollect at the present moment.

25056. *Q.* Do not you recollect that he gives as a reason, and advances as a theory, that these local explosions, as it were, were caused by the main explosion having access to fresh oxygen? *A.* Yes; I recollect that. I remember that; so does Haldane.

25057. *Q.* Would not you consider that Mr. Stuart was a careful investigator, and as capable of explaining those occurrences as Mr. Dickenson? *A.* He is a careful investigator, but I do not consider Mr. Dickenson and Mr. Stuart in the same breath—oh, no.

25058. *Q.* Did Mr. Dickenson ever write a paper as able as Mr. Stuart's book? *A.* I do not know whether he has written a paper; but Mr. Stuart's papers give rise to a very great deal of controversy of an adverse description. I am sure he is an able man; but he is rather a partisan, and aggressive in his style, and gives rise to a good deal of adverse discussion.

25059. *Q.* But are you aware whether Mr. Dickenson's theories gave rise to any discussion? *A.* No; Mr. Dickenson's theories do not seem to have given rise to much discussion, but I can see that they are being taken up now.

25060. *Q.* I recollect that at the time his theory was ridiculed by the profession? *A.* Yes; the dust theory was ridiculed also.

25061. *Q.* Well, there are two able men who, by different trains of reasoning, give their theories as to the cause of these independent explosions in different parts of the mine;—now, which do you favour? *A.* Well, Mr. Dickenson, I take it, more confined himself to the matter in hand. He gave his opinion as to an individual explosion. Mr. Stuart rather generalised in that particular place, I think. He did really write his book with the Camerton and Tylorstown explosions in his eye, but I think Mr. Dickenson was more on particular cases—to explain particular explosions.

25062. *Q.* I am under the impression that that is just what Mr. Stuart did; he took particular explosions, investigated them, and gave his conclusions as the result of those particular investigations? *A.* Oh, yes. Of course, a few years before that the brothers Atkinson wrote a book on colliery explosions, where they pointed to the fact that wet parts of the road seemed to give an immunity beyond; but investigations seem to have gone beyond that now: certain explosions seem to show that wet portions of the road give no immunity whatever in certain cases. I presume that the Atkinsons were referring more to gas explosions.

25063. *Q.* Can you state any colliery where there has been an explosion and simultaneously there have been other explosions in different parts of the mine, which were attributed to concussion—any colliery free from gas or dust? *A.* How could there be an explosion if it was free from dust or gas—how could there be.

25064. *Q.* I say, "If free from dust or gas"? *A.* I do not see how it is possible to have an explosion.

25065. *Q.* I say, "Free from dust or gas";—you may have one of the two, but not both? *A.* I see; I think that in Udston —— [*Interrupted.*]

25066. *Q.* They had both? *A.* I think they had a very slight amount of dust; I am not sure,

25067. *Q.* Udston adjoined Blantyre? *A.* Yes; I know. Well, Blantyre was a particularly fiery place. All these collieries were almost unworkable in the lower seam—the Splint seam—from the amount of gas that was given off. I remember the time when they were practically unworkable.

25068. *Q.* Is it not a fact that in all those explosions where this theory of concussion has been advanced either dust or gas has been present? *A.* There must have been either one or the other or there could not have been an explosion.

25069. *Q.* Now, the Udston mine was a gassy mine, was it not? *A.* I do not think it was particularly gassy in the Ell coal.

25070. *Q.* This was the splint coal where the explosion occurred? *A.* Oh, was it? It was since my time.

25071. *Q.* And dusty? *A.* Oh, yes, it was dusty.

25072. *Q.* It was also worked with safety-lamps? *A.* Yes.

25073. *Q.* Do you remember the type of safety-lamp? *A.* No, I do not. I never was in Udston Colliery.

25074. *Q.* But do you remember the type of safety-lamp that was used twenty odd years ago in Scotch collieries? *A.* Yes, I do; I know the only type that was available; either the Davy or the Clanny.
25075. *Q.* Do not you know that there was a particular type in use in Scotland in those days? *A.* No, it was before that time.
25076. *Q.* Do you know that it was a lamp that was condemned by the Mining Institute of Scotland? *A.* Very likely.
25077. *Q.* As a matter of fact, every miner who carried that lamp in his hand carried a death-trap with him? *A.* Very likely. I do not know what lamp the Udston Colliery was using. Was it not the Clanny?
25078. *Q.* No, it was what they called the Scotch gauze lamp.
25079. *Q.* Do you know that there was very lax discipline in Udston? *A.* I do not know. I was here at the time.
25080. *Q.* I thought you said you read the report? *A.* I have read extracts from it.
25081. *Q.* And you do not know that, on a number of the bodies, pipes and matches, and open lights were found? *A.* No, I do not know that.
25082. *Q.* Now, I would like to read you a bit of your evidence here, in order that you may understand my remarks later:—

> We were very much disturbed in our minds to account for the phenomena of this disaster, and were naturally casting about in every possible way to account for it; and I received a hint from a very eminent mining engineer in the North of England that the late Chief Inspector for Mines, Mr. Dickenson, was rather taken with the notion that some rather obscure colliery explosions could be attributed to the percussive force of the air displaced by a large fall; and, about the same period that I received that information, I read in some of the mining journals about some of the remarks made in connection with the Udston explosion. Udston is a large colliery in the Lanarkshire coal-field, on the margin of the Hamilton coal-field, adjoining Blantyre. It seemed to me that, in that colliery, the origin of the evil was found to be in rise workings, where they had commenced pillaring; and, in that coal-field, the roof was a very tender roof indeed. A very large fall had taken place; and, in the absence of any other cogent reason, Mr. Dickenson, and, I think, Mr. Atkinson, the Inspector, and possibly other Inspectors—possibly Mr. Ronaldson, the Inspector; I think he was there—Dr. Dickenson, at all events, in his report attributed the probable cause of the disaster to the effect of that large fall; inasmuch as, immediately after the first explosion took place—this was to the rise—simultaneously, and in different parts of the mine to the dip, other explosions took place, which he could only account for by the percussive force of the air. (Para. 23875.)

You have read Mr. Dickenson's report? *A.* Not the whole of it.
25083. *Q.* Have you got it here? *A.* No, I have not read his report at all.
25084. *Q.* Would you be surprised to find that Mr. Dickenson makes no reference whatever to a fall? *A.* I understood that he did.
25085. *Q.* He made absolutely no reference whatever to a fall; and there is nothing in the evidence to show that a fall had occurred. I will read you Mr. Dickenson's conclusion:—

> On these grounds we are of opinion—
> (*a*) That the explosion originated either at the stoppings in the west, or Blantyre, section; or at Harkness' shot in the east section; the former place being most likely.
> (*b*) That it was primararily caused by the ignition of some quantity of fire-damp at an open light, or at a match, or by being drawn through the gauze of a Scotch safety-lamp.
> (*c*) That, being thus commenced, it was reinforced by gas, with which the ventilation was impregnated, and by dust, together with gas drawn out from the solid coal, and from cavities at the stoopings, and elsewhere, by the suck and pressure set up by the explosion; and that some of the issues of gas were ignited separately by the pressure, or through the gauze of the lamp, or at open lights.
> (*d*) That some of the miners were clearly guilty of contraventions of the principal Act, in having lamp-keys and matches in their possession, and in opening their lamps.
> (*e*) That no apparent contravention of the Act is proved against the officials of the mine.

A. How does he account, then, for it; read the portion where he accounts for the simultaneous explosions in the dip part of the mine?
25086. *Q.* I have just read it; he does not, as your evidence leads us to believe, suggest for a moment that the explosion was caused primarily by percussion or by a fall? *A.* I understood so.
25087. *Q.* Well, I have read it for you; and it is there for you to see; now, can you state an instance where an explosion is stated to have been caused primarily by percussion or by a fall? *A.* It is suggested that the Talk-o'-th'-Hill explosion must have been caused through that.
25088. *Q.* That is by a correspondent? *A.* That is by a correspondent.
25089. *Q.* And that, of course, was contradicted by the Managers; and it is not supported by the report of the Inspector? *A.* But the Inspector's report was written before the mine had been cleared up; and when there was, according to the Inspector, a reasonable supposition that it was caused by a gob fire. Subsequent events, I understand, proved that there was no gob fire.
25090. *Q.* Then, the correspondent's letter was written without any knowledge at all of the mine? *A.* I do not know that.
25091. *Q.* Well, the Manager says so? *A.* I do not know that. The correspondent evidently knew what he was talking about; he was a clever man.
25092. *Q.* Do not you see that, in the case of an explosion, and a serious explosion, if you like, if it could be attributed to a fall, or percussion, the Manager would be only too glad to take refuge in that suggestion? *A.* He did not know at the time. That was only a thing that could be suggested when it was known that it was not a gob fire. Of course, your own Manager sent to me an excerpt from some remarks of Mr. Southern, a well-known teacher at Home, of a mysterious explosion in South Wales, where there was no one in the mine at all; and it was suggested that, in that case, there must have been both gas and coal-dust; and that it was the sparks caused by the velocity and intensity of a fall that ignited the gas, and, possibly, the stirred up coal-dust. Of course, I do not know the name of the mine; and I simply mention it.
25093. *Q.* That was not percussion? *A.* They did not suggest percussion then.
25094. *Q.* That was simply combustion caused by sparks brought about by the friction of masses of rock; but that is a very different thing from this theory of concussion brought about by a fall. When you were making your calculations as to the heat that would be developed by this great velocity, did you have in mind Dr. Bedson's experiments? *A.* Yes, I read Dr. Bedson's experiments.
25095. *Q.* Do you know whether Dr. Bedson's experiments went to show that, in order to get heat, you must have continued pressure? *A.* Sufficiently continued, yes. Of course, we know that you must have continued exposure of fire-damp to intense heat before it will ignite; and that is one of the safeties of fire-damp, that it does not immediately ignite.

25096. *Q.* The calculations giving a velocity of 700 miles per hour are based upon the datum of half a second for the stroke of the piston, as it were? *A.* Somewhere about three-quarters of a second.
25097. *Q.* No, half a second? *A.* I did not go into it with that minutæ; but I allowed three-quarters of a second.
25098. *Q.* But that would not be continued pressure? *A.* It might be sufficient, because coal-dust and carbonic oxide is different from coal-dust and fire-damp.
25099. *Q.* But that would not meet the conditions of Dr. Bedson's experiments? *A.* Probably not.
25100. *Q.* And, when Dr. Bedson was experimenting, he was experimenting with an air compressor, working against a pressure of 36 lb. per square inch, his air compressor was not exhausting to the atmosphere? *A.* It was simply pressure. That, I think, was Dancer's experiment, not Dr. Bedson's. Dr. Bedson's experiments were conducted more to explain what was at first supposed to be mysterious explosions in air receivers. Of course, he went to show that the pressure of the air was quite sufficient to ignite all the oils that were used as lubricants, and also the coal-dust.
25101. *Q.* Yes, but that is by continuous pressure? *A.* Whether it was continuous he does not say.
25102. *Q.* You cannot draw a parallel between an explosion caused in an air compressor under continuous pressure with that in the mine? *A.* They would be analogous, quite analogous.
25103. *Q.* You knew Mr. Ralph Moore? *A.* I did.
25104. *Q.* He was a long time an Inspector, a capable man? *A.* He was an old Inspector. Well, of course, the man is dead; and I am very sorry to say a single word against a man who is not here; but I do not consider he had anything like the capacity of some of the other Inspectors.
25105. *Q.* At all events, he was a shrewd man? *A.* Oh, yes; he was a very honest man.
25106. *Q.* And, in investigating the cause of an explosion, I suppose his evidence should be given weight to? *A.* Yes.
25107. *Q.* Well, Mr. Ralph Moore reported upon the Udston explosion; and I will read you what he says:—

> Upon full consideration of the whole matter, I am of opinion that this was a dust explosion; and that it originated in some place in the rise section where some gas was present; that a shot was fired in the place surreptitiously, and without an examination for gas; that, when the shot was fired, it ignited the gas which was in the place, and a cloud of coal-dust was raised,

and so forth. Now, that is Mr. Ralph Moore's opinion as to the cause of the disaster at Udston? *A.* Yes; and the force in Udston was from the face towards the shaft in all the cases, not to the face.
25108. *Q.* There were conflicting forces—I do not know whether you have seen the diagram? *A.* No, I have not seen the report at all. It is not procurable easily here.
25109. *Q.* Will you admit that there is no evidence to show that the explosion was caused primarily by a fall; and that concussion, if it was a factor in any explosion, was a secondary effect? *A.* I do not know at all. You see here we have got all these proofs so immediately to hand. There is less interest in reading up explosions a year or eighteen months after they occur.
25110. *Q.* But I take it you yourself attach considerable importance to the report by Mr. Dickenson on the Udston explosion, as bearing out your own idea? *A.* No; I made a suggestion that it was the only one feasible that I could see under the circumstances. A great many of the factors you will never know; and, therefore, it will be incomplete to that extent.
25111. *Q.* But then you mentioned the Udston report as supporting your theory or your suggestion that a fall —— [*Interrupted.*]? *A.* My principal information regarding Udston was from the *Colliery Guardian* remarks.
25112. *Q.* There has been a suggestion made by, I think, the northern miners, that only certificates of competency obtained in the Colony should be recognised;—do you consider that the men holding Imperial certificates should be considered as undesirable persons to come here? *A.* No, I do not think they should be considered as undesirable.
25113. *Q.* Undesirable immigrants? *A.* No; I would condemn myself. I hold an Imperial certificate; I could hardly be expected to condemn myself.
25114. *Q.* But do you think it is to the interest of the industry and of the miners themselves that owners should be prevented from securing the services of the very best men that the British coal-fields produce? *A.* I think it is distinctly in the interests of the owners, and of the miners, and of the trade, that the very best intellect and experience that can be obtained should be obtained.
25115. *Q.* Well, I presume you recognise that the conditions of mining in the Colony are not sufficiently varied for a man to obtain the same experience here as in British coal-fields? *A.* I have already stated so. We have not the varied conditions here that they have at Home. You cannot put an ordinary miner here to do the same work as the ordinary miner at Home would be put to do, because the miner here is quite inexperienced in it.
25116. *Q.* Have you paid attention to General Rule 12, as to shot-firing—is not the structure complicated? *A.* Yes, I think it is, a little. I think it should be altered.
25117. *Q.* Simplified? *A.* Yes, simplified.
25118. *Q.* In your experience in the Colonies, have you found the strata rather treacherous? *A.* Yes, it is rather treacherous from these intersecting cleavages.
25119. *Q.* And affected by atmospheric conditions? *A.* Yes.
25120. *Q.* That being so, do you agree that all shafts sunk in future should be lined? *A.* Yes, I am distinctly in favour of shafts being lined, even when there is conglomerate; because very often, when air is admitted to that conglomerate, it frets easily. Pure sandstone is not so liable to fret; but conglomerate is very treacherous; and I would say that not only bituminous strata, but also conglomerate, should be lined.
25121. *Q.* There was another suggestion made, that miners should have power to appoint mining engineers to make their check-inspections—what is your opinion about that? *A.* I think you could not expect owners to agree to that; you could not expect owners to agree to any such suggestion. I think it would be highly reprehensible. First of all, you appoint Managers by an examination; they are appointed because of their ability. The miners are allowed to inspect; what more do they want? I do not think it would be right to call in any stranger, or any mining engineer. It would be quite wrong. Personally, I would prefer to go out of the trade altogether than to be obliged to do such a thing. I would prefer to go out of the trade entirely than to divulge my secrets to any mining engineer that I did not choose myself.

25122. *Q.* The evidence of the miners who have come before this Commission is to the effect that they have a difficulty in securing the services of competent men? *A.* I do not think there can be any truth in that, because competent men are welcomed and respected wherever they go. They are becoming such a rare commodity, that they would be hailed with satisfaction; any recommendations made by competent men would receive instant and sincere attention.
25123. *Mr. Ritchie.*] *Q.* Do I understand you to say that competent men are becoming a rarity? *A.* Yes, a rare commodity.
25124. *Q.* Amongst the miners? *A.* Amongst the newer class of miners.
25125. *Mr. Robertson.*] *Q.* You mean men of experience? *A.* Yes.
25126. *Q.* That is partly due to the easy conditions of mining in New South Wales? *A.* Yes. It is holidays, play, football, horse-racing, and such like. The rising generation seem to be much more taken up with these than with serious work.
25127. *Q.* I take it, from what you say, that you have no objection at all to competent men inspecting on behalf of the miners? *A.* No; on the contrary, I would encourage it by every means. The opinion of a competent man, in my opinion, is a very valuable thing indeed to the Manager; and, personally, I would hail it with satisfaction. I would give competent men every possible encouragement, and pay great deference to their opinions.
25128. *Q.* There is an objection to the present form of Rule 39. The miners raise the objection that, according to the wording of the rule, they are forced to appoint men who are actually working, although they may have competent men not working? *A.* Yes. Of course, I am rather out of that now; but I do not think there would be any objection raised to men who are not actually working, but who had been practical miners. I may be quite wrong, because, as I say, it is hardly in my way; but I think I have heard of miners who were practical men, and who had ceased working in a mine, who had been appointed.
25129. *Q.* But it was given in evidence here that a man who was not an actual working miner had been appointed a check-inspector, and there was some demur to his making his inspection at Kembla Colliery —that is Mr. Wynn—but ultimately he was allowed to go in? *A.* I do not know about it; it did not come before me. I would have made no objection, I am sure.
25130. *Q.* You do not see any objection to the rule being altered so that any competent miner, although not actually working, could be appointed check-inspector? *A.* I would have no objection; I would not make an objection. I have never heard of any objection being taken to even Mr. Wynn. As a matter of fact, I never heard his name before; but I am sure the objection would never have come from me.
25131. *Q.* You have, in your evidence, said that you think dusty roads should be watered. Now, I would like to know to what extent you would carry this out? *A.* That requires a good deal of consideration. I think there can be no objection to drenching the sides of the roads against the coal, and washing the dust off, and, in the majority of cases in the Colony, the floor also; but there is no doubt in the world, with regard to the roofs of some of the mines, you must proceed with very great caution; they fret so easily; there is so much aluminous matter in the strata immediately above the coal that it begins to swell and fall, and cause a good deal of trouble. The roof is the danger.
25132. *Q.* My question has more bearing on the length of road you would water? *A.* I think I would be inclined to water certainly all main roads, and where the horses travel, and, as far as possible, where the roads enter the face.
25133. *Q.* But supposing you have a mine with, say, one main haulage road, and two or three travelling roads to a particular district, and, in addition, half a dozen or more roadways, equally, if not more, dusty, not travelling ways, and not haulage ways, would you stop short at the haulage and travelling roads? *A.* No. As far as possible, and as far as it is practicable and possible, I think that the roads into the bords—is that what you mean, the bord roads?
25134. *Q.* No, I am taking the case of a colliery which may have 40 miles of dusty roadway? It is a very serious question. I think it would be better that the particular case should be dealt with separately. It is a very serious question in this country, unless you have plenty of water; and a large number of collieries have no water.
25135. But, assuming you have plenty of water, would not the first cost of appliances for watering an extensive mine, and the up-keep afterwards, be practically, commercially speaking, at all events, impracticable? *A.* Oh, yes, in the case you give. In the supposititious case that you mention I think that it would be a question with the owners whether they would continue the mine. You cannot separate the cost of production from such questions; because, over many years, the coal trade in New South Wales has been conducted, in the majority of collieries, with no profit at all—absolutely at a loss. I know that, with every knowledge of the business, and giving it every attention and every consideration, for five years on end I have worked extensive collieries at a loss, and could not make the two ends meet; and I do not think there is anybody who would find fault with the expenditure; I wasted nothing; and everything that was necessary was provided.
25136. *Q.* Now, what is your object in watering roadways at all? *A.* To damp the dust, and to prevent it from mixing with the air in the case of a sudden commotion, such as, for instance, quick haulage, or shot-firing in the main road, or any sudden commotion that would disturb the dust if it were dry.
25137. *Q.* But you know that, in the case of shot-firing on a main road, the place has to be watered? *A.* Yes, that is true; but on many roads—I do not say that they exist here—on many roads at Home it would be almost impossible to perfectly and sufficiently water the main roads. You see what a tremendous explosion happened, I understand, from a shot on the main road, in the Albion, one of the newest and finest collieries that exist in Britain. Of course, here, where there are tight skips and endless rope-haulage, there is very little dust escaping on to the road at all.
25138. *Q.* But at the Albion Colliery no provision at all was made for watering, and dynamite was used for blowing out the timbers while 200 or 300 men were shovelling the dust up? *A.* That was very bad.
25139. *Q.* But, supposing that you do water the roadway, is it not conceivable that, in a dusty mine, there may be sufficient dust in suspension in the air to carry on an explosion? *A.* I think, if it is effectually damped, in the majority of mines in New South Wales, at all events, if it is damped and continuously kept in a damp state for some time, it retains the moisture, so that after a time you may diminish the watering.
25140. *Q.* But you are thinking, probably, of mines with a temperature of 60 or 70 degrees? *A.* Yes.
25141. *A.* As the temperature increases—— [*Interrupted*] ? *A.* It would be a very difficult thing.

25142. *Q.* But, even if you do water the roadways, is it not possible that, in a dusty mine, there is sufficient dust produced by the men at the face, and carried along with the air, to carry on an explosion? *A.* Quite. I know of a mine where considerable quantities of virulent dust were collected on the sides of the road, and on the road, and we could not see any reason for it; but latterly we discovered that it was being swept down from the screens above, and carried down with the intake air. It would be a very difficult and serious problem indeed with these deep mines, and with a high temperature, and long lengths of road, and dry coal, and probably friable coal, to water it. It would be a very serious question indeed. The question of the supply of water is probably a very serious one itself. Of course, it is suggested that we should mix salt with the water, in the hope that it would keep damp longer; but even that is not all plain sailing. As I say, the very cost of it must be considered.

25143. *Q.* But, if this suggestion of concussion holds good, clearly the watering of the roadways would be in vain? *A.* Well, I see some writers in the magazines doubt the efficacy of watering of roadways. They doubt if even 5 or 6 per cent. is of any value.

25144. *Q.* Are you aware that Mr. Hall, the eminent Inspector at Home, has reported that the attempt to systematically water in his district has failed? *A.* Yes, I read that some time ago. It would be a difficult thing to systematically water round extensive collieries.

25145. *Q.* I suppose there has hitherto been no definition—no standard definition—of a gassy mine? *A.* No, not so far as I am aware.

25146. *Q.* Do you think it is desirable that there should be? *A.* It is desirable that some definition, within reasonable limits, should be made.

25147. *Q.* Will you give your views on what you consider should be the definition? *A.* I really have not considered the point sufficiently to do so.

25148. *Q.* But this is rather important? *A.* Yes, I know it is. But I really have not had time to consider it.

25149. *Q.* Would you consider that any mine giving off gas should be designated a gassy mine? *A.* Containing a certain percentage in the air—I should say that that would be considered a gassy mine; it must be detectable.

25150. *Q.* But, if it is detectable, would not you class the mine in the category of gassy mines? *A.* If it is always, if it continues to be, detectable, I think it would be reasonable to classify it in that way.

25151. *Q.* But we have had serious disasters in mines in this State where their reputation as regards gas was good? *A.* I do not know about that. Bulli, of course, was giving off gas.

15152. *Q.* But, at that time, would it not have been considered only a slightly gassy mine? *A.* No; they were using safety-lamps in Bulli; it was considered a gassy mine.

25153. *Q.* Was Dudley considered a gassy mine? *A.* No. Of course, I have not been down Dudley since they were breaking off the bottom pillar.

25154. *Q.* Was Burwood considered a gassy mine? *A.* A portion of Burwood, I believe, did give off gas.

25155. *Q.* Was Seaham considered a gassy mine? *A.* Well, I do not know, of course, what Seaham has been lately. I do not know whether all parts of Seaham gave off gas or not, or whether it could be detected in the air.

25156. *Q.* I think you said you had no knowledge of the presence of gas in Kembla? *A.* Yes, I said that.

15157. *Q.* And your officials had reported that no gas could be found? *A.* That is so.

25158. *Q.* But is it not possible that, although your officials reported, in all good faith, that no gas could be found, the coal may still have been giving off a slight percentage of gas, not detectable with the ordinary lamp? *A.* Well, since the introduction of the hydrogen lamp, we have failed to detect it with the hydrogen lamp.

25159. *Q.* Since when is that? *A.* I suppose about two years ago or so.

25160. *Q.* When was it examined? *A.* I do not know, I am sure. Of course, Hotchkis has been there only since the accident; but he has failed to detect any gas.

25161. *Q.* Has he had the advantage of the use of the hydrogen lamp? Oh, yes.

25162 *Q.* And you still think that the coal gives off no gas? *A.* I do.

25163. *Q.* Well, that being so, it would be of very great importance to the company if that could be demonstrated beyond all doubt? *A.* Yes.

25164. *Q.* Would you be willing to have a heading bricked off without access to the air for a week or so, and a test made? *A.* I do not suppose there would be any great objection to it; application could be made to the company; but they have been delayed a very great deal already, as far as I can see, to no purpose, and have suffered exceeding loss, and, I think, uncomplainingly.

25165. *Q.* Do not you see that it would be of great importance to the company? *A.* Of course, we are working Kembla with safety-lamps; and we have no intention of withdrawing them.

25166. *Q.* Well, then, what was your reason for putting safety-lamps in Kembla, or using safety-lamps? *A.* Oh, well, I do not know that there was any cogent reason, except the state of the public mind, and the extent of the calamity. If you cross-question me upon the point, I do not know that I can give any cogent reason at all for it. I have always looked upon it that we have done it of our own free will; but I have always looked upon Kembla as a mine where safety-lamps were being used without any evidence of gas.

25167. *Q.* Still it would be of great value to the company if this doubt were settled? *A.* I do not think it would be of any value to the company at all now; because the company, so far as I know, have no intention of withdrawing the safety-lamps. They think they get just about as good a light with the safety-lamp as with the ordinary lamp. It is a little more expensive; but it keeps things in a very much better state, and you can preserve better discipline.

25168. *Q.* I admit all that; but still safety-lamps do not absolutely insure absolute safety, though they give a great degree of safety, no doubt? *A.* Yes.

25169. *Q.* But, apart from that, would it not be of importance to you to have it demonstrated beyond all doubt that the coal did not give off gas? *A.* I do not know that I would suggest any such thing; the company have just done about as much as it is possible for them to do If there are any of these experiments, they must be made with money other than the company's money, because the company have no funds at their disposal to do any such things.

25170. *Q.* But I am not making a suggestion that would involve any large expenditure beyond a brick wall and I am certainly not making the suggestion in any other way than in the interests of the company? *A.* I do not see that it would alter their opinion in the slightest if they knew either that there was gas or no gas. They believe that there is no gas just now; and they are going to continue the use of safety-lamps.

25171. *Q.* But if it could be demonstrated that there was no gas, there would clearly be no necessity for the safety-lamp? *A.* It would never be detected at all.
25172. *Q.* Then you have an objection to the suggestion being given effect to? *A.* It would never come from me.
25173. *Q.* But, if it were made to the company, do you think they would object? *A.* I do not think they would incur the expense; I do not think they can honestly incur any more expense.
25174. *Q.* This is not a question of expense;—the only cost would be that of a few bricks, which could be used over again? *A.* Possibly.
25175. *Q.* A recommendation has been made by the miners that furnaces should be abolished and fans substituted;—have you any objection to that? *A.* Unless they can adduce very good reasons for it; it would be hard for me to supply the miners with reasons for some of their own suggestions; they must state the reasons why they make the suggestions. In that case some of the largest collieries in Great Britain would be required to stop. I see that some of the largest quantities of air are supplied by furnaces. I do not see why furnaces should be abolished. In many respects there is very much less damage done to a furnace, in case of an unforeseen accident, than to a fan. When fans are damaged in outlying districts, it is much more expensive to get them repaired than furnaces, and the damage is much more extensive.
25176. *Q.* But there cannot be any question that fans are approved ——[*Interrupted*]? *A.* Oh yes, sometimes, when they can be afforded. Personally, I approve of them.
25177. *Q.* As a matter of fact, at all the collieries with which you are connected, except Mount Kembla, I think, fans are used? *A.* They have all fans; but I do not see that they circulate more air.
25178. *Q.* It is all a question of power? *A.* Of course, it is all a question of power in both cases.
25179. *Q.* And that is a matter, of course, at the discretion of the owners? *A.* Yes.
25180. *Q.* If there was a provision making fans compulsory for the future ——[*Interrupted*]? *A.* No, there is no reason whatever.
25181. *Q.* Pardon me, I had not finished;—if it were compulsory, with a general exemption, say, as to mines employing under thirty men, and special exemptions where there might be some difficulties in the way, through insufficient capital, or the configuration of the ground rendering it unsuitable for the erection of fans? *A.* I do not think it should be made compulsory at all. I do not think it is one of those things that should be made compulsory.
25182. *Q.* But there have been some fires caused by furnaces, have there not? *A.* Yes; and there have been a great many break-downs of fans. There will be accidents wherever you have machinery. I do not care how much foresight you display, you cannot get out of accidents where there are men and machinery employed; you will have great danger, and you cannot get out of it. You may do a great deal to prevent the accidents; but you cannot altogether prevent them.
25183. *Q.* Do you think that gunpowder should be prohibited for use in gassy mines? *A.* I think it would be wise to discontinue the use of ordinary gunpowder, in favour of some of the more improved high explosives; but we are under a great difficulty in that way; we cannot get a proper supply of high explosives; and those that have been introduced here have not given great satisfaction. The last explosive that was brought before our notice was this Bull-dog; certainly it was a permitted explosive; but, on the experiments that we made, it certainly gave out flame. I suppose all of them do, more or less; for none of them is perfect immunity claimed. Bull-dog certainly gives off flame; and I see, from a recent communication from Home, that that has been removed from the list of permitted explosives. Well, of course, at Home, they could give effect to that at once; but here there would be very likely six months' supply in the Colony, and six months' supply on the road; so that we would probably be using a dangerous explosive for twelve months after it had ceased to be permitted at Home. There is a great deal of difficulty connected with the use of high explosives here. The men have an objection to pay the higher expense. Roburite was tried for a considerable time; and that was certainly not a satisfactory explosive.
25184. *Q.* You mean as regards the efficiency? *A.* Yes, the efficiency; and it was irregular in its action. We are too far away, somehow, from the centre of these experiments. We do not know sufficient about them.
25185. *Q.* That is scarcely a sufficient reason for continuing to use a dangerous explosive? *A.* I think that, if we could get one of the permitted explosives that are, without any doubt or question, as safe as any of the permitted explosives possibly can be made safe, then it would be a benefit to all that they should be used; because there is no doubt that they reduce the liability to accident—if they are not absolutely safe, at all events they reduce the liability to explosions.
25186. *Q.* And the firing of shots, do you think that should be entirely in the hands of officials? *A.* Yes, entirely in the hands of officials appointed for the purpose.
25187. *Q.* The miners of Newcastle District have asked to have the power to nominate Inspectors of mines;—have you anything to say about that? *A.* I have no sympathy with any such suggestion. I do not want to have anything to say myself on the appointment of Inspectors; and I do not see that the miners have any reason to put forward for any such suggestion. I think it would be highly improper and wrong for either the miners or the owners to have anything to do with the appointment of Inspectors.
25188. *Q.* They are both interested parties? *A.* Yes; I think it highly wrong that either one or the other should have anything to do with it.
25189. *Q.* Objection has been taken to the present method of appointing them;—that is to say, to the appointments being made by the Minister? *A.* I think it would probably be more satisfactory if Inspectors were subjected to a standard examination.
25190. *Q.* You know that has been tried in Great Britain? *A.* But failed.
25191. *Q.* And they have reverted to the old system? *A.* Yes, I believe that is so.
25192. *Q.* Would you consider that there was any difference in appointments being made by the Home Secretary in Great Britain and by the Minister here? *A.* At all events, for whatever reason, it has been abandoned at Home, I believe.
25193. *Q.* Would it be an improvement to have appointments made by the Public Service Board, as being less amenable to political influence? *A.* Well, probably. I do not know that I have given it any consideration at all further than that the very best men should be appointed, and of the highest standard;

that is all I desire. I have few suggestions to make as to how they are appointed provided that the best men are appointed. The Public Service Board possibly should be considered; probably they would be as good a body to make the appointments as any.

Examination by Mr. Ritchie:—

25194. *Q.* I think you said that, since the hydrogen lamp was brought into existence, you have not been able to discover any gas in Mount Kembla? *A.* I think so.
25195. *Q.* And you mentioned two years ago? *A.* No; it is not two years ago since we had it at Mount Kembla.
25196. *Q.* Did you really have it there as long as two years ago? *A.* Not so long; I think it is a year ago.
25197. *Q.* Did you have it a year ago? *A.* Yes.
25198. *Q.* Have you one there now belonging to the company? *A.* Yes.
25199. *Q.* Had you one there a year ago? *A.* Yes; I think it is fully a year ago since we had it.
25200. *Q.* Have you had any test made with it? *A.* Yes; I think so. I think Mr. McGeachie might have tested about a year ago.
25201. *Q.* You only think so? *A.* I am almost certain that he went down and tested about a year ago with a hydrogen lamp.
25202. *Q.* Is there any record of that? *A.* I do not know; but since the accident there have been very frequent tests.
25203. *Q.* But, so far as you know, you are not certain that any tests were made with the hydrogen lamp before the disaster? *A.* No; I could not prove it.
25204. *Q.* Did the company have any hydrogen lamp there before the disaster? *A.* Oh, yes; a long time before that.
25205. *Q.* You have said that, in your opinion, you could not advance cogent reasons why the safety-lamp should be used in Mount Kembla at the present time;—can you give us a cogent reason why you have had to increase the number of deputies? *A.* Because the use of safety-lamps necessitates the use of more deputies.
25206. *Q.* In what way? *A.* The shot-firing requires men to attend to the shots.
25207. *Q.* But apart from the shot-firing? *A.* I have nothing to do with the appointment of deputies, Mr. Rogers appoints the number of deputies that he considers right; and as long as he considers it right, I take no exception.
25208. *Q.* But you have come here to give an opinion as to the safety or otherwise of that mine, and you have done that;—you have already given expressions of your opinion here as to whether that mine was a safe one or not? *A.* Yes.
25209. *Q.* If it is a safe one in the way you have described it here, what need was there to increase the number of examining deputies since the disaster? *A.* Mr. Rogers, I believe, could tell you; I do not know.
25210. *Q.* But have you not a knowledge of these facts yourself now? *A.* No. There has been a good deal of work to do in connection with putting things up and getting things straight, in which extra deputies have very likely been employed; but, beyond that, I do not know of any reason why they should be increased beyond the shot-firing and the extra work entailed by safety-lamps—everything is new to them.
25211. *Q.* Do you know whether it took one or more deputies constantly employed to examine the waste workings before the disaster? *A.* No; I do not think that any of the deputies were employed doing that before the disaster specially.
25212. *Q.* Do you know that there is one constantly employed now? *A.* Yes; but probably not constantly. He does other work; he seals off the roads leading into the goaf. There are two of them (deputies).
25213. *Q.* He said it would take five days of his time each week to examine the waste workings? *A.* Yes; but he is doing other work as well. I have inquired into that.
25214. *Q.* He expressed the opinion to the Commission that it would take five days of his working time to examine the waste workings? *A.* It may be so.
25215. *Q.* Do you know any reasons why the examinations should be so minute now? *A.* No. We have been very anxious to discover anything that we could discover, and I have put no limitations whatsoever on the management, either on the under-manager or the Manager, as to what they should do or whom they should employ in order to discover any clue to the accident, and, of course, the introduction of safety-lamps has introduced a new and extensive element quite strange to them.
25216. *Q.* That does not affect the question I put to you? *A.* It does.
25217. *Q.* What would be the nature of the duties of the deputy who would be examining waste workings; would he be looking for gas? *A.* Yes.
25218. *Q.* Would he be looking for large falls that would be likely to take place? *A.* Very likely; and, you see, the whole of the mine has not been in operation since the explosion. There was a large section of the mine that was not working at all, and he had to go through that.
25219. *Q.* He would have much more to do than he has now? *A.* Much more to do than when the mine was in working order.
25220. *Q.* So that, instead of taking five days, it would probably take seven days, then? *A.* I do not say that at all. The necessity for keeping men looking at the waste workings would be very much more since the accident than before, because formerly there were sections of the mine in which men would constantly travel which have not worked at all since the explosion.
25221. *Q.* Sections of the mine which were formerly worked are not working now? *A.* Yes.
25222. *Q.* Would they require to be examined every day? *A.* They would be travelled every day.
25223. *Q.* What are you referring to now? *A.* The roads among the pillars.
25224. *Q.* You do not mean to say they should be examined every day? *A.* Of course they were; the wheelers would be going in among them.
25225. *Q.* The wheelers would only go on the haulage roads? *A.* Yes; but all the traffic was going through the pillars of the waste.
25226. *Q.* You do not mean to give the Commission to understand that the wheelers were making an examination? *A.* No; they simply went along them.
25227. *Q.* You do not regard that as an examination; they were simply travelling these roads before the disaster? *A.* Yes.

25228. *Q.* How does that affect the examination of the workings? *A.* Well, these are practically waste workings, where the traffic was going through.
25229. *Q.* But, if the examination of the waste workings was efficiently done in a few hours on one day each fortnight before the disaster, why should it take a man five days of his time each week now? *A.* I presume Mr. Rogers will very likely be able to answer the question; but I suppose that these men who have been appointed and practically called examiners of wastes have been employed sealing up the wastes and —— [*Interrupted*].
25230. *Q.* One of them has been here and has told us that his time is wholly taken up examining? *A.* Probably; but you are asking me a question which does not come under my notice at all. I could not tell you what individual men are doing in Kembla.
25231. *Q.* I want to know if you yourself, who know about this mine, know of any reason why so much time should now be devoted to the examination of the wastes? *A.* I give no orders whatever. Mr. Rogers will, no doubt, be able to explain everything to you. I give no orders about the examination of waste workings, or the employment of deputies, or anything of that nature.
25232. *Q.* Do you know any reason why the examination should be made now oftener than monthly any more than before the disaster? *A.* No, except that we expressed a wish to Mr. Rogers that he should ascertain everything possible about it, and spare no expense in doing so.
25233. *Q.* About what? *A.* Anything that would lead us to an opinion as to the cause of the disaster.
25234. *Q.* You do not expect that this would necessitate the employment of a man going round every day? *A.* Still, Mr. Rogers might put his own interpretation on that.
25235. *Q.* Do you think the men going round every day would be able to find any new clue by going round every day? *A.* I think they would be doing other work too.
25236. *Q.* Do you think an examining deputy going round day after day would discover any new clue? *A.* There is no saying what he might find.
25237. *Q.* Then you think it is possible he might? *A.* He might do so. You cannot tell what he might find.
25238. *Q.* The only thing he might discover besides what we know now is the existence of gas? *A.* I could not suggest what he might discover; I cannot answer it.
25239. *Q.* Is there any other conceivable thing that he would be likely to discover? *A.* I do not know; I keep my mind perfectly open. Whatever he thinks sufficiently important to report he would report.
25240. *Q.* Do you think there would be anything else he would be likely to find except gas? *A.* Probably not.
25241. *Q.* So that the examination that was made so minutely is for the examination of gas, to discover whether the mine gives off gas or not? *A.* Yes, possibly.
25242. *Q.* Do you regard the dust as a more dangerous element than gas in a mine? *A.* No.
25243. *Q.* Do you think that you can deal with the gas question with safety-lamps? *A.* In a mine?
25244. *Q.* In a mine? *A.* Oh, I think so.
25245. *Q.* You think you could meet the gas difficulty by the introduction of safety-lamps? *A.* Oh, yes.
25246. *Q.* Now, you have already told me that, if safety-lamps had been at Mount Kembla, it would have made no difference so far as this disaster in concerned? *A.* So far as my opinion is concerned.
25247. *Q.* How do you reconcile these two questions now that you can meet the gas conditions with safety-lamps ——[*Interrupted*]. *A.* Because I do not think there was any gas.
25248. *Q.* You have already told me——[*Interrupted*]? *A.* I distinctly asked "In a mine?" and you said "Yes;" and I said "Yes, I thought the safety lamps would deal with the gas question in a mine.
25249. *Q.* In any mine? *A.* In any mine.
25250. *Q.* Well, Mount Kembla would come within that heading of any mine? *A.* Of course it would.
25251. *Q.* You have a recollection of telling me, in answer to a question I put yesterday, I think, that if safety-lamps had been in use in Mount Kembla, in your opinion, it would have made no difference so far as this disaster is concerned? *A.* Yes.
25252. *Q.* How do you reconcile these two things that you consider gas to be a more dangerous element in a mine than dust, and that you consider that safety-lamps would deal with the gas question? *A.* Because I do not think gas was present.
25253. *Q.* But you have told me here that you regard gas as more dangerous than dust? *A.* I think it is.
25254. *Q.* You have told us further, that, in your opinion, the loss of life at Mount Kembla was caused through inhaling carbon-monoxide distilled from heated dust? *A.* I suggested that carbon-monoxide can practically only be produced by the incomplete combustion of coal, or dust, or carbonaceous matter.
25255. *Q.* And that distillation from coal-dust may take place in a mine where safety-lamps are used? *A.* Incomplete combustion?
55256. *Q.* Yes, where safety-lamps are used? *A.* Not necessarily: if you lit a fire anywhere it would produce carbon-monoxide.
25257. *Q.* But I understood you to say, in answer to that question, that this distillation of coal-dust would not take place in a mine where no safety-lamps were used? *A.* I said no such thing.
25258. *Q.* You shook your head in answer to that; and I took it to mean that? *A.* No such thing.
25259. *Q.* Would you say that you would get this distillation of coal-dust in a mine worked with safety-lamps? *A.* Yes, you could get distillation of coal-dust, producing carbon-monoxide, wherever incomplete combustion of carbonaceous matter took place; but there would be no difference whether the mine was worked with safety-lamps or open lights—light that gas and you will get carbon-monoxide.
25260. *Q.* What I want to get at is how you make gas to be a more dangerous element than dust, in view of the fact that you think that the gas danger can be met by the introduction of safety-lamps, and you now tell us that it would be possible—and your own evidence goes to prove, if it is worth anything at all, that as a matter of fact it has occurred in this mine—to get distillation of coal-dust, and to get it where safety-lamps were used. I want to know how you really describe the gas element of danger as greater than that of coal-dust? *A.* I do not think anybody could answer you: I do not think anybody alive could answer you.
25261. *Q.* But you gave an opinion; and I thought probably you could answer? *A.* I do not see how anybody could really answer your question.
25262. *Q.* I will try and simplify it for you, in order to get an answer if I can. You have a clear recollection, I presume, of telling me that, in your opinion, the gas element was a greater danger than the dust element? *A.* Yes.

25263. *Q.* How do you make that out? *A.* Possibly it is a greater danger than the dust; but, of course both combined increase the danger.
25264. *Q.* That is not an answer to my question. You gave me a most decided answer to the question, saying that gas is a greater element of danger than dust. Then I asked, and I want to know, how you arrive at that conclusion? *A.* Do you apply it to Mount Kembla?
25265. *Q.* I do not apply it to Mount Kembla: I apply it generally? *A.* I do not know that you can apply it generally.
25266. *Q.* Do you want to withdraw your previous answer? *A.* Yes.
25267. *Q.* Then how do you want to qualify it? *A.* I leave that to you.
25268. *Q.* But I am not giving the evidence? *A.* I can hardly put a question and answer it. Of course, there are some mines with coal-dust; and there you have a certain danger; and there are other mines giving off gas, and probably no coal-dust; and the danger in such a mine would arise from the gas: and it is where the two are combined that the greatest danger would be found.
25269. *Q.* Supposing you had a colliery which was naturally damp, and therefore had no dust; but was known to be giving off great quantities of gas? *A.* Yes.
25270. *Q.* And supposing you had a mine which was very dusty, but known to be giving off no gas; which would be the greater element of danger in your opinion? *A.* I should think the gassy mine.
25271. *Q.* How do you regard that as the most dangerous? *A.* Well, of course, to explode the coal-dust would require a combination of circumstances that might very rarely happen; and, even in these experiments that have been conducted at Home, they were conducted under conditions that could hardly arise in a coal-mine; that is, with dust alone.
25272. *Q.* But then you do know this, that it is possible to get as large a fall in a mine which is naturally damp as in a mine which is known to be very dusty? *A.* Oh, yes; but to explode the pure coal-dust at Home it was necessary that there should be great concussion. It was not sufficient to simply introduce flame; but I think, if I am not wrong, they had to introduce the element of severe, violent, concussion.
25273. *Q.* I want to bring this matter round to Mount Kembla Colliery before I finish with you; and I would like you to give us a pointed expression of opinion to every answer, instead of covering the same ground every time? *A.* I do not think you are quite justified in saying so.
25274. *Q.* I think I am? *A.* I have an opinion also.
25275. *Q.* Very well: do you now say that gas would be, or is, a greater element of danger to treat in a coal-mine than coal-dust? *A.* It would depend on circumstances. If it were pure dust in the one, and pure gas in the other, then I should say my own opinion would be that there would be more danger from the gas.
25276. *Q.* And what facts have you got to lead you to that conclusion? *A.* I am just giving you my opinion in answer to your question. I think there would be more likelihood of damage to lamps—that is, if the gas was in an explosive state, in an explosive quantity—than there would be of the combination of circumstances that would explode the coal-dust. I think you have more chance of accidents occurring in a purely gassy mine, where the atmosphere is explosive, than in a mine with pure dust.
25277. *Q.* Now, we will take Mount Kembla in connection with the matter: supposing that you had known—which, of course, you say you did not know—that Mount Kembla was giving off gas—you admit having a knowledge of the state of the mine so far as dust is concerned—which would you have regarded as the greater danger at Mount Kembla, if it had been known to be giving off quantities of gas which may have been, possibly, explosive? *A.* I would have taken precautions at once.
25278. *Q.* If Mount Kembla had, to your knowledge, been giving off gas in sufficient quantities to make it dangerous and explosive, which would you have regarded as the greater element of danger—that known quantity of gas, or the dust which you knew was in the mine? *A.* Oh, I should think the gas, because I have practically seen no dust in Kembla; there is no dust practically in Mount Kembla; and of course I know that there was no such quantity of gas.
25279. *Q.* Then are we to believe that those men were killed by the distillation of dust which was not in the mine? *A.* Oh, no, we cannot ask you to believe that; but I think that it got sufficient dust out of the stoppings, and out of the upturned skips, and, possibly, out of a portion of the crushed coal and pillars in the 4th Right—possibly that. That is the suggestion that I make. I do not know where the dust came from; I only make the suggestion.
25280. *Q.* As a matter of fact, if this volume of air which you have already spoken of, having a velocity of 700 miles per hour, had come out of the 4th Right, would you have expected it, if it brought dust with it, to have left any deposit of dust on the left hand side going inbye on the main heading? *A.* Oh, yes; we know that all the dust that we see in the main heading—you mean No. 1?
25281. *Q.* Yes? *A.* Has been deposited after the air had subsided; after the pulsation of the velocity of the air had subsided.
25282. *Q.* As a matter of fact, was there any deposit of dust which had been apparently carried there, opposite the 4th Right? *A.* I cannot hear you, you speak so quickly.
25283. *Q.* As a matter of fact, was there any deposit of dust opposite the 4th Right in the main heading? *A.* There was a little, I think, in the ledges of the coal. There was very little timber in there; the roof was good; and there was very little timber. I think we got samples of the coal dust from that neighbourhood; but there was very little there. Of course, that was after the event.
25284. *Q.* Of course I am speaking now of after the event; was there anything in the way of dust to lead you to believe that any quantity of dust had been brought out of the 4th Right by this wind blast? *A.* Oh, yes; there were accumulations of small coal, and sweat, and swirled coal, and that came out. It appeared to me that a portion came from the 4th Right; but I am quite certain that a large portion of the dust would come from the tops of the stoppings and from the upturned skips. Of course there would be a little small coal lying on the road; although there was very little. It was continually cleaned; it was essentially a very clean road.
25285. *Q.* I suppose the greatest velocity would be about the orifice from the goaf into the 4th Right? *A.* I expect so.
25286. *Q.* This prop which has been spoken so very much of, or props, as they have been described by some, you say were surrounded by a quantity of dust? *A.* Well, not dust; small debris.

25287. *Q.* As a matter of fact, if a gust of wind came out of the 4th Right at a velocity of 700 miles per hour, do you seriously consider that any dust or props would be left there after that force had travelled over that road? *A.* Well, it is very difficult to say. It is carrying out an immense quantity of débris and props; but it is hard to say what would be the after effect. If you notice a railway train going through a station, you will find that it deposits dust; a great swirl of dust comes up after the last car, and is deposited. In the same way that blast would deposit dust similarly.
25288. *Q.* But it would not deposit that prop there on end? *A.* I do not say anything about the prop.
25289. *Q.* But the prop was there on end? *A.* The prop was there on end; and there were other props and rubbish of all kinds driven out.
25290. *Q.* Do you seriously think that a blast of air would come out of the 4th Right and bend these iron rails at great distance, and leave this piece of timber standing up in that way? *A.* I see no reason to doubt it; it is so very difficult to say. Sometimes you say things are absolutely impossible, and yet afterwards you find they are quite possible.
25291. *Q.* Now, do you yourself think that it would do so? *A.* Yes; I have seen so many evidences of force coming out of that place that really it is one of those little things that are difficult to explain; but I see nothing improbable in it.
25292. *Q.* You think it is quite possible that a piece of timber, which is not very weighty in itself, a prop, would be found standing, after a terrific blast of that description, which you have described, had passed by, with the head of it leaning in towards where the blast came from; and that the force, after passing that, would be sufficiently strong to bend these heavy rails? *A.* I think so. You do not know exactly the direction and swirl of the wind at that particular spot. The prop was found sticking into a lot of loose rubbish, probably two feet.
25293. *Q.* But you know very well that, to support your own theory, there could have been no swirl there, for it shot right out? *A.* I do not know. I do not attempt to explain any of these little things; they are difficult to explain; there are such a superabundance of other facts that a little one may escape.

[At 12·45 p.m. the Commission adjourned till 1·45 p.m.]

AFTERNOON.

(On resuming at 1·45 p.m., Mr. W. R. Pratt attended to take shorthand notes of the evidence and proceedings.)

JAMES ROBERT MILLAR ROBERTSON, previously sworn, was further examined, as under:—

Examined by Mr. Ritchie (*continued*):—

25294. *Q.* In view of the disaster which has been the cause of loss of life through the distillation of coal dust, caused, as you say, by a wind-blast, what proposal do you make with a view of preventing such a disaster in future? *A.* No proposal, excepting watering the roads whether they contain dust or not.
25295. *Q.* Do you think this is a provision which should be put in operation elsewhere? *A.* Wherever there is dust.
25296. *Q.* Whether there is gas or not? *A.* Yes; and leaving to the management as to how it should be done.
25297. *Q.* I am taking it as your opinion that the roads should be watered whether they are dusty or not, and leaving it to the management to devise the best means? *A.* At Kembla we shall water, whether the roads are dusty or not; and it will be left to the management of other collieries to say whether they will do so or not. If they do, it will be left to the Managers to provide the best scheme of distributing the water.
25298. *Q.* In your opinion, where there is dust, the roads should be watered? *A.* It is a wise provision, at all events.
25299. *His Honor.*] *Q.* Not only in the expectation of a big fall, but generally speaking? *A.* You could never expect another big fall like this to occur again. I would like to make an explanation with regard to a statement I made previously with regard to an inspection with the hydrogen lamp. I said I thought that McGeachie had been shown a place where to work it; but I find that is not the case. I told McGeachie to go; but I do not know whether he went or not.
25300. *Mr. Ritchie.*] *Q.* Then, to the best of your recollection, no test was made with the hydrogen lamp? *A.* I do not know of any.
25301. *Q.* Coming again to your theory as to a blast of wind coming out of the 4th Right, which split at the end of the 4th Right on the main heading, can you account for the reason why so much damage was done by the outward part of the current, and so little damage was done by the other half? *A.* I do not think that it was an equal force. I think probably that more force went outbye than inbye; but, again, the inner part of the roof is much better than the portion of the roof outbye. There were no iron bars required to support the roof inbye; and most of the damage was caused by the knocking out of the iron bars and letting the roof down.
25302. *Q.* It would take tremendous force to knock these bars down? *A.* Yes, it would take a great force.
25303. *Q.* Did you have iron bars outside the tunnel? *A.* Yes.
25304. *Q.* Do you think that the force, from what you saw, was as great at the tunnel-mouth itself as it appeared at the telephone cabin where there was a lot of destruction? *A.* The telephone cabin was a weak part and a wide part of the mine. I cannot see much difference in the force. Timber was knocked out, and the falls of roof were pretty equally distributed.
25305. *Q.* Can you understand, if this was a wind-blast, how it would be as great at the tunnel-mouth as at the cabin? *A.* Even an explosion of gas would diminish as it went on. As to whether this blast was greater at the first or at the last I cannot say.
25306. *Q.* Could the evidences of force at the tunnel-mouth—could they not have been generated by dust explosions? *A.* Any such force would have left evidences of dust. There are no evidences even of heat—none whatever.
25307. *Q.* How do you arrive at the conclusion that there was no heat? *A.* There were no evidences of heat on the timber.
25308. *Q.* If we have evidence that people were burned or singed? *A.* I much doubt it. I think you will find that Clark was burned with steam. How anyone escaped there is a mystery, considering that there were three boilers, working up to 60-lb. pressure, roaring out steam.

25309. *Q.* Will steam burn a man's hair off? *A.* There were red-hot ashes and heated portions of steam-pipes flying about. Really I see no evidences of burning.
25310. *Q.* Do you think that these men were peppered with steam-pipes or hot ashes? *A.* They were peppered with hot dust. Clark's injuries would arise from scalding.
25311. *Q.* You know that Clark had his hair burned? *A.* I did not see his hair singed.
25312. *Q.* Did you not see that his hair was short? *A.* Clark always wore his hair short.
25313. *Q.* Did you see Paddy Purcell? *A.* Not until he resumed work.
25314. *Q.* Do you know it is a fact that you could see the ends of his hair were singed? *A.* You could do that with heat.
25315. *Q.* Steam would not do that? *A.* The truth is that it is one of the mysteries of the world how Purcell ever escaped?
25316. *Q.* There would be no mystery if the flame came out of the main heading? *A.* It would leave traces. You can singe hair with heat. At all events, some of the bodies outside the mine were no more burned than I am at the present moment.
25317. *Q.* That is a matter of opinion? *A.* It is a matter of fact.
25318. *Q.* Do you know that other people say they were burned? *A.* I have seen them since they recovered.
25319. *Q.* Do you know that other persons say so, and that at least four of these are qualified men?
25320. *Q.* At the tunnel-mouth?
25321. *Mr. Wade.*] I do not think that is so, Mr. Ritchie. I think that Dr. Wade said he could not express an opinion about Clark. Dr. Nash spoke of two small boys.
25322. *Mr. Bruce Smith.*] He spoke of a man being burnt, and of his hair being singed.
25323. *Mr. Wade.*] There were two boys who had their clothes burnt off and straps round their waists.
25324. *Mr. Ritchie.*] Their names are not given.
25325. *Mr. Wade.*] At the inquest someone said that one of the boys was named Silcock; but someone else said it could not have been he.
25326. *Mr. Ritchie.*] There was a boy named Nelson.
25327. *Mr. Bruce Smith.*] The fact is Dr. Robertson will not accept anything which he did not see for himself. That is an explanation of the whole of his evidence.
25328. *Mr. Ritchie.*] *Q.* Your opinion is that there was no burning by the flame there, notwithstanding the medical evidence? *A.* There was no burning by flame.
25329. *Q.* How many bodies did you see yourself? *A.* A large number.
25330. *Q.* Did you examine them thoroughly, with a view of giving evidence? *A.* No. I saw probably a dozen with the outer skin loosened, but the true skin undetached below. That could be done without flame.
25331. *Q.* Did you examine them so that you could say they were not burnt with flame? *A.* I never examined them with a view of giving evidence at all. I took no notes of their appearance.
25332. *Q.* Notwithstanding the evidence of other witnesses you say that they were not burnt by flame? *A.* The evidences I saw could have been produced by heat without flame.
25333. *Q.* What degree of heat would you require, to give the evidences of burning which you saw? *A.* It would depend on the individual.
25334. *Q.* Do you accept the statement that Aitken was burned? *A.* I saw Aitken—at least a person who they said was Aitken. He had a portion of his whiskers singed, and a portion of the epidermis on his neck was raised.
25335. *Q.* How was that caused? *A.* I think by heat. It was not much damaged.
25336. *Q.* What degree of heat would it take? *A.* I could scarcely tell you—under 200 degrees, I think. If he were severely scalded, it would take more.
25337. *His Honor.*] 212 degrees is a severe scald with water, but not without water.
25338. *Q.* Do you know what heat they subject you to at a Turkish bath? *A.* I do not know much about Turkish baths; 140 or 150 degrees I suppose.
25339. *Mr. Robertson.*] *Q.* Do you know that stokers in the Red Sea work in a heat of from 160 to 180 degrees? *A.* I know that persons working in the open air would have portions of the exposed epidermis removed by the heat and the dust.
25340. *Mr. Ritchie.*] *Q.* Have you made any calculation with regard to the velocity of the air at 700 miles an hour, at the orifice at the 4th Right;—what would it raise the temperature to at that point? *A.* The velocity of the air would raise the temperature to 290 degrees, I should think.
25341. *Q.* At that particular spot? *A.* Yes.
25342. *Q.* You do not put before the Commissioners the view that that velocity would be maintained at that high rate anywhere besides the 4th Right orifice itself? *A.* I do not put that view forward.
25343. *Q.* Have you made any calculation of the rate at which the heat would decrease? *A.* That would be an involved calculation; and, without data, no one could do it at all. It would be impossible.
25344. *Q.* Are you able to account for the fact that, according to your evidence, a current of air passed the back heading without doing any damage? *A.* It is a very remarkable thing.
25345. *Q.* Are you aware that evidence has been given showing that some force must have gone down the back heading? *A.* Where?
25346. *Q* On the inbye side of the 4th Right? *A.* You mean the 5th Right.
25347. *Q.* That is on the inbye side of the 4th Right? *A.* Of course, I think a little puff of wind went down there.
24348. *Q.* What velocity would the little puff of wind have? *A.* No one can say. It toppled over the building on each side of a door; but the door was left standing.
25349. *Q.* You are unable to explain, taking your theory, why the wind did not show evidence of force in the back heading—you cannot explain it? *A.* I do not see how anyone can explain it. It is certainly a remarkable thing that apparently no force went up the back heading.
25350. *Q.* If so much compressed air was given off, would it not naturally go up there? *A.* It would make no difference whether it was air or gas. An explosion of gas would travel at 3,000 miles an hour.
25351. *Q.* There is no evidence put before the Commission that an explosion took place in the 4th Right; but, if gas was forced out, not with great velocity, but if the current took it into the front heading and it met a light, it would travel at the rate of 3,000 miles an hour afterwards? *A.* No, it would be the initial point of the explosion.

25352. *Q.* Some of the evidence does not support your theory that an air current came out of the 4th Right, but that some mixture came out? *A.* Then how do you account for the thing having gone both ways, and having never faltered in its course.

25353. *Q.* Of course I do not account for it. I want you to give us your views on the matter. Would that be possible, in your opinion—that a mixture—say gas—was forced out of the 4th Right and was deposited in the intake airway of the main heading, and that the evidences of force that we have got could be obtained by an explosion of gas afterwards? *A.* The evidences are not in accordance with an explosion of gas at all. That idea would not harmonise. There has been no faltering or hesitation in the force.

25354. *Q.* If that blast of air came out, would not the rib sides at the corner be torn away? *A.* I do not think so.

25355. *Q.* Such a great force as that would surely do this. If it bent iron rails, it would remove any obstacles where it met any obstruction? *A.* Your theory would involve the fact that there was an explosion at the outlet of the 4th Right? If so, where was the light?

25356. *Q.* It has been put before the Commission that young Morrison was working near the 4th Left with a light? *A.* That if not the 4th Right.

25357. *Q.* Would it not have been possible for the force to have been much less, and to have practically died away, before it reached Morrison's light? *A.* We see evidences of force.

25358. *Q.* The force was wind, in your opinion? *A.* Yes, because there was no evidence of gas.

25359. *Q.* It may be evidence of something else? *A.* If there was a subsequent explosion, it would have obliterated the previous traces; but there are traces of one great prevailing force.

25360. *Q.* You say that a puff of wind came down the back heading? *A.* It blew out the stoppings as it came along, and this was the only place—the door on the 5th Right—where any such impediment was on the road. The wind blew out the stoppings on each side of the back heading, and struck against a pillar in the same way that the force struck the solid pillar in the 4th Right and divided.

25361. *Q.* Have you made any calculations as to what force it would require to displace these stoppings? *A.* They are not firm stoppings; very little force would be needed to do that.

25362. *Q.* This temperature of 291 degrees—would that be sufficient to ignite coal-dust? *A.* Do you mean to distil it?

25363. *Q.* Would it be high enough to distil it? *A.* I cannot say. Stuart says that dust will become incandescent where the oxygen is greatest; but I have not carried out any experiments myself.

25364. *Q.* Is that the lowest temperature that would distil it? *A.* A little lower than that, I think.

25365. *Q.* How much lower? *A.* A few degrees.

25366. *Q.* You would require a current of air of 700 miles an hour to distil the coal-dust according to your theory. *A.* Something like that. It is not a theory. A theory is a calculation based on facts; if your theory is wrong, then your facts are wrong.

25367. *His Honor.*] Call it a hypothesis.

25368. *Mr. Ritchie.*] *Q.* If the velocity was decreased, you would not get the distillation of the coal-dust? *A.* Possibly not. On that matter, of course, extensive experiments would have to be made. It is of little use asking me these questions, because I have not made any experiments; I am only giving you the result of ascertained experiments.

25369. *Q.* You have been speaking of what you have been able to find in works dealing with mining matters. From your own knowledge you do not know anything about it? *A.* No.

25370. *Q.* Dealing with the dust question, do I understand you to say that you have been in Wales where the dust was so thick, and hanging in clouds, that you could not see far ahead of you? *A.* Yes, on a dull thick day you would have a great black pall over the surface of the colliery. Of course that is on a still day, like in Mount Lyell, on the same kind of day, the valley will be filled with a sulphurous vapour.

25371. *Q.* The mines in Wales are very dusty? *A.* Yes, they are very dusty mines. The skips they use have boards placed at the sides for the purpose of letting out everything and simply keeping in the large coal.

25372. *Q.* Do you call that good management? *A.* Some of the Managers would have something to say about the matter if you called it bad management. I should not like to work under those conditions myself. Of course, a change of system is advisable.

25373. *Q.* With all your knowledge of the danger arising from coal-dust, do you say that we ought to get a system of management exactly the same as in the old country? *A.* Of course you would not follow their system of management in all cases: the management of a pit depends on circumstances. I can scarcely conceive that there are two collieries working under the same circumstances. The object is to adapt things to your circumstances.

25374. *Q.* Do you think the British law admits of that? *A.* Yes.

25375. *Q.* Do you say that we are safe in adopting their laws? *A.* Not necessarily. I gave an answer to a particular question which I was asked.

25376. *Q.* You admit that there are some matters in which you should not follow it? *A.* It would not suit us, for instance, to have those skips which I have mentioned. In some parts of England they have wicker baskets which let out the dust in the same way.

25377. *Q.* Should we follow the English law? *A.* Not in these cases.

25378. *Q.* Do you think it would be good management to allow the dust to be distributed along the sides of a colliery? *A.* I presume that the management would take steps to remove the dust. I think watering is pretty generally resorted to now. When you commence to stir up coal-dust you get something which is worse than the disease. It is a case of letting sleeping dogs lie.

25379. *Q.* But, if you do not stir up the dust, and leave it in the mine, a wind blast may stir it up in a moment, and it may be distilled and cause great loss of life? *A.* There is no doubt about that.

25380. *Q.* I want to ask you about Rule 39 in the Coal-mines Regulation Act. Do you know that, under that rule, the miners cannot appoint mining engineers, but must appoint working miners, to make the inspection on behalf of the workmen? *A.* I think the rule exempts mining engineers.

25381. *Q.* The rule provides that the persons employed in a mine may from time to time appoint two of their number, or any two persons not being mining engineers, who are practical working miners, to inspect the mine? *A.* If there was a practical engineer working in the mine, I suppose he could be appointed. I do not see how you could exclude him.