1914.

NEW ZEALAND.

HUNTLY MINING ACCIDENT

(REPORT OF ROYAL COMMISSION ON THE), TOGETHER WITH MINUTES OF EVIDENCE.

Presented to both Houses of the General Assembly by Command of His Excellency.

COMMISSION.

LIVERPOOL, Governor.

To all to whom these presents shall come, and to FREDERICK JAMES BURGESS, Esquire, of Thames, Warden and Stipendiary Magistrate; JOHN CONNELL BROWN, Esquire, of Westport, Mine-manager; and JOHN DOWGRAY, Esquire, of Granity, Miner.

WHEREAS an accident occurred at the coal-mine at Huntly, known as Ralph's Colliery, the property of the Taupiri Coal-mines (Limited), on the twelfth day of September, one thousand nine hundred and fourteen, which caused the deaths of forty-three persons working therein: And whereas it is expedient that a Commission should be issued for the purpose of inquiring into the cause of the said accident, and into the working of the existing law in respect to the prevention of such accidents, and for the other purposes hereinafter mentioned:

Now, therefore, know ye that I, Arthur William de Brito Savile, Earl of Liverpool, the Governor of the Dominion of New Zealand, reposing trust and confidence in your knowledge, integrity, and ability, and acting by and with the advice and consent of the Executive Council of the said Dominion, do hereby, in exercise of the powers conferred on me by the Commissions of Inquiry Act, 1908, and of all other powers and authorities enabling me in this behalf, constitute and appoint you the said

FREDERICK JAMES BURGESS,
JOHN CONNELL BROWN, and
JOHN DOWGRAY

to be a Commission for the purpose of making inquiry into the matters hereinbefore referred to, and into the several other matters mentioned in these presents, that is to say,—

(1.) To ascertain in what part or parts of the mine the accident occurred, and the nature of the same.

(2.) To ascertain how the accident was caused.

(3.) To ascertain what lights were used in the different parts of the mine at the time of the accident.

(4.) To ascertain to what extent the provisions of the Coal-mines Act, 1908, and the general rules, the special rules, and additional rules made in accordance with the provisions of that Act, were complied with in the mine, but more especially as regards—

(*a.*) Ventilation and lighting;

(*b.*) The examination of the mine;

(*c.*) The character of the explosives used;

(*d.*) The withdrawal of workmen in case of danger; and

(*e.*) The means of escape in case of accident.

(5.) To ascertain the nature and character of the working and general management of the mine, and whether the mine was well and safely managed.

(6.) To determine the efficiency of the inspection of the mine by—
  (*a.*) The Inspector of Mines for the district;
  (*b.*) The workmen's inspectors.

(7.) To make suggestions for the prevention, as far as possible, of similar accidents, and for the safe working of this and other mines in the future.

(8.) To ascertain if the provisions of the existing law are sufficient to give the Inspector of Mines full authority to order the use of safety-lamps and other appliances if in his opinion such appliances are necessary.

(9.) And generally to make inquiry into any matter or thing arising out of or connected with the several subjects of inquiry hereinbefore mentioned, or which in your opinion may be of assistance in fully ascertaining, explaining, and arriving at a fair and just conclusion in respect to the subjects of inquiry, and into the working of the existing law in respect to the prevention of similar accidents, and to report whether any additional legislation is necessary, and the scope of same, or whether an amendment of the regulations under the existing law can be made sufficient to provide reasonable and proper safeguards.

And with the like advice and consent I do further appoint you the said FREDERICK JAMES BURGESS to be Chairman of the said Commission.

And for the better enabling you to carry these presents into effect you are hereby authorized and empowered to make and conduct any inquiry under these presents at such place or places in the said Dominion as you may deem expedient, with power to adjourn from time to time and from place to place as you think fit, and to call before you and examine on oath, or otherwise as may be allowed by law, such person or persons as you may think capable of affording you any information in the premises; and you are also hereby empowered to call for and examine all such books, documents, papers, maps, plans, or records as you judge likely to afford you the fullest information on the subject of this Commission, and to inquire of and concerning the premises by all other lawful ways and means whatsoever, and also to use the evidence taken in the course of any previous inquiry touching the accident.

And, using all diligence, you are required to report to me, under your hands and seals, your opinion resulting from the said inquiry in respect of the several matters and things inquired into by you under or by virtue of these presents not later than the first day of November next ensuing, stating in such report what steps, if any, it would, in your opinion, be expedient to adopt under the circumstances which you find to exist, and in what manner effect should be given to such recommendation.

And it is hereby declared that this Commission shall continue in full force and virtue although the inquiry be not regularly continued from time to time by adjournment, and that you or any two of you shall and may from time to time proceed in execution hereof, and of every power, matter, and thing herein contained.

And, lastly, it is hereby further declared that these presents are issued under and subject to the provisions of the Commissions of Inquiry Act, 1908.

Given under the hand of His Excellency the Right Honourable Arthur William de Brito Savile, Earl of Liverpool, Knight Grand Cross of the Most Distinguished Order of Saint Michael and Saint George, Member of the Royal Victorian Order, Governor and Commander-in-Chief in and over His Majesty's Dominion of New Zealand and its Dependencies; and issued under the Seal of the said Dominion, at the Government House at Wellington, this twenty-eighth day of September, in the year of our Lord one thousand nine hundred and fourteen.

W. FRASER,
Minister of Mines.

Issued in Executive Council.

J. F. ANDREWS,
Clerk of the Executive Council.

REPORT.

To His Excellency the Right Honourable Arthur William de Brito Savile, Earl of Liverpool, Knight Grand Cross of the Most Distinguished Order of Saint Michael and Saint George, Member of the Royal Victorian Order, Governor and Commander-in-Chief in and over His Majesty's Dominion of New Zealand and its dependencies.

MAY IT PLEASE YOUR EXCELLENCY,—

The Commission, dated the 28th day of September, 1914, entrusted to us by Your Excellency, was received on the 30th idem, upon which date the Commission assembled at Huntly.

On the following day the inquiry was formally opened at the Courthouse, Huntly, but was adjourned after a short sitting to enable the Commissioners to visit the mine and make an inspection of the scene of the accident.

The taking of evidence at Huntly was commenced on the 2nd and continued until the 9th October, when the Commission adjourned to Wellington, where further evidence was taken on the 23rd October.

During the course of its investigations the Commission examined twenty-three witnesses.

The proceedings were open to the public, and full reports were published in the newspapers.

The parties represented by counsel were,—

(1.) The Mines Department and Inspector Bennie (represented by Mr. P. S. K. Macassey, Assistant Crown Law Officer, Wellington).

(2.) The Taupiri Coal-mines (Limited), (represented by Mr. C. J. Tunks, barrister, of Auckland).

(3.) The trustees of Ralph's Estate, the owners of the freehold of the mine (represented by Mr. W. J. Napier, barrister, of Auckland).

(4.) The Executive of the Taupiri Coal-miners' Union (represented by Mr. G. M. Newton, barrister, of Auckland).

(5.) The widows of certain miners killed by the explosion (represented by Mr. A. M. Gould, solicitor, of Auckland).

(6.) The widows of certain other miners killed by the explosion (represented by Mr. T. M. Wilford, barrister, of Wellington).

(7.) The coal-miners of the Dominion affiliated with the United Federation of Labour (represented by Mr. T. M. Wilford, barrister, of Wellington).

With the consent of all parties, it was arranged that Mr. Wilford should call the witnesses and conduct the examination in chief, and that each counsel for the other parties represented should cross-examine in the order arranged among themselves.

The Taupiri Company's mine, in which the accident the subject of this Commission's inquiry occurred, is situated in the Township of Huntly, near the Waikato River, and extends under that river in a southerly direction to a considerable distance beyond. The company is the lessee from the owners of two coal-mines, known respectively as Ralph's and the Taupiri Extended Mines. These mines are contiguous but are worked independently, and a barrier of coal 2 chains in width separates the working of one from the other. There is a duly certificated manager in charge of each mine, but Mr. James Fletcher, the manager of Ralph's Mine, exercises a general supervision over both. The operations in these mines are extensive, covering an area of 840 acres, and a large number of men are employed in each colliery. The coal obtained is a lignite of superior quality. Ralph's Mine, the scene of the accident, has three shafts, by any one of which access to or egress from any part of the mine may be obtained. The principal shaft is situated close to the railway-line in the Huntly Township. It descends vertically to a depth of 166 ft., and from the bottom of this shaft the main travelling-way dips uniformly to the end, a distance of 60 chains, in a southerly direction.

The method of working the mine is by the system generally followed in mines in this Dominion, known as the "bord-and-pillar system," but in one essential feature the mode of operations in this mine differs from that followed in any other mine in the country. It is usual in coal-mines where the bord-and-pillar system is adopted to remove the pillars when the seam of coal in that section of the mine has become exhausted, and the standing columns of coal are no longer required to support the superincumbent strata. In Ralph's Mine it is impracticable at present to follow this course, for any collapse of the earth due to the removal of the pillars would involve the almost certain consequence of the waters of the Waikato River or of the Wahi Lake finding their way into the mine, to the great peril of all persons employed therein and the eventual destruction of the property. As a result of these circumstances there is a considerable portion of the mine in which no further operations can be carried on, but which remains in all other respects precisely in the same conditions as regards the existing bords-and-pillars as those "districts" in which operations are actually in progress. This portion of the mine is known as the "old workings," and is so designated by witnesses, and will as such be referred to in this report. It is important to keep in mind the peculiar feature of the Huntly mines just noted, because it has a direct and important bearing on the subject-matter of this inquiry.

On Saturday, the 12th September last, a very violent explosion took place in Ralph's Mine whereby forty-three men lost their lives. The manager, Mr. Fletcher, was not in charge of the mine at the time, having been incapacitated by illness for a week or more, and the deputy manager, Mr. William Gowans, a certificated mine-manager, was in charge. From the evidence it appears that the day of the occurrence was what is called an "off day" in the mine. It was the day following the usual fortnightly pay-day, and it is not the custom of the miners to engage in the ordinary work of the mine on such days; but it is usual for a limited number of workmen to be employed on casual works of a necessary character for facilitating the working, or providing for the security of the mine. It is not disclosed by the evidence for what purpose the majority of the men whose bodies were found in the mine after the explosion went there, but it is conclusively established that a party consisting of five or six men was instructed by Deputy Smith, on the preceding Friday evening, to proceed on the Saturday morning (the 12th) to section 5 of the mine, in the old workings, for the purpose of lifting and removing iron rails which had on the cessation of work been left lying in some of the disused bords.

There are two ways by which the old workings can be reached from the shaft—first, by the travelling-road for a distance of 50 chains, thence by bords a further distance of about 10 chains (bord No. 6 of section 5 is open at the northern end, but the entrance is blocked by a door); secondly, the old workings can be reached by a more roundabout route, about 70 chains in length, by way of the little dip, south-east of the shaft, entering section No. 5 at the south end.

There is no direct evidence as to the route taken by the workmen in going for these rails, except with respect to the horse-driver Brownlie and two young men whom he took to accompany him. These, according to Brownlie's evidence, went the longer way round, by the little dip. The reason for this he explains by saying that he had to take a horse with him to bring out the rails, and that the opening through the door above referred to was not sufficiently large to admit of the passage of the horse. He says that from what Deputy Smith told him he expected the other men to go round by the travelling-way, and after passing through the door at No. 6 bord of section 5 (old workings) to meet him at the place where the rails were to be found. Before he arrived at the place appointed the explosion occurred, and all the men he was to meet there were, without exception, killed. Considerable doubt has been expressed as to the direction taken by the party who were proceeding to the place where the rails were lying, but after careful consideration of the facts and probabilities we have no doubt that they went by way of the travelling-road and entered No. 6 bord by the door previously mentioned. This was the shortest and easiest route, and no special reason has been shown why they should have gone by the other.

From the position in which Martin's body was found he would appear to have been the first man to pass through the door. This door was not secured by any lock or other protective fastening.

It was contended by some witnesses that, judging by the quantity of firedamp found in bords 4, 5, and 6 even some time after the explosion, at the moment of the ignition bord No. 6 must have been so full of firedamp that it would have been impossible for Martin to enter carrying a naked light with him, and that therefore he must have come from the opposite direction to the way by the door. There is, however, no sufficient evidence that these bords contained firedamp to such an extent as to completely fill them, even at the upper ends. It would appear as if Martin passed through the door carrying a naked light in his hand, and when he had proceeded a short distance down the bord, probably as far as the cut-through to No. 5, he encountered an inflammable mixture of air and firedamp, and an explosion took place. This explosion served to disturb and put in motion the coaldust on the floor and sides of the bord, which being, as recent analysis has shown, of a most highly inflammable nature, ignited with a terrific explosion, and the liberated gases sweeping through the bords and passages of the mine with enormous velocity hurled to great distances, and in most cases destroyed, every obstacle in their path. No man within the immediate range of the explosive action escaped alive. The exact spot where Martin was standing when the explosion took place cannot be determined with certainty. It seems probable from the evidence that his body, which when found was, with the exception of the socks and boots on his feet, entirely devoid of clothing, was carried by the force of the explosion a considerable distance. His coat, which was not destroyed, was found near the third stenton from the door. The probabilities are that he was carrying his coat on his arm, and that it was the first thing torn from him by the force of the explosion. If he had been wearing it at the time, it is almost conclusively certain that it would have disappeared with the rest of his clothing.

The explosion was due beyond any reasonable doubt to the emission of firedamp from the roof of No. 5 bord in No. 5 section—known as the old workings—where there is a "fall" from the roof of several months' standing. There is an extensive fall in No. 6 bord which was first seen after the explosion, but that, in our opinion, did not contribute the firedamp which was encountered by Martin. Its occurrence is probably due to the explosion. There is not sufficient evidence before us to enable us to say what quantity of gas was present in bords 4, 5, and 6 on the morning of the accident. All those who could have thrown light on the matter have, unfortunately, perished. It is a well-ascertained and accepted fact that a large amount of an inflammable mixture of atmospheric air and firedamp is not essential to the production of an explosion; but there is no doubt in this instance that the firedamp must have been escaping in considerable quantities to have impregnated the air to an inflammable extent (5·6 per cent.) at the distance from its source at which Martin met it. If Martin entered by the door, as we think is certain, and was carrying a naked light in his hand, it would have been extinguished by the current of air caused by the opening of the door. There is almost a certainty that his light was put out and that he probably relit it at the spot where the explosion originated. In all probability the upper air of No. 6 bord was impregnated with gas to a dangerous extent. Martin entering the door carrying the lamp in his hand would not bring the naked light into contact with this inflammable mixture, but if he had occasion to raise it for any purpose—such as to fix it to his head before entering on his work—an explosion would inevitably follow.

It is possible, as suggested, though not probable, that the exudation of gas had not long commenced in No. 5, and had reached No. 6 just when Martin arrived there. Be that as it may, we are perfectly satisfied that if a proper inspection of the old workings had been made with a safety-lamp prior to these men entering through the door the presence of firedamp in the air must certainly have been discovered, and in that case, without doubt, steps would have been taken to render the air pure, and the calamity which we now deplore would have been averted.

From the evidence it appears to us certain that Martin was the first to enter through the door. Deputy Smith, the official in authority, and the only man, apparently, of that party who was in the habit of carrying a safety-lamp, seems to have been very much in the rear, judging from the position in which the body was found. The door should not have been open for Martin to pass through until Deputy Smith, or some one authorized for the purpose, had previously entered with his safety-lamp and examined the place to ascertain its safety or otherwise.

There is, unfortunately, no direct evidence as to Smith's movements on that morning, and no absolute proof that he did not enter section No. 5 for the purpose of making an inspection before the workmen arrived; but the surrounding circumstances and the ascertainable facts make it morally certain that no inspection of that part of the mine was made that morning. There is no evidence to show how long the firedamp had been issuing from the fall in No. 5 before the explosion occurred. The place had been examined by Deputy Wear three days before the accident, and his report states, and he himself swears, that there were no signs of gas at that time.

At the conclusion of the inquiry, some three weeks subsequent to its opening, Deputy John McGill came forward to say that Mr. Gowans, the acting-manager, and one of the men killed in the explosion, had informed him that on the afternoon preceding the 12th September he (Gowans) had passed bord No. 6 with a naked light without apparently encountering any gas. This evidence, however, throws no additional light upon the matter, for Mr. Gowans made no inspection or examination, and there may have been even then large quantities of gas in the upper part of the bord which he did not detect. This would be more particularly so if he were carrying his lamp in his hand. This evidence, too, is open to the objection that no mention was made at the Coroner's inquest or before this Commission at Huntly of the fact mentioned by Mr. McGill, although it related to a matter of the gravest importance in connection with this inquiry.

The important part played by coaldust in a coal-mine explosion was again brought prominently under notice by the Huntly disaster. Dust was plentiful in the mine, but according to the evidence the quantity was not large compared with that found in some mines in Great Britain. It was, however, sufficiently abundant to compel the Inspector of Mines to call the attention of the manager to it, and to direct him to take steps to mitigate it by watering the travelling-road. Mr. Bennie did this primarily out of consideration for the men who had to use the travelling-way, but he also realized its danger, and in two successive memoranda to the manager directed his attention to the matter.

It is only fair to the Inspector of Mines and to the mine-manager to say that, though as a matter of general knowledge the danger of dust-explosions in a coal-mine was known and recognized, the extraordinarily inflammable nature of the dust in this mine was unsuspected until after the accident. Analyses then made by Professor Harold Baily Dixon, M.A., Ph.D., F.R.S., of the University of Manchester, and Dr. Maclaurin, D.Sc., F.C.S., Dominion Analyst, first revealed its unusual potency in creating a disaster.

In the opinion of your Commissioners, some legislative provision should be made having for its object the prevention or mitigation of the danger arising from the presence of dust in a mine. Much evidence was submitted at the inquiry relative to dust-explosions in coal-mines and their remedy, and the Commissioners were fortunate in hearing the opinion of so prominent an authority as Professor Dixon on the subject. Suggestions as to the best means of guarding against the evil will be made later on in this report.

With respect to the several matters submitted by Your Excellency to us for our inquiry, we beg to report as follows:—

(1.) In what Part or Parts of the Mine the Accident occurred, and the Nature of the Same.

The point of origin of the disaster was bord No. 6 in the No. 5 district, the nature of the disaster being an explosion of a large accumulation of firedamp, which raised and ignited a cloud of coaldust, and was thereby intensified and carried on. The explosion traversed the main haulage and travelling roads to the top of Ralph's Colliery downcast shaft, and for a considerable distance towards the Taupiri West shaft, with which Ralph's Colliery workings are connected underground. A large area of mine-workings was also traversed by the explosion. Forty-three persons employed by the Taupiri Coal-mines (Limited) lost their lives as a result of this explosion, which occurred about 7.30 a.m. on Saturday, the 12th September, 1914. That being a no-work day for hewers and truckers, only sixty-two men were engaged in the mine at the time of the disaster; under normal conditions the number of persons employed underground would be about one hundred and sixty.

(2.) How the Accident was caused.

The accumulation of firedamp which caused the explosion occurred in bords 4, 5, and 6, owing to inadequate ventilation and inspection. Bords such as these, rising as they do from the southward to dead ends, favour the accumulation of firedamp, the air being stagnant, and there being no signs of stoppings or brattice in the vicinity, having been used. The firedamp mixture was ignited by a miner's naked acetylene cap-lamp carried by John Martin, a contract trucker, while performing his duties in that part of the mine.

(3.) What Lights were used in the Diferent Parts of the Mine at the Time of the Accident.

For the daily examination of the mine by firemen and deputies before work was commenced safety-lamps were used. Miners and others used acetylene-lamps and other naked lights. Stationary electric lights were installed at the shaft-bottom. At the time of the accident naked lights only were carried in the mine.

(4.) To what Extent the Provisions of the Coal-mines Act, 1908, and Rules were complied with.

(*a.*) *As to Ventilation and Lighting.*

There is no evidence that firedamp was permitted to accumulate in the actual working-places and travelling-roads to and from such working-places in contravention of Special Rule 3, but with respect to the old workings we are satisfied that sufficient examination for gas was not made, and that gas was allowed to accumulate in dangerous quantities.

In contravention of Special Rule 1, the manager did not see that the mine was properly ventilated in all parts, and did not see that the working of the mine was carried on with all reasonable provisions for the safety of the persons employed.

In contravention of Special Rule 16, the door for ventilation and safety purposes connecting bord No. 6, in which the disaster occurred, with the working portion of No. 5 district, and which was only used occasionally, was not locked, or even provided with a lock.

In contravention of Special Rule 18, the old workings and return air-courses of the mine, also bords 4, 5, and 6, No. 5 district, were inadequately fenced, persons being therefore liable to inadvertently enter the same.

Notwithstanding repeated ignitions and explosions in Ralph's and the adjoining Extended Colliery, any one of which might have created a disaster, the manager continued to permit naked lights to be used, although under Special Rule 14 it was his duty to direct the underviewer to see that locked safety-lamps only were used and naked lights excluded wheresoever and whensoever danger from firedamp was apprehended.

(*b.*) *The Examination of the Mine.*

The daily examination of No. 5 district, in which the explosion originated, was entrusted to John Whorskey, the holder of a fireman and deputy's certificate of service without examination. He had held an appointment in that capacity prior to the passing of the Coal-mines Amendment Act, 1909, which first required candidates to pass an examination. Whorskey, with both the other examining deputies, John Skellern and H. Peckham, were killed in the explosion. None of these men had passed the Mines Department's gas test, the only two officials in the mine who had passed such test being Deputy John Darby (deceased) and Joseph Young, formerly assistant inspector of the old workings, but now out of the company's employ.

The frequent occurrence of gas in the old workings was, in our opinion, a source of danger, and there is no evidence that No. 6 bord was examined on the morning of the 12th September. Had the provisions of the Act been strictly adhered to on that occasion the explosion would have been averted.

We consider, therefore, that no regular or systematic examination for gas was made in the old workings.

On the day of the explosion Whorskey entered the mine at about 5 a.m., and about 7 a.m. wrote in his report-book that his district was safe; he reported no gas or other dangers. His daily reports were of a formal nature, seldom or ever varying. If Whorskey had entered No. 6 bord, in which Martin's body was found, and where the latter was passing along and met his death on the morning of the disaster, he (Whorskey) could not have failed to discover firedamp with his safety-lamp, as with the minimum explosive mixture—viz., 5·6 per cent.—his lamp would have become filled with flame, and with a 4-per-cent. mixture the flame would have risen to the top of his lamp-glass.

No. 6 bord, if not actually a working-place, was certainly a travelling-place on the day of the explosion, and it is obvious, therefore, that it should have been examined by Whorskey, in accordance with section 40, subsection (42), of the Act, and Special Rules 17, 23, 24, and 25, but it was not so examined by him, nor by any one on his behalf.

The only surviving official, Joseph Young, now an ex-employee, who had passed the Government gas test, and had formerly acted as assistant examiner of the old workings (or return-air courses), gave evidence to the effect that the state of the mine caused him a great deal of concern. On two occasions last April he had found accumulations of gas amounting to 33,600 cubic feet, and he had found dangerous quantities in the No. 5 district. At the inquest this witness stated that he had frequently found accumulations of gas in dangerous quantities. Daniel Wear, examiner of the old workings (which constitute the return-air courses) stated that there was no one whose duty it was to test for gas in the old workings, his duty being to look for fires. He added, however, that though it was not his duty to do so, he reported the existence of gas whenever it came under his notice. He had never passed any examination in gas-testing. He stated that he visited bords Nos. 4, 5, and 6 on the 9th September, three days prior to the explosion, but saw no gas there. He had no ladder nor any other means by which to test for gas near the roof in any of the high bords of this section, though the fall in No. 5 bord may have afforded means for examination of that particular bord. As the height of many of these bords exceeds 11 ft., the inadequacy of Wear's examination is apparent. The absence of ladders for such examination throughout the mine, as disclosed by the evidence, indicates that the examination of them for firedamp was inadequate and unreliable.

We cannot refrain from referring to the frequent occurrence of gas in dangerous quantities in the working-places of the mine, to which we think that sufficient importance was not attached by the manager.

(*c.*) *The Character of the Explosives used.*

The only explosives used in the Huntly mines up to the date of this inquiry was Curtis and Harvey's blasting-powder. No objection had been taken to its use by the Inspector or any other person. The mine was regarded as a safe mine, notwithstanding the occasional discovery of gas, as this was not looked upon as a source of danger. The extreme inflammability of the dust in the mine was unsuspected until analyses were made of it after the explosion.

The nature of the explosives used in the mine does not affect our opinion as to the cause of the explosion, for it is quite clear from the evidence that no shot was fired in the mine on the day of the accident.

(*d.*) *The Withdrawal of Workmen in Case of Danger.*

There was no evidence tendered at the inquiry to show that at any time the workmen were removed from the mine. The mine had for many years enjoyed an immunity from serious accidents, and apparently no occasion had arisen on which danger to life had been apprehended by the management necessitating the withdrawal of the men.

(*e.*) *The Means of Escape in Case of Accident.*

Three vertical shafts connect the coal-seam with the surface, two of such shafts being equipped with cages and the third with an inclined and protected ladderway.

The depth of these shafts is—two each of 166 ft. at Ralph's Colliery, and one of 207 ft. at Taupiri West Colliery (connected). The diameter of each shaft is 10 ft. The means of escape are adequate.

(5.) The Nature and Character of the Working and General Management of the Mine, and whether the Mine was well and safely managed.

The coal-seams consist of a superior brown coal, the thickness varying from 10 ft. to 34 ft., the average thickness worked being 20 ft.; the average dip of the seam is about 1 in 10. The system of work, as already mentioned, is bord-and-pillar. About 250 acres of coal pillars are now standing. No pillar-extraction has commenced, or is proposed, owing to the fact before referred to—that the surface is traversed by the River Waikato, and in places covered by lakes and watercourses of considerable magnitude, from which inundation would follow if the roof-support were removed. These extensive and unusual ramifications of old bords and stentons (or cut-throughs) require more than ordinary attention, as the conditions are somewhat unique. The tendency for gas-accumulations in the high places and of spontaneously ignited fires where coal and debris become piled up is great, calling for special care and attention. Special attention was given to the prevention of heating, but we think, on account of the presence of gas, more frequent inspections were necessary.

In view of what has been stated above, and of the fact that the Coal-mines Act and the special rules thereunder have to some extent been either neglected or disregarded by the manager, Mr. Fletcher, it cannot be said that the mine was in all respects well and safely managed by him. If Mr. Fletcher had performed his obvious duty in causing safety-lamps only to be used in Ralph's Colliery the disaster would never have occurred. He had ample warnings by previous explosions. A manager has not only to comply with the requirements of the law, but he has a duty to his fellow-man beyond mere statutory obligations. Had the Mines Department known of these cases at the time no doubt legal provision would have been made for the Inspector of Mines to enforce the use of safety-lamps, by which the disaster would have been averted.

Of the several cases of injury to workmen by the ignition of gas in Ralph's Mine and the Taupiri Extended, only in one instance—that of Kelly—was the matter reported to the Inspector of Mines. It is unfortunate that the Coal-mines Act does not enforce the reporting of all cases of injury by gas-ignition, whether trivial or serious. It only requires a report where the accident is attended with "serious injury to any person," leaving it to the manager to decide as to what is or is not a serious injury. The manager in these cases decided the injuries were not serious, but we are of opinion that where the man is incapacitated from work for fourteen or more days, as was the case in more than one instance, the injury should not be treated as anything less than serious.

(6.) The Efficiency of the Inspection of the Mine by

(*a.*) *The Inspector of Mines for the District.*

With regard to the efficiency of the inspection of the mine by the Inspector of Mines for the district, your Commissioners find that the present occupant of the position, Mr. Boyd Bennie, has been assiduous and conscientious in the discharge of his duties, and has shown himself to be a capable and painstaking officer; but we consider that on occasions he has been satisfied with less than a strict and prompt compliance with orders given by him to the manager with respect to matters relating to the working and safety of the mine. He has regularly visited and inspected the mine, usually four times annually, except during the present year, when up to the time of the disaster he had made seven visits to the mine.

We have no reason to think that his inspections were otherwise than thorough and conscientious so far as regards the working-part of the mine, but we are of opinion that it would have been better if more attention had been given by him to the old workings, which actually formed part of the return airway of the mine. It is, however, due to the Inspector to say that it was at his instigation that this part of the mine was regularly inspected by the company's officials.

With regard to the occasional discoveries of gas in different places in the mine, it appears to us that the Inspector does not seem to have realized to its full extent the gravity of the situation, as disclosed by the presence from time to time of this gas. In our opinion, after the explosion by which Kelly was injured, the use of safety-lamps should have been insistently urged upon the manager. The Inspector quite honestly considered that the gas occurring in the mine could be kept harmless by careful inspection and proper ventilation, and that no risk was run of any ignition or explosion by continuing the use of naked lights. That in this he was guilty of an error of judgment is too abundantly proved by the terrible accident which resulted from the continued use of naked lights.

Doubt has been expressed as to whether an order given by the Inspector for the use of safety-lamps could be enforced by him under the present Act or Special Rules. In the opinion of the Inspector, and apparently of the officers of the Mines Department, the Inspector has no power to do so. There is no direct authority given by the Act or rules to the Inspector to order the use of safety-lamps; but we are of opinion that section 58 of the Act, though not apparently framed for such purpose, may be employed on an emergency to effect the purpose by an indirect method.

The Inspector duly reported to the Under-Secretary of Mines the results of his inspections and his observations on the condition and working of the mine, and after the accident to Kelly instructions were received by him from the head of the Department to prosecute the manager for a breach of Special Rule 14 for not providing safety-lamps, subject, however, to a favourable legal opinion of the case being obtained. In consequence of an adverse opinion being received by the Inspector from the firm of solicitors to whom he referred the matter, no proceedings were taken against the manager. Before there was time for the Department to consider the position, and to decide what further steps should be taken to secure the safety of the mine, the disaster apprehended by the Inspecting Engineer of the Mines Department (as shown by his several memoranda to the Under-Secretary) unfortunately occurred.

Mr. Reed is entitled to credit for bringing so forcibly under the notice of the Mines Department his fear of impending danger in the Taupiri Company's mine by reason of the gas known to exist there. We agree with him in his view that, not being the Inspector of Mines for the district, he had no right to interpose in any directions or orders given to the manager, although his right as an Inspector of Mines to inspect the mine is beyond question. We cannot refrain, however, from saying that we regret that Mr. Reed did not, in the interests of human life, personally visit and examine the mine and acquaint the manager of his very strong convictions as to the imminent danger threatening the mine. We also regard it as unfortunate that specific instructions were not given him by the Mines Department to do so.

Mr. Reed had no occasion to visit the mine for a considerable time before learning of the presence of gas there, but he had, while at the Thames on other official business, arranged with the District Inspector to visit the mine in his company only a short time before the explosion, and he had with him two electrical lamps for trial there, but, being called away to the West Coast on official business, the visit of inspection to the mine was unfortunately deferred.

(6.) The Efficiency of the Inspection of the Mine by (*b.*) *The Workmen's Inspectors.*

No evidence was given by the workmen's inspectors before the Commission, but from the evidence of other witnesses we learned that only two inspections were made by the workmen's inspectors during the past twelve months—that is, practically, since the new union was formed after the first strike during 1912.

Inspector Bennie in his evidence complained that he had received no help from the union or their check inspectors. The reference to them in his letter to the Under-Secretary as the creation of the mining companies was not supported by any witnesses produced before the Commissioners, who declined to hear evidence attempting to show victimization.

(7.) Suggestions for the Prevention, as far as possible, of similar Accidents, and for the Safe Working of this and other Mines in the Future.

Your Commissioners have arrived at certain conclusions with respect to the prevention of future accidents in mines, but they find that in most instances their intended recommendations have been anticipated by the Coal-mines Amendment Bill now before Parliament. This is particularly so with regard to—(*a*) Ventilation, (*b*) safety-lamps, (*c*) duties of inspectors.

Ventilation.

We approve of the provisions of clause 7 of the Bill now before the Goldfields and Mines Committee. In our opinion the observance of these provisions will conduce to the safety of the mines and the comfort of the miners working therein.

[Mr. Brown concurs in this recommendation, except with regard to clause 7, subclause (1), paragraph (*a*), subparagraph (1D). With respect to this he recommends that Inspectors of Mines should have discretionary power to increase the number of men in an air-split to eighty-five.]

Safety-lamps.

We approve of and adopt as our recommendation respecting safety-lamps paragraph (*a*) of subclause (1) of clause 7 of the Bill now before the Committee.

Duties of Inspectors.

We concur in the provisions of clauses 17 and 18 of the Bill as regards the duties of Inspectors and submit these clauses as our recommendations on this matter.

Coaldust in Mines.

We deem it imperative that legislation should be passed with the object of preventing, if possible, or mitigating the danger arising from the presence of dust in coal-mines, and to that end we recommend the incorporation in our Coal-mines Act of section 62 of the Coal-mines Act of Great Britain (1911) in its entirety.

Notice of Accidents.

The provisions of the Coal-mines Act with respect to the reporting of injuries to workmen are somewhat loose and uncertain, as it is left to the judgment of the mine-manager in every case to decide whether or not the injury is a serious one. In this respect section 80 of the Coal-mines Act, 1911 (Great Britain), is much to be preferred to the corresponding section in our Act, and we beg to recommend its inclusion in the New Zealand statute, in lieu of section 62.

Shot-firing in Dusty Mines.

We recommend that the following provisions be incorporated in the Coal-mines Act: In all dry and dusty mines, and in mines where the Inspector of Mines is of opinion that dust of a highly inflammable nature exists in dangerous quantity, and also in mines where safety-lamps are in use, no explosives but those permitted by the Chief Inspector of Mines shall be used, and all shot-firing shall be done by officials specially appointed by the manager.

(8.) As to whether the Provisions of the Existing Law are sufficient to give the Inspector of Mines Full Authority to order the Use of Safety-lamps and other Appliances if in his Opinion such Appliances are necessary.

We are of opinion that the existing law does not give the Inspector of Mines direct authority to order the use of safety-lamps or other appliances. There is no provision in the Act giving in precise terms any such authority. Section 58 might be employed as a last resource by an Inspector as an indirect method of compelling the use of safety-lamps or other necessary appliances, but it was not framed for such purpose, and the use of it is, at best, a clumsy and unsatisfactory expedient.

We recommend the insertion in the Act of a direct and definite section, giving the Inspector power to order the use of safety-lamps and any appliances he deems necessary.

Summary.

We have the honour to report the result of our investigations to be as follows :—

1. The disaster occurred in No. 6 bord of No. 5 section of Ralph's Taupiri Mine.

2. The explosion was caused by a naked light used by Martin (deceased), thereby igniting a gaseous mixture of CH_4 in No. 6 bord.

3. Safety-lamps were used by the mine officials for examination purposes, but naked lights were used throughout the mine by the workmen.

4. The ventilation of the mine generally was efficient, but was defective as regards section 5.

5. The examination of the mine as a whole was satisfactory, but the inspection of the old workings was inadequate, and the absence of ladders in the high bords prevented a thorough examination in such places for gas.

6. The only explosive used was Curtis and Harvey's blasting-powder.

7. There was not to our knowledge in the past history of the mine any occasion on which it was necessary to withdraw the workmen.

8. The means of escape in case of accident were afforded by three shafts, which in our opinion were adequate.

9. The management of the mine was, speaking generally, good, but in certain respects—*e.g.*, the prompt carrying-out of the Inspector's orders, the precautions taken against danger from gas, the ordering of safety-lamps, and the examination of the old workings—it was lax and unsatisfactory.

10. The Inspector of Mines is a careful and competent officer, zealous and conscientious in his work; but he was remiss in not exacting prompt and strict obedience to his orders, in not more frequently visiting the old workings, and he committed an error of judgment in not insisting on safety-lamps being used in the mine after the accident to the miner Kelly.

11. The inspection by the workmen's inspectors was infrequent and valueless.

12. No inspection was made of bords Nos. 4, 5, and 6 of section 5 (old workings) by any person on the morning of the accident, before the workmen were permitted to enter.

13. The door at the end of bord No. 6 of section 5, where it connects with the working-part of the mine, was not locked, nor in any other way securely fastened. If there had been no neglect with respect to the matters mentioned in the two preceding paragraphs the disaster in the mine could not have happened.

14. This report contains suggestions for the prevention, as far as possible, of similar accidents, and for the safe working of this and other mines in the future.

Before concluding our report we would like to place on record our high appreciation of the prompt and spontaneous manner in which the attempted rescue of the men in the mine was made by the management and workmen, and of the courage and resource displayed by all engaged in the work.

We desire to express our appreciation of the assistance rendered to us during the inquiry by the learned counsel engaged, and of the able and courteous manner in which the examination of witnesses was conducted by them.

The Secretary, Mr. J. T. Watkins, has merited our sincere thanks for the able and satisfactory manner in which he has discharged his duties.

We return herewith Your Excellency's Commission, and also enclose herewith—

(1.) Verbatim report of the evidence submitted to the Commissioners.

(2.) Notes of the evidence taken before the Coroner at the inquest, which it was agreed should be accepted and used as though tendered to this Commission.

(3.) Plans, documents, and letters produced at the inquiry.

(4.) Addresses of counsel appearing before the Commissioners.

And this our report we have the honour to respectfully submit, for the consideration of Your Excellency, in obedience to the Commission addressed to us.

Given under our hands and seals, at Wellington, this 30th day of October, 1914.

Fred. J. Burgess, Chairman.
J. C. Brown.
John Dowgray.

MINUTES OF EVIDENCE.

HUNTLY, THURSDAY, 1ST OCTOBER, 1914.

THE Commission met at 10 a.m.

Mr. C. J. Tunks appeared for the Taupiri Coal-mines (Limited); Mr. W. J. Napier for the trustees of Ralph's Estate, the owners of the mine; Mr. P. S. K. Macassey for the Mines Department; Mr. G. M. Newton for the Taupiri Coal-miners' Union; Mr. T. M. Wilford for the New Zealand coal-miners affiliated with the Federation of Labour and the United Labour Party, and certain of the relatives of the deceased miners; Mr. Gould for other relatives of the deceased miners.

HUNTLY, FRIDAY, 2ND OCTOBER, 1914.

HAROLD BAILY DIXON, Professor of Chemistry in the University of Manchester, sworn and examined. (No. 1.)

1. *The Chairman.*] What is your full name and qualifications?—Harold Baily Dixon. I am Professor of Chemistry in the University of Manchester. I am and have been working on the nature of explosions for the last twenty-eight years, and for the last twenty-five years I have been interested in explosions in mines. I was a member of the Royal Commission on the Explosion of Coal-dust in Mines that was sitting between 1891 and 1894. I have also been a member of the Royal Commission on Coal-supplies; and, lastly, I have been a member of the Executive Committee of the British Home Office to investigate explosions in coal-mines and to carry out experiments on a large scale, with a view to finding the nature of such explosions, and, if possible, to find a remedy for them.

2. You have inspected Ralph's Mine and come to certain conclusions with regard to what you saw there?—Yes, I have made two inspections of the mine since the accident—the first on the Monday following the explosion, the 14th September, and again last Tuesday, the 29th September. After making my first inspection I wrote a report on the subject, dated the 15th September, to the Minister of Mines, which is as follows:—

"SIR,— "Wellington, N.Z., 15th September, 1914.

"I am glad to comply with your request conveyed in your letter of to-day's date that I should give you my opinion on the question of the future working of coal in Ralph's Mine at Huntly, and of coal in similar seams.

"Though it is not possible at present to locate the origin of the explosion in Ralph's Mine, the main loss of life was due to the inflammation of coaldust lying on the roads. The flame traversed the main intake airway, which is also a haulage-road to the downcast shaft. No other inflammable agent but coaldust could have been present in this intake airway in sufficient quantities to propagate an explosion. Parts of this road are wet, but the dust-cloud raised by the blast was carried over the wet places and the flame of the burning dust-cloud ignited the dust beyond until it reached the shaft. The flame also penerated many of the other roads, blowing stoppings here and there into the returns.

"I am of opinion that it would be advisable in future to work this and similar coal-seams with safety-lamps, and I believe that modern electric lamps (which give far better illumination than oil-lamps) would be the best. There are several types of electric lamps which have passed the British Home Office tests. Until such lamps are procurable I am of opinion that it would be safe to work with naked lights, provided (1) that strict tests were made for firedamp before the miners entered, and (2) that the dust in the main roads was rendered uninflammable either by systematic watering or by systematic admixture with finely divided inert dust, such as powdered shale, limestone, or fullers' earth.

"In the Home Office experiments carried out at Eskmeals, Cumberland, it has been found that it becomes more and more difficult to propagate an explosion through a gallery containing finely divided and easily inflammable coaldust when the latter is mixed with more and more inert dust in a fine state of division. When the inert material is equal in weight to the fine coaldust it is practically impossible to start an explosion by such means as the discharge of 24 oz. of blasting-powder from a cannon placed in the gallery. The inert dust must be so finely divided that any disturbance of the air that raises the coaldust into a cloud will also raise the inert material.

"The damping of coaldust by finely divided water-sprays (an atomizer is most effective) is also a sure means of preventing the coaldust being raised. A combination of inert dusting and spraying may be used, the inert dust being thrown into the roof, where it is sometimes impossible to water. Safety depends on either preventing a dust-cloud being raised or on rendering such dust-clouds as are raised uninflammable by diluting the combustible with incombustible particles.

"The quantity of inert dust to be added depends, of course, on the amount of coaldust made in the mine. It is the fine dust blown off and shaken out of the tubs in haulage that is the most dangerous, and to this must be added in many cases dust carried from the screens on the surface down the downcast shafts and deposited on the haulage-road. In the case of Ralph's Mine, where the roofs are good throughout most of the mine, efficient watering would be very easy to carry out. In a few places inert dust might be used where watering might be difficult.

"It may not be possible to prevent some minor ignitions of fire-damp occurring, but I believe it is possible and practicable to prevent such small inflammations developing into a destructive explosion such as caused the disastrous loss of life at Huntly.

"I have, &c.,

"The Hon. the Minister of Mines, Wellington." "HAROLD B. DIXON.

That letter was written in answer to some specific questions regarding the explosion put to me by the Minister of Mines.

3. Had you seen the ground at the time you wrote that letter?—Yes.

4. You have visited the mine subsequently, since writing that letter?—Yes.

5. And did you see anything on your second visit to induce you to qualify anything in that letter?—Yes, slightly, as I say in the beginning of the evidence given by me at the Coroner's inquest, which I will read to you. [Evidence given at inquest proceedings read by witness, as follows.]

"HAROLD BAILY DIXON, sworn, saith: I am Professor of Chemistry in the University of Manchester. I adhere to the opinion expressed in the letter from me to the Minister of Mines dated 15th September, 1914. I was not then, however, acquainted with the fact that gas in large quantities had been discovered in the mine. I have again inspected the mine since that report. The seat of the explosion can be identified now within a small area. At my former inspection it was evident that up to No. 5 level the force of the explosion had been outward. When I got up as far as the cabin at No. 6 the force of the explosion is away from the shaft in the direction of Taupiri West. It is clear, therefore, the explosion must have started between those two points, or have come into the main haulage-road from No. 5 level, or somewhere between those two points. Yesterday I inspected the area to the north of the haulage-road and found gas in the old workings. I found a stopping and a door blown towards the main haulage-road. The initiation of the explosion must have come from beyond that—that is, inside that door. Since there is a fall there (the old fall) and gas making there at the present time, it seems there are the exact conditions required for an explosion, for it is known that a man went in there with a naked light. The gas-explosion so initiated stirred up the dust along the roads and ignited it. The explosion of dust was propagated along No. 5 level to the main haulage-road, where it spread in both directions, reaching the downcast Ralph's shaft, but dying out towards the west through lack of pure coaldust. The amount of dust in this mine would ordinarily be described as small—that is, in the mine generally. A great quantity of dust is not necessary in a lignite-mine to produce an explosion, or in any mine. For the last three years I have been a member of the Home Office Committee which has been experimenting on a large scale with a view of finding out what kind of flame will ignite coaldust so that it will propagate an explosion along a gallery, and, secondly, what means are effective in stopping an explosion from being propagated. With ordinary bituminous coal it is not easy to start a coaldust-explosion. We have found that a concussion and an intense flame are both required, the concussion to stir up the dust so as to form a cloud in the air and the intense flame to ignite it. We have made our experiments in a model steel mine, 7 ft. 6 in. in diameter and 1,000 ft. long. We have found that a blown-out shot, produced by a discharge of blasting-powder blown out of a cannon, gives the concussion and intense flame necessary for the stirring-up and ignition of the dust. This may be also effected by firing a mixture of fire-damp and air, which gives the concussion and intense flame. The amount of dust we have found necessary to put along the steel gallery in order to propagate an explosion is less than 1 lb. per lineal foot of the gallery—that is, when stirred up, about ½ oz. of dust per cubic foot of air. This amount of dust would look exceedingly small lying in a mine—it could hardly be noticed. We have found different coaldusts to differ rather considerably in their power of being ignited. Two days ago I made some tests with powdered coal from this mine. It is more inflammable than any coal I have yet tested. At the Home Office Experimental Station we have been trying the effect both of inert dust and of spraying with water, and we find that both remedies are effective, provided that you add enough incombustible dust or enough water. I should not endorse the statement that watering is out of date in England. I know a good many mines where it is carried on. Watering to be effective must be thoroughly done; merely watering the roads may be useless. It must be sprayed so as to fall anywhere where the dust might be. We have had the floor quite wet, and yet an explosion has gone through it. Coaldust floating on water can be raised up and fired. Inert dust must be well distributed—that is, thrown about so that it falls on to ledges, the roof, and timbers. There are two essential things with regard to the incombustible dust: first, it must be so fine that it is raised up when the coaldust is raised; and, secondly, it must be harmless to the miners. There are many dusts which can be finely divided and are harmless to breathe in small quantities. The cleaning-up of very dusty mines where a large quantity of dust is being continually made must be systematically carried out, or otherwise there will be too great an accumulation of coal and inert dust. From time to time the floors have to be swept up and fresh inert dust added. I have seen the dusting carried out practically at the Altofts' Mine, in Yorkshire; the powdered shale is taken in a tub and thrown by hand, the tub travelling along with the air-current, and the cloud of shaledust will settle, like the coaldust, on ledges, and so on. With regard to other precautions, the Home Office has just instituted severe tests for safety-lamps, and the test for permitted explosives is a very severe one. In England we hope by the use of secure safety-lamps and permitted explosives to stop even the initiation of an explosion, but we are urging proprietors and managers to render coaldust harmless by adding inert dust or by watering, or by a combination of the two, for sometimes that is more feasible than either of the other two alone. Sometimes the floor can be watered without any damage while the roof cannot, and *vice versa*. I do not know any case where an explosion has taken place where the inert-dust remedy has been used.

"By Mr. Macassey: There have been several electric lamps that have passed the Home Office tests.

"By Coroner: No large amount of gas-mixture would be required to start a dust-explosion—probably a few hundred feet of such mixture would suffice to start such an explosion. It would not be a pure gas-explosion after the flame had travelled, say, 50 ft. Some dust was

burned in the No. 6 bord where Martin was found. I agree generally with the statements in the card produced, 'How to test for firedamp.' An average miner would not be able to detect the presence of gas in less quantities than 2 or 2½ per cent. It would require careful practice to detect gas in less quantities than that. It is only in recent years that systematic tests have been made on the explosion of coaldust on the large scale.

"*Q.* Do you think that a competent manager ought to have known that dust was present in this mine in a dangerous condition and quantity?—A. I think very few managers would have recognized that dust existed in this mine in dangerous quantity, and unless they had been interested in the dust question and made experiments on it I do not think they would have been aware of the dangerous character of lignite-coal dust. Falls are sometimes produced by the gas-pressure. The variations in barometric pressure have some influence on the presence of gas in a mine, but not a very large influence. If a man were testing for gas by himself it would be a great temptation for him not to put the light in the lamp too low for fear it might go out. This would prevent it being an effective test for small percentages of gas. We went over the fall in No. 6 bord, but we could not get over the big fall in No. 5. In No. 5 there was a considerable accumulation of gas above where we were. It put my lamp out. If the gas were present in any quantity you could test for it by holding the lamp over your head, but not if it were present only in small quantities. You would then have to be level with the light. There could not have been a great accumulation of gas over the big fall when Wear inspected it on the 9th September, judging by his evidence. We did not inspect it until the 29th September. There was then some ventilation, which must have swept away some of the gas. On the 29th September no one could have stood on the top of the fall. I was only 5 ft. up when my lamp went out. I think if the old workings are left as open as they are now they should be treated with inert dust. No fresh dust is accumulating now, and one dusting with inert dust should be sufficient for a long time. Water would be always drying up.

"By Mr. Northcroft: Under 2 per cent. of gas would be too slight for even an official of the mine to detect with an ordinary oil-lamp. It would require to be a larger percentage of gas to be detected by holding the lamp above the head. I should think Wear might have detected 2½ per cent. by holding the lamp a foot above his eyes.

"By Mr. Napier: To secure safety by the use of inert dust it is necessary to mix with the coaldust an equal weight of finely divided incombustible dust so that the dust-cloud raised into the air by a blast or concussion will contain rather more incombustible than combustible matter. Such a dust-cloud cannot be ignited by the flame of a blown-out shot or by a small gas-explosion.

"By Mr. Bennie: The percentage of firedamp in air must be at least 5·6 before you have an explosion. I do not suggest that a blown-out shot caused the explosion on the 12th September, as I understand no shots were fired that morning. All the evidence seems to me to point to the fact that the explosion was caused by the ignition of a quantity of gas. I have not heard that sufficient evidence has been adduced to show that there was a considerable quantity of gas at the fall in No. 5 before the explosion, but there is no doubt that there has been a considerable quantity of gas at that fall since the explosion.

"By Coroner: The particular bord where Martin was found must have been filled with gas from the point where he fired it to the roof.

"By Mr. Bennie: It is possible that sufficient gas might have been held in the cut-through between 5 and 6 to have caused the explosion on Martin passing with a naked light. I think Martin must have gone some little way in after going through the door before he ignited the gas. There was a rise from the body to the door. If Martin came through the door the assumption is that there was not a large quantity of gas in No. 6 bord.

"By jury: There must have been over 7 per cent. of gas in No. 5 when my light went out. The sample of coal I tested with was fresh from the face. Fresh dust would be falling in the haulage-way out of the tubs. There are more delicate methods of testing for gas—for instance, the hydrogen-lamp, with which you can see if there is ½ per cent. present, and ¾ per cent. you can find quite easily. I am not suggesting that it should be used here. Life-saving appliances should always be within reach, and miners trained in their use. I think each large mine should have some of their men trained in the use of life-saving apparatus, as the men who explore the mine after an explosion must be accompanied by some one who knows the workings."

6. Is there anything you wish to add to that?—I wish only to make it quite plain that the first letter, the one to the Minister of Mines, was written in answer to certain specific questions.

7. *Mr. Wilford.*] May I at the outset ask that consideration which the uninitiated requires of a professor. Please use as simple terms in your replies as possible, so that I may understand them?—I will try.

8. The first point I want to discuss with you is the question of an examination of gas. Supposing a man is sent down the mine by the Taupiri Company to examine the mine with the idea of reporting whether it is safe for work, can that examination be efficient in a mine such as this one unless a ladder is used to reach the high places?—Do I understand you to mean in the working-places or generally?

9. Wherever there are high places which a man cannot reach without putting a lamp up, say, 20 ft.?—Clearly you cannot examine for gas 20 ft. above the floor unless you have some means of getting a lamp there.

10. Can an examination be efficient unless a ladder is used to reach the high places?—If there are high places it requires a ladder.

11. If a place is so high that it cannot be reached by a man standing on the ground, is it possible to make an efficient examination without a ladder?—Personally I think not. You mean, of course, with a lamp?

12. Yes; I do not mean that it cannot be made by other means?—That is so.

13. You say, "Personally I think not": why not say "No"?—You asked me whether it is possible to make an efficient inspection of a high place without a ladder.

14. Can such an inspection be efficient unless a ladder is used to reach the roof?—No. You mean, in a high place which a man could not otherwise reach?

15. Can an examination be efficient unless a ladder is used?—My answer is, for a high place I personally think not.

16. Why do you say that?—Because I can only use my own knowledge.

17. Then if there is no ladder, under such a condition such an examination is useless: any other examination would be useless?—No, I would not like to say that.

18. Supposing you have got a place 20 ft. high to be examined by a man who has no ladder, how can he make an efficient examination under such conditions?—The examination cannot be so efficient as to enable a man to swear that there was no gas in the roof, but you ask me to say that it is useless.

19. Then there might be a large accumulation of gas undiscovered?—There might.

20. Then, if Wear went through places that were out of his reach without being able to raise his hand to the highest points, and he had no ladder, such an examination would not be a guarantee that there was no gas in those places?—No.

21. And would be useless for all practical purposes for the area out of his reach?—I do not understand the word "practical."

22. For "warning" purposes, then?—It is quite clear that he could not test for gas places which were out of his reach.

23. Did you see a ladder in your walk through—in the high places?—I only saw one ladder in the mine—in the part I went through.

24. How many places did you go into which were too high for a man to reach with a lamp without a ladder: we will find out later how many there are?—That would be hard to say, exactly.

25. Would there be fifty?—No, but I went into perhaps half a dozen such places.

26. You went into half a dozen places in which an efficient test could not be made without a ladder?—A good test for the gas in the roof?

27. That is what I am asking?—Yes.

28. In those half-dozen places would a ladder have enabled an efficient test to have been made for gas?—A sufficient ladder would.

29. Did you see any suitable ladder in the mine to reach the highest places so that an efficient test could have been made for gas?—I did not measure the only ladder I saw.

30. Did you see any suitable ladder in the mine: was the ladder which you saw suitable?—I could not answer that because I did not measure the ladder.

31. Could you not tell us whether the ladder was suitable to reach the highest places you saw?—No, I cannot tell you.

32. Then if there were no ladders where ladders were required to make efficient tests for gas, it is possible that the examiners frequently walked under considerable accumulations of firedamp without knowing it?—It is possible.

33. Is it improbable?—I do not know the conditions of the mine sufficiently to answer that

34. Would the absence of ladders be a reason why any men who were examining the mine at first failed to detect firedamp accumulations which may have started the explosion?—The evidence as I have gathered it would lead me to say that Wear did test up in the roof where the gas was evidently coming from on the Wednesday before the explosion.

35. You mean in the one place where gas came from eventually?—Yes.

36. As to the other parts of the mine you know nothing?—I do not know.

37. Now, it must stand to reason, must it not, that if it is possible for gas to collect in the roofs of the places which are inspected, a man might quite safely walk below the accumulations of firedamp without noticing it?—Clearly gas may be in the roof, if it is a high roof, and a man might walk underneath without noticing it.

38. And might report that particular locality safe, whereas it was dangerous?—That might be so.

39. Now, if you have an accumulation of gas for some time in a given place, will you always on a test being made find afterdamp? Would you after some time find afterdamp?—No.

40. You would not have any afterdamp there under the conditions I have mentioned unless there had been combustion?—No.

41. And if there had been combustion, and the afterdamp was present, but air had been put through it, it is possible that the afterdamp, which is the lightest, would be swept away?—The afterdamp is heavier than air; the firedamp is lighter than air.

42. The afterdamp would not be blown away until the firedamp had been blown away?—No. The afterdamp is heavier and therefore would come out of the cavity in the roof. The firedamp remains up in the roof. The afterdamp would be swept away first; it would not remain in the roof.

43. I want to know the effect of an air-current on afterdamp and firedamp. You mean that only the afterdamp would be swept away?—The afterdamp would be swept away before any firedamp that may be there.

44. Now, do you consider that an examining deputy carrying only one lamp—a safety-lamp—is fully equipped for an efficient examination?—That would depend entirely upon the nature of the workings he had to examine. Are you speaking of the main workings or the old workings?

51. Do you not think an examining deputy should carry more than one safety-lamp for an efficient examination?—Yes.

46. I was talking about the number of lamps, not the number of men?—Well, one man with two lamps.

47. You turn your flame down to one-tenth of an inch?—About an eighth of an inch.

48. Do you think a man with one safety-lamp would be fully equipped for an examination?—He would probably not be able to detect small quantities of gas, but when the percentage was above 2½ per cent. he should detect it.

49. Is not there a liability of his lamp going out?—Yes, after he puts his lamp into firedamp.

50. Your lamp went out; yours was the only one that did so?—Yes, because I went up high on to the fall.

51. Do you not think an examining deputy should carry more than one safety-lamp for an efficient examination?—Yes.

52. Then it is not an efficient examination with one safety-lamp?—No, I would not say that. He should carry two: it would be better. A man may make an efficient examination with one, but he would be better if he had two.

53. With the naked light or a safety-lamp having the ordinary luminous flame, is it possible to detect firedamp when present below explosive proportions?—Yes, it is possible.

54. It is possible with a naked light to detect firedamp though that firedamp has not reached its explosive point?—Yes it is: it alters the flame.

55. Is not the effect of the firedamp on that luminous flame a kind of cap on it?—There is no doubt a cap, but it is not visible in the same way as on a turned-down flame: it elongates the flame.

56. Now, it is possible that there may be accumulations of firedamp present below explosive proportions on the ground, and of explosive proportions out of the man's reach above his head?—Certainly.

57. That is to say, that an examining deputy going through a mine may, for instance, if he tested on the ground, find by the appearance of the flame that there was firedamp, though not of explosive proportions, and he might be satisfied to go right on, while above his head there might be highly explosive proportions. Because there was only a small quantity below it would be no indication of large proportions above?—No.

58. That is to say, the test is no test?—On the ground, no test.

59. Unless it is tested to the roof it is no test?—Yes, it is a test. If you were sure that half-way up there was no cap at all you would know that there was no great accumulation of gas above.

60. If it were 20 ft. high the ground test would be no test?—It would be no test of what is 20 ft. above his head.

61. If a man went through with a lamp and found firedamp below explosive proportions, but could not reach above, and went out and reported it safe, that is no test?—You would find the gas if there were only 2½ per cent. present.

62. If a man going through these mines, which are of varying heights, is not able to say the whole part which he surveys is clear of gas (because he is not able to test above his reach), there is no guarantee of safety to the men whom he allows to go into the area?—He can only say it is safe up to the height where he has tested.

63. Now, if men are working under such conditions they must be at times in terrible dnager, without the whole area being tested before they go in?—That deepends upon the quantity of gas in the mine.

64. Supposing they have naked acetylene-lamps they must be working at times in great danger?—If the mine is a gassy mine.

65. This is a gassy mine—you know it is?—Now I do.

66. Well, in this mine they must have been working in terrible danger?—Sometimes. They must have been working in possible danger sometimes.

67. Have you found any evidence to indicate that the quantity of firedamp originating the recent explosion was only a small quantity?—I do not think there is any clear evidence to show how much there was there; there must have been above a certain minimum.

68. Is it not likely, in view of recent discoveries, that the volume of fireamp in the Taupiri Mine was very considerable?—At that moment you mean—the moment of the explosion? There must have been a good many hundred cubic feet.

69. May I say a good many hundred thousand cubic feet?—I do not think there is any evidence of that.

70. There has been a great quantity of gas found since?—Yes.

71. Up to what quantity?—I cannot tell that because I have made no measurements of the quantity.

72. It would be very easy to calculate the quantity?—You could calculate the total quantity of air, but you could not, of course, determine the actual volume of firedamp.

73. Do you consider that any man should occupy an official position in a mine like the Taupiri Mine who has not passed a firedamp test by examination, now that you have seen the mine and know something of it?—I should say that he ought to be tested by some means or other—examination or otherwise.

74. How otherwise than by examination? By some one in authority who knows, appointed for the purpose, and who was fit for the purpose?—Obviously.

75. May I say this: that it is wrong, in your opinion, for any man to occupy an official position in a mine such as the Taupiri Mine who has not become thoroughly conversant with firedamp testing?—You may. Such an examiner should be conversant with firedamp testing.

76. You now agree that safety-lamps should be used in the Taupiri Mine?—Yes.

77. Would you have ever considered the necessity of such a course being in doubt if you had previously known what you do now?—No.

78. Was your report in reference to the Taupiri Mine written without the knowledge that you now have?—Yes. I stated in the beginning of my evidence that my report was written in answer to certain specific questions put to me by the Minister of Mines.

79. And has that knowledge made you feel the necessity for giving evidence to show that what you now know modifies that report considerably, and in regard to safety-lamps nullifies it?—No, modifies that report. I should like to take this opportunity to say that that report would have been modified if I had known that considerable quantities of gas were issuing from the fall in No. 5 bord. My report was written in answer to a specific question as to whether it would be safe to continue working in similar mines until a supply of safety-lamps could be obtained. I said I would not stop such a mine provided two precautions were taken—a strict examination for gas, and that the dust should be rendered harmless.

80. You would never, however, have written that report if you had been seised of the conditions as you now know them?—I should not have written it in that way.

81. Should the owners of the Taupiri Mine in future be allowed to work those mines without safety-lamps?—No.

82. Are you aware that the dust found in the Taupiri Mine is more highly explosive than is generally the case?—I am now.

83. Were you awere of that when you wrote that report to the Minister?—No.

84. Were you aware of it when you were interviewed by the *New Zealand Herald* reporter in Auckland before you had come to the mine at all?—I was not interviewed by the *New Zealand Herald* reporter in Auckland on the Huntly disaster.

85 Where were you first interviewed in regard to the Taupiri Mine, when you gave that information in regard to coaldust: in Wellington, was it?—I am sorry, but I do not remember.

86. You say that you now know that the dust found in the Taupiri Mine is more highly explosive than is generally the case: when did you find that out?—Last Sunday (27th September).

87. Do you consider that a dusty travelling-road in a mine of, say, 8 ft. in width, in which 2 ft. in the centre is watered, is a safe protection against danger, or merely a minimizing of it?—It would have no effect, I should judge.

88. Can you tell me what quantity of this highly explosive dust would cause an explosion?—Such a quantity that, being raised into the air as a cloud, would weigh about half an ounce per cubic foot of air.

89. Do you mean by that that a minimum explosion would be produced, or would it be an explosion of any magnitude?—No, that would propagate a violent explosion, if stirred up in the form of a cloud.

90. By a horse's hoof?—No.

91. How then?—It must be a sudden violent concussion.

92. It would have to be a very powerful force?—Yes, and a sudden one, which would cause a concussion.

93. Do you consider that doors opening to old workings should be marked "Dangerous" for the safety of the men?—I am afraid my opinion would be useless on that point.

94. Do you know whether it is done at Home?—We have few old workings at Home that are open.

95. Do you know whether it is done at Home?—I do not know.

96. What would be an extra precaution to adopt?—To mark up "Dangerous" on a door where the men go through would be no precaution.

97. Should not all disused workings in which there might be possible accumulations of gas be guarded by notices of some kind?—My own experience shows that merely marking with notices is not much good. Locking the doors would be more effective.

98. I understand that you came to your conclusion in regard to the highly explosive quality of this dust from analysis?—No, I actually tested it.

99. I think you went down the mine with Mr. Bennie, Inspector of Mines, the first time?—Yes.

100. On the 14th September?—Yes.

101. The second time was last Tuesday, the 29th September?—Yes.

102. On the 14th September you went with Mr. Bennie and were down about three or four hours?—Something like that—I am not sure of the time.

103. Did you get any of the samples which you tested when you were with Mr. Bennie?—I got samples that day. I am not sure whether Mr. Bennie was present when I took them.

104. Do you tell me that you took any samples that day out of the mine?—Yes, I do.

105. I am talking about dust?—No, I thought you meant coal.

106. Where did you get your samples of dust which you tested?—The one I tested last week I got from the coal which I ground up.

107. But did you not get that piece of coal out of a coal-scuttle?—No.

108. Did you take a piece of coal in the hotel here?—Yes, I did. I have that.

109. Had you any samples for testing, except the piece you took out of the coal-scuttle, when you went to Wellington to the Royal Oak? Had you any samples in your possession from the Taupiri Mine except the "grab" sample which came from the coal-scuttle in the Huntly hotel, when you went to Wellington before you wrote that report to the Minister?—I understand your question to be: had I any samples of coal out of the mine when I left here for Wellington, where I wrote that report. Yes, I had.

110. Where did you get them from?—I took it myself when in the mine.

111. Did not Mr. Bennie carry some boxes for samples and were they not brought back empty?—I do not know.

112. Was that coal-scuttle coal Taupiri coal?—Yes, I believe so. I was told so.

113. Who told you so?—Everybody sitting in the room. But you also wish to know what the coal was I tested in Wellington?

114. Yes, please?—That was sent by the Minister of Mines.

115. Now, if you gave an interview at Auckland or Rotorua—supposing it can be found—it was prior to seeing the mine at all?—Obviously.

116. And when you made the report to the Minister it was prior to your knowledge of the conditions of the mine, such as were discovered afterwards?—I had been down the mine.

117. That report may be called, as far as this Commission is concerned, useless?—I do not think any particular stress may be laid on it.

118. You were not then in possession of the knowledge which you have now?—Certainly not.

119. You had not obtained your present knowledge then?—I think my knowledge is more valuable than it was then.

102. It would have been rather awkward if we had had to rely on your report and not on your evidence?—I said that this mine should be worked with safety-lamps. The whole question was whether similar mines should also be worked with safety-lamps.

121. You said in that report that until such lamps were procurable it would be safe to work with naked lights?—With the accompanying provisoes.

122. You made that report on inadequate knowledge?—Yes—incomplete knowledge.

123. Do you not think it was rash for a gentleman of your attainments?—No, I answered the questions to the best of my knowledge.

124. Your word goes a long way?—It was printed wrongly. The provisoes were put as alternatives in the newspapers and that altered the sense completely.

125. I am only judging by your statements that you wrote a report to the Minister without a knowledge of the subject?—That is false. I had a knowledge of the subject.

126. Did you have a proper knowledge of the conditions upon which you could write a report of any value?—I think the report was of value. I wrote it to the best of my belief and knowledge.

127. I ask you whether you would, in view of your present knowledge, change your report?—I have already stated that I would modify it, but not nullify it.

128. There was a British Royal Commission on Mines sitting in 1911?—It is still sitting.

129. You were not a member of that Commission, nor were you called by that Commission as a witness?—No.

130. And there were over one thousand witnesses called?—Possibly.

131. Why were you not called, if you are the expert you have suggested?—The Royal Commission on Mines did not carry out its work on a large scale because the Government were not able to give them the necessary funds. The mine-owners supplied funds, and the experiments were started at Altofts, in Yorkshire. Afterwards the apparatus was handed over to the Government on condition that the Government would carry on the experiments. Then an expert on explosives, Captain Desborough, and myself and a mining engineer were appointed to join an executive committee of the Home Office to carry on those experiments. The Government asked me to work on these experiments, and I have done so for three years and a half. All our reports have been furnished to the Government and have been published.

132. You are a Professor of Chemistry?—Yes.

133. Have you any diplomas in mining?—No, not one.

134. *Mr. Tunks.*] Assuming that the ventilation in a mine was adequate, would it be possible for an accumulation of gas to exist in the roof and you to find no gas at the height that a man could test?—It depends upon the height of the cavity and the strength of the current.

135. You do not mean in the ordinary roof or bord; I am speaking of the ordinary roof or bord. If the ventilation is adequate would you expect to find a dangerous accumulation of gas above the heights a man could test?—No, I should not expect it in good ventilation.

136. Now, a cavity, I take it, generally exists as the result of a fall?—Yes.

137. The fall liberating same gas?—It may do so.

138. Assuming that gas is found in the cavity?—Yes.

139. That forms in the cavity first?—Yes.

140. And I take it that if the fall is sufficient in area to enable the man to reach it, he can then make a satisfactory test for gas?—If he can reach up to the cavity, yes.

141. Would you say that an examination of old workings made by two men each carrying a safety-lamp might be an adequate examination?—I am speaking now as to the number of safety-lamps?—Yes.

142. And if you found that where the test for gas was being made both men were present, so that the safety-lamp of one was in reserve in case the other's went out, would you suggest that there was any temptation—that there would be any temptation to make a poor test there?—No, not if there were two.

143. Now, the examination has been directed in regard to the testing for gas in the mine as a whole. I think you understand that in this mine the old workings and the working-places are differentiated?—Yes.

144. And the examination to which your attention has been mainly directed—that of Wear—was an examination of old workings; was not that so?—Yes.

145. You have seen nothing, I think, of the method of examination of the working-places in this mine?—No.

146. And I take it that you express no opinion in regard to the examination of working-places in the mine?—I have expressed no opinion.

147. I take it that you have no doubt that the coaldust which you examined as to its explosibility was coaldust from the Taupiri Mine?—It was sent to the office of the Dominion Analyst by the Minister of Mines. That was the specimen we tested. The other small specimens I spoke about I took away myself, merely as specimens. I have the specimen here which I tested, if any one wishes to examine it.

148. And I think we may take it that the mere fact that there was a very large quantity of gas then in the mine, some days after the explosion, affords no guide as to the amount of gas that was present at the time of the explosion?—No measure of it.

149. That would be particularly so where the ventilation had been interfered with by the explosion?—That is the reason of my answer.

150. I think, in addition to the violent and sudden explosion you have spoken of, in order to propagate an explosion there must be flame?—There must be flame.

151. So that the mere kicking up of dust by horses' hoofs would not be sufficient to create an explosion—there must be a concussion and an intense flame. The main evidence of the explosion is to be seen in the main haulage-way, is it not?—So far as I have examined.

152. And the greatest force seems to have travelled through the main haulage-way?—I think so.

153. *Mr. Napier.*] Supposing that gas existed near the roof, is there not a constant tendency for it to become diffused?—Yes.

154. And assuming that the current of air was efficient the gas would not remain?—No. It would gradually come down, be diffused into the air, and be carried away, if there was no fresh supply.

155. And even if there was a continual small exudation of gas, provided the air was continuous also there would be a constant diffusion of the gas?—The firedamp will diffuse into the air. It flows on the top, but it gradually comes down, and if there is a current it gets swept away; but that takes some time.

156. The method of cleansing or freeing the cavity from gas is, I presume, by the introduction of fresh air?—Yes.

157. Now, Wear has told us during the inquest proceedings, and it is suggested that he will state here, that they were constantly able to detect gas or foulness in the adjacent area: they had some premonition that gas would be there. What do you say to that?—Some people can sniff firedamp.

158. He has had some experience as an examiner, and would be likely to be able to detect it with perhaps a greater keenness than others?—I am not sure—I think I can detect it myself. I know other people who cannot, and then again some people are better than I am at it.

159. Is it customary, from your experience of mines at Home, for gas to be always reported by the deputies in England?—Yes, I believe so.

160. You have heard the evidence which was given at the inquest with regard to the reporting of gas?—Yes.

161. In the books which were produced by the Inspector it was reported. Did you understand that gas to mean gas even when it was below the explosive standard, and that it is always reported whether 2 per cent., or 3, or more?—So long as it can be detected gas should be reported. I understand that is done.

162. Mr. Wilford put a question to you as to whether the test could be efficient without the use of a ladder. Is a ladder at all necessary if a man can reach the place where the gas is likely to be?—If he is certain where it is and can reach it a ladder would not be necessary.

163. Then the question of a ladder or no ladder really only becomes relevant if the place where the gas is supposed to be, or is likely to be, is out of his reach?—Clearly.

164. What is the height of the passage-ways which you examined yourself?—I am afraid I cannot answer that correctly—they vary so much.

165. Say 7 ft. then?—Many were higher and many lower.

166. The place where your lamp went out was at the fall?—Yes, the fall in No. 5.

167. And do I understand you to say that you went up 5 ft. on the debris which had fallen from the roof?—About 5 ft., yes.

168. Now, assuming there were falls, could not an efficient test be made by a man without a ladder by ascending the debris from the fall, provided he could reach sufficiently close to the roof of the cavity?—At that place, yes.

169. With regard to this alleged interview, have you ever seen a *New Zealand Herald* containing a report which purported to be an interview with yourself on this matter?—I am sorry, but I cannot say—I have been interviewed here so often, but I have no recollection of seeing it.

170. *Mr. Bennie.*] You said, I think, that your report to the Minister was written in answer to certain specific questions; that you had visited the mine before writing the report, but when writing the report you were not aware that large quantities of gas had been found in the mine. Do you mean that since then you have become aware of the discovery of gas in the mine?—Yes. When I wrote my report I was not aware of gas being found in large quantities in the mine.

171. You had no knowledge then that there had been a large quantity found?—No, I had no knowledge.

172. Your knowledge that large quantities of gas had been found in the mine was obtained since the explosion?—Certainly since and not before the explosion.

173. That is the meaning of your reference to it in your remarks?—Yes.

174. *Mr. Dowgray.*] Is it not a fact that the coaldust theory has been engaging the minds of mining men for a considerable number of years?—Yes, in England certainly.

175. And also in America; the American professors have been studying the matter almost to the same extent as those in England?—Yes, they are testing on a large scale—more elaborate perhaps than ours.

176. You stated that on your first view of this mine, so far as the dust was concerned you did not consider it dangerous?—What I meant to convey was that it would not be described in and ordinary parlance as a dry and dusty mine.

177. But after making the test, what is your opinion now: do you consider the mine a dangerous one by reason of the character and amount of dust there?—I now consider it a dangerous mine as far as the dust is concerned. I did not analyse the dust itself—I only tested it for its inflammability. May I add, about the specimen which I tested, that it was sent to the Dominion Analyst by the Minister of Mines.

178. Do you think it was part of the duty of the manager of the mine, which is certainly dusty, to analyse the dust?—Analyses had been made and published by the Dominion Analyst of the dust of the Taupiri Mine, and I imagine any one reading that analysis would not be drawn to consider it was a very dangerous mine, for the dust contains over 12 per cent. of water.

179. Would you consider a mine like this, where, when men bored holes to fire their shots, gas was given off and could be lit up, to be a gassy mine?—I have not understood that gas has been found in a borehole—a shot-hole.

180. Yes, in a shot-hole bored to fire a charge gas was found?—Yes, I should call that a gassy mine.

181. You would not consider that a mine where naked lights should be used?—Unless the finding of the gas was quite an exceptional circumstance.

182. If gas were found in ordinary shot-holes, say, two or three times in three months?—I should certainly forbid the use of naked lights.

183. Did you go through the place in the stone drive to the main haulage-way—to Dooley's dip?—I do not remember the name; I do not think so.

184. You certainly visited the fall referred to?—Yes.

185. There was gas making from there?—Yes.

186. There was an extraordinary amount of gas there?—Yes, there is certainly gas in the roof; it is now coming out.

187. So it must have come out of the strata?—Yes.

188. One counsel said that if there was satisfactory ventilation it would take away the gas. Do you think that method of ventilation would keep the workings entirely free from gas—bords worked up to 20 ft. and over?—I think the explosion has proved that the ventilation could not have been adequate for such a system.

189. One of the counsel questioned you as to whether a deputy could examine for gas without a ladder if he knew where it was to be expected: is it not a fact that a deputy presupposes gas exists all over, and examines accordingly?—That I understand is the ordinary practice in a mine—that the deputy examines all along the roadways, goes into the working-places, and examines carefully.

190. *Mr. Brown.*] Do you think it is a necessary precaution for deputies to be examined to test their eyesight before they are appointed to the position?—I think they ought to be tested to determine whether they can see and recognize a cap on the lamp-flame.

191. Has it been brought under your notice in Great Britain that a large percentage of these men cannot see a cap?—I think a large percentage cannot see a small cap—a cap you would get with anything less than 2 per cent. of firedamp.

192. Were there not a number of men tested in Scotland last year who failed to see a cap showing 2½ per cent.?—I do not know of my personal knowledge.

193. Do you think that all examining deputies should have their eyesight tested in that respect—for gas-testing?—Yes.

194. Is inert dust used largely in Great Britain?—It is used in some large mines; I think about twelve mines are now using it.

195. Was it a recommendation of the Mines Commission to the Government?—Not by the Mines Commission that I know of. It is a recommendation of the Executive Committee, who are reporting separately to the Government.

196. Now, in regard to breathing-apparatus: I think you stated in your evidence that all mines should have this apparatus for use, and men trained in its use?—What I said was that life-saving apparatus should always be within reach.

197. Does it not require a great deal of training to make these men competent?—It takes some time.

198. Would it not be positively dangerous for men inexperienced in the use of such apparatus to go underground with it where noxious gases existed?—Yes.

199. Assuming that there were no mines with these noxious gases present, how would you train the men?—In England we have small galleries made for the purpose, and the men have to go through them, and they are watched through glass doors.

200. And in many cases do these men not collapse in these galleries?—I have known a man to collapse at one of the trials.

201. Do you think it is the duty of a company to provide these galleries?—I think there should be one such station in New Zealand.

202. Just so?—Some central station where miners might be trained.

203. Would Ralph's Mine have been considered in Great Britain to be a dry and dusty mine?—I think not, although portions are dry and dusty.

204. But, generally speaking, it would not have been considered dry and dusty?—I think not.

205. Now, as to the future use of explosives, what class of explosives would you consider necessary for safety?—If I am to speak unofficially and not as representing the Home Office at all, I should say there are several explosives which can be used with, at all events, comparative safety, for all safety in mines is comparative only—we shall never totally eliminate accidents. I think comparative safety would be assured with several explosives, even not on the permitted list, but, of course, blasting-powder is another matter.

206. It is not a permitted explosive?—No.

207. Do you think that monobel should be used in gassy mines?—It would be far safer than blasting-powder, but it has not passed the English test. It is possible to get a flame from it and to ignite gas or dust.

208. Is it not probable?—No, not probable, I think, under the working-conditions of a mine.

209. What percentage of gas do you consider to be dangerous in the return airway in a gassy mine?—I should think that anything over 1 or 1¼ per cent. would indicate that more ventilation was required.

210. In some mines in Great Britain is there not much more than that in the return air, where the mine is well ventilated?—I have seen more.

211. Can you tell the Commission what Dr. Haldane considered was a reasonable percentage?—Did not he put it at 2½ per cent.?

212. I know he said that above 2½ per cent. would be dangerous?—Yes, of course; but I think he has put some figure as a suggestion for the return airways—I forget the exact figure.

213. In connection with the watering of mines, what is the principal objection in some mines to general watering?—It is that it is liable to result in the roof cracking and coming down through the moisture being absorbed.

PROFESSOR DIXON, recalled.

214. *The Chairman.*] I understand, Professor Dixon, that you have an explanation you wish to make in reference to the reported interview referred to this morning?—Yes, sir, I had to admit this morning that I had not seen the report of the interview with me, to which counsel referred. I have now obtained a copy of it. I find it refers to an interview which a representative of the *New Zealand Herald* had with me when I was changing my clothes after returning from the pit on the 14th September. There is one mistake in the report which I should like to correct. It states "The Professor was then asked if it were likely that a fall from the roof would release gas in sufficient quantity, if it became ignited, to create a flame big enough to fire the coaldust. He said that he did not think so." I did not make that statement. The question as I understood it was: Is it likely that a fall of roof with some gas would strike sparks and so produce an ignition? and I said I thought that was not likely.

215. *Mr. Wilford.*] Then I can add to your evidence that not only is the report not your opinion, but the interview you now produce is not your opinion either?—I have already told the Commission that the report I made to the Minister is my opinion, and only requires to be modified. That paragraph in the report of the interview is not my opinion. There is also one other correction I wish to make. The interview goes on, "Referring to the mine the scientist said that, while he would not describe it as a dry and dusty mine. . . ." I have said before the Commission that it would not ordinarily be described as a dry and dusty mine, and that is what I said in the interview.

216. Instead of the words "I would not describe it as a dry and dusty mine"?—Yes.

217. May I ask you while you are in the box, Professor Dixon, to give me a little assistance on a couple of points in that connection. A blown-out shot is one of the things which could cause an explosion with dust or gas?—Yes.

218. I suppose, because a blown-out shot gives both concussion and flame?—Yes, a blown-out shot with such a thing as blasting-powder.

219. I understand that such explosives as monobel No. 1 would give no flame?—I am not sure that it gives no flame, but it does not ignite dust under the Home Office test.

220. Then should there not be precautions taken in regard to blown-out shots—for instance, watering round the area?—If there is dust about.

221. How would you put that water on so as to make it effective, as a counter-irritant?—I should put such water on with a spray. There is an instrument called an "atomizer" which blows the water into a very fine spray.

222. You think the area round where the blown-out shot occurs should be watered—preferably sprayed?—I think that should be done round all shots where the place is dusty; you cannot tell whether the shot is going to be blown out or not.

223. Round all shots?—Yes, if it is dusty.

224. Because any blown-out shot might cause an explosion?—Yes, if there is inflammable gas or dust.

225. If there is dust in this mine or gas, and there is a possibility of a blown-out shot, you would spray the area round where you are going to fire your shot?—Yes, if there is dust near the shot.

226. *Mr. Napier.*] Should not the spraying be done immediately before the shot is fired?—Yes.

227. You are aware that there were no shots fired on the morning of the disaster?—Yes, that is in evidence.

228. *Mr. Tunks.*] Is it only monobel with a numeral that is entirely safe?—I think it is only monobel with a numeral which has passed the Home Office test.

229. It does not follow that the other monobel, without the numeral, is necessarily dangerous?—No, I am speaking of comparative safety in all these answers.

230. *The Chairman.*] You say there is no such thing as absolute safety?—I believe there is no such thing as absolute safety.

231. *Mr. Wilford.*] But it is clear that only monobel with the numeral has passed the Home Office test—the other has not done so?—That is so, I believe.

Professor DIXON recalled.

232. *Mr. Napier.*] Do you produce a bottle containing coaldust portion of which you tested in Wellington, and which you have referred to in your evidence?—Yes, this bottle contains coaldust a portion of which Dr. Maclaurin and I tested in Wellington.

233. There is an inscription on this bottle, "Taupiri Coal, Ralph's Mine, Mr. Reed's sample": can you say whose handwriting that is?—Dr. Maclaurin's.

234. He is the Dominion Analyst at Wellington?—Yes. [Bottle put in—Exhibit No. 1.]

235. And you received that from Dr. Maclaurin's Department?—We opened one of the boxes containing coal from this mine and ground it up. We made certain tests of the dust, and this is a portion of the same material. This was solid coal which we ground up.

236. Do you remember the Sengennydd disaster in South Wales?—Yes, I remember it.

237. That accident was attended, I believe, with terrible loss of life?—Yes, I think the greatest loss of life in any British explosion in a coal-mine.

238. How long is it since that happened?—About a year ago.

239. Was that mine watered?—Yes, water was being used.

240. I think the coal in that mine is a bituminous coal?—Yes.

241. And much less inflammable than the Taupiri coal from Ralph's Mine?—Yes, it is less easy to ignite it.

242. Would that coal be one of the best as far as non-inflammability of the dust is concerned?—I cannot speak positively on that.

243. Do you know if there was an inquiry into the cause of that disaster?—There was a Home Office (Government) inquiry.

244. Do you know what the report stated the principal cause of the disaster to have been?—Yes; it was stated that the probable cause was an ignition of firedamp that had come down, probably with a fall, and that the firedamp had been carried along an intake road and was then fired, the firing of that body of firedamp then producing the dust-explosion.

245. The dust being gathered up by the ignited gas?—The explosion of the air and gas causing an intense flame, and the concussion stirring up the dust, the cloud of dust was fired and propagated the explosion through the workings.

246. And was it discovered how the gas was ignited?—The only way it appeared to be probable for the gas to have been ignited was by an electric spark from signalling-wires. It was found that the bell employed used with a similar current to that used in the mine gave a spark sufficient to fire firedamp and air.

247. The mine, of course, had been duly inspected by the Government officers?—I presume so.

248. Do you know what the report says?—I do not know of my own knowledge.

249. As far as the report came out?—I cannot say. Nothing was said as to any negligence on that point.

250. *Mr. Wilford.*] I understood you to say yesterday that the sample of dust you examined was the one sent by the Minister of Mines?—I meant to say by the "Ministry" of mines. Perhaps I should have said "Mines Department."

251. Why did you say yesterday that the sample was sent by the Minister?—Because I thought it had been sent by or through the Minister.

252. What did you base that opinion upon, any foundation or none at all?—Yes, because Dr. Maclaurin said he had got it through the Minister of Mines, but whether he said "Minister of Mines" or "Department of Mines" I cannot remember.

253. I think you said you helped Dr. Maclaurin in the test of the dust?—Yes, we did it together.

254. What became of the "grabbed" sample you took out of the coal-scuttle in the hotel here?—I do not remember.

255. I think you said you could produce it?—No, I was referring to the two small pieces I brought out of the mine.

256. Did that get into Dr. Maclaurin's possession?—I do not know.

257. What became of the sample of coal which you took from the coal-scuttle in the hotel here?—I believe it is there, inside or outside the hotel.

258. Did you take it to Wellington?—I do not think so.

259. Could you not be sure whether it was thrown outside or taken to Wellington?—It was too big for me to carry with my luggage.

260. Did you make any test of it at all?—No.

261. You told us that you were informed that it was Taupiri coal?—Yes, I was.

262. You, of course, know that there are many samples of Taupiri coal differing as far as their inflammability is concerned?—Possibly. I do not know that of my own knowledge.

263. Do you know that there are any differences in them?—No.

264. And it was only from information given to you in Huntly that you came to the conclusion that it was Taupiri coal?—I said I should like to have a sample of this coal to take Home, and I believe somebody in the room said that that was Taupiri coal in the scuttle.

265. Now, you know probably all about a Commission which presented its report in regard to the Camerton Colliery disaster in 1893. It was a Royal Commission. I have here a text-book by H. R. Hughes, published in 1904, and on page 435 I find this quotation from the report of that Commission: "We have no hesitation in expressing our opinion that a blown-out shot may under certain conditions set up a most dangerous explosion in a mine even when firedamp is not present at all, or only in infinitesimal quantities; and while we are prepared to admit that the danger of a coaldust-explosion varies greatly according to the composition of the dust,

we are unable to say that any mine is absolutely safe in this respect, or that its owners can properly be absolved from taking reasonable precautions against a possible explosion from this cause. But even if we had been able to come to a different conclusion, we should still have to call attention to the serious danger which results from the action of coaldust in carrying on and extending an explosion which may have originally been set up by the ignition of firedamp''?—That quotation is, I believe, correct. I was a member of the Commission which wrote it.

266. You accept that as really part of the finding of the Commission on the evidence: you adhere to that?—Yes.

267. Now, I think you used these words in giving your evidence before the Coroner's inquest proceedings: "I think very few managers would have recognized that dust existed in this mine in dangerous quantity, and unless they had been interested in the dust question, and made experiments on it, I do not think they would have been aware of the dangerous character of lignite-coal dust": do you still subscribe to that?—Yes.

268. You remember admitting to the Commissioners that every blown-out shot in this mine might have caused a disaster if the dust was present in sufficient quantity? I think you admitted that to me also?—I meant, of course, every blown-out shot in a place that was dry and dusty. If that was the question I should say "Yes" to it now, as I did then.

269. Is it not a reasonable practice for examiners, particularly in view of the dangerous properties of all coaldust, and particularly when mixed with carburetted hydrogen below detection-point, to assume that there is gas in dangerous proportions in the mine? What I mean is, should they not rather assume that there is gas there (and therefore test very keenly for it) instead of assuming that it is not there?—They certainly should start off with the belief that there possibly is gas there.

270. And they should practically assume in their examination that gas will be found? Is not that the line upon which the examiners should go?—I cannot understand that question. A man should, of course, look for it, and if it is there he should find it and report it, without assuming anything at all.

271. You, of course, are giving your evidence with regard to this with a clear memory as to the whole of the circumstances. Now I want to know whether it is not a fact that that sample was received by Dr. Maclaurin four days after you sent in your report to the Minister?—I do not know in the least when he received it.

272. Had not you written your report to the Minister before that sample was in Dr. Maclaurin's hands?—I do not know. I have no means of judging. You can easily tell—my report was dated the 15th September.

273. Now, if that sample was taken on the 18th September, then you had written your report to the Minister four days before you examined that sample?—I did not test the sample until the 28th September.

274. What samples had you examined when you wrote your report?—I had not examined any samples.

275. When you wrote that report you had tested no samples?—I had examined no samples.

276. Your report to the Minister was in reply to the Minister's letter, containing certain questions?—Before I examined these samples.

277. Then your report to the Minister was written without your having examined any samples from the mine whatever?—Without my having tested samples from the mine; but I had seen the dust in the mine.

278. You are quite positive on that point?—Absolutely certain.

279. Then the interview which appeared in the *Herald* and the report to the Minister were both given without any samples from the mine?—Without having tested any samples.

280. Where are the questions the Minister asked you?—They were verbal questions he asked me.

281. Is there no record of them?—No record of all of them—he wrote me a letter.

282. Have you got it?—It exists.

283. May I see it?—Yes, if it is here at Huntly; I do not know whether it is here or at Auckland, but I will see.

284. *The Chairman.*] Does this bottle contain some coal you made a test from?—That is part of the same sample which I tested.

285. It is taken from a lump of Taupiri coal?—Yes.

286. Was that a fair test of the dust that lies in the mine which you say is highly inflammable? Would the coaldust in the mine be equally inflammable with that powdered coal?—Probably not so inflammable, but in making tests we have always employed freshly ground coal, so that each coal might be tested under the same conditions. If we took the dust in the mine for testing purposes there might be more foreign matter in one sample than in another, and therefore the comparison might not be a fair one.

287. Did you make any test of the dust as it lies in the mine?—No, I only examined it to see whether there was fine dust present.

288. You could not say whether that dust in the mine is as highly inflammable as the sample of powdered coal which you examined?—Probably not. I think it gradually alters by the action of the air.

289. *Mr. Dowgray.*] In connection with that disaster you quoted, you said that watering was carried out in that mine?—Yes, some watering was done.

290. You said it came out that the explosion had occurred by firedamp and it had travelled along the intake airways?—The finding was that the outburst occurred in an intake airway and the gas was carried inwards.

291. It is not customary to water the intake airways: the watering theory would not have anything to do with it?—This was in the intake. There was some watering at Sengennydd, but it appeared not to be sufficient to prevent dust being ignited.

292. *Mr. Napier.*] Mr. Wilford quoted from this text-book at page 435 (Hughes), and you subscribed to this extract indicating what the Commission thought. Just over the page, however (page 436), the following paragraph occurs: "Action of moisture: It is now established that the presence of moisture effectually prevents the possibility of coaldust being ignited, and that, unfortunately, only the very smallest amounts are needed. It has consequently become the practice at many collieries where the coal is dry and dusty to water the main roadways regularly. In order to be efficient the water should be applied in such quantities as will simply damp the dust and prevent clouds of it being raised by any means. If the floor be properly watered it is sufficient to prevent any deposit of dust on the sides or the roof." Do you agree with that?—That is not part of our Commission's finding. I think you are now quoting the opinion of the writer of the book. Damping the surface of the roads is not sufficient. The experimental explosions at Eskmeals have shown that mere damping is not sufficient.

293. *Mr. Brown.*] In practice, in Great Britain, when watering is done, the sides, roof, and floor are thoroughly watered?—They ought to be.

294. Does that necessarily apply to the whole of the intake airway or only to the watered zones?—It does not apply to the watered zones only. I think there is a danger in having a mere zone protected, for we know that in an explosion the burning dust may be carried through a dust-free zone for some considerable distance, over 100 yards. My opinion is that zone-watering is not nearly so good as universal watering.

295. *Mr. Dowgray.*] There is a clause in the British Coal-mines Act dealing with coaldust: will you read it, please?—I think one of these clauses is very important. "No. 62. Prevention of Coaldust.—In every mine, unless the floor, roof, and sides of the roads are naturally wet throughout—(1) Arrangements shall be made to prevent as far as practicable coaldust from the screens entering the downcast shaft; and in the case of a mine newly opened after the passing of this Act no plant for the screening or sorting of coal shall be situated within a distance of eighty yards from any downcast shaft unless a written exemption is given by the Inspector of the division: (2) the tubs shall be so constructed and maintained so as to prevent as far as practicable coaldust escaping through the sides, ends, or floor of the tubs, but any tub which was in use in any mine at the date of the passing of this Act may, notwithstanding that it is not so constructed, continue to be used in that mine for a period of five years from the said date: (3) the floor, roof, and sides of the roads shall be systematically cleared so as to prevent as far as practicable coaldust accumulating: (4) such systematic steps, either by way of watering or otherwise, as may be laid down by the regulations of the mine shall be taken to prevent explosions of coaldust occurring or being carried along the roads: (5) the roads shall be examined daily, and a report (to be recorded in a book kept at the mine for that purpose) made on their condition as to coaldust and on the steps taken to mitigate danger therefrom."

296. You think that is a model clause in connection with coaldust?—I think the clauses are good. Of course, their efficiency depends upon the rules for carrying them out. The Home Office Committee has reported that in their opinion such a systematic step as is contemplated in clause 4, in lieu of watering, would be taken if the roads were treated with inert dust in such a way that the mixture of fine dust that could be easily raised into a cloud should always contain more than half its weight of incombustible matter.

DAVID MOLESWORTH, Sen., Miner, sworn and examined. (No. 2.)

1. *Mr. Wilford.*] For how long have you been mining, Mr. Molesworth?—I have worked for this company for thirty-two years.

2. Do you know this mine pretty well?—I do.

3. When were you last working there, in the mine?—About two years ago, some time after Mr. Fletcher came. I have been at the top since then.

4. I want to ask you whether your memory can carry you back to the longest distance from now when to your knowledge gas was known to exist in the mine?—Well, sir, I believe that the first time I saw it was about twelve or fourteen years ago. I can tell you exactly the place where it was found. It was at the time they were sinking what it called the little dip—I mean the little dip proper. I was examining the places for a cavil.

5. Who was in charge at the time you refer to?—Mr. William Dunn.

6. Now, in your own words, tell us what you saw?—Well, in the little dip two men were working named Tom O'Loughlin and Gus Rosenbank. Mr. Dunn got his lamp and we were looking at the roof, when we came to a borehole overhead. It went off and burnt out for a few seconds. After that I noticed that it lit up again every time you put your lamp near it.

7. It was bleeding?—It must have been.

8. Now, since then, I want you to tell us any other occasions when you have seen gas bleeding from boreholes?—Well, in the same region I have seen it after that in various parts of the mine.

9. You have been on top for about two years and a half?—Yes.

10. When you were working down below, was there much dust about at any time?—Yes, and there has been some lots of dusty stuff coming up since I have been on top, and more especially in the last month—just as if some one had been sweeping it to get rid of it.

11. How recently?—Well, the first time that I saw anything that indicated trouble to my mind was about twelve months ago, just before the strike. For a considerable time there was a lot of bad stuff coming through the screens.

12. What sort of stuff?—Such as would come from old workings—that is, dust and coal and stone all mixed together—and some of it was smoking hot. That was about twelve months ago.

13. Where was that coming from?—I could not tell you what part of the mine, but I said to my mate that wherever it came from there was trouble.

14. Did it come right up?—Yes.

15. Was it still hot when it reached you?—Yes, I remember one day I picked up a lump and handed it to Clout, and it was so hot that he dropped it.

16. Who is Clout?—The man in charge on the top; he is considered my boss—the man in charge.

17. You passed this bit of hot stuff over to him and he dropped it?—Yes.

18. Was there any quantity of it coming from the mine, or did it just come up now and then?—No, there would be half skips and whole skips of it; then sometimes there would be dozens of skips full.

19. In how long?—In about an hour.

20. Did this come along on one day, or on several successive days?—On different days.

21. From that time you thought of the possibility of trouble?—Yes, I knew from that that there must be fire somewhere.

22. Did you ever come across any hot spots before you came up on top?—No, I never saw any hot spots in the mine before I came up.

23. Did you ever see watering done?—No, there was no watering done while I was down the mine.

24. The watering is of recent date?—Yes, very recent.

25. *Mr. Tunks.*] Can you say, Mr. Molesworth, roughly, how many times you have seen gas in the mine?—No, I cannot say how many times.

26. Have you seen it ten times?—Yes, I should say so. We had to put in boreholes every now and then. That was how we discovered the gas, when we were trying our roof. The gas burned till it was all burned away.

27. What were those boreholes put up there for?—To see how much coal there was over our heads.

28. Did you ever see gas come out of a shot-hole?—No, not in my time.

29. You say you have put up many of these boreholes yourself?—Yes, I should say I had in my thirty years below. We had to put them up every 6 ft. or thereabouts.

30. But you did not get gas in them all?—No.

31. Did you get gas in those places where you broke through into the roof?—In many instances I never pricked the roof at all. Where there was only 3 ft. or 4 ft. of coal over our heads it was usual to bore 9 ft. and if we got no roof there it was considered all right, and that there was quite enough coal.

32. What was done with that particular one which you saw with Mr. Dunn?—Nothing.

33. And nothing happened?—No.

34. You say that gas was found every time you tried it?—Yes.

35. How often did you try it?—Not very often—two or three times.

36. The same day?—No, at different times.

37. Had you any idea where that heated stuff was coming from?—No, I did not know where it came from.

38. You did not know whether it came from the old workings or not?—I do not know, but I should think it must have come from the old workings.

39. It was probably from a heated place that was being cleared out?—Yes.

40. So that the proper precaution was being taken with it?—Very likely.

41. Have you since had some heated stuff?—Only last month—very similar, but rather more cindery.

42. Also from old workings?—Yes, probably.

43. *The Chairman.*] In regard to the gas you say you discovered twelve or fourteen years ago, was that all exhausted in the one day?—Yes, it only lasted six or seven seconds.

44. Did you visit that borehole again after that date?—Yes.

45. Was there any gas in it then?—Yes, it was just the same.

46. How often did you see it?—About three or four times.

47. Did you report it at the time?—I did not need to do so because the deputy was with me.

48. It was his duty to do so?—Yes.

49. And on the several other occasions you speak of, did you get gas in the same quantity?—Yes, to the same extent.

50. Supposing you had not been working there, was there any way by means of which it would have been discovered? Would any one else have found it there?—Yes, the deputy.

51. Was it not too high?—He could have got up my ladder.

52. You had a ladder?—Yes.

53. You did not know what part of the mine that hot coal and stuff came from?—No, sir. That has been lying there for some considerable time before I left the workings down below.

54. You cannot say what part of the mine it came from?—No, the only thing I can say about it is that it was necessary that it should be got out or that something should be done in regard to it.

55. And in bringing it up to the surface the employees might have been doing the proper thing with it?—Yes.

56. You would not argue that there was any neglect?—No, not at all.

BOYD BENNIE, Inspector of Mines, sworn and examined. (No. 3.)

1. *The Chairman.*] I will first ask you, Mr. Bennie, to read your evidence given before the Coroner at the inquest proceedings?—[Witness reads evidence as follows.]

"BOYD BENNIE, sworn, saith: I am Inspector of Mines for the Auckland District—Coal-mining District—and the Hauraki Gold-mining District, including Puhipuhi. I propose to give evidence to show when I first became aware that these mines were liable to give off gas. About six or seven years ago, when Mr. Wight was manager here, I ignited a small quantity of gas in a borehole. These boreholes are put up in the roof of the working-places to ascertain if there is a thickness of coal sufficient left all over the bord or places. Nothing further occurred until the 12th February, 1912, when David Conn, a shiftman in the Extended Mine, got burnt with gas and was idle fourteen working-days. William Willcox, a roadman in the Extended Mine, was also burnt with gas on the 26th March, 1912. Arthur Ruston, in Ralph's Mine, going into the old workings in Dooley's dip, got burnt with firedamp, but escaped injury. This would be between 1912 and early in 1914. On the 9th July, 1914, William Kelly got burnt by gas in Ralph's Mine on the arms, neck, and face, and was off work for fourteen working-days. This was in the stone drive between No. 6 and No. 7 levels on the main haulage-road. Mr. Fletcher reported the occurrence to me. I put in a copy of the letter reporting it [Exhibit T]. [Copy of letter from Mr. Fletcher to Mr. Binnie in reply to Exhibit K put in as Exhibit U.] I put in a copy of memorandum left in the mine-manager's report-book by me on the 2nd July, 1914 [Exhibit V]. On the 14th July, 1914, I visited the mine and inspected the place where Kelly was burnt. The mine-manager was present with me, and we found a little gas over the back of the drive. The cavity was very small and the quantity was small. On the 24th July, 1914, I reported to the Mines Department the result of my investigation of the place where Kelly was burnt. I was instructed by the Under-Secretary for Mines to take legal advice and see if I could enforce the use of safety-lamps in the mine and prosecute the manager for a breach of Special Rule 14, Second Schedule of the Coal-mines Act, 1908. I put in a copy of my letter to Miller and Son, Thames [Exhibit W]. [Their reply put in and marked X.] In consequence of the finding of gas in the mine as reported by the examining deputies I have made a number of visits to Ralph's Mine, and made special examination of the places where gas was reported to be found. On the 14th July, 1914, I found a little gas where Kelly was burnt, at No. 7 at the middle of the stone drive. Mr. Fletcher and Mr. Gowans were with me. We found in a bord in the old workings, No. 7 level south, about 100 cubic feet of gas there. On same day we examined the place in the old workings where the gas was reported to have been found at a fall. I could not find a trace of gas there. In two places where there were falls from the roof the examining deputy reported discovering gas in April, 1914. We could not find a trace of gas there. On my visit of inspection on the 21st August with the manager I inspected the stone drive between No. 6 and No. 7 levels where Kelly was burnt. We found traces of gas over the drive-timbers: the quantity was very small. No. 7 south, behind a little winch in the old workings, was searched for gas, but I could not find a trace of gas. It had been reported by the examining deputy that he had found gas there. I made a two-days inspection of the mine and found the conditions generally satisfactory with the exception of what appeared to me to be an excessive quantity of coaldust. This was on the 21st and 22nd August, 1914. I found the mine satisfactory except that the travelling-road in No. 6 to Taupiri West had and was being watered only on the floor half the width where the men would walk. There was dust along the sides of the travelling-roads. I cannot find a note of such a letter, but I have no doubt I discussed it with the manager. The watering was continued, but not to the full width of the road. I did not give any instructions about watering the sides or roof, as I could not say there was any dust on the walls at all. Prior to receiving the legal opinion I was so impressed with the necessity of something being done in consequence of the accident to Kelly that I wrote the letter [Exhibit Y] to Mr. Fletcher. [Mr. Fletcher's reply is put in and marked Exhibit Y.]

"By Inspector Wright: I have known this mine for nine years and have been inspecting it for that time. I inspected it usually three or four times a year, but this year I have inspected seven times, all prior to the explosion. This was because gas had been found in the old workings. Prior to 1914 gas was found, but not so frequently. It is the duty of every one in the mine to report anything in the shape of gas. During the last two years I have had no complaints from any one employed in the mine either as to gas or anything else wrong in the mine. I have not found gas in the working-places or travelling-roads in such quantities as would, in my opinion, render the use of safety-lamps compulsory. I have never at any time advised the management that safety-lamps should be used in the mine instead of naked lights. I considered I was writing to an intelligent and competent man, and I drew his attention to the matters which I considered dangerous. The only thing that was not carried out as I should have liked was the watering of the travelling-roads, which were not watered at the sides. Prior to Mr. Fletcher's arrival the old workings were not inspected as they are now. As a result of our conversation for more adequate inspection two men were appointed to examine the old workings to guard against spontaneous combustion and also against accumulation of gas. The instances of gas exploding in the mine that I have given are the only ones known to me. In addition to the inconvenience of the coaldust I also considered it a danger. After hearing the evidence of Professor Dixon I am now of opinion that it is absolutely necessary to use safety-lamps. I have now informed the managers of both mines that only safety-lamps must be used in the mine, and 'permitted' explosives according to the British Schedule No. 953 must be used only. There is no doubt that on my inspection on the 21st August I informed the manager that the roads were insufficiently watered. I cannot say positively that we did discuss it. There is no letter on the file and no note in my book of my having called Mr. Fletcher's attention to this matter. I agree with the opinion expressed by Mr. Wood as to the place where the explosion first started. The place where

Martin's body was found would be about 10 ft. lower than the highest portion of the drive. I believe just inside the door was the highest point of that portion of the section where the body was found.

"By Mr. Napier: Up to this occurrence I considered this mine to be a safe mine to work, with the exception of the finding of the small quantities of gas that were found and the coaldust.

"*Q.* In your letter of the 25th August you state that in the event of a certain contingency happening in the future it may be necessary to insist on the use of safety-lamps: had that contingency happened prior to the accident?—*A.*: No.

"By Mr. Tunks: My letter of the 30th May was written after an inspection made by me in company with the check inspectors.

"By jury: There are not many large falls in the old workings.

"*Q.* Do you consider it a safe system to allow the old workings to fall in and allow the falls to remain there?—*A.* Sometimes the debris has been on fire when turned over to allow the gases to escape. Fires will not recur there. I am aware that the four old mines in or about Huntly have been on fire. As soon as there were signs of heating the falls should be removed. Unless the heap is more than 3 ft. deep it rarely catches fire. I think where any special danger is noted on the visit of the examining officer to the old workings that they should be visited oftener than once a week.

"By Mr. Tunks: I was aware of the system of examining the old workings. It took a week to go round.

"By Coroner: I am satisfied that the ventilation of the old workings was sufficient, but there may have been odd corners in which the air may have been a little warm. That is sufficient to clear away any ordinary accumulation of gas. In addition to the return air there are 7,000 cubic feet of air per minute going into the old workings in the old dip."

2. *Mr. Wilford.*] Of course you realize, Mr. Bennie, in a Commission of this kind that if there is default on the part of the management of the mine it is equally your fault?—I am not aware of that.

3. You realize that you are an overseer?—No, I am the Government Inspector of Mines, whose duty it is to see that the work is carried out in accordance with the provisions of the Coal-mines Act and Regulations.

4. Is not the Government Inspector of Mines an overseer?—No.

5. He has to oversee?—That is splitting straws.

6. You have to oversee the mine and give directions if you think something requires remedying?—On my examination of the mine, if anything is contrary to the provisions of the Coal-mines Act and Regulations, then I draw the manager's attention to it or ask permission to summon him.

7. If you find anything out of order?—No, sir, I cannot have that: unless contrary to the provisions of the Act and Regulations.

8. Now, I have a few questions I want to ask you, and I want you to think carefully before you reply, because they are very important. Have you reported all ignitions of gas by which persons received damage, to the Inspector?—To whom?

9. Whom do you report to?—Any serious accident is reported to the Under-Secretary.

10. I will modify my question: have you reported all ignitions of gas by which persons received burns immediately in writing to the Under-Secretary of Mines?—The Coal-mines Act requires that in cases of serious accident the mine-manager shall notify the Inspector, and the Minister, and the workmen's inspector.

11. Have you reported all ignitions of gas by which persons received burns immediately in writing to the Under-Secretary?—No, sir, I have not.

12. You have not reported all ignitions by which persons received burns immediately in writing to the Under-Secretary?—No.

13. Have you reported any of them?—Yes.

14. Have you got copies of all the reports you have made?—Yes, sir.

15. When did you first report to the Under-Secretary the burnings by ignitions of gas of David Conn, William Willcox, and Arthur Ruston?—I never reported them, because they were not serious.

16. Am I correctly stating the date of the burning of David Conn as the 16th February, 1912?—Conn and Willcox were working in the Extended Mine.

17. Were the injuries to Conn dated the 16th February, 1912?—D. Conn, 16th February, 1912; William Willcox, 26th March, 1912.

18. Arthur Ruston, December, 1913?—I have no idea.

19. We have got it that you did not notify those three cases to the Under-Secretary?—That is perfectly correct.

20. Were you notified by the manager at the time of those burnings?—I could not say positively whether I was or not.

21. Is it not a fact that you never received any notification at all of those three burnings at the time of the burnings? You say you do not know?—I cannot remember.

22. You remember writing a letter on the 8th January, 1914, to Mr. Fletcher?—Yes. [Letter produced and read, as follows.]

"Inspector of Mines Office, Thames, 8th January, 1914.

"*Accidents by Powder-explosions and the Ignition of Firedamp.*

"WILL you be good enough to forward me at your early convenience a list of the persons burned by the explosion of powder and also the ignition of firedamp during the past two years, together with the dates of the accidents. An early reply will greatly oblige.

"B. BENNIE, Inspector of Mines.

"James Fletcher, Esq., Manager, Taupiri Mines (Limited), Huntly."

23. Then you did write and ask him?—Yes.

24. You wrote on the 8th January, 1914, asking for particulars of burnings that had occurred in the two previous years?—Yes.

25. You had forgotten that a minute ago?—No, sir.

26. The copy of the letter which you have handed to me is dated the 8th January, 1913, but it should be the 8th January, 1914, I think. If you never wrote until the 8th January, 1914, for particulars of these burnings in 1912 you waited two years, but if you wrote in 1913 you only waited one year?—Yes.

27. That is important?—Yes. What do you suggest?

28. When you wrote in January, 1914, was that the first time you had heard of them?—I think not.

29. Just remember where you did hear of them first. Did you hear of them before the beginning of this year? Mr. Fletcher never told you of them till replying to your letter of the 8th January this year in his letter of the 14th January, 1914?—On the 22nd March, 1912, I sent to the Under-Secretary for Mines, as a claim under the Coal-miners' Relief Fund, "David Conn, Huntly, arms, neck, and face burned, 16/2/12 to 14/3/12."

30. Were they reported to you by the mine-manager?—I believe they were.

31. Will you find the report?—I will telegraph to my clerk at Thames for it.

32. It is quite clear you did, but I want you to tell me did Mr. Fletcher tell you about it?—About what?

33. Those three injuries?—In all probability he did.

34. Then why did he write to you on the 14th January of this year about it?—In reply to my letter.

35. What are the special reasons?—I wanted to know what accidents had occurred in the mine.

36. Did you think then that Mr. Fletcher had neglected to notify you of some accidents? If you had had the notifications you would not want to write for them, would you?—[No answer.]

37. I do not think you have these other notifications from him?—I would not say that I have.

38. Did you receive any further information from Mr. Fletcher in reference to the burnings in reply to your letter of the 8th January, 1914, over and above that already received by notification in writing previously?—I think there are only the three referred to.

39. What I am trying to find out is this: if these accidents occurred in 1912 and Mr. Fletcher never notified you, how did that come out?—In consequence of a conversation with Mr. Reed, Inspecting Engineer of Mines, I asked for that report.

40. That is why you wrote?—Yes.

41. Did not you get some information locally in Huntly?—No.

42. Now, if that is so, why should you write to get any more information than you already had?—If you will turn to the Coal-mines Act I think you will find that the manager has to report all serious accidents. It is not absolutely necessary for him to report accidents of that nature.

43. Can you produce the deputy's report-books and your report-books regarding these burnings?—No.

44. Why not?—They are not serious accidents, and were not reported to me, very likely. Not being considered serious accidents I would not make a special visit of inspection.

45. Is that your whole answer?—Yes.

46. Now, turn up and tell me for how long the men got sick-pay for these non-serious accidents?—Willcox was off eighteen working-days, Conn fourteen days.

47. Ruston?—I have no note of that.

48. You never heard of that until you got Mr. Fletcher's letter of the 14th January, 1914?—I remember when visiting the mine Mr. Fletcher showed me the place where Ruston was singed.

49. But he did report further on?—No, I could not say.

50. Do you keep copies of all your reports to the Department?—Yes.

51. Have you all those reports for the last two years in connection with the Taupiri mines?—I have the 1913 reports.

52. And part of 1912?—No.

53. Do you report to the Department all serious accidents due to ignitions of gas?—I report all serious ones.

54. Do you consider any burn by the ignition of gas a serious accident?—No.

55. Then the mere fact that there is escaping gas which causes a burn is not, *prima facie*, sufficient to report?—It just depends to what extent the man is injured.

56. The mere fact that he is burned from an ignition of gas is not sufficient to report?—It has not been in the past.

57. Do you report that gas has been found there without there is an ignition of gas?—Not unless it is a serious accident; but on my visit I inspect the place.

58. *The Chairman.*] If there was an escape of gas which caused a burn, would you report that?—Not unless the burn was serious.

59. The mere escape of gas you would not report?—Not unless the quantity of gas was a dangerous quantity.

60. *Mr. Wilford.*] Supposing there was a big escape of gas and a small burn, what would you do?—Draw the manager's attention to it and report to Wellington, and ask for permission to prosecute him.

61. Have you done so?—Yes. [Letter, 7th August, 1914, produced.]

62. This letter is dated the 7th August this year?—Yes.

63. I would like that put in the evidence. Will you read it, please?—[Witness reads letter, as follows.]

"Office of Inspector of Mines, Thames, 7th August, 1914.

"*Gas-explosion at the Taupiri Collieries.*

"Memorandum for the Under-Secretary, Mines Department, Wellington.

"In reply to your memo. of the 4th instant I beg to state that after careful consideration I am of the opinion that to prosecute Mr. Fletcher, the mine-manager, for a breach of Special Rule 14 in the case of William Kelly, burnt by an ignition of gas in the company's mine on the 9th July last, I may fail to get a conviction, but the moral effect of such a prosecution will be to produce more effective supervision, the value of which we cannot foresee.

"In view of the alleged previous burnings by gas in the mines, apart from that of the 4th instant, it may render it necessary to prosecute. I as Inspector of Mines receive no help from the Miners' Union or their check inspectors, who are as at present constituted the creation of the mining company's directors. I have had no complaints from the union officials or any one of its members, either written or verbally, for over twelve months past.

"I may say that there is very little carburetted-hydrogen gas found in the mine, but for some time past small quantities have been found and reported by the examining officers of the company. In view of that I have repeatedly requested that the roads in the mine where dry coaldust has accumulated should be adequately watered, and all shots fired in the mine to be fired by the fireman and deputy as required by Special Rule 25 (*d*). The manager has not complied as fully as I would like. The foot-tracks of the travelling-roads only have been watered; and, while the manager has informed me in writing that shots are being fired by officials, I am not quite sure that this is so.

"I cannot recommend that safety-lamps only be used in these mines, for two reasons: (1.) Very little gas is found in the miners' working-places. It has practically always been found in falls of the roof of the old workings, and two officials are specially appointed to examine the old workings. During the week daily inspections are made and a full round of the work is made during the week. (2.) The working-places are 10 ft. to 18 ft. high. The light from a safety-lamp is very poor, and if the mine is to be worked as at present, by present methods, there will be a great increase in the number of accidents to miners and serious accidents, if not fatalities, as the result of defective lighting; the safety-lamps will be damaged and the end in view defeated.

"To prosecute for a breach of Special Rule 14 in Kelly's case will at least have the effect of producing stricter supervision, therefore I now ask permission to summons Mr. Fletcher under Special Rule 14 of the Coal-mines Act, 1908, and also permission to employ a solicitor.

"B. BENNIE, Inspector of Mines."

Following on that the Under-Secretary authorized me to take a solicitor's opinion, and I consulted Miller and Son, of Thames, as to my chances of succeeding in the case.

64. And you absolutely claimed that the prosecution, if it took place, would possibly save the lives of the men?—Would have the effect of stricter supervision.

65. You say in your letter to the Under-Secretary dated the 7th August, 1914, "The manager has not complied as fully as I would like. While the manager has informed me in writing that shots are being fired by officials I am not quite sure that this is so. The light from a safety-lamp is very poor, and if the mine is to be worked as at present, by present methods, there will be a great increase in the number of accidents to miners, and serious accidents, if not fatalities"?—That is so.

66. That is your report?—That is my opinion.

67. And no prosecution followed?—The reason why was because I was advised that I could not get a conviction.

68. May I ask for your letter of the 27th August, 1914, setting out your case for the opinion of Miller and Son. [Letter handed to Mr. Wilford.] You say that the prosecution did not take place because of the solicitor's opinion?—Yes.

69. Now, in the solicitor's opinion which you read it says, "on the facts submitted to us"?—Yes.

70. And the letter you put in dated the 27th August contains the facts you submitted to them?—Yes.

71. Did you tell Miller and Son that Conn, Willcox, and Ruston had been burned by ignitions of gas in 1912?—I was not instructed to do so.

72. Who fixed what you should say?—The Under-Secretary. It arose out of Kelly's burns.

73. You must surely know that the lawyer should have been advised how many burns had taken place in the last two years in order to interpret this Act. Did you give Mr. Miller any information about Ruston, Willcox, and Conn being burned?—My answer is No.

74. Did you give Miller and Son the information that you gave the Under-Secretary on the 7th August?—I think so.

75. But your letter to Miller and Son is here: three parts of it consist of quotations from the Act. The only information you give the solicitor when you asked for his opinion is, "On the 9th July ultimo a miner named William Kelly was burned by an ignition of CH_4 gas in the Taupiri Coal Company's mine. The examining deputy reported finding gas in Kelly's working-place on the 1st July ultimo, but on each succeeding morning up to and including the 9th July (date of accident) the examining deputy reported the place clear (safe)"?—Yes.

76. Is not that all the information you gave Mr. Miller?—No, I gave him my notes taken from the report-book, showing the occasions on which gas was found by Deputy Wear in Ralph's Mine.

77. When I asked you what you gave Mr. Miller you said this was it, and yet there is something else?—There are the notes also. I think I have them here.

78. You see you have nothing to hide, but this report and these notes never came out before the Coroner's inquest, and have only come out now?—If you were present at the inquest you would have noticed there was a desire to make haste because it had been dragged out so long. I made a statement and then asked the Inspector of Police to put any questions to me. If they had wished any further information they could have had it.

79. Where are these notes?—They are here. [Notes produced and read by witness, as follows.] "23/3/14: No. 7 South.—Found gas in first fall, third bord.—D. Wear, Fireman and Deputy. 23/3/14: No. 7 South.—I have cleared all gas from the same.—J. McGill, Fireman and Deputy. 22/4/14: Little Dip.—Found gas in three falls, winch level.—D. Wear, Fireman and Deputy. 29/4/14: Little Dip.—Found gas in three falls.—D. Wear, Fireman and Deputy. 8/5/14: No. 7 North.—Found gas in a fall behind the pump.—D. Wear, Fireman and Deputy. 15/5/14: No. 7 Section North.—Found gas behind pump.—D. Wear, Fireman and Deputy."

80. Where is that entered in duplicate?—You can get it from the examiner's report-book.

81. That is a copy of his report?—These are extracts which I took from his report-book.

82. Did you tell the Court that you told Mr. Miller that gas had been found in all these places?—I say Yes.

83. Are you positive?—Yes.

84. I want this matter further cleared up. When you sent that statement for counsel's opinion you only made reference to Kelly's case, and that the examining deputy had reported the place clear. Now, on such a statement no lawyer could advise you otherwise than Mr. Miller did?—You read Mr. Miller's opinion.

85. Yes, he said "on the facts submitted"?—The inference was that a place might be worked where there was adequate ventilation.

86. Who ordered you to take the opinion of the lawyer?—The Under-Secretary for Mines.

87. And that was on the 7th August?—I think that was the date.

88. Did you, after the lawyer's opinion, write again urging a prosecution?—No.

89. Did you ever put anything on record to the effect that you regretted that no prosecution had taken place?—No.

90. It might have saved this trouble?—If I had been a prophet and could have foreseen I would have done so.

91. It might have saved this trouble if the prosecution had been gone on with?—I cannot say it would.

92. Is there any other correspondence on the file dealing with your application to prosecute the manager?—In what case?

93. In any case?—I think not.

94. Are you sure? Did you ever write in again asking for a prosecution to be taken?—In reference to this case?

95. No. In reference to any other case?—Since this opinion?

96. Since or before?—Yes, I have prosecuted the manager several times.

97. Since that?—No.

98. Between the 7th August and the 12th September?—No.

99. And since that opinion was taken you have not written to the Under-Secretary suggesting any prosecution?—No.

100. That is the reply you got from the Under-Secretary, dated the 11th August, 1914: "I should be glad to have your views upon this matter, particularly on the proposal to prosecute contained in the last paragraph"?—No, that is addressed to the Inspecting Engineer.

101. Who is the Inspecting Engineer?—Mr. Reed.

102. Then, on this same paper appears Mr. Reed's report, dated 11th August, 1914. Is that his answer to the Under-Secretary for Mines?—Yes, that is his handwriting.

103. It reads as follows: "The Under-Secretary for Mines. Ignitions of gas by which men have been burnt have occurred frequently of late at the Taupiri collieries. A prosecution would do good even if it failed (owing to our obsolete and weak Coal-mines Act), for it would show the public that the Mines Department were alive to the danger, and it would cause the management of the company to give greater attention to the safety of his mine in future. Should an explosion occur the fact that we had prosecuted would be appreciated by the public. I recommend that Inspector Bennie consult a reliable solicitor, and if we are considered by him to have a fair chance to secure a conviction proceedings should be taken, and I will go north to assist the Inspector.—FRANK REED, 11/8/14"?—And the opinion was taken, and read, and handed into the Court.

104. Now, will you please read to the Commission your instruction from the Department to take that opinion?—[Witness reads letter, as follows.]

"Mines Department, Wellington, 17th August, 1914.

"*Gas Explosion, Taupiri Collieries.*

"Memorandum for the Inspector of Mines, Thames.

"WITH reference to your memo. of the 7th instant, I have now to convey you authority to consult a solicitor as to the chances of a prosecution in the above matter being successful, and if there is a fair chance of a conviction being secured you are authorized to institute the necessary proceedings. If required, Mr. Reed will visit the district and assist you with the case.

"H. J. H. BLOW, Under-Secretary.

"Per H.E.R."

105. Whom is that signed by?—H. J. H. Blow, per H.E.R—that is Mr. Ratcliffe, Chief Clerk.

106. No prosecution took place?—That is so.

107. In that letter which you wrote to the Under-Secretary dated the 7th August, 1914, you referred to the fact that you could not get information from the men, did you not?—Yes, that is so. I said, "I as Inspector of Mines receive no help from the Miners' Union or their check inspectors, who are as at present constituted the creation of the mining company's directors."

108. I happened to notice that in that letter, but I want to ask you this: did not you tell the Coroner that you did not find the men reticent in making complaints?—That is so.

109. How do you reconcile the two statements?—They had made no complaints.

110. Did you tell the Coroner that you did not find the men reticent or that you did find the men reticent in making complaints?—I am reported to have said, "During the last two years I have had no complaints from any one employed in the mine for the last two years, either as to gas or anything else wrong in the mine. I have not found gas in the working-places or travelling-roads in such quantities as would in my opinion render the use of safety-lamps compulsory."

111. Now, in your letter to Mr. Fletcher, dated the 30th May, 1914, in regard to spraying, you said that there was a great amount of dust on the travelling-roads, and you requested that same be remedied by spraying. I want you to define as clearly as you can what you meant by "a great amount of coaldust"?—Some places it might have been 2 in. deep with coaldust. It was not the very finest of coaldust. The term "coaldust" as I used it was the ordinary expression of the miner and of myself, not the dust which Professor Dixon has declared to be so explosive. The coarse dust would probably not explode. But this dust to which I referred will rise when the men are walking along, and will be a serious source of inconvenience.

112. So that the men would get it all over them when they walked along the road?—Yes, and they would breathe it also.

113. Would you be prepared to say that any part of it is not explosive?—Professor Dixon gives it as his opinion that only the small dust would explode—that portion which would hang on the walls.

114. Are you differentiating it purely as that which will and that which will not hang on the walls—that the dust which is fine enough to hang on the walls will explode, while that which is too coarse to do so will not explode?—From what I have read of coaldust-explosions, and from his opinion, that is the conclusion I have arrived at.

115. In your letter to the manager dated the 30th May, 1914, you say, "From one of the coal-cutting machines in the Taupiri West Section I noticed a youth clearing away coaldust. The air was also ladened with dust, and as in my opinion it is unreasonable to ask persons to work under such conditions I have to request that a jet of water be used for the purpose of laying the dust which accumulates." Had that any reference to the possibility of an explosion?—No, the dust appeared to be a source of inconvenience to the boy. That is what I had in view. I had no thought of an explosion.

116. You also said that a greater quantity of air was necessary?—That is so.

117. Was it remedied?—Yes.

118. When did you go down to that section of the mine after the date of your letter—the 30th May?—The 21st August. This is a quotation from my diary dealing with the matter, and was written the day after I made the inspection: "22nd August, 1914. With the manager and underviewer I have this morning continued my tour of inspection. Taupiri West section: We inspected all the working-places and the haulage and other roads leading thereto, and found them in good order; ventilation good."

119. On the 30th May you wrote to Mr. Fletcher on the subject, and on the 21st August you found it had been remedied?—Yes, that is correct.

120. Now, you say in your statement to Mr. Miller that gas was reported in Kelly's place on the 1st July?—Yes, that was reported in the officials' mine report-book.

121. And on the 2nd July you found gas?—Yes; my report is as follows: "2nd July, 1914. With the underviewer, Mr. W. Gowans, first-class certificated mine-manager, I have this day, between the hours of 9 a.m. and 1.30 p.m., examined several sections of the mine, old workings, where it was reported CH_4 gas had been found, and we found as follows: No. 7 level, south side, main haulage-road, and in the third bord, old workings, we found gas in roof over a fall of coal and rock. The gas was very strong; the area filled would be 60 cubic feet. The place is not in a travelling-road, and is fenced off."

122. Then gas was found on the 2nd July also?—Yes. My report also states, "On the said date I also visited No. 7, north side of the main haulage-road in the old workings. Behind the pump along the horse-haulage road leading to Bond's dip, and about 6 chains distant from that road, I found CH_4 gas in a fall over the back of the drive. The area of the fall would be 144 square feet filled with gas to a height of about 4 ft., equalling 576 cubic feet of gas.

123. I will come back to my original statement that gas was found in the mine on the 1st, 2nd, 9th, and 14th July: the 9th July is in connection with Kelly's case?—Yes, I agree as to the 2nd and the 9th, though I was not there on the latter date.

124. In your letter to Mr. Miller you say it was the 1st July?—Yes.

125. *Mr. Dowgray.*] Are we to understand that the gas you found was in addition to what was found by the deputy?—It is in the same place.

126. *Mr. Wilford.*] Can you identify the 21st August as the date when gas was discovered?—Yes. My report for that date is as follows: "21st August, 1914. I entered the mine with the manager at 9.15 a.m. and examined the following places and found as follows: (*a*) Stone

drive between 6 and 7 levels, where William Kelly was burned on the 9th July ultimo. Mr. Fletcher, with a safety-lamp, examined the place over the drive timbers and found CH_4 gas. The quantity was small. The canvas is hung across the drive, but not close up to the back of the drive, so that the air may sweep the gas out of the cavity over the timbers. I advised that the debris between the side slabs near the top of the drive be cleared, so as to allow the air to more effectively sweep into the cavity. That was done late the same day, and the gas cleared out."

127. *Mr. Newton.*] I want to ask some questions with regard to that letter of the 7th August. You say in that letter, "I as Inspector of Mines receive no help from the Miners' Union or their check inspectors, who are as at present constituted the creation of the mining company's directors": now, what did you mean by that, Mr. Bennie, "as at present constituted"?—I meant to say that from a general expression of opinion by Mr. Dixon and Mr. Stewart, who formed this union, it was generally believed that they were the agents of the mining company.

128. Generally believed by whom?—By the miners. Whether they were right or wrong, that was the opinion expressed.

129. Was Mr. Dixon an inspector at the time of the strike?—I do not think so.

130. You say the opinion was generally expressed at the time of the strike?—No, at the close of the strike, when the new union was formed by Stewart and Dixon, who were the agents of the mining company.

131. But they were not the check inspectors. You say you received no help from the check inspectors?—That is so.

132. And you say that was the general opinion of the miners?—Yes.

133. The miners formed the union—they were the union—they were the members of the union?—They say, under coercion.

134. You got your information from whom?—I formed my opinion from the expressions of opinions given by the miners.

135. Whom do you mean—there are about six hundred here?—I cannot individualize; I cannot say.

136. You cannot say from whom you got this information?—It was the general expression of opinion at Huntly.

137. Have you ever applied to the union for any complaints they had to make?—I have.

138. When?—When Mr. Duncan was secretary. I have asked him frequently, and requested him to accompany me.

138. When was that?—Just before the strike.

140. When was that?—About two years ago.

141. When did you receive the last complaint from anybody connected with the Miners' Union?—I could not say. I said that during the last two years I have received no complaints.

142. Did you ever during the last two years make any application for any complaints?—I cannot say.

143. Then, what did you mean by saying that you received no help during the last two years from the Miners' Union? What help did you require?—My reference was general, to the mines within my district. In North Auckland district, where I have brought several prosecutions against the mine-manager, the Miners' Union have not only not helped me, but they have given evidence for the manager. Those facts were in my mind when I wrote that letter.

144. What prosecutions are you referring to now?—The prosecution of W. R. Dunn, manager, at Hikurangi. I was speaking in general terms of miners' unions throughout my district.

145. The check inspectors are appointed by the Miners' Union and paid by the Miners' Union?—Yes.

146. *Mr. Napier.*] I should like to clear up a chance expression of yours, Mr. Bennie, with regard to the inquest proceedings. You said there was a disposition to hurry matters. Did you mean to suggest that any facts were excluded or any documents not admitted which should have been tendered?—No; but there was a tendency to shorten matters up as much as possible. For instance, I was asked, "Do you agree with Mr. Woods's evidence?" so that there would be no necessity for me to repeat it.

147. Not to duplicate facts already proved?—Yes, that is my meaning.

148. And is it not a fact that, with regard to that letter you produced to Mr. Wilford, that that was summarized in the expression that instructions had been received by you to take legal advice?—Yes.

149. You do not wish to suggest that the inquiry was in any way less thorough because of anything you have said?—No, certainly not.

150. There is a statement in your report to the Under-Secretary when you were corresponding with him about the question of getting legal opinion: you say, "two men were appointed to examine the old workings." You do not add, but I think you mean, that they did examine the old workings?—Yes, I am satisfied they did it, because I have met them myself when I have been on my tours of inspection of the mine.

151. They were appointed exclusively for that purpose?—Yes, and they did it.

152. Referring to the report to the Department where you mention the question of the advisability or otherwise of using safety-lamps, I do not want you to repeat the lengthy letter you wrote, but would I be right in summarizing what you say in this way: that with your knowledge of the mine after five years' continuous inspection, and the full knowledge you had of the method of working adopted, that you did not think it necessary, and would not advise, the compulsory introduction of safety-lamps?—That is so.

153. In several of your reports you refer to coaldust, and I think you elaborated your answer somewhat more here than at the inquest. May we understand from what you say to-day that when you refer to coaldust you do not mean that proportion of the dust which is so very fine and so combustible?—That is so. I did not necessarily refer to the whole of this dust as "this fine explosive dust."

154. What we may term "explosive dust" is the dust of the character described by Professor Dixon?—Yes, there may be a small percentage of it in the mine.

155. You are not always referring to that explosive dust: you are referring to the general dust in the mine?—Yes.

156. Was the 22nd August the last day on which you visited the mine prior to the accident?—Yes.

157. And on that date you found, according to your report, that the ventilation was good and all was in order?—On the 21st August I referred to the finding of gas where Kelly was burned, and also in No. 7 level behind the haulage-winch and near Dooley's dip. I found gas there. My report goes on to say, "The travelling-roads have and are being watered. The dust nuisance is much abated, especially on the foot-tracks, but there is dust along the sides of the travelling-ways. The new air-shaft is brick-lined up for a distance of 20 ft."

158. You were satisfied with the condition of the mine on that date?—With those two small quantities of gas as exceptions.

159. It was in good working-order?—The mine generally was in good working-order.

160. *Mr. Tunks.*] I think Conn and Wilcox were both injured in the Extended Mine?—Yes.

161. Is there any connection between the two mines?—No, sir. There is a barrier as shown on the plan, 2 chains wide.

162. Do you know as a matter of fact whether Ruston was burnt at all?—No, not as a matter of fact. Mr. Fletcher told me that he had gone in and got slightly burnt, and he showed me the place.

163. He made no claim on the fund?—Of that I could not be positive, but I do not think so.

164. Now, have you ever asked that the haulage-way be watered?—Not specially the haulage-road—that is, the main haulage-road.

165. No copy of your letter to the Department was ever sent to Mr. Fletcher?—No.

166. That was entirely a departmental matter?—Yes.

167. He was never informed that you even contemplated a prosecution?—No.

168. These manifestations of gas which have been spoken of—on the 1st, 2nd, 9th, and 14th July: the one on the 1st was in the stone drive, Dooley's end: was that where Kelly was burnt?—Yes.

169. Were the exudations of gas found on the 1st and 9th July in the same place?—Yes.

170. And those on the 2nd and 14th were also in the same place, No. 7 level in the old workings?—Those of the 1st, 9th, and 14th were in the same place.

171. And the other one was in the old workings?—Yes.

172. The exudations found on the 1st, 9th, and 14th were all found in working-places?—Yes, it was a working-place.

173. *Mr. Brown.*] On three different dates you found gas at this particular place?—Yes.

174. *Mr. Tunks.*] I would like a copy of your memo. in Mr. Fletcher's report-book, dated the 2nd July, 1914, to go into the evidence. Will you read it please?—[Witness reads report, as follows.] "To-day, with the underviewer, Mr. Gowans, first-class certificated mine-manager, I have between the hours of 9 a.m. and 1.30 p.m. examined several sections of the old workings, where it was reported CH_4 gas had been found, and found as follows: No. 7 level, south side road leading to Bond's dip, and about 6 chains distant from the road, I found CH_4 gas in a fall over a fall of coal and rock. The gas was very strong, 9 per cent. The area filled would be 60 cubic feet of gas. The place is not a public travelling-road, and is fenced off. No. 7 level, north side of the main haulage-road, in the old workings behind the pump off the horse-haulage of the main haulage-road and in the third bord (old workings), we found CH_4 gas in the roof over the back of the drive. The area of the fall would be 144 square feet filled to a height of 4 ft., equalling 576 cubic feet of gas. Little dip, old workings, winch level: Three old bords examined where the back of those places were falling up to a thin seam of coal. Fireman and Deputy D. Wear reported that he found CH_4 gas in those places on his examination on the 22nd and 29th April ultimo. However, no gas was found by me to-day in the places. The falls left cavities (*a*) 576 cubic feet, (*b*) 1,000 cubic feet, (*c*) 1,400 cubic feet. It should be noted that the 22nd and 29th are both Wednesdays. It has been stated to me that the mine-ventilating fan is not run continuously during Sundays. It is clear that on the dates referred to, 22nd and 29th April, the ventilation could not be affected by the fan stopping on the Sundays. Crossing through the old workings we reached the damaged pillar area (below the Waikato River), No. 2 north section, and we carefully examined that area. There appears to be no further noticeable damage to the pillars since my previous visit. The whole of the old workings are examined once a week by two certified firemen and deputies. Coaldust in the travelling-roads has not been attended to as might have been expected. I left a memo. in the manager's report-book requesting that the dry coaldust in the No. 6 level south, Taupiri West travelling-road, and No. 6 haulage-road, together with sections of the main dip travelling-road, be removed or efficiently watered.—B. BENNIE."

175. Did you again visit those places where gas was found later on?—I have no reference to testing on that occasion. My visit was to examine the place where Kelly was burnt, to enable me to report to the Under-Secretary. On the 21st August I visited No. 7 level south, behind the haulage-winch, in what is known as Dooley's dip, with Mr. Fletcher and Mr. Gowans. We found no traces of gas there, additional brattice having been erected since my previous visit.

176. Something had been done and you found no trace of gas?—Yes. There was a fall, and there was a brattice-cloth up the centre of the drive. On my next visit that canvas had been re-erected and there was no trace of gas.

177. You have referred to prosecuting the manager on three occasions: can you remember what those prosections were for?—One was to insist upon an engine-driver being on shift from 12 midnight till 8 a.m.

178. And it had nothing whatever to do with gas, or dust, or ventilation, or anything of the kind?—Nothing whatever.

179. It was a question of the construction of the rules?—Yes; it was merely a technical matter, and my interpretation was correct. The second case was in regard to a check inspector, Mr. Fulton, who was appointed after the strike. The check inspectors, of whom he was one, presented themselves at the Taupiri West Mine to make an examination, and the manager refused to let Mr. Fulton into the mine because he was not an employee of the colliery.

180. *Mr. Wilford.*] What was the manager prosecuted for?—For not allowing the check inspector to examine the mine.

181. *Mr. Tunks.*] Are those the only prosecutions you can think of?—I cannot remember any others.

182. *Mr. Macassey.*] How often would you inspect the Taupiri mines in the ordinary course of your duties?—About four times a year.

183. And I think you visited this mine very frequently during this year?—I had been seven or eight times into the mine this year before the explosion.

184. You say you visited this mine seven or eight times: does that mean that you were seven or eight times underground?—[After consulting diary] I have been actually in the mine on separate days eight times between May or June of this year and the date of the explosion.

185. Is it part of your duty to direct as to how the mining operations are to be carried on?—No.

186. I take it that it is your duty to see that the provisions of the Coal-mines Act and Regulations are duly complied with?—Yes, that is so.

187. Are you under the control of the Inspecting Engineer, or what is your position?—My position is this: I receive my instructions from the Under-Secretary of the Mines Department.

188. And what is the position of the Inspecting Engineer?—So far as I know I have no authority to take any instructions from him.

189. You have told us that prior to the date of the disaster you believed that the circumstances did not justify you in insisting upon the installation of safety-lamps?—Yes.

190. But since the explosion, and since hearing the evidence of Professor Dixon as to the inflammability of the coaldust, and after reading Dr. Maclaurin's report on the samples, you are satisfied that safety-lamps should be introduced?—Yes, I have ordered them, and they have been introduced into the mine.

191. Regarding these proceedings upon which Mr. Wilford examined you, did you ask for instructions from the Department?—Yes.

192. And you were advised to consult a solicitor?—Yes.

193. And that is the reason why you did not prosecute?—Yes.

194. And you say also that you never received any complaint about the mine?—Not during the past two years.

195. Neither from members of the present union nor the old one?—From neither of them.

196. *The Chairman.*] You said in reply to a question about your instructions to water the dust that you did that out of consideration for the workmen, and not with any idea that the dust might be dangerous. You had not in your mind the idea of an explosion, but only the inconvenience caused to the workmen?—Primarily, it was the inconvenience to the workmen which I was considering.

197. In your memo. left with the manager on the 2nd July you twice say that coaldust was found on the travelling-roads in dangerous quantity, and again in regard to No. 6 level: what did you mean by that?—I was also aware that coaldust had been stated by eminent authorities to have been a material factor in causing colliery disasters in cases where the ignition of carburetted-hydrogen gas or a blown-out shot caused the trouble.

198. You must have had in your mind the danger of an explosion?—Yes, I had that in my mind also, but primarily my instruction was given in order to remove what was an undoubted inconvenience to the men.

199. And you said that the dust should be removed or watered?—Yes.

200. Were your instructions carried out?—Partly. The foot-tracks, which would be the most dangerous part of the mine, were watered, so that a very material part of my instructions were carried out, thought not as fully as I would have liked.

201. Were you satisfied?—I was satisfied that the danger to a great extent was removed.

202. Would it not have been safer if the sides had been watered as well as the other places?—Yes, certainly; but, speaking roughly, 75 per cent. of the danger was removed.

203. When you make an inspection of a mine do you always test for gas, or only when the existence of gas has been reported to you?—In an open-light mine I only test for gas when it has been reported, or when a fall takes place which would create dangerous conditions.

204. Then your attention has to be directed to it before you make any special examination?—Yes, unless I know of a fall.

205. You do not make any test generally? We heard about the passages being beyond the reach of the miners' lanterns: how would you test in that place?—Well, sir, in a place that is beyond a man's height the miner with his pick makes a hole in the wall about 6 ft. high. Into

these holes he puts bearers, on which is placed a plank. By this means he can inspect a high place. There is a ladder in every man's place to enable him to reach the platform. [Witness further explained his point by diagram].

206. When you referred to "old workings" were you speaking of absolutely abandoned workings, or are they only temporarily in disuse?—They are places where the company has permanently ceased to work. There is no hope in this mine to take out the pillars there unless they fill the places with rock. They might then be able to take them out under the river.

207. They cannot take them out otherwise because of the fear of the water coming in?—Yes, the overlying strata must be kept up.

208. Are they—the old workings—used for any purpose at all now?—No, they are not used for any purpose, but sometimes the management allows the rails to lie in those old workings until they are wanted. The unfortunate men who were killed were going there to remove the rails.

209. Ordinarily that portion of the mine is properly secured?—Yes, it is old workings. It is nobody's business to go in.

210. Do the men never go in at all for personal purposes?—No, there is a W.C. outside.

211. But do they always use it?—We believe so, though one of the witnesses, Young—who was an old-workings examiner—said he had seen persons going in there to ease themselves instead of going to the pan.

212. Do you think that things should be left as they are, or do you think the men should be forcibly kept out of those places? Is the present rule broken?—Well, they are intelligent men.

213. But all men are not intelligent—you know that?—A good many of them are.

214. In view of the danger of going into those workings, I ask you if you think the precautions are sufficient?—Many of the old bords are closed—stopped by brick walls; others have an iron rail or a piece of 4 in. by 4 in. timber placed across the old drive. That is the only precaution I have ever known to be taken in any mine. That is done here. That, I think, is sufficient.

215. Is this old part essential in any way for the ventilation of a mine?—So as to remove the possible danger of any accumulation of gas, the return air, after it has passed through the present workings, is allowed to go through the old workings so as to remove the gas there. If the air is confined to one course and stopped off to make it go through that course, then those old workings would become a very serious menace to the lives of the workers. The system of allowing the air to scale through the old workings is a good one.

216. *Mr. Napier.*] With regard to the deputies who were appointed to examine the old workings, as per your report, the law does not require the appointment of any inspectors for this purpose, does it?—I am not quite sure that there is a section which requires a manager to have all such places inspected.

217. I am now referring to your report, in which you say that until Mr. Fletcher came here there were no special officers appointed to continuously inspect these places?—No.

218. So that this is an extra precaution, of having two officers specially appointed for the purpose?—Yes, sir.

MR. BENNIE recalled.

219. *Mr. Dowgray.*] In reporting the conditions of the mine, to whom do you report?—To the Under-Secretary of the Mines Department.

220. From whom do you receive your instructions?—From the Under-Secretary of the Mines Department.

221. Have you ever been instructed to address any of your correspondence to the Inspecting Engineer of the Mines Department?—No.

222. Have you ever consulted the Inspecting Engineer?—As a consultation, no.

223. You stated yesterday that in the ordinary course of your inspection you usually visited the mine four times in the year?—Yes.

224. Do you think in this mine the management was carried out in accordance with the Coal-mines Act, and that the working of the mine was conducted to the best advantage of the miners and everybody concerned?—Yes, with the exception of the points to which I drew their attention.

225. How do you account for departing from your usual course of inspection by visiting this mine eight times this year between the month of May and the date of the disaster? There seems to have been something which caused you undue alarm?—Yes. In consequence of the reports of the examining deputies regarding the old workings I visited more frequently. They reported finding gas in the stone drive and in No. 7 south and No. 7 north, and also in one or two old bords, towards the little old dip. Those were my reasons for the extra visits.

226. In your opinion, then, things were not so safe during the last four years as they had been previously?—My opinion was that there was an element of danger present. My inspections were made in order to see exactly the extent of those dangers, and as to whether adequate precautions were taken.

227. Were the adequate precautions provided?—Yes, reasonable precautions were taken.

228. You stated yesterday that you thought the mine was a safe one with the exception of the explosions of the gas and the coaldust?—Yes, that is so.

229. What did you mean when you wrote a letter asking for permission practically to compel the company to install safety-lamps in the mine?—That was after the ignition of a small quantity of gas in the stone drive and the location of small quantities in the old workings. That was in accordance with my adopted system of taking all possible precautions in view of these dangers.

230. And in the same letter you stated that even although you were not able to get a conviction against the management, it might have the effect of making them provide a more strict supervision than that which had taken place previously?—I do not know that.

231. You say "to prosecute them for a breach of the Special Rule 14 in Kelly's case will at least have the effect of producing stricter supervision"?—Yes.

232. Then if it were the ignitions of gas which were causing you anxiety, and not the supervision, why should you seek to obtain stricter supervision by prosecution?—Prior to the burning of Kelly, or immediately afterwards, some pieces of rag got into an air-pipe and so interfered with the ventilation. If stricter supervision had been provided that would have been detected earlier.

233. Surely that was a minor thing?—No, because a miner was burnt.

234. But that was only one circumstance?—Well, about that time immediately after the burning of Kelly, I demanded that all shots should be fired by officials appointed under section 25 (*d*) of the special rules. That would mean stricter supervision, because it would provide against the danger of a blown-out shot.

235. That is so: but at the same time you admit that the mine was, comparatively speaking, a safe one, with the exception of the coaldust. But you say that you do not recommend the introduction of safety-lamps owing to the height of the workings?—Yes, the working-places are from 10 ft. to 18 ft. high, and the light from a safety-lamp is very poor; consequently if safety-lamps were to be introduced there would be a great increase in the number of accidents to miners, and serious accidents if not fatilities, as the result of defective lighting. The safety-lamps would be damaged and the end in view defeated.

236. How would there be more fatalities—by falls from the roof?—I think I explained that yesterday. With places 18 ft. high no person can stand on the floor and examine or work to that height; most men cannot reach above 7 ft. With imperfect lighting the dangers would be increased.

237. You are aware that seams are worked as high in Wales as they are here?—I have never been there.

238. And in America higher?—But they have a great many fatalities there.

239. The main thing which you wanted to secure by a prosecution was stricter supervision?—Yes; the manager had one underground manager and he had also several other capable men under him, but under the special circumstances I desired him to provide a further supervision. He had one first-class man, and in a large mine such as this I thought he should have two.

240. You spoke yesterday about the dust in the travelling-roads: was your complaint on account of the disagreeableness to the men travelling?—Yes, and because of the elements of danger from an explosion if the dust were ignited, though the danger would not be so great in the travelling-roads as it is in the working-places. There is seldom carburetted hydrogen to be found on the travelling-roads. Further, I have never heard of any shot-firing on the travelling-roads: therefore there was no chance of blown-out shots in the vicinity of where the dust was. The primary object I had in view was the inconvenience to the men caused by the dust.

241. In what manner would it be an inconvenience to them?—They would be breathing the coaldust when travelling along the roads.

242. The dust was sufficiently fine to be raised when the men were travelling?—Yes; that was prior to the disaster and before the road had been watered, and that was the most dangerous part.

243. Did the men fire their own shots?—I was informed by the manager that my instructions regarding the appointment of shot-firers had been carried out, but from something I heard and from evidence given at the inquest I am afraid that that was not so—or, at any rate, all the shots were not fired by the shot-firers.

244. You had been mislead?—That is the position.

245. What do you mean by that?—At the inquest one witness, in answer to my question on the subject, said, "So far as me and my mate are concerned, we fire our own shots."

246. During your inspections of the mine since the explosion did you discover any ladders in the working-places?—I was only in one working-place—in No. 5 section, where we believe the ignition took place which caused the disaster. These places are not excessively high—perhaps 10 ft. or 12 ft. We saw one ladder, but it was broken, and whether that was the result of the force of the explosion or whether it had been in that state before the explosion I am unable to say. A ladder would not be much use there except for examination purposes.

247. Referring to your letter of the 7th August, where you make reference to receiving no assistance during the last two years from the Miners' Union, you say also that the union or their check inspectors are as at present constituted the creation of the mining company's directors. When Mr. Newton examined you upon this point you said that you intended that to mean a general statement, and might even refer to the Northern Company at Whangarei?—Yes; I meant to convey this impression: that the unions on the dates referred to had been established after the industrial strikes, and were what were called "break-strike" unions. The check inspectors appointed by these unions showed no disposition to assist me in regard to improving unsatisfactory conditions in the mine. When I wrote that memorandum I had in my mind one case which I brought against a mine-manager at Hikurangi, Mr. W. R. Dunn. When I asked the union there to supply me with a witness I found that I dare not call him because his evidence would have been against me and in favour of the manager. He was in an intoxicated state and I could not call him, whereas the mine-manager had his officials present, and also some miners, who gave evidence on his behalf. Although I had a good case I could not secure a conviction because I had no witnesses.

248. What were the miners afraid of?—Well, they were not afraid of the manager, because they gave evidence on his side. I may say also in regard to the Taupiri mines that my acquaintance with the union here has been somewhat unfortunate. When Mr. Duncan was secretary to the Miners' Union I have on occasions inspected the mine and found things in very fair order—I am now referring to the Extended Mine—and on a subsequent visit I found a report in the check inspector's book making complaints regarding certain sections of the mine. These I found to be very trivial, and when I said so the check inspectors became very abusive towards me.

249. But prior to this period of two years, do I understand that you derived some assistance from the check inspectors?—Yes, there are check inspectors and check inspectors. I remember Mr. Turton and one or two others who were very decent, respectable men.

250. Is the promoter of this union not Mr. Dixon, check inspector?—I do not know.

251. You have been down the Little dip in this mine?—Yes.

252. Where the rails are lying?—Yes.

253. Did you note where body No. 43 was found?—No, I was not in the mine then.

254. Was that the return or intake airway?—The returns all went along that way.

255. Is it customary to travel return airways with naked lights, in a mine giving off gas?—It is not a travelling-way at all.

256. Is it customary to enter returns with naked lights?—That is in a return where the miners in the ordinary course of their duties have occasion to be.

257. Is it customary for any person to enter return airways with naked lights and to travel them with naked lights?—So far as I am personally aware I do not know that any one did so.

258. I want to know from you, as Inspector Mines, and a man with a considerable amount of mining experience, if any person should travel a return airway with a naked light, and more especially in a mine which is known to contain gas in sufficient quantities to warrant your visiting it eight times in four months?—No, I do not think it would be right to do it.

259. Do you know that on the morning of the disaster certain men are alleged to have been sent there for the purpose of lifting rails—not in the old workings, but in what was for the time being a disused part of the mine?—The evidence given before the inquest shows that that was so, but I have no knowledge of it myself.

260. What is your interpretation of "old workings," and what is the difference between them and that what you call disused workings for the time being?—The old workings were the areas set apart to be inspected by firemen and deputies, and include the Little dip workings, where these rails were lying, and workings which are not in any way connected though close by the present workings of the mine. They are workings just finished, but yet in the centre of the district where the men are at present working.

261. So that the Little dip would come under the heading of "disused workings" and not old workings?—Yes, the section where the rails were lying.

262. And if men were to go there, it ought to be examined by a deputy before?—Yes.

263. And reported in the report-book: is it reported in the report-book as being examined, that particular part of the mine?—I do not think so. He meant that he had not examined it because it was not under his official supervision. I think that was Skellern, who examined the locality. He says in his report, "No. 7 North section and No. 8 Lake section: I, the undersigned, have examined between the hours of 5 a.m. and 7 a.m. all working-places, airways, brattice, and travelling-roads in the above-named sections, also No. 6 stone drive, and found all safe, ventilation good.—J. SKELLERN."

264. *Mr. Napier.*] That is the morning of the accident?—Yes.

265. *Mr. Dowgray.*] Then, if men were deputed to lift rails there, whose duty was it to see that the place was safe?—The manager's. Knowing that they were going into disused workings he should have given instructions to the old-workings deputy or to one of those deputies to make an examination between 5 and 7 on the morning of the 12th.

266. Such an inspection not being recorded, we must assume it was not made?—Yes.

267. In your opinion, should not these old workings be properly fenced off?—Yes.

268. What is a sufficient fence, in your opinion?—If an iron rail be placed across securely about 3 ft. high, the whole width, that would be adequate, unless it was leading to a place where there was a fall and a small accumulation of gas, or likely to be one. Then, I think, a board bearing the word "Danger" should be placed there as well.

269. I was going to ask you your opinion with regard to the instructions to deputies as to examining the mine, in the English Act. Under that Act they are supposed to examine disused as well as working-places?—Well, we had two men here to do that.

270. Every morning, two hours before the men went in?—My contention is that they ought to have been examined not more than two hours before the men went in.

271. We are to report any suggestions necessary to prevent similar occurrences in the future, and we would like your advice as to whether deputies should be required to examine disused workings for the time being as well as old workings and working-places?—Well, I should say Yes, if they were adjacent to the working-places.

272. That was a place where you would derive a supply of your rails: that would be a proper place to be examined every morning?—Well, unless because it was in a section a long way from any other section—except those in No. 5—so that it would come under the designation of "old workings"; but generally speaking I should classify it as "old workings" where rails were lying. If you look at the plan you will see that there are only some four or five bords at the most in the small section No. 5, and there are disused workings between that and 6 and 7, and also above it again to the shaft.

273. That was a working-place in the old part of the mine?—No, a small section of the mine where it was difficult to get the coal out. In a short time that section would be worked out.

274. Those workings had been abandoned for the time being?—Yes, and until they could get at it in a more economical way.

275. In connection with your duties as Inspector of Mines, have you found yourself hampered in any way under the present Act, or have you any suggestions to make regarding the advisability of getting more power in reference to the installation of safety-lamps in a mine, as there is in the English Act?—No; I have not read the English Act.

276. You will see that the Inspector there has the power to order safety-lamps, especially if there is ½ per cent. of gas in the main return airways?—If they work it we can work it.

277. If it is possible there to ascertain ½ per cent. of gas in the return airway, it is possible to do so here?—Yes, we can send samples for analysis.

278. And you think that if we incorporated the whole of their provisions regarding safety-lamps in our Act it would have a beneficial effect?—That would be too much to say, because I have not read the section; but we generally regard the provisions of the English Act as setting forth a standard which we can reasonably follow.

279. Do you think it would be better if our Act provided that the Inspector of Mines could immediately insist upon the introduction of safety-lamps?—Yes, I certainly think it would be better, and indeed very necessary.

280. You have had analysis made, I understand, of mine-airs from Taupiri mines?—Yes, it was made by Dr. Maclaurin, Dominion Analyst, and reads as follows:—

"*No. 1 at No. 2 pump; No. 2 at No. 5 level north.*

"Analyses—	No. 1.	No. 2.
Methane (CH_4)	0·09	Nil
Carbon dioxide (CO_2)	0·20	0·10
Oxygen	20·26	20·80
Nitrogen	79·15	79·10
	100·00	100·00"

281. *Mr. Dowgray.*] On what date was that taken?—The 16th September, four days after the disaster. The temperature-reading by the hydrometer was 70° wet bulb and 71° dry bulb, so that the air was almost completely saturated. That was at the same time.

282. How can you lay any stress on that analysis in view of the fact that such a volume of gas was discovered? That gas had been liberated during that time?—I measured the air and found 9,554 cubic feet per minute.

283. That was air which had just come from the surface, so that it could not be taken as direct evidence of the state of the ventilation at the time of the accident?—I admit it may have been short-circulated.

284. It was only going round a very small portion of the mine?—I could not say.

285. How would you account for such a volume of gas there, and also fires in the return airways?—The analysis shows that there was no carburetted hydrogen in the air.

286. But the air-crossing was blocked?—No, this air-crossing was not blocked.

287. It certainly eased your conscience to proceed further, but it must be quite clear to you that the air had not reached that volume of gas at that particular time, or your sample would not have been as clear?—It was just about that time that the accumulation of gas was detected by Walter Mills on the Monday, the 14th.

288. Had any analysis been taken of the air in these airways before?—No analysis of the air in the return airways had been made prior to the explosion.

289. The only thing that that shows is that every precaution was taken by the company in connection with the rescue party after the explosion?—Yes, that is so.

290. Have you any suggestions to offer in regard to the amendment of the Coal-mines Act? Do you think if the recommendations of the Royal Commission on Mines were embodied in the Act it would have the effect of lessening the risk of similar accidents? There is a clause which gives the Inspector of Mines greater power?—I think the Inspector of Mines should have more power than he has at present.

291. With reference to the system of the workings, is it not clearly the duty of the Inspector of Mines to see that the provisions of the Coal-mines Act are carried out irrespective of employees and employers?—Yes, that is so.

292. When you came back to the Huntly Mine on special occasions you did so in order to satisfy yourself that the conditions were satisfactory?—Yes, to see whether they were or not.

Mr. BENNIE recalled.

293. *Mr. Macassey.*] What experience have you had, coal-mining and gold-mining?—About forty-seven years.

294. I believe, in England, Scotland, New South Wales, and New Zealand?—Yes.

295. Have you managed mines in New Zealand?—Yes, the Mokau Mine, for about two years.

296. And I think you won the gold medal at the Waihi School of Mines?—Yes.

297. You have been Inspector of Mines for this district for about seven years?—Yes.

298. And previous to that you were an Assistant Inspector?—Yes, with headquarters at Waihi.

299. During the term you have been Assistant Inspector and Inspector how many serious accidents have been reported from Ralph's Mine?—Only one by burning by gas.

300. That was the case of Kelly in July?—Yes.

301. And in the Extended Mine?—No serious accidents were reported to me from there. Willcox and Conn were burnt. I only got the information when I asked the manager for it.

302. You wrote to Mr. Fletcher for a return of the cases of burning during the last two years—that was in January?—Yes.

303. Have you any reason to suspect that that list is not correct?—No.

304. You report every month to the Under-Secretary for Mines?—Yes.

305. Your report contains a summary of your inspections of the various mines for the previous month?—Yes.

306. Have you found gas in the working-places in Ralph's Mine?—Never.

307. And have you made a thorough inspection of the working-places?—Not with a safety-lamp.

308. Have you used the ladders and examined the working-places?—Yes.

309. And you never found gas there?—No.

310. Have you examined the old workings?—I have.

311. Have you found gas there?—Yes.

312. In large or small quantities?—On one occasion 212 cubic feet, and in another place on the same day somewhere about 550 ft. It was a gaseous mixture, with a percentage of about 6 per cent.

313. How many times did you discover gas in the old workings since January last?—Speaking from memory, about three separate times.

314. Was that gas cleared away?—Yes; one time I might have found it and the next time I would not.

315. In May you wrote to Mr. Fletcher asking him to water the coaldust: that was because of inconvenience caused by the dust to the men?—Yes, I thought it was unreasonable to expect a boy to work there.

316. On the 11th July you wrote again to Mr. Fletcher pointing out the danger from coaldust, and asking him to appoint shot-firers and to water the coaldust?—That is so.

317. You had not prior to the disaster any knowledge of the extreme inflammability of the coaldust in this mine?—No.

318. And with your experience that the directions you gave in regard to watering the dust and the appointment of shot-firers were sufficient to secure the safety of the men in the mine?—Yes.

319. I understand that you met Mr. Reed at the Thames about the 5th September of this year?—Yes.

320. Was it arranged that he should come to the Thames to see you?—He came to the Thames to attend a conference with Warden Burgess, Inspector Paul, and myself to inquire into an application for a loan which was made by one of the gold-mining companies. Also, it was understood that should I be advised that there was a reasonable chance of my securing a conviction against the Taupiri Coal-mines (Limited) in reference to Ralph's Mine, he was to assist me with the prosecution. He had also arranged to make a visit of inspection to the mines in the North Island.

321. Was that inspection made?—No.

322. Do you know why not?—I understood from Mr. Reed that he had to hurry back to the West Coast in connection with the State coal-mines.

323. Were you aware of the memoranda which had passed between Mr. Reed and the Under-Secretary in regard to Ralph's Mine?—No.

324. Did Mr. Reed ever impress upon you his fears of the dangerous condition of Ralph's Mine?—We had conversations on the subject, but as I had a more perfect knowledge of the conditions of the mine I regarded my opinion as superior to his, and I had no authority to accept any instructions from him. Unless there were any instructions from the Under-Secretary I preferred my own opinion.

325. I think the inspection of the old workings which was commenced some years ago was undertaken at your suggestion?—Yes.

326. To Mr. Fletcher?—Yes.

327. In your inspections of the mine did you measure the quantity of air passing through it?—Yes.

328. In your opinion was the ventilation in Ralph's Mine adequate?—Yes.

329. Is there anything further going to be done by the company in regard to ventilation?—Yes, the manager notified me early in the year of his intention to sink an air-shaft at Ralph's and to install a powerful ventilating-fan.

330. In regard to the disaster, can you form any opinion as to the amount of gas in the place where Martin was on the morning of the accident?—I am of opinion that in that cut-through in No. 6 bord, beside where Martin's body was found, and which communicates with the old fall in No. 5 bord, was the only accumulation of gas in that section of the mine, and that caused the disaster. There was probably 2,000 cubic feet of gaseous mixture—perhaps less than 2,000 cubic feet.

331. Have you formed any opinion as to which way Martin got into No. 6?—I am thoroughly convinced that Martin entered through the little door at the head of No. 6 bord, going through the main haulage-road and through No. 5 section. My reasons for saying this are that there were other workmen found close by Martin's body just outside the brick stopping. I do not think he came in from the Little dip section, because the examining deputy had only reached a point further back near No. 3 pump, and the boys, Brownlie and another, who went round to bring the rails, got scarcely to the point between the intake and the return on the old horse level, and from that point to where Martin's body was found is a very considerable distance, and it is not likely that he could have been that far ahead of the boys.

332. In regard to the question of lamps, I think Mr. Reed said he brought you a couple of electric lamps?—Yes, those we used in the deep levels at the Thames, and I think also in the Waitangi Mine for about three hours. He left them with me and suggested that I should show them to Mr. Fletcher, believing that they would give adequate light in Ralph's Mine for the high bords that were being worked. That was about the 6th or 7th September. These lamps have no value whatever for detecting firedamp—they are merely to give light; and a miner might be using one of those and be in a dangerous mixture without knowing it.

333. I think you had a brother-in-law, Mr. Holden, lost in the disaster?—Yes.

334. What position did he hold in the mine?—Generally speaking, he was an official who was held in reserve by the underground manager. If any of the men were absent on holiday or through incapacitation he was employed as underviewer at Ralph's: that meant that they had one spare manager.

335. He was a very experienced miner?—Yes.

336. How many years' experience had he had?—I should say, about forty-six years.

337. If you had been apprehensive of danger you could have got a confidential report from him?—Yes, and I have had confidential consultations with him when I thought some little matters were being concealed, and the only information I was able to get from him was that he thought my instructions to Mr. Fletcher that only shot-firers should be permitted to fire shots were not being carried out as fully as I wished, and probably as Mr. Fletcher expected.

338. So that neither you nor Mr. Holden apprehended any serious danger in this mine?—No.

339. In regard to your duties, under section 58 of the Act, if the mine is exceptionally dangerous, have you full power to remove the men?—Yes.

340. Subject to the right of appeal by the company under section 57?—Yes.

341. Where a mine is dangerous from firedamp you have full power to call the men out?—Yes.

342. *Mr. Napier.*] Then, following on that answer, may I take it that you never did consider that this mine was specially dangerous within the meaning of that section?—I never did.

343. Would you recommend the compulsory introduction into the coal-mines of the Dominion of the lamp submitted by Mr. Reed?—No.

344. *Mr. Dowgray.*] I understand that the liquid ran out of it: it is not on that account that you would not recommend it?—No, but because it gives no indication whatever of the presence of firedamp. Moreover, the luminous flame is so little better than the oil-lamps we have. They could not be procured in this country—they would have to be brought from England.

345. *Mr. Napier.*] I think we all understand, and a vast amount of evidence has been led to prove, that firedamp is the most dangerous in any mine?—Yes, that is so.

346. And that the principal object of legislation and rules is to enable the presence of firedamp to be immediately detected?—Yes.

347. Then if a lamp is worthless for the purpose of detecting the presence of firedamp it is of very little use?—Yes.

348. Are there no other means of detecting the presence of firedamp than with the safety-lamp?—No other practical means.

349. You have worked in similar capacities during your long career to that in which Martin worked?—Yes.

350. And you would understand, I suppose, how a man in his position would act in a given contingency?—Yes, in a position such as his I would not have gone into that section of the mine without first having received instructions from a responsible officer.

351. If you had been in Martin's position would you have gone through that little door under the circumstances, or would you have gone round by the circuitous route?—I should have gone through the little door.

352. Have you seen that plan upon which Mr. Reed marked with green ink a certain section which he called a "panel"?—I know the section on my own plan.

353. He drew an arbitrary boundary himself?—I have seen the plan here, but I have not seen the line he made. [Plan explained to witness.] I recognize the plan produced and observe the green boundary-line marked on it by Mr. Reed.

354. Can you tell us whether it was possible to ventilate that section enclosed in that green line?—Quite possible.

355. *Mr. Dowgray.*] With the aid of brattice?—No.

356. *Mr. Napier.*] Would you tell us what means you would adopt for the ventilation of that portion of the mine?—Many cut-throughs could be closed with canvas stoppings, or brick or timber stoppings. The dead ends can be ventilated by carrying canvas up one side about 3 ft. from one wall, the air travelling up either between the canvas and the wall or returning.

357. Then you would not say that permanent stagnant air would remain in the portion surrounded by the green line?—No, the small door was not a check door or a double door, but No. 1 and No. 2 bords were leading across from the intake to the return, where it is very desirable that as little leakage as possible should take place. We have what may be called an air-lock—that is, two doors. By opening one you pass into a chamber, then you open the other and pass into the return. That makes the leakage very, very small indeed. But this door at the end of No. 6 bord was not an air-lock—it was a single door; and no matter how closely it fitted there would be a considerable amount of leakage through that door. I measured with an anemometer after the disaster, when the stoppings were blown out, and found that there was only approximately 12,000 cubic feet of air passing through that place. The air-pressure would be against that door with the door in that position, and the leakage would be very considerable. [Witness here discussed the plan with Mr. Dowgray.]

358. And you do not agree with the suggestion of Mr. Dowgray that that door was hung in such a way that the pressure of the air would open it?—No, because it would be impossible for an accumulation of gas to remain in No. 6 bord.

359. You told us that you understood when you saw Mr. Reed at the Thames prior to his going to the West Coast that he had arranged to make an inspection of Ralph's Mine?—Yes.

360. How many days after that arrangement had been made did he leave for the West Coast?—The arrangement was made prior to his coming to the Thames. The Under-Secretary in his memo. to me said that Mr. Reed would come north to assist me in the prosecution if there was a fair chance of obtaining a conviction. He was to come north in connection with that and the conference regarding the loans.

361. Then the inspection by Mr. Reed and yourself had been arranged prior to Mr. Reed's coming to the Thames, and was in conjunction with the prosecution and also the proposal to lend money to the gold-mining companies?—Yes.

362. During the time that Mr. Reed was with you at the Thames did he appear to suffer from great anxiety as to the condition of Ralph's Mine?—No, sir.

363. Did he indicate to you during that visit that there was a daily or momentary danger of a holocaust?—No, sir.

364. If you had thought that there was any danger of any loss of life, and Mr. Reed had indicated his opinion to you, would you not have hastened to Huntly at once?—I should have ordered the men out of the mine at once.

365. Under the power you have under the existing law?—Yes.

366. Then if that very full power is given to you by the existing law would you consider that the present law is obsolete or useless?—I think that that section of the Act is subject to arbitration.

367. But you can order them out—the men come out on your order?—Yes, but the company can object.

368. Then the responsibility is not on you?—No.

369. You stated that early in April, 1914, the manager informed you of the intention to install a more powerful ventilating-fan?—Yes.

370. You had given him no order to do so?—No.

371. It was purely voluntary on the part of the company?—That is so.

372. If you had determined that the ventilation was insufficient you would have given them notice to put in a more powerful fan?—Or had a more equal distribution of the air.

373. In the course of your duty you inspect many other mines besides Ralph's?—Yes, all the coal-mines in the North Island.

374. I want to ask you a comparative question: have you considered the question of the safety of Ralph's Mine in comparison with the other mines which you inspect?—I considered the Extended Mine the safest mine in my district, and Ralph's next.

375. You know Ralph's shaft well, do you not?—Yes, I know it well.

376. How many years is it since you first inspected that mine?—Nine.

377. So that you have known the shaft for nine years?—Yes.

378. Do you consider that the shaft-pillars are sufficient to sustain the weight and make the shaft safe?—They have shown no signs of deterioration since I first inspected them. They are cut up considerably, but they have shown no signs of deterioration during that nine years.

379. I do not want you to say anything that is unfair or contrary to the ordinary rules of private correspondence by telling me the contents of private letters, but I want to ask you a general question with regard to your knowledge. Had you since January of the present year become possessed of the belief of Mr. Reed that there was imminent danger of a holocaust in this mine?—He has from time to time expressed the opinion that there was some little danger because of the alleged burnings by firedamp, but he never once gave me the impression that he thought that there would be such a disaster or anything approaching the disaster that has occurred. I formed the opinion from his expressions that there might be some others burned as Kelly was burned.

380. By ignitions?—Yes.

381. I mean, could you judge when he came to confer with you—it was confidential?—Unofficial.

382. Did you ever see the Inspecting Engineer officially?—Yes, when he came to report at the Thames on the loan applications.

383. May I put it in this way: that since December, 1913, Mr. Reed did not officially confer with you regarding Ralph's Mine?—No, he did not.

384. Did Mr. Reed ever suggest to you the desirability of making a test of the coaldust in Ralph's Mine?—No.

385. At the Thames, when you met Mr. Reed prior to his visit to the West Coast, did you make him understand that you were going to prosecute the company?—I handed him a copy of the statement of the case and Mr. Miller's opinion.

386. Did you say anything to lead him to suppose that there was not going to be a prosecution?—He understood perfectly clearly what were the contents of the letter.

387. *Mr. Newton.*] Mr. Reed in his evidence said that when he wrote to you in December last, I think, asking you to ascertain and get information regarding the burnings from gas, that you replied that the union would give you no information: is that correct?—From memory, I think it is so.

388. From memory can you say whether you did apply?—Yes.

389. By letter?—No, I came to Huntly and interviewed the manager, and met several of the officials in the ordinary way and made inquiries from them.

390. By "officials" you mean officials of the union?—Yes, I should say so.

391. Was that the present union?—I think it would be.

392. Do you know any of the officials whom you applied to?—I think I asked Mr. Dixon. I do not know that I knew any others.

393. Are you quite sure about it?—I would not say positively that I did, but I think I did. I certainly did not write to them.

394. But if they say no application was made you would not deny that?—No, I would not.

395. *Mr. Tunks.*] In regard to monobel and monobel No. 1, do you allege that you were deliberately hoodwinked and deceived in regard to that?—I would not use that language.

396. Was it not a simple question of misunderstanding in regard to the numeral?—I did not know there was a No. 1. I accepted the word "monobel." I had not a list of the permitted explosives. I understood Mr. Bishop to say it was a permitted explosive, and I added it to the list. I was satisfied that that was what he meant, and he evidently, if he knew, omitted to say No. 1.

397. You saw the vouchers in regard to compensation payments?—Certainly.

398. I think it is your duty to scan those vouchers?—It is my duty to carefully examine them, and if there is a mistake made I have to make it up. Only recently there was a mistake in a payment, and I received a demand from the Department to pay the amount into the Public Account.

399. So that there is no doubt that you did read that paper and know at the time that Willcox had been burned by gas?—That is so.

400. Have you any evidence or anything to suggest to you that Mr. Fletcher was deliberately concealing these cases from you?—No, I have no reason to think so. He freely gave me the lists of persons who had received minor injuries at the mine. The description of the injuries for which the claims on the relief fund were made indicated that they were such as might be caused on the football field or on the street on a Saturday night. If I were suspicious I asked for a return from Mr. Fletcher, knowing that he would investigate every claim.

401. You said that you had a conversation with Mr. Reed at the Thames in regard to the mine, and that he had his opinion and you had yours?—That was at the Auckland Exhibition.

402. Did you convey any part of your conversation to Mr. Fletcher?—No.

403. Or to any one else connected with the company?—No.

404. Did I understand you to say that the old fan is sufficient to supply ventilation required in the mine at the present time: was that your opinion?—Prior to this accident I held that opinion.

405. And I think you did not yourself ask that the company should install a new fan?—No.

406. Mr. Bennie, in your opinion is it possible to have a sudden inrush of gas sufficient to cause this explosion in a very short time?—Yes, I remember one such inrush at the Kaitangata Mine about 1886.

407. That occurred quite suddenly?—Yes.

408. *Mr. Wilford.*] You stated that when Mr. Reed and you were at the Thames there was a letter in front of you, I presume, addressed to the Under-Secretary, containing Mr. Miller's opinion?—No, my memo. had gone to the Under-Secretary, and I showed Mr. Reed my copy.

409. Then you had forwarded the contents of Mr. Miller's opinion to the Under-Secretary?—Yes.

410. I think you told Mr. Reed that the opinion was against the prosecution?—I showed him the letter and he glanced over it, and he asked me "Is Mr. Miller a reliable mining solicitor?" and I said "Yes."

411. You always considered Ralph's Mine a safe mine?—Yes.

412. That was your opinion, and you are a man of many years' experience, and yet it blew up?—So did Kemble, and Brunner, and Kaitangata.

413. They were considered by you to be safe mines: you considered Ralph's a safe mine, and yet it blew up?—Yes.

414. You were asked by Mr. Napier whether Mr. Reed gave you the impression that he thought there would be such a disaster as occurred at Ralph's Mine, and you said "No"?—He gave it to the Under-Secretary. The Under-Secretary did not give it to me. I have no knowledge of that.

415. It is on the Under-Secretary's file. You know that Mr. Reed wrote to the Under-Secretary and predicted it?—He says so.

416. Have you not seen it?—Officially I do not know what Mr. Reed wrote to the Under-Secretary, unless my attention is drawn to it.

417. Your attention has been drawn to it by the Commission. Do you want to trifle with this Commission? I ask you do you know that Mr. Reed predicted this catastrophe at Ralph's Mine to the Under-Secretary?—From the file placed before the Commission I understand it is so.

418. Is it not also a fact that as late as the 12th September, 1914, the date of the disaster, Mr. Blow wrote to the Minister of Mines as follows: "The above [that is, a wire from Mr. Bennie's clerk reporting the accident] is the only intimation so far received, but doubtless Mr. Bennie will wire a further report after he reaches Huntly. This shows that the fears of the Inspecting Engineer were well grounded." Do you know that that is a fact?—I see you are reading it from the file.

419. Did you know that Mr. Reed had written to the Under-Secretary predicting this disaster in six letters, four of which directly predicted it? Did you know that he had predicted it?—No.

420. If Mr. Reed were to predict a disaster he would predict it to his superior officer?—That is so.

421. There is nothing extraordinary in his not predicting it to you?—No.

422. You realize in this inquiry that if Mr. Fletcher is to blame, you are?—No, I do not.

423. You are Inspector for the district?—Yes.

424. And you have got to see that that mine is properly worked?—To see that it is run according to the Act and the regulations.

425. Therefore if it is shown that Mr. Fletcher did not run the mine according to the Act and regulations, are you not to blame?—No.

426. You do not realize, then, that if Mr. Fletcher has failed to run the mine according to the law, then you have failed in your duty?—No, I do not know that. It means that he has failed.

427. And yet you are the Inspector who has to see the law carried out?—Yes.

428. You said that the lamps which Mr. Reed had given you, and which you brought down in the train, had leaked?—Both of them did.

429. Do you know that it is a fact that Mr. Wood and Mr. Duncan have been using these same lamps in the mine since?—They have been recharged.

430. At any rate, do you know that those two lamps which you have been making so little of have been used by Mr. Duncan and Mr. Wood?

[Mr. Wood interjected that he used one of the lamps, but Mr. Duncan did not.]

431. Well, do you know that Mr. Wood used one?—No, I did not know that.

432. In regard to the question about monobel, you believed that monobel was a permitted explosive?—From what Mr. Bishop said to me in the presence of Mr. Fletcher I accepted it as a permitted explosive and added it to the list.

433. Then you did not know that monobel with a numeral was a permitted explosive, but that monobel without the numeral was not?—I had not a list of the permitted explosives: Mr. Reed lent me his.

434. Then you did not know?—I did not know.

435. You were misled?—I was misinformed.

436. And misled?—Misinformed.

437. When you are going to inspect a mine do you send a telegram to say you are coming?—Once or twice I have done so, when there was a serious or fatal accident. I send word to the manager and the miners' inspector.

438. *Mr. Macassey.*] When you took Mr. Miller's opinion you prepared a statement of the facts upon which you asked his opinion: did you also see him personally?—Yes.

439. And what further facts did you lay before him?—That I had discovered gas in No. 7 south and No. 7 north, which was adjacent to the scene of the accident, and that on the morning of my inspection, after the accident, it was reported to be all clear by the examining officer, but Mr. Fletcher and I found a trace of gas over the timbers, although there was a sufficient current of air sweeping through the drive.

440. *Mr. Dowgray.*] I think you stated, Mr. Bennie, that you discovered gas three times in the old workings during your inspections this year?—Yes.

441. I believe you visited this mine eight times this year?—Six inspections, and two visits to the office to get some information for reports which I wished to make.

442. On one occasion you made two inspections: they occupied you two days?—Yes.

443. How many times did you visit the old workings in the course of those six visits to the mine?—Two or three.

444. So that on each visit to the old workings you discovered gas?—No, in several places where I was.

445. You told the Commission that you discovered gas in the old workings three times?—Yes.

446. And that it was removed afterwards?—Yes. [Witness refers to diary and explains same to Mr. Dowgray.]

447. On the 2nd July you visited the south side of No. 7 and found gas there; on the same day you visited No. 7 north and found gas again; in the Little dip section, old workings, you could find no trace of it. Out of three places, then, in the old workings you discovered gas in two places?—Yes.

448. On the 14th July, in No. 7 south, you found gas in the same place where you had previously discovered it?—Yes.

449. On the other visits, apart from these, you found gas recorded in the mine report-book?—Yes.

450. On the 24th August you report gas again in connection with Kelly's case?—Yes.

451. That is, on every visit you have made to the old workings during this year you have discovered gas in some place or another?—Yes.

452. And you have only visited the old workings twice?—Yes, according to my diary.

453. In regard to your reply to Mr. Napier as to whether Mr. Reed had officially communicated with you, did he unofficially communicate with you in regard to this mine at any time during this year?—No, I cannot say that he communicated with me in reference to the working of the mine.

454. In regard to the dangerous nature of the mine and the conditions as to safety-lamps?—Earlier in the year, when he asked me to get a report from Mr. Fletcher. I now say that we had a conversation in reference to that, and that with my personal knowledge of the mine, and in view of the fact that I was the responsible officer and had no authority to accept instructions from him, I preferred my own judgment.

455. You said therefore that in your opinion there was no occasion for alarm in connection with this mine?—I thought so.

456. In your letter to the Under-Secretary dated the 7th August you said that even if the prosecution against the company were not successful it would have the moral effect of producing stricter supervision?—Yes, that it would produce more effective supervision.

457. If everything was all right before, why the uneasiness or anxiety for stricter supervision?—I think I explained that before. In No. 6, where the coal-cutting machines were, there were some brattice-cloths hanging caross the road for the distribution of the air into the individual places. These were torn, and a great deal of leakage was taking place There was smoke hanging in some of the places. On measuring the air-returns from that section I found there was something like 800 cubic feet per man returning, and I desired to draw the manager's attention to the fact that stricter supervision was necessary.

458. Did you not also tell us that one of the reasons was that you thought another underviewer should be employed to examine the mine?—I did not know that I had said it to you, but I had held that opinion, because that mine is as much as I can walk through from 9 o'clock to 4 o'clock, and it is more than one underviewer can pass through and examine every place, as he is expected to do, and generally supervise the underground workings.

459. What did you mean to convey to this Commission when in reply to Mr. Macassey you said that you had a brother-in-law who was assistant manager in this mine: did you wish to convey the impression that he was an addition to the staff?—He was regarded as a reserve official, and whenever the manager was in want of an underviewer he was made underviewer in Ralph's Mine so as to comply with the law.

460. You did not mean to say that he was an addition to the staff already provided?—No. I know from my own knowledge that he knew the mine thoroughly.

461. In connection with Willcox's case, you knew that he was burned by gas in the Extended Mine?—Willcox and Conn were both burned in the Extended Mine.

462. Only one certificate had "burned by gas" on it?—No, Willcox's and Kelly's both had that.

463. You stated that it was quite possible for the gas in No. 5 bord to have come from an inrush: did you mean that that inrush could have taken place between the time of the deputy's examination and the hour of the men entering in there?—No, I did not make any reference as to whether there had been any examination or not.

464. Do you think it is possible for an inrush to have taken place between the examination of the deputy and the men travelling to work?—It would be possible, but very improbable. I would like to call the Commission's attention to one or two circumstances. On the plan there is a fault line running on the lowest side of No. 5 section. The bords from No. 6 and 7 were driven up to the fault and stopped there. That accounts in all probability for the reason why those bords were not connected. The line of resistance to the fault, which you know is a conveyer of gas, was only a short distance. If both falls took place in No. 5 bord, which appears probable, it may just have given the connection to this line of fault, and therefore have allowed the gas to come in suddenly into No. 5 and 6 bords.

465. That line would be shown in the Little dip also?—Not necessarily.

466. In regard to this plan which Mr. Reed has marked in green ink: in reply to a question by Mr. Napier you stated that the door leading to No. 6 bord would not be quite tight, and the ventilation from that door would be sufficient to ventilate this section?—I did not say that it would be sufficient to adequately ventilate that bord though.

467. Would not any leakage from that bord go straight out of No. 6 bord and enter the return, instead of going into 4 and 5: the return airway is immediately at the bottom of No. 6—you said the height was 10 ft.?—There is 140 square feet there, with 10 ft. velocity that would give 1,400 cubic feet of air passing per minute.

468. There is no fall in No. 6?—No.

469. There is a fall in No. 5?—Yes.

470. Any leakage from that bord would go down into the return airway, and not into bords Nos. 4 and 5?—It would be a kind of diffusion. It certainly would find its way straight down the bord, but there would be no perceptible velocity, and it would be in the form of diffusion. It would mix slowly with the gas.

471. Do you mean to suggest that the amount of air scaling through that door would be sufficient to diffuse the gas accumulated in Nos. 4 and 5 bords?—No, under normal conditions the leakage through that door would not adequately ventilate those places, but there would be a diffusion of sufficient air into the still air to keep the places safe provided there was no inrush of gas.

472. To keep Nos. 4 and 5 bords clear?—There is nothing before the Commission to show that any gas was coming from 3 and 4. The evidence has gone to show that the fall was at No. 5 bord, and that in all probability the gas exuded from over that fall.

473. Any leakage from that door should go straight down No. 6 bord?—Yes, but it would not sufficiently ventilate that section.

474. *The Chairman.*] To adequately ventilate that section would require stoppings or brick, or wood, or canvas?—Yes.

475. *Mr. Napier.*] Even though the whole of those bords might not be adequately ventilated, would not the ingress of sufficient air tend to constant diffusion in those bords by the leakage from the door so as render practically harmless the mixture inside?—That depends upon the quantity of gas given off and the quantity of air coming through. A little leakage would have kept the place sweet if there had been no gas coming in.

DANIEL WEAR, DEPUTY, sworn and examined. (No. 4.)

The Secretary read to witness the evidence given by him before the Coroner at the inquest, as follows:—

"DANIEL WEAR, sworn, saith: I am employed in Ralph's Mine as inspector of old workings, and have been so for the last four years. I have an assistant named Hughes. It takes me six days to examine all the places—that is, to get round. A place would only be inspected once a week. During the last four years there has not been a great lot of gas found in the old workings. About four months ago there was more gas than usual in No. 7 south (marked No. 4 on plan). I went and reported it to the under-manager and he brought down the manager to see it. The gas was removed that night. I put in the report I made [Exhibit N]. It was on a Monday. I think the fan had been stopped on the Sunday night, and that would allow gas to accumulate. That is the only time within the last six months that I have found gas in any quantity in the old workings. There have been other occasions when there were small quantities of gas in the old workings. Any such would be reported in the book. The gas on this occasion was caused by a little fall from the roof. The gas on other occasions has always been caused by falls. I think an inspection of once a week is sufficient. Gas could accumulate in dangerous quantities in a week. It could never be told when there is going to be a large fall releasing a large quantity of gas. It might happen that a heavy fall would drive it to where men were working with naked lights. There would have to be a large quantity of gas before it could be driven that distance. I have been in the mines working for forty-seven years. I have been in the Huntly mines for twenty-eight years. The only other explosion I have known was when Kelly was burnt a little while ago. During that time I have known heavy falls to occur in the roof of the old workings. The occasion I reported—23rd March, 1914—was the largest quantity of gas I have known in all my time. The weekly inspection of old workings has been going on since Mr. Fletcher came—about four years. I had no reason to anticipate any danger. I would call it a dry mine. I would not call it very dusty. On each occasion I have reported gas steps were immediately taken to remove the gas. [The place where the gas was found is marked on the plan 'Wear's find of gas.'] During the last three weeks there has been no gas at all in the old workings. There is nothing to prevent any of the miners going into the old workings. I have once seen miners in the old workings where they had no right: this was a few months ago. This was in the little dip. I warned the man back or I would report him. It is not customary for any miners to go into the old workings. I went down in the first cage on the 12th September at 7 a.m. I go down first cage every morning. I went to the cabin near the bottom for a few minutes, and then I went down the little-dip road. I was at No. 3 pump. little dip, taking my clothes off when I heard a roar. My mate Hughes was with me. I heard a roar, and a rush of wind struck us in the face. The wind then seemed to change round to the back of us and knocked me down, putting out my safety-lamp, but not Hughes's. I did not see any flame. I did not hear any explosion or fall. Subsequently I got out by Ralph's shaft. I was not injured, except a few bruises. Young assisted me for some time. If Young says there has been more gas in the old workings recently than ever before I do not agree with it. There were no shots fired that morning. The stone workers would have been shooting if they had got to work. The explosion took place before they got to work. I have been down the mine since the explosion. I have been in the old workings since the accident, but not in the old workings near No. 5 and No. 6. I always looked upon the mine as a safe one.

"By Mr. Tunks: I always used the safety-lamp in making my examinations. I had found nothing previously where the gas was found on the 23rd March. I have never found gas in the old workings other than from falls that have touched a small seam in the roof. The falls in the old workings have not been of a frequent occurrence, but at long intervals. I have never found a fall in the old workings sufficiently large to drive gas out to where the men would be working. The nearest point that the bodies were found to the old workings would be a considerable distance. I don't think gas from the old workings could have reached these men. You can get into the old workings from No. 3 and No. 5. To do that you would have to go through doors or fences. All the other communications are stopped off. The place where the gas was found in the old workings is blocked off the travelling-way in No. 5. It could not possibly have reached the travelling-way. The possibility of gas going from the old workings into the present travelling-ways or present workings would be very remote.

"By Mr. Bennie: There appears to have been no disturbance in the mine near where the gas was discovered in the old workings. I have found a little gas there since the 23rd March, 1914. I have been down the mine since the explosion. The stopping, near where the gas was found, into the main road is intact [marked 'No. 4' on plan]. There is no indication or any sign of any explosion having been near there.

By Mr. Napier: From what I have seen since the explosion I am satisfied that the explosion did not take place near where the quantity of gas was found in March.

"Re-examined: I have found gas in the old workings near the little dip. Three men went into the old workings in the little dip to bring out rails, and they carried naked lights. I inspected the little dip on the 9th September, three days before. I have no theory of my own as to the explosion. As far as my knowledge goes there must have been gas there to cause an explosion, and that gas must have come in contact with a naked light. There must have been gas somewhere in the locality of the explosion. I cannot form any idea as to where that gas came from. The deputies would not inspect the old workings in the little dip that morning. I cannot say if they were or not.

"By jury: I hold a fireman's and deputy's ticket by examination. I have held it for four or five years.

"By Mr. Tunks: When I examined No. 7 on the Wednesday it was all safe. I have found gas in the little dip; not on the 9th September—it would be five or six weeks ago."

1. *The Chairman.*] That is the evidence given by you at the inquest before the Coroner: is it correct?—Yes.

2. *Mr. Wilford.*] I understand, Mr Wear, you have had considerable experience in mines?—I have never done anything else.

3. For some forty-odd years?—Forty-seven years.

4. But you have been on this new work only for the past few years?—I have been engaged examining the old workings for the past twelve months, but off and on for four years.

5. Now, I understand that it was your duty to go round the old workings to look for fire and not to look for gas?—That is right.

6. And I suppose that what you had not to do you did not do?—If I thought there was gas I would examine for it.

7. I am speaking generally: you usually tested for fire and not for gas?—Yes, speaking generally.

8. Did you do more than you had to do?—Yes, on occasions if there was anything like gas about.

9. That is to say, if your suspicions were aroused?—Yes.

10. If they were not, you kept on going?—I kept on going.

11. Have you ever had any special training in testing for gas?—No.

12. Have you ever passed an examination in gas testing?—No.

13. Do you know that there is such an examination in New Zealand which men can pass if they desire?—Yes.

14. And have you never tendered yourself for that examination?—I thought of going to Auckland at the Exhibition time for it, but I did not.

15. Supposing you were standing in a bord the height of this room: how could you test that bord for gas?—I would test it as far as I could reach.

16. Show me?—Something like that. [Witness is handed a lamp, and demonstrates with same.]

17. Do you mean to say you could see the flame of that lamp if you kept it there [at arm's length above his head]?—There it is.

18. You could not see it at all if you put it up like that?—No.

19. Would you get a line with your eye between the rim and the flame?—I do not know.

20. You say you do not take a line between the rim and the flame, but you simply look at the flame: is that right?—Yes.

21. Can you get a 3-per-cent. test in that way, let alone 1½ or 2?—I think so.

22. What height are you?—About 5 ft. 8in.

23. And if you went into any bord that was over 7 ft. high you could not test it?—Yes, and I have done so.

24. How?—Where there has been a fall.

25. Where there has been no fall, I mean?—No, I have not.

26. And how many bords over 7 ft. are there in the part of the mine which you have to go through?—That I could not tell you.

27. Miles of them?—I could not tell you.

28. Are there miles of them?—I do not know.

29. Would you deny that there are miles?—No, I would not.

30. Then, if there are miles or bords in the part of the mine that you had to inspect, and there were no falls in those miles, you never inspected them?—I never inspected them unless they were low bords.

31. That applies to those over about 7 ft.?—Providing the air is good.

32. If the air is bad how do you inspect a place 20 ft. high?—I do not inspect it at all.

33. Are there ladders provided for inspection purposes in those high places?—Not in the old workings. There are one or two on top of these falls, but that is all.

34. Are there any ladders provided in that section at all for inspection purposes?—Yes.

35. How many—one?—Do you mean in the old workings or in that place?

36. In that place?—I know nothing about them.

37. In the old workings?—About four or five.

38. And how many miles of bords?—Well, I do not know whether you would call it "miles."

39. How many miles of bords do you have to inspect?—I do not know.

40. Between one and twenty miles?—Two or three miles.

41. Then this Commission can understand that it was purely voluntary on your part whether you should look for gas?—That is quite correct.

42. As a matter of fact you had the right to please yourself?—Yes, I could please myself.

43. And you did?—I did.

44. Did you ever get any gas except where there was a fall—be careful, because I am going to ask you about Molesworth?—Yes, once.

45. Where was that?—In what was called Dooley's dip, No. 8 section.

46. When was that?—A long while ago.

47. How long ago?—I had not started inspecting the old workings then: it is, I suppose, about twelve months ago.

48. *The Chairman.*] Is that in the old workings?—It was in an old place—there are new places and old places.

49. *Mr. Wilford.*] Will you please explain the difference between "old workings" and "disused workings"?—I would call them all "old workings" where the men were not getting the coal.

50. There is no difference in your evidence between "disused" and "old" workings?—Yes.

51. Was there a large quantity of gas on this occasion when you found it?—No, you could just tell there was gas there.

52. Did David Molesworth, jun., ever call your attention to a large flame some feet long at any time?—No, never.

53. Did Robert Neil ever call your attention to such a thing?—Never.

54. Now, when you were giving evidence at the Coroner's inquest you told Mr. Napier that you always tested for gas from the beginning where your common-sense told you gas might be. What indications would make you test for gas?—If the air was bad I would test for it.

55. That is the sole reason?—Yes.

56. Do you mean where there was a bad smell or it was stuffy?—Yes, and if there was not sufficient air.

57. Then you test it?—Yes.

58. Now, do you remember No. 6 bord in the little dip where Martin's body was found, No. 43?—Yes.

59. And you know that No. 6 bord runs almost directly north and south?—Yes.

60. Do you know that south and westward slightly, where Martin's body was found, the old fall is in No. 5 bord?—Yes, I know where the old fall is, but I was not sure where Martin's body was found. I know where the door was blown out, though I cannot put a number to the bord. [Sketch-plan discussed by witness with Mr. Wilford.]

61. When were you at the spot marked by me on the plan [Exhibit AA] with a W, prior to the explosion?—On the 9th September, 1914.

62. You were last at the spot marked W on the 9th September, before the explosion?—Yes.

63. Since the accident have you been to that fall?—Yes.

64. When?—Last Wednesday or Thursday.

65. How near to that cross [on Exhibit AA] are the rails lying?—They are a good bit off there now; they have all been lifted out of those bords.

66. When you were there last week they were there?—I could not say.

67. Would you deny it?—No.

68. Before the explosion were the rails where the cross W is marked on the plan [Exhibit AA]?—They might have been there.

69. Where were the rails?—I could not say. Most of the rails were lifted out of those bords.

70. When?—I could not say.

71. Would you deny that they were there last Wednesday?—I do not know.

72. Did you see them there?—No, I did not.

73. Now, if Mr. Bishop was correct in the evidence he gave at the Coroner's inquest, and Martin entered this No. 6 bord, it looks as if he was at the rails?—That does not say he was going to take them out of that bord.

74. Do you not say that Martin was going to get rails?—I did not.

75. Did you hear any one say so?—I did not.

76. Do you know whether it is a fact that on the Saturday morning of the disaster Martin was going to get rails from the little dip?—I do not know.

77. You never heard anything said by Brownlie on that point?—No.

78. In the course of your duty you go into No. 5 bord at least once a week?—Yes.

79. And you tell the Commission you do not know whether any rails were in that No. 5 bord?—I would not say; there might be rails lying about the sides.

80. You evidently do not know what there was in that No. 5 bord?—I do not go to see what is lying about the roads.

81. You do not look for rails or gas, and you cannot tell me whether there were any rails on that fall three days before the explosion?—There were no rails to be removed, not down in that place; there were one or two through at the side.

82. If they were there last week you did not see them?—If they were put down I might see them, but if they were lying at the side I might not notice them.

83. Was the old fall gassy on the 9th?—No.

84. Have you seen it since the explosion, and do you know that it is gassy?—Yes, I do.

85. Very gassy?—I could not say that it is very gassy, but I would not say it is not.

86. Would you say that it is possible that there has been measured in that district over 200,000 cubic feet of gas?—I quite believe it.

87. Well, the old fall is gassy. Am I not right in saying that the new fall in No. 6 bord, in which Martin's body was lying, is not gassy? Have you ever seen any sign of gas in No. 6?—I never examined it—the new fall.

88. You told me that you always looked for gas when you smelt it?—Yes.

89. You never noticed any condition there which led you to desire to test for gas?—When I went in there last week I did not go to examine that new fall for gas.

90. Why?—I went in with the under-manager.

91. When you were there on Wednesday you never noticed there was any gas?—I did not go down to it.

92. How close were you to it?—8 or 10 yards away.

93. If it were gassy you would know 8 or 10 yards away?—No. I did not go for any examination last Wednesday.

94. Was there any gas there at all?—No, I do not think so; but I am not sure.

95. You cannot tell me whether there was any gas there?—No, I cannot; I was not there to see.

96. On your tour of inspection do you ever take any air-test?—No.

97. Can you?—No.

98. Could you read an anemometer?—No.

99. To your knowledge, have the old workings which you traverse ever been air-tested during the last twelve months?—I could not say. They might have been and I might not know.

100. Have you ever heard of it?—No.

101. Will you tell me whether the door which is the entrance to No. 6 bord, and is also the way out from No. 6 bord into the travelling-road from No. 5, has ever had a lock on it, to your knowledge?—No, not to my knowledge.

102. Is No. 6 in the old workings?—Yes.

103. Then the door which is at one end of an old working has had no lock on it, to your knowledge?—No.

104. Is the other end of that bord fenced off?—I do not think so.

105. Do you not know it is not?—No.

106. And never has been?—No.

107. I just want for one moment to transport you to No. 5 section where it meets the main haulage-drive: you know where that is?—Yes.

108. No. 5 section from the haulage-road to the jig is a travelling-road?—Yes.

109. Did you notice after the explosion that a skip had been smashed to matchwood against the opposite side of the travelling-road?—That I could not say; there are so many skips broken.

110. Was there a large portion of a cable chain flung or hurled at least 40 yards down the haulage side of that travelling-road?—Yes, I noticed that chain.

111. Was that the chain round the wheel, or the one fastened by the staple?—It would be round the wheel with the brake on, but I do not know if that was the same chain.

112. Did you notice the chain?—Yes.

113. Are the old roads which you inspect dusty?—I could not say that they are.

114. As a matter of fact you do not bother your head about them?—I do not take much notice of the dust.

115. Is there any dust in it?—There is a little.

116. In some places more than others, I suppose?—Where there are only two men they do not kick up much dust.

117. Are there some places in the mine 28 ft. and 30 ft. high?—28 ft. high.

118. *Mr. Napier.*] I want you to try and let us clearly understand this question about rails. You said in answer to Mr. Wilford that the rails have all been lifted out of the bord, but you could not say when. Do you mean some considerable time ago?—Yes, but there might be an odd one lying there yet.

119. And with the exception of an odd rail or two there was no quantity of rails there?—No.

120. It is usual, is it not, when workings are disused to leave the rail?—Yes.

121. You examined the old fall when you visited it on the 9th?—Yes.

122. And you say there was no trace of gas on that day?—No trace at all.

123. Now, about the absence of an air-test: if the mine is well ventilated can you not, with your forty-seven years of experience as a miner, recognize whether the air is pure or not?—I was quite satisfied with the air myself going round there.

124. Is it necessary to take an air-test when you are satisfied with the air?—I did not, but somebody else might have done so many times.

125. Did any one ever suggest to you that an air-test was necessary?—No.

126. The mine was well ventilated, was it not?—Yes, very well ventilated.

127. There was a much larger quantity of air than what is required by the Act?—Yes.

128. And you say that, with the exception of once about twelve months ago, when you could just faintly tell there was gas, there never has been gas detected in Dooley's dip?—No.

129. Now, the ordinary ways in the mine are about the average height—about 6 ft. or 7 ft.?—Yes.

130. When Mr. Wilford said there might be two or three miles of bords over 7 ft. high was that right?—No, not that we examined.

131. Now, if there is no fall in the bord and it is well ventilated, is it possible for any dangerous quantities of gas to collect that you would not see?—I have never seen any gas there.

132. Nor detected its presence?—No.

133. Have you any doubt that if, as has been suggested in the questions of Mr. Wilford, there was a large accumulation of gas over 7 ft. high, have you any doubt that you could have discovered it?—I think I could find it.

134. Can the gas remain absolutely stationary in a ventilated passage even over 7 ft. high and not mix with the other air?—I should not think so.

135. *Mr. Tunks.*] How long is it since you first made a test for gas—I mean in your mining experience and not in this mine?—About thirty years ago.

136. Were you told to test for it?—Yes. That was in the Old Country.

137. Did you use safety-lamps there?—I never used anything else until I came out here.

138. And with what class of lamp did you test for gas in the Old Country?—The Davey lamp.

139. Then I may take it that you have been testing for gas off and on for the last thirty years?—Yes.

140. The No. 6 bord at the other end was not fenced: does it connect with the old workings?—Yes, the old workings.

141. When you went down last week you say you saw the new fall, but did not go in there?—No, we did not.

142. You went down for a special purpose?—Yes, to see the old fall.

143. And that was all?—Yes.

144. It was not part of your round for examining the old workings?—No.

145. It was a special visit to the old falls?—Yes.

146. I think these old workings constitute the return airway, do they not?—Yes.

147. *The Chairman.*] You say you have tested constantly for gas with a Davey lamp. What percentage of gas is required to produce the first indication of gas on a safety-lamp?—From 2 to 2½ per cent.

148. What are your specific duties in regard to the inspection of these old workings?—Looking to see if they were heating.

149. You say you tested for gas: did you test for gas only when you saw a fall, or did you make a practice to do so?—We made a practice of it when the air was bad.

150. Did you make a systematic test?—We tested properly.

151. Every time you went through those old workings did you test for gas as well as to see if there was any heating?—Yes.

152. You did not make any test above 7 ft.?—Only on top of a fall.

153. Did you make any tests otherwise?—No, only where there was a fall we tested on the top of it.

154. When were you last through those old workings?—On the 9th September.

155. And the accident happened on the 12th?—Yes.

156. Did you make any report to the manager or anybody else of your inspection these times?—Just in the report-book.

157. *The Chairman* reads report dated the 9th September, 1914, in report-book as follows:—"Ralph's Mine.—I, the undersigned, have examined the old workings and return airways, limbs heading, and little dip, north section, and found all safe. No sign of heating. Ventilation good.—D. WEAR." That is your report: who wrote it?—The man who was with me.

158. There is nothing at all about gas in this report. Can you say whether you made any examination or test for gas?—Yes; that was the morning we were on top of the old fall, the 9th, just before the accident.

159. Did you make any special examination for gas?—Yes, on the 9th.

160. But there is nothing in the report in regard to gas?—We only refer to gas when it is found.

161. *Mr. Dowgray.*] What were you doing before you became an inspecting deputy?—Shot-firing.

162. Where was it customary for the men on pay-Saturdays to receive their instructions as to where they were to go to work?—At the cabin at the shaft-bottom.

163. That was on pay-Saturday morning?—On any morning.

164. You have been at work on pay-Saturday morning?—Yes, and we generally get our instructions there.

165. If you were to get your instructions there, which would be the quickest way to get to the little dip?—To go right down the road to the dip.

166. You say that you could see the gas when holding up your lamp as you showed us?—Yes.

167. Where were you working thirty years ago?—At the Wellington Pit, where the White Haven disaster took place.

168. What kind of lamps were used there thirty years ago?—The little Davey lamp.

169. Did the miners work with the Davey lamps?—Yes.

170. What age are you?—Fifty-six.

171. And you tell us that thirty years ago you were in a position to test for gas?—Yes, I knew what gas was.

172. Is it customary in Northumberland for miners to test for gas?—Where I came from the first thing a man does when he goes into his place in the morning is to examine for gas and sound the roof.

173. Does the deputy not make that examination?—Yes.

174. What age were you then?—Nearly twenty-eight.

175. There are two of you travelling the old workings?—Yes.

176. Do you both travel together?—We used to take bord and bord—one went up one bord and the other the next.

177. So that you did not travel together at all?—We did not both go up the one bord, but met at the top.

178. In that case it was only at certain points you met one another?—Yes, that is true.

179. I think you stated to Mr. Wilford that there were two or three miles of old workings?—Yes.

180. Would it take you a week to examine two or three miles?—We would travel up and down each bord.

181. Are some of these blind bords?—Yes.

182. And if gas accumulated in them how would ventilation get up there?—The gas would be shifted by means of brattice-cloth.

183. Was that done in the old workings?—Yes.

184. How often?—Whenever we got gas there.

185. Do you ever get any gas in the blind bords?—No, I cannot say that we do.

186. There was never any necessity for arranging special ventilation then?—Not in my time.

187. Then, in the blind bords about 14 ft., 15 ft., and 20 ft. high you just simply walked into them and walked out again: there were no fires?—Yes, that is so.

188. There might have been gas there, but you would not know?—No, I have never seen any of it.

189. You could not say, so far as that was concerned, that there was no gas in the blind bords?—That is right.

190. You said in reply to a question that in your opinion there was the amount of air prescribed circulating round the old workings: how much is prescribed?—150 ft. per man.

191. Do you know the Act?—No.

192. How do you come to the conclusion, then, that that was the amount prescribed?—By just hearing the men talk about it. At the last examination of check inspectors there was more than the quantity .

193. Do the check inspectors ever accompany you round the old workings?—Yes, but not this last twice.

194. Have they done it recently at all?—There was one lot of check inspectors went round for about an hour one time, but not these last check inspectors: it was Jones and Patterson.

195. Does the manager ever go round the old workings?—No, the under-manager used to go there.

196. Accompanying you?—No, by himself.

197. Without your knowledge?—No, he has told me.

198. It would not be necessary to lock the door shown on the plan, because that was an ordinary travelling-road?—Yes; that is where they used to take the rails out.

199. That was the quickest road?—Yes.

200. They have to go through that door to get them on to the rope road?—Yes, it was the handiest way.

201. That was known as the travelling-road where the men were to go?—I could not say whether it was called a travelling-road.

202. You have met men travelling there?—Yes, I have seen men lifting rails when I have been in there.

203. *The Chairman.*] When was it that you saw the rails?—Four or five months ago.

204. *Mr. Dowgray.*] You noticed them lifting rails in No. 5 section?—Not in the old bords, but it is in the same section.

205. You said, in the old workings that had been worked out?—Yes, but these bords have been worked out, and it is in the same section which they examine every day.

206. To get the rails to the foot of this section you would have to bring them that way?—Yes, it is the handiest way.

207. *Mr. Brown.*] You said that you did not receive special instructions to test for gas?—That is right.

208. You made an adequate examination of the old workings?—Yes.

209. Is it not the duty of every man, whether he is an official or otherwise, to report anything dangerous at all in a mine?—I should think so.

210. Then would there be any real necessity to tell you specially to examine for gas?—Well, I should think there would, but I know I was never told to test for gas.

211. You think that notwithstanding that it was your duty, and the duty of every workman, to report everything that was dangerous, it was also somebody-else's duty to tell you to do that?—I would report whenever I saw danger of any kind.

212. You would do that without anybody telling you?—Yes.

213. In regard to your statement about the air being bad, can an examiner not feel the fresh air on his face as he is walking along the road?—Yes, I suppose he can.

214. And when the air was sluggish you examined for gas?—Yes, when I thought the air was bad or anything like that I tested.

215. I think you stated that you examined for gas where there were falls?—Yes, I did.

216. Are these falls removed?—No.

217. Then, you can climb on most of the falls to examine for gas?—Yes.

218. Did you ever examine any pothole in the roof for gas where there was no fall?—No.

219. If the high workings—I mean the bords and cut-throughs—were all the same height and ventilation was going through, would there be any likelihood of gas staying there?—I should not think there would.

JAMES FLETCHER, Mine-manager, sworn and examined. (No. 5.)

Mr. Wilford: I ask leave, sir, to put in the evidence given by Mr. Fletcher before the Coroner's inquest.

Evidence read by witness, as follows:—

"JAMES FLETCHER, sworn, saith: I am general mining-manager for the Taupiri Coal-mines (Limited), and also certificated manager under the Coal-mines Act for Ralph's Mine. I produce a copy of the plan of Ralph's Mine. I was not in charge of the mine on the 12th September last, when the accident took place. I was incapacitated. I appointed William Gowans, the underviewer, who was a qualified man, as acting-manager, and he was approved by the Inspector of Mines. Mr. Gowans was one of the victims of the explosion. The plan produced [Exhibit A] shows the workings of the mine up to the time of the last survey three months ago to the end of June. On the day of the explosion it was an off day at the mine, and the active mining in operation was at Bond's dip, Dooley's dip, No. 6 dip, No. 6, Taupiri West section, and No. 5. There were six distinct sections in the mine being worked for coal. All the rest are areas where the coal has been taken out and only pillars left: they are old workings. The plan shows the system of ventilation of the mine. The letter "D" represents wooden doors. The deputies are thoroughly acquainted with the method of ventilating the mine. If they notice anything wrong it would be their duty to immediately report it. The practice is for the whole of the workers to go down Ralph's shaft. To comply with section 42 of the Coal-mines Act the whole of the working-

places of the mine have to be examined by three competent persons—examining deputies holding deputies' certificates. Their duty was to go into the mine and examine all the working-places within two hours of the time when the body of men commence work. The mine was examined on the morning of the accident. I produce the three examining deputies' reports [Exhibit B] for the morning. They were found in the usual place in the mine after the explosion. The reports are in one book. The reports produced cover the whole of the working-places and travelling-roads in the mine. After they have inspected the mine each morning the three of them meet at cabin No. 6 and make their report. The first man down in the morning when the mine opens would be the day-shift deputy. He goes to the telephone and telephones the examining deputies at No. 6, and they tell him the mine is all right. Then the men go down to mine, to the workings. If there was anything wrong the usual routine would be to stop the men. The examining deputies examine the working-places with a safety-lamp and look for gas, see that the places in their examination are all clear of gas, see that the ventilation is in good order, and see that the haulage and travelling roads are clear of falls. This would include examining the roof. Their duty was to see that the working-places and roads were left fit for men to work in. I produce a list showing the names of those who were down the mine that morning, who were lost and who were saved. There were sixty-two men down that morning, twenty-one of whom were rescued alive, but two have since died. This makes a total of forty-three dead. There was no actual mining to be done in the mine that morning, only repairs—that is, as far as I can gather. In addition to the examining deputies there is an inspector of old workings, who has an assistant. It was a system introduced about three years ago for thoroughly examining the old workings to see that nothing unusual had taken place there from combustion, heavy falls. This is his sole work. He makes a report after every day's examination. It takes him a week to go right through the mine. I produce his report [Exhibit C]. Five days' reports would constitute a report of the whole of the old working. D. Wear was the inspector. J. Darby and W. Smith are two day-shift deputies who were lost in the disaster. Gas has been found in the old workings in small quantities. It is usually found in cavities formed by falls from the roof. I have never had any difficulty in dealing with the gas from the old workings. The gas is always of the same nature—CH_4. The last report of gas is on the 17th August. "Gas diluted" means that he could not get sufficient to make a test with his safety-lamp away from the bleeder, because the ventilation is so good. In consequence of this report Mr. Bennie and I inspected this place—I think it was on the 21st August. I found the place satisfactory; there was a good current of air. As a week would elapse between the examinations of the old workings by the Inspector I would not expect any gas there unless there had been a big fall and a lot of gas suddenly let out. I consider these mines pretty free from firedamp. As the coal is of such a very hard nature I would not expect a fall, and falls are very few. On the 9th July last William Kelly, a contractor, was working in No. 6 stone drive, which is an overhead drive, to take out a big depression in the haulage-road. I produce a plan of that drive [Exhibit D]. He was working about 20 or 30 yards from a little pothole in the roof that was bleeding gas, on the fresh-air side of it. He went to the pothole to get a drink, and having a naked light on his head he ignited an accumulation of gas near the pothole. He was singed. He was off work for fourteen days, but was about the streets five days after. That particular section had been inspected before 8 o'clock on the morning of the accident and found correct. The men had been working there between 8.30 and 10.30 at the time the accident occurred. The day previous to the accident to Kelly the holing was effected between the two ends of the stone drive, and these men were engaged taking out the full opening. A good current of fresh air was going through that drive, and from the time the opening was made one of the contractors made a request to Deputy Darby to stop some of the fresh air going in as they were complaining of the cold. That request was refused by the deputy. In my opinion, the accumulation of the gas was caused by a disarrangement of the air going in there, because the intake-pipe was partly blocked by brattice-cloth. I think they found it too cold to be comfortable, and stopped some of the ventilation. That accident was reported to the Inspector of Mines, and he read my report and marked it. Besides that accident to Kelly during the four years I have been in charge of the mine I have no recollection of any other explosion in the mine. There has certainly been no explosion in the mine during the last twelve months. I have never received any complaints of gas from the deputies or underviewers other than what was in the reports. I have had no complaints from any worker in the mine concerning gas in the mine. I have never had any reason to suspect that gas was in the mine in dangerous quantities. We have a tally-board at the surface, and one at the shaft-bottom, to show what men are working. As the men go into the cage the banksman pegs them off in numbers on the tally-board at the top, and the onsetter tallies them at the bottom. The banksman and the onsetter compare their tallies, and if they agree this is reported as the number of men who were working in the mine that day. We have no system of keeping a record of the names of the men who go down the mine. When the men come up out of the mine they are checked in the same way. In future the names of the men will be kept as safety-lamps are issued to them. Every man who goes down the mine will have a safety-lamp. The lamps will be kept on the surface. The present system will also be kept going. There are two check inspectors appointed by the union. These are S. Dixon and J. Turton. I put in a report from these inspectors [Exhibit E]. This is the only recent report [dated 27th August, 1914]. I put in a report made by the check inspectors [Exhibit F] dated 23rd May, 1914. All the matters mentioned in these reports were at once attended to. Each man is supposed to have 150 cubic feet of air per man per minute. According to these reports there were in most cases a quantity far in excess of legal requirements. The dust referred to in the report would be coaldust and stonedust. This was watered. There have been cases of incipient heating in the mine. The case was on the 26th August last. It is in my report in the old working report-book [Reports put in—Exhibit G and

Exhibit G1]. This was dealt with and made perfectly safe. There were charred timbers at the place. The spot on the plan marked "Heating" is where it took place. The deputy found no trace of fire-stink in the morning at 8 o'clock, but found that there was fire-stink there in the afternoon. There would only be a few of such heaps about the mine. No case of heating was reported between the 26th August and 10th September. Some weeks previously there had been heating in old No. 6 by the south. No gas would be created by this heating unless coal was actually burning. I do not think any gas thrown off by heating would cause an explosion with a naked light. On the 11th July a letter was sent to me by Mr. Bennie, Inspector of Mines, complaining of the dry coaldust. Watering has been carried on regularly on the travelling-roads since the receipt of that letter, but not on the old workings, because I did not and do not consider them dusty. I put in copy of letter sent to Mr. Bennie [Exhibit I]. The Inspector has never requested that safety-lamps be used. On one occasion—the 25th August—he suggested that it might be necessary to insist on their use. [Letter put in—Exhibit J.] Each miner carries sufficient explosives for one day—not more than 5 lb. If any are left over it is left in their working-bord in a canister they carry it in. We send down for the use of the coal-cutting machines a case containing 25 lb.; very rarely more than this goes down at once. This is in charge of a man who takes it to the machines. It is kept in a specially constructed box. I do not think there is any chance of heating taking place at any of the working-faces. I cannot form any theory as to how this explosion occurred, as I have not been able to make a personal inspection of the mine. I believe the company carry their own insurance risks. Where the explosives were kept would be quite free from any effects of this disaster. I did not consider it necessary to use safety-lamps in this mine, and it has never been suggested to me that they should be used.

"By Mr. Macassey (for Mines Department): I thought the mine was a safe one and safety-lamps were not necessary. Safety-lamps are used in other mines where it is considered that the mines are not safe enough to do without them. We shall have to use safety-lamps in the future. The men would rather use a naked light than a safety-lamp. I could not express an opinion as to the cause of the explosion until I have made an examination. We watered the roads by scattering piping and flooding.

"*Q.* If it was properly watered can you say how the explosion occurred?—*A.* I cannot answer that without further examination.

"By Mr. Napier: I always considered this mine a safe mine in all respects.

"By Mr. Tunks: It is not correct for Mr. Bennie to say that 'little or nothing had been done since his letter of the 30th May.' Watering has been carried on more or less since I have been manager, but more particularly these last two months. A man has been appointed to do it regularly. More attention was given to it after the 30th May. I also authorized the deputies in charge of each section to see all shots fired, and appointed men to shoot for the coal-cutting machines. The letter of the 30th May followed the check inspectors' report of the 23rd May. The dust on each occasion was on the travelling-way. I took it that the report referred to the difficulty in travelling. I produce a letter from Mr. Bennie of the 30th May [Exhibit K]. Mr. Bennie inspected the mine again on the 21st and 22nd August. I went round the working-places with him, and over the travelling-roads. Mr. Bennie did not make any further comment on the dust on that occasion. I did not understand Mr. Bennie to refer to dust in the old workings in any of his letters. If the mine had wanted safety-lamps, in my opinion, I would have put them in. My experience of the last three years has not suggested to me that the inspection of the old workings should be more frequent than every week. The heat may show itself suddenly, but it has been latent and working up from the bottom. Testing with iron rods every week would be a sufficient means of testing to see if there was any heating. The directors have never restricted me in any way when I wanted any improvements in the mine. I have never heard of a jet of water being used behind a coal-cutting machine as requested in the letter of the 30th May. I have never received any complaints from any of the men working the coal-cutting machines as to dust.

"Re-examined: I understand now that the correct number of persons killed in the mine was forty-two, not forty-three. The mine is considered a cool mine. At No. 6 cabin on the main haulage-road the temperature is about 60°. At the return-air shaft the temperature is about 68°.

"No question by jury.

"It has been proved by investigation that where explosions have taken place in mines without the presence of firedamp the primary cause has been a blow-out shot. This is a shot that has had too much work to do or has been insufficiently tamped, and the force of the explosion has been expended outwards instead of upon the coal, causing a sheet of flame and raising a cloud of dust. Dry coaldust, very fine, becomes a highly explosive substance, and the flame from the shot explodes it.

"Recalled by jury: The company had no life-saving appliances at the time of the explosion. We had the usual ambulance outfit—that is, a stretcher on the surface, an ambulance-box below, and bandages and an ambulance on the top.

"By police: Life-saving appliances are only kept in New Zealand by the Waihi Gold-mining Company and the Grade Junction Company. As far as I have read, more lives have been lost by their use than they have saved. A Proto apparatus is at Waihi, given to them by the Government."

1. *The Chairman.*] Is there anything, Mr. Fletcher, which you would like to add to that statement before you are questioned any further?—No, sir.

2. *Mr. Wilford.*] Who did the watering of the roads?—Hugh Ransom, one of the victims of the explosion.

3. Was it done on the travelling-roads with a kerosene-tin and a wheelbarrow?—Yes, and by a pipe.

4. And on the haulage-road?—No, in the travelling-road from No. 3 down.
5. Was No. 5 done with a pipe?—No, not No. 5.
6. Was the work done by that old gentleman?—Yes, a portion of it: he was sixty years of age.
7. And what was the process—was a kerosene-tin put into a wheelbarrow and the contents allowed to flow on to the road?—That was one of the processes: but I will explain to you how it was done. From the bottom of the shaft there is a falling grade to the far end of the mine. There are depressions. We run the water down from several points to collecting-holes, from which the roads are thoroughly watered.
8. Will you swear that it was watered on the morning of the explosion?—No, I was not there.
9. Nobody can?—No, because none of the men who were lost had recorded it.
10. Were the roads watered on the morning of the explosion?—No, they could not have been.
11. Now, was John McGill on the night shift before that?—The afternoon shift, I think.
12. He used to use a bicycle-lamp for inspection purposes?—Yes, an acteylene bicycle-lamp.
13. Probably a good deal safer than a naked light?—Yes, although it was really a naked light.
14. It was a naked light, and it would not be burning like a safety-lamp?—Yes. I could not tell you for certain whether it was a bicycle-lamp or not.
15. Did you tell the jury at the Coroner's inquest of all the accidents from burners which had occurred in the mine?—Yes, as far as I know.
16. Are you sure?—Yes.
17. Was Massey not thirty-four days off about the same time as Carlyon?—I could not tell you from memory.
18. Do you know anything of Massey? He received £16 compensation on one occasion for being thirty-four days off work: do you know anything about it?—I cannot remember it. I might be able to turn it up in my books.
19. You do not remember either case—Carlyon or Massey?—No, I cannot say.
20. Did you ever know of a case when an explosion put out all the lights in a certain bord or place?—No.
21. It was never reported to you, if it occurred?—No.
22. It occurred amongst a number of men who were working in a certain part of the mine: do you know nothing of it?—I knew there was an ignition of gas, but nobody was burnt.
23. I am referring to an ignition of gas which occurred two years ago: where was that?—It was right down Dooley's dip.
24. Is that the one which Molesworth had something to do with?—No.
25. This is a gaseous mine—you would admit that?—No, I would not admit it.
26. Then would you claim it is a mine free from gas?—I consider it is a mine free from gas, and not a gaseous mine.
27. Now that you have said that I want to ask you this: Was Conn injured by gas-explosion?—Yes.
28. Was Willcox injured by gas-explosion?—It was doubtful.
29. Was Ruston?—No.
30. By what, then?—He was never injured by an explosion.
31. What by, then?—He was never injured at all.
32. Is not that his name—Ruston?—He was working, but he never got any compensation for it.
33. Did you say he was injured?—No. I say Ruston was not injured.
34. You admit the case of Kelly on the 9th July, and that of Conn?—Yes.
35. In your evidence you say he was singed?—Yes, that was what I called it.
36. Was not part of his ear burnt?—I could not tell you.
37. Did you hear of the case of a man who had put in a drill in the mine during the last twelve months, and then on going back to the hole that was drilled his light caused a flame explosion?—No.
38. Are you aware that when William Casson was boring in Bond's dip the gas rushed out and flamed up, and that when they got the drill up they quickly plugged up the hole?—No.
39. Was that ever reported to you?—No.
40. If it occurred it was never reported to you?—If it occurred it was never reported to me.
41. Did you ever hear of Charles Allen boring a hole in the little dip section, and that when he returned after getting his powder to charge the hole the gas ignited and burnt him?—No, I have never heard of it.
42. Was Mr. Allen boring?—No.
43. You were here three years ago?—Yes, I have been here three years and nine months.
44. Do you remember three years ago when Skelton and Fulton were in the little dip, when the gas was lit with a lamp?—I do not remember it.
45. Do you know Frank Raynor, sen.?—Yes.
46. Do you know that he and others were kept out of a certain part of the mine by Deputy Bill Smith?—No.
47. Is there such a deputy?—There was.
48. Is Smith alive now?—No.
49. Is it a fact that on the 26th August, while you were going round the main haulage-road, an escape of gas was reported to you verbally by two men, one of whom was Dixon?—No.
50. You swear that?—I swear it.
51. Is it not a fact that on the 26th August it was reported to you that gas was escaping?—In one portion of the section the air was diverted through a breakdown of the brattice stopping, but not gas.

52. Was it not on account of a culvert breaking?—You can call it a culvert if you like, but it was really a brattice conduit which conveyed the air into the far places.

53. Was that reported to you on the 26th August?—I do not know the date, but I had it repaired.

54. Was there any record of that made in the mine-books?—It is in the check inspectors' report.

55. Does Mr. Bennie note that?—He may have.

56. Did you ever tell him?—No.

57. Did you ever tell Mr. Bennie that Conn had been burnt until Mr. Bennie wrote to you on the 8th January, 1914?—Yes. Mr. Bennie knew he was burnt.

58. Did you ever tell Mr. Bennie?—I never told him, but I wrote to him.

59. Can you produce your letter?—Yes, I will produce a copy of my letter. [Letter-book produced.] I produce a list dated 29th March, 1912, which contains, amongst other entries, "16th February, 1912: David Conn, burns to face and arms."

60. It might have been by powder or an explosion according to that?—Yes.

61. You did not say it was an explosion?—No.

62. Will you show me where you told Mr. Bennie that Conn was burnt by a gas-explosion?—No.

63. You have not got it?—No.

64. It was not until he wrote you on the 8th January of this year that you gave him the information in your letter of the 14th?—He asked me for a two-years list of men who had been burnt by powder-explosions and the ignition of firedamp.

65. Why did you keep that back?—Because they were to a great extent not serious, and I hardly thought it necessary to report them.

66. How long was Conn here?—I cannot say.

67. Is there nothing in the Coal-mines Act which requires you to report such cases?—Not unless it is a serious injury.

68. Was he not ill for over eighteen days?—I dare say.

69. Is that not a serious accident within the meaning of the Act? How many days has a man to be ill before it is considered a serious accident?—It is not the illness. A man may get a smack in the eye and be off work for twelve months.

70. How do you decide whether a burn should be reported under the Act?—I consider the nature of the injuries received by a man, or get a medical certificate.

71. Did you get one in that case?—We would get a verbal one.

72. But did you?—I could not tell you whether we did or not.

73. Is there anything you wish to add to that?—Nothing else.

74. Is the present shaft safe at Huntly? Are you satisfied that the mine-shaft is absolutely safe?—Yes.

75. Are you satisfied?—Yes, quite.

76. Now, before we leave the question of those injuries, will you please produce your letter of the 14th January, 1914, written to the Inspector in reply to his of the 8th?—Yes; it is as follows: "I beg to acknowledge your letter of the 8th instant regarding accidents by powder-explosions and the ignition of firedamp. In the Extended Mine there were two cases of burning by explosions of firedamp during the past two years, but not serious. The first occurred to David Conn, a shiftman. There had been a fall of roof at the face of the west heading, and he with other men had been sent to repair same. During the course of repairs slabbing had to be done, and while putting the slabs into position overhead he got his naked light, which was on his head, too far into the fall; some gas which had apparently collected in a pocket was ignited, and he received burns to both arms. Date of occurrence, 16/2/12. This place had been inspected and reported all clear just previous to the shift commencing. The next occurred to William Willcox, who was a roadman at that time. It appears that on the previous afternoon this man had commenced to lay a turn into a cross heading, which was driven in a distance of 15 yards and brattice carried right to the face. He did not complete the laying of the turn, but went in a little earlier next morning, but not before the examining deputy had inspected the place. At the point where he was laying the turn, 15 yards back from the face, an ignition of firedamp took place. Mr. Wood, the certificated manager, in company with Deputy Duncan and Assistant Deputy Wood, immediately inspected the place after the accident and found no trace of any gas. It may have collected in a roof-cavity through a disarrangement of the brattice, but Mr. Wood is of the opinion that the acetylene lamp he was carrying at the time on his head had exploded. I might add these explosions occurred during the time the small fan was doing duty, and there is no doubt—although plenty as regards quantity to comply with the Act—there was not sufficient volume to keep down small accumulations during the time the mine was not working; but since the new fan has been erected, these troubles are things of the past. Date of occurrence, 26/3/12. Regarding the burning of Alexander Reid by an explosion of blasting-powder on the 14th December, 1912, this accident was reported to you under date 16th December, 1912. In Ralph's Mine a roadman named Arthur Ruston went into an old bord in Doloey's dip, to lift some rails near the face, and he ignited a small accumulation of gas near the face with his naked light. He escaped without injury."

77. In regard to this explosion which caused the injury to Conn, it was two years to the month after the burning of Conn took place when you first reported in writing to the Inspector that it had occurred?—Yes.

78. That was not in the Taupiri Mine?—No, but it belongs to the Taupiri Company. I am not the manager of that mine.

79. Is it not under the management of the same company?—It is under the supervision of the company, but under a different certificated manager.

80. They are both owned by the one company?—Yes.

81. In regard to Conn, wherever he was he got burnt by gas-explosion on the 16th February, 1912, and you informed the Inspector on the 14th January, 1914?—Yes.

82 And your answer as to why you did not inform the Inspector before was ——?—We did not consider it a serious accident.

83. Then why did you ever report it afterwards?—Mr. Bennie asked for some particulars regarding accidents.

84. You said in the course of your evidence at the Coroner's inquest that the 26th August, 1914, was the last date when there was incipient heating in the mine. That was the 26th August prior to the accident?—Yes.

85. Where was that incipient heating in the mine on that date?—In the old dip to the right of the old horse-road.

86. Is that the travelling-way?—No. [Place indicated on plan by witness.]

87. Can you give it a name?—We can call it the fifth bord to the right from the air-crossing that goes over between the two doors leading into the old dip.

88. Did you put that out?—Yes, we lived on it until we put it out.

89. Is it not a fact that some weeks previously there was heating in No. 6 south?—Yes.

90. Is the mine on fire anywhere now?—No.

91. Neither the Extended Mine nor this?—No.

92. Not at present?—No, there are no fires reported, nor any signs of heating at present.

93. But there are large accumulations of gas, are there not?—No.

94. Not in the old workings?—No.

95. Are they clear this morning?—There is an indication of one at the top of the old fall, but there are no large accumulations.

96. Is it clear of gas now?—There is an indication there, but not a large accumulation, according to my last report.

97. When was your last report made?—At 12 o'clock to-day. I was talking to the acting-manager.

98. Have you taken special precautions in regard to that section?—The air has been turned in there.

99. When was it done?—It has been done all the time during the last week right up till dinner-time to-day.

100. You have nearly got it out in a week?—Less than that.

101. It has taken out all the gas?—It has diluted it. It was not yet all diluted up till 12 o'clock to-day. They can get a trace only to-day.

102. And when did they start the diluting process—how many days have they been at it?—I think it was a week yesterday that they started.

103. Now, was any watering done on the old workings ?—No.

104. Never?—No.

105. Are they dusty?—No.

106. What does Mr. Bennie mean in his letter to you of the 30th May, where he says little or nothing has been done to carry out his instructions?—I do not know I am sure, unless he meant to put it mildly that nothing had been done.

107. Did you have any indication of that impression?—No.

108. Did you take any notice of it?—Yes, I was watering.

109. Did you speak to him or answer him?—No, I never drew his attention to the phrase.

110. Was the place where Martin was killed—if he was killed in No. 6—inspected on the morning of the catastrophe by Whorskey?—I do not know.

111. You have Whorskey's report?—I have Whorskey's report, but it does not particularize.

112. Did he say that he had inspected this place where Martin was killed?—No.

113. Then Whorskey's report does not contain any intimation, though we are told that he went through that way?—Who?

114. Whorskey?—I could not tell you.

115. Is No. 6 bord a working-place?—You would not call it a working-place.

116. But Mr. Napier said Whorskey inspected all the working-places; therefore Whorskey's report would not apply to that place?—Unless he was able to examine it.

117. Have you no information on that point?—I have no information on that point.

118. Now, is it not required by the law, Mr. Fletcher, that the examining deputy shall examine and inspect every place where men are going to work?—Yes.

119. Is it not also required by Special Rule 23 that when inspected such places shall be chalked?—Yes.

120. Were these places chalked?— The working-places, yes; I have seen them.

121. I am talking about this particular morning. In No. 5 down Dooley's dip, were the places chalked where Martin was found?—I have not been down. I do not know of my own knowledge.

122. Did Whorskey ever report gas?—Yes.

123. Will you show me when?—[The following report was read by witness from the report-book.] "Ralph's Mine, 8 a.m., 7/7/14.—Bar. 30·7; therm. 43. Nos. 5 and 6 Sections. I, the undersigned, have between the hours of 6 and 8 a.m. examined all working-places, airways, brattice, travelling, and haulage roads in the above section, and found gas in No. 6 bord in machine section, and found the rest of places all safe. Ventilation good.—J. WHORSKEY."

124. Did Whorskey ever report to you as required by Special Rule 25?—No, he has not—not directly.

125. Did you ever call his attention to the fact that he had never reported to you in accordance with that Rule 25?—There is no necessity to call his attention to it.

126. But did you?—No.

127. You know the door leading into No. 6 bord where Martin's body was shown on the plan?—Yes.

128. Was it used frequently or occasionally?—I could not tell you. I used it myself.

129. Can you say whether it was used frequently or seldom?—It could not have been used frequently, and only by officers of the mine.

130. Had it a lock?—No.

131. Do you know Special Rule 16?—I know there was a fence at the foot of that bord.

132. Here is Special Rule 16: "The underviewer or his deputy shall inspect daily the doors in the main airways, and see that they are checked or doubled. No door must be propped or fastened back while on its hinges. The underviewer must appoint doorkeepers whenever necessary. Doors only used occasionally by the underviewer or his deputy must be kept securely locked, and only opened by properly authorized persons." Did you break that law?—I suppose we have.

133. Now, if any of the men had no right in that No. 6 bord where Martin's body was found, at the end of which the door was, the company had neglected to keep that door locked and observe that condition of the law: is that not so? That is clear, is it not? You see that has not been kept. On your own admission it is only used occasionally?—That is so.

134. That law has been broken?—Yes, that has probably been overlooked.

135. Do you know Rule 18, under which the other end of that bord is supposed to be fenced off? It says, "The underviewer, acting under the direction of the manager, shall see that all places not in actual use are properly fenced across the whole width, so as to prevent persons inadvertently entering the same." Was that bord properly fenced across the whole width?—Show me the bord you mean.

136. Was it fenced?—I could not tell you, because it is a bord within old workings.

137. Then, had Martin a right there?—I could not answer you.

138. Had Martin a right there?—I could not tell you whether he had a right or no right.

139. Was it fenced off to prevent him getting there?—I know the entrance to the old dip was fenced, and there was also a fence that led up to No. 5.

140. Do you suggest that there was any fence across the end of bord No. 6?—I could not tell you.

141. Do you see that it is necessary under the law?—It is necessary, where places are disused, to stop men from going in.

142. Is this a disused place?—I call it a place from which the coal had been extracted.

143. Would it be called "disused" when a man was sent there to get rails? Would it not be part of the travelling-road?—I do not know about a travelling-road or a working-place.

144. Do not you think that any explosions which occurred in the mine were sufficient warranty for you to order safety-lamps without waiting for anybody-else's order?—No, because I do not consider that the quantity of gas was sufficient.

145. Do you know section 56 of the Act, which provides for "Defects not provided for by express provision in the Act"—it reads as follows: "If in any respect (which is not provided against by any express provision of this Act or by any special rule) . . ."? Do you not think that under section 56 you could have ordered safety-lamps?—No.

146. We may put it this way, then: that you did not think it necessary?—Certainly I did not.

147. Did you appoint Wear to do the work he did?—I did.

148. Was there adequate air passing through bord No. 6 under Rule 3?—The law does not provide for the air to pass through the old workings.

149. The rule says, "The manager shall see that an adequate amount of ventilation is constantly produced in the mine to dilute and render harmless noxious gases, to such an etxent that the working-places of the shafts, levels, stables, and workings of the mine, and the travelling-roads to and from such working-places, shall, so far as is reasonably practicable, be in a fit state for working and passing therein." Was No. 6 in a fit state for "working and passing therein"?—It must have been, according to the last report of the deputy.

150. But look at the result?—Something extraordinary happened.

151. Have you any report of No. 6 bord, in the last twelve months prior to the accident, ever having been inspected either for gas or adequate ventilation?—Only the report of the old-workings deputy made every week, which showed that the ventilation was adequate in there.

152. I ask whether the place has been inspected for gas?—We do not particularize each and every bord in the reports.

153. You have not any report on that particular bord—No. 6?—No.

154. What is the cubic-feet capacity of the fan at Ralph's end—about 45,000?—About 55,000 ft. per minute.

155. Is it large enough for the purpose?—Yes, for the present size of the mine.

156. Is it not a fact that they have installed a fan with five times that capacity in the Extended Mine, which is a smaller mine?—The Taupiri Extended is a larger mine than Ralph's.

157. At present?—Yes. It is worked under difficulties greater than Ralph's, because it has only two shafts, whereas Ralph's has three.

158. Is it a fact that their fan has five times the capacity of Ralph's?—No.

159. What is the capacity of it?—It was got for 200,000 cubic feet, but they are always short of what the makers say. Ralph's fan produces 55,000 ft. of air: that is what we get in the returns.

160. That is the amount according to your test: it is no proof that it is being distributed throughout the whole of the mine?—The test is made in the different places, you know. That is the quantity produced by the fan whether the air is getting away or not.

161. I suppose you admit, with the other expert mining men, Mr. Fletcher, now, that safety-lamps are absolutely necessary for this mine, do you not?—No, I do not admit it, in view of possible legislation that is foreshadowed.

162. But you formed one of a deputation to oppose that particular Bill, which provided that safety-lamps should go into such mines?—Yes, I was on the deputation.

163. And this is the Bill of 1912 which was reported from the Goldfields and Mines Committee on the 17th October, 1912, and I think that after it had passed the Goldfields and Mines Committee a deputation came down to Wellington and that you were one of the deputationists?—I was a member of it.

164. Did the Bill go through after that?—No, it has not gone through yet.

165. Did it contain this provision: "No lamp or light shall be used other than a locked safety-lamp shall be allowed or used in any place in a mine in which there is likely to be any such quantity of inflammable gas as to render the use of naked lights dangerous . . ."? That is the Bill your deputation opposed?—Yes, that is the Bill. I think it is the same Bill which is before the House this year.

166. Were not you one of the deputation which went to Wellington to oppose that Bill?—I accompanied the deputation of coal-mine owners as a manager. I only opposed two clauses in that Bill.

167. Was the deputation got together to oppose this Bill?—Yes, right through.

168. And it never saw the light of day, or, at any rate, it did not reach the statute-book?—No.

169. *Mr. Tunks.*] In regard to the reporting of these burnings, Mr. Fletcher, we have had a great deal of talk about the accident to Conn. I think it has been made clear that that occurred in the Extended Mine?—Yes.

170. That accident was reported in 1912?—In March, 1912.

171. You stated simply that he was burned?—Yes.

172. Without particularizing whether it was caused by gas or otherwise?—Yes.

173. Was there any reason for that? Did you do it with the intention of holding anything back?—No.

174. Did you receive any inquiry at once as to whether it was gas or powder which caused the burn?—No, I do not remember whether I did or not.

175. May we take it that there was no attempt at holding anything back about the burning of Conn or Willcox?—Yes; and that applies also to other cases.

176. Have you ever attempted to keep anything back from the Inspector in regard to anything that happens in the mine?—No, I tell him everything to the best of my knowledge.

177. It was stated that the brattice was found to be disarranged and there was some lack of ventilation: was there anything serious in that?—No, that happens every day in every coal-mine in New Zealand, Australia, and in the Old Country.

178. It was a trivial matter and was attended to?—Yes.

179. So that there was no necessity for you to solemnly sit down and write a letter to the Inspector of Mines to tell him that the brattice had become disarranged when five minutes' work would remove the trouble?—No.

180. In regard to watering, you said something about the method that was adopted. We have heard that it was only the middle of the road that was watered?—Yes.

181. Did you do anything or was anything done in regard to the dust that lay alongside the road?—It was worked into the centre and the road was kept sloppy.

182. So that what lay on the sides was drawn into the middle and got into the wet area?—Yes.

183. That was being regularly done?—Yes, regularly; men were kept for the purpose.

184. Was Ransom, although sixty years of age, fit for the work?—Yes.

185. And doubtless you could judge whether he did his work faithfully?—Yes.

186. Was any suggestion ever made that you should water the haulage-way?—No.

187. Or the old workings?—Not the old workings. It cannot be done in the old workings.

188. Mr. Molesworth, sen., in his evidence referred to some hot coal coming out of the mine?—Yes.

189. Did you know where that was coming from?—It may have been from the places on the south side—I forget.

190. What was the object of bringing up the heated material?—It was brought up for safety.

191. *Mr. Brown.*] To get rid of the menace?—Yes.

192. *Mr. Tunks.*] In regard to the question of gas in the old workings, we have had it in evidence that these old workings are return airways?—Yes, all return airways.

193. And what was the position in regard to the slope of the mine, the lie of the strata?—When travelling towards the shaft you are continually on the rise. The only dip of the seam is from the shaft to the north-west. Every bord-length we fall down feet until we come to the bottom.

194. What effect, if any, has that on the ventilation and the presence of gas?—We get what we call ascensional ventilation in its true state. That means that the continual rise from the lowest point of the mine to the upcast shaft is a help to the return air, and carries off the gases to the highest point, the air-shaft. That is the advantage.

195. The tendency of these gases is to rise?—Yes, travelling to the highest point.

196. And if that is taking place then these gases are being pursued by the return air all the time?—If there is any gas in any place where there is a fall diffusion must take place and remove it.

197. Do you consider the mine a dusty mine?—No, far from it.

198. The coal naturally contains a certain amount of water?—Yes, from 12 to 14 per cent. of moisture.

199. Is that the result of a test?—Yes, the result of analytical tests made by the Government Analyst.

200. Is that a factor in determining whether the mine is dry and dusty?—Yes, I think that has a lot to do with it. It plays an important part in helping the dust to be naturally damp.

201. *The Chairman.*] When the coal is in the form of dust none of that moisture is left?—I have not had any of it examined.

202. *Mr. Tunks.*] Prior to the experiments made by Professor Dixon, had any examination been made of the dust?—No.

203. The explosive nature of this dust had never been brought under your notice at any time?—No.

204. In consequence of Mr. Bennie's letter to you, did you give any instructions about shot-firing?—Yes, I did. I instructed the deputy in charge of each section that he must supervise the firing of his own shots.

205. I think those men have all been killed?—Yes. Personal and definite instructions were issued. I got them all together and told them. In addition, I appointed two shot-firers and gave them written authority. The following is the authority which I gave John Gilbert, dated the 22nd July, 1914: "I hereby authorize you to fire all shots in any machine bords throughout Ralph's Mine." Blenkinsopp was also given a similar authority.

206. I think you had been off the whole week prior to the explosion?—Yes, unfortunately.

207. I think you were actually in bed at the time?—Yes, and I had been all the week.

208. Had you any knowledge at all of the work that was going to be done in the mine on the Saturday morning?—No, I had no knowledge of it.

209. Then, of course, you cannot say what instructions were given to Martin, or where he was going, or where any of the others were going, or anything about it?—No, I cannot say.

210. Perhaps you can tell me this: has it been a rule in the mine to examine any old workings if work was going to be done in them?—Yes.

211. I do not mean by the old-workings deputy?—Yes, it has been the rule.

212. Can you say whether Whorskey has ever done that?—Yes, in one particular place. That second heating—we considered that as a working-place, and it was examined by the deputy, but not particularized.

213. It was not particularly referred to in his report?—No, but I know it was examined, because I have seen his dates on it myself.

214. So that he actually examined it, and included it in his general statement, but without particularizing the place?—I am quite sure and positive of that.

215. Did you go through it with him?—Yes, one morning when he was on his rounds.

216. I may take it as a fact, then, that the absence of anything under Rule 25 in Whorskey's report meant that he had nothing to report under that rule?—That is so.

217. He does not report to you that he has nothing to report under Rule 25?—No.

218. You were asked some questions about this heating: were any of these sections where heating took place anywhere near No. 5?—No, a long way from it.

219. Could they have had any possible connection?—No, because all the air was brought to the air-shaft.

220. So that under no circumstances could it have had any effect?—No.

221. Now, Kelly was off for fourteen days?—Yes.

222. Do you know whether he was about during that time?—Yes, he was about during the first week—the fifth or sixth day after his accident.

223. So that though he was away from work his injuries were not very serious?—No; that is a matter of past experience.

224. In regard to this door which was blown out, had that anything to do with the ventilation of that part of the mine—the one leading to No. 5?—No, it would not affect the ventilation whether it was there or not.

225. *Mr. Dowgray.*] In connection with the moisture in the dust, was not the dust which was tested taken from fresh coal?—Yes, I presume it would be.

226. Is it not a fact that lignite coal when it has been exposed for any period at all becomes dry and the moisture is passed off altogether?—I believe that would occur if it were out in the sun and the open atmosphere, but I do not know that it would be likely underground.

227. How do you account for the crumbling conditions of the pillars in your mine? Our attention was drawn to the sides of certain pillars, and the manager accompanying us told us that that was accountable by reason of their being exposed to the air. The place became dry and the moisture was absorbed?—The only time or times that I know of when there is alteration in the sides of the pillars is when we change the ventilation and put in fresh air direct into some of the returns.

228. There is not the slightest doubt that the coal on the sides, after being exposed for some time, even only to the atmosphere of the mine, has a tendency to dry and crumble?—I would not say positively one way or the other until I had had an analysis made of it, because the temperature very rarely varies.

229. But that, to my mind, would not have much effect on the fresh-cut coal which had not been exposed to the outside atmosphere?—No, that is so, perhaps.

230. When once it was exposed to the air, whatever the temperature of the mine or otherwise, would it not have a tendency to dry up?—I do not think so. I know, because with the floor of our mine, it does not matter where, your coal is naturally damp. You cannot sit on the floor without putting a board under you. You must sit on the timber or you feel a dampness striking through your clothes.

231. Could that not be accounted for by the clay bottom?—But the bottom alters.

232. *The Chairman.*] Do you take the coal right out down to the fireclay?—We try to, because it is to the advantage of the worker.

233. *Mr. Dowgray.*] You stated that your intake and return air-shafts were all to the rise?—The upcast shaft is to the rise, and all the workings to the downcast in Taupiri West, which is the deeper shaft.

234. Are not the old workings in No. 5 away on the rise?—Yes, they are all coming on the rise.

235. There is just a possibility that gas might be bottled up in places of that kind?—Well, it might be possible in some isolated places that that may occur, but I have never known gas to come off coal in the bords.

236. It is possible for gas to be found under those conditions?—Yes, possible.

237. In reply to one question you mentioned that the examining deputy did inspect without specializing in his report whether the test he made was for gas or heating?—It showed signs of gas and heating.

238. But prior to that I think you told Mr. Wilford that you had the men continuously on it all the time?—That was on the right side: the men were there until it was fixed up.

239. Did the deputy go to that particular place because heating had been reported?—It was because men were working there—fillers.

240. That would be a working-place?—Yes.

241. There would be a vast difference between a place where men were filling coal and one where men were sent casually to lift rails?—There should not be.

242. Do you not think there should be a distinction?—I think, and I have every reason to believe, that the men I had under me were conscientious deputies. You could not have got better men for making examinations.

243. To examine that place every morning would be certainly out of the deputy's run?—Yes, provided there was no work to be done in there; but you must examine once a week all the old workings.

244. In the ordinary course he would simply go his ordinary rounds?—Yes, unless he had been specially told.

245. You stated, I think, in reply to a question, that in view of the legislation that is likely to be passed you did not consider this a mine in which it was necessary to use safety-lamps?—I say that in a separate ventilating district, in a mine where the percentage of inflammable gas is ½ per cent. or over, then safety-lamps should be used. Supposing by the additional ventilation we contemplate by our new fan, which is on the road out from England, in anticipation of working some far-off coal, if the quantity of air is doubled in this mine by means of the new fan and we do not get more than ½ per cent. of inflammable gas, the proposed legislation does not say that we shall put in safety-lamps provided we have this additional ventilation.

246. There is a vast difference between something that is going to occur and something we have at present?—Yes.

247. A question I want to ask you is whether you think it necessary to work that mine with safety-lamps under the present conditions, without the new fan?—I would not be afraid to work it with naked lights.

248. In view of all that has occurred?—There may have been some unfortunate occurrence that happened that morning.

249. In view of the burnings you had had, produced by ignitions of firedamp, and this disaster coming on top of them, would you still say it would be quite safe to work with naked lights?—A man is likely to change under the stress of such a calamity as we have gone through—it upsets all one's calculations; but up to the morning of the disaster I considered this a safe mine.

250. But from the present point would you still work the mine with naked lights?—Well, thinking broadly over it, in view of the fact that the fan just gives adequate ventilation for the present workings, and with the knowledge that there may be pent-up gas in some reservoir, of course, trouble might occur again, unless the whole of those old workings, to which I have been giving special attention during the last three months, were dealt with by hydraulic stowing. Under the present conditions, however, I would let it go with safety-lamps.

251. Have you altered your opinion in connection with the Bill, or would you still oppose it?—I would oppose it in regard to two or three clauses.

252. There is no alteration in it as compared to the previous one?—I thought there was.

253. There are some good clauses in it?—Yes, and some bad ones.

254. Which ones do you object to?—I do not mean in regard to safety-lamps or anything like that.

255. Anything in regard to the ventilation clauses? There is a good deal in it incorporating the findings of the Royal Commission?—I do not think the prescribed quality of the air was based upon the report of the New Zealand Royal Commission. That is one point I seriously object to. The British standard has been laid down by the foremost scientists of the day, and is different to the proposal in the Bill. The clause respecting "Additional rules for a mine" is also open to objection.

256. *Mr. Brown.*] Was there any pressure on that door in No. 6?—Yes, there was 6,000 cubic feet of air pulling against it.

257. I want to clear that point up. You said in reply to Mr. Wilford that it would not affect the ventilation if the door was open?—It would not have affected that split, because, though there was 6,000 ft. pressing, it was being turned down another way.

258. But, still, the pressure was on the door, and when it was open the ventilation would sweep down Nos. 5 and 6 bords?—Yes, it is short-circuiting.

259. Then if the door was opened by anybody and there was an accumulation of gas in Nos. 5 or 6 bords that gas would not stay there long?—Not with the force of air going through there.

260. If a pocket is formed by a fall in the roof and there is gas in there, what really occurs? The ventilation is going past that place?—The ventilation is going through it, and if it has to climb over the fall there is no doubt that diffusion takes place.

261. Is it not the same as everything else—it takes the line of least resistance? Take as an example the water running down that river outside: there is an eddy formed, and is not that just exactly what takes place in the mine—the ventilation eddies round?—Yes.

262. You have had a good deal of mining experience: what is the usual practice with you as to reporting what is alleged to be a serious accident?—I only report to the Inspector what we consider a serious accident—if I think the man is going to be off work for a fortnight, unless in the case of an eye accident. If it is an eye accident he may tell you it will be better in a day or two, but the eye troubles are very slow. I would not report that; but all serious accidents I report to the Inspector.

263. Do you rely on the doctor's report?—Yes.

264. And does he not tell you whether the accident is a serious one?—Yes, always.

265. Is not that the only way you can judge whether the man is seriously injured or not?—Yes.

266. *Mr. Dowgray.*] I think you stated in connection with the safety-lamp proposition that if the provisions of the present Bill were enforced this mine would be practically able to work with naked lights?—Yes, when the new fan is put in, and if by that means we could double the ventilation.

267. If the provisions of the Bill had been in force and you had been compelled to divide your mine into ventilating sections, would this disaster have occurred?—The mine is divided into ventilating sections.

268. As described in this Bill?—Seventy-five men to a split.

269. Do you say you have seventy-five men in a split just now?—Yes, just about.

270. Would the provisions be complied with as to the air to be recorded leading into each split, as described in this Bill?—Yes.

271. That has already been carried out in your mine?—Yes, as far as I can do it.

272. I want to be sure. I have been down that mine twice. Is the mine divided into ventilating sections with all the necessary precautions required by this Bill as to air-measurements, and so on?—Yes, we try to measure it.

273. You record it in a book?—Yes.

274. Can I see that book?—Yes. We measure the air every month. I can show you the book.

[Subsequently the book was produced and handed to Mr. Dowgray for his perusal. Witness also subsequently produced his book containing references to the injuries sustained by Massey and Carlyon, regarding which Mr. Wilford had examined him. Witness read the entries as follows: "J. Massey, Huntly, Ralph's Mine; burns; July 12, 1905; sixteen days off work; £1 13s. 4d. — Carlyon, same date." Further particulars read.]

JAMES FLETCHER recalled.

275. *Mr. Tunks.*] Were you in any way aware that the inquiry which Mr. Bennie addressed to you regarding accidents, in his letter of the 8th January, 1914, was without prejudice to any right to prosecute you?—No, I was not aware of that.

276. Were you aware that a prosecution of you had even been contemplated?—No.

277. Had you any reason at all, Mr. Fletcher, to conceal anything in regard to Conn, Willcox, or Ruston?—No reason whatever to conceal.

278. I may take it that you did not report the cases of Conn and Willcox for the simple reason that you did not consider them serious injuries?—That is so.

279. Have you ever been instructed or informed that you should report every ignition of gas?—No.

280. Did you consider that it was at all necessary to do so?—No, I did not.

281. After you sent in your list of accidents in 1912 and the following one in 1914, which included both Willcox and Conn, was any further demand made upon you by any one—the Inspector or any one else?—No.

282. Now, were you ever made aware in any way of Mr. Reed's opinions in regard to the mine?—Never.

283. So far as you are aware, was any one else connected with the company made aware of those opinions?—No, not that I was aware of.

284. Did you hear anything about the safety-lamps which Mr. Reed took to the Thames: were they mentioned to you?—No.

285. Several instances of burnings have been deposed to; we have had cases referred to. In regard to the injuries to Robert Cumming, was that in your time?—No; I do not know anything about the Cumming case.

286. It is said to have happened in the little dip section, No. 2 bord: have you no recollection at all of Cumming's case?—No, that was an old bord before I came.

287. Then the case of Robert Jenkins, who is supposed to have been injured in No. 7 north when driving a heading towards No. 5: have you any knowledge of that?—No, because that place was stopped when I came.

288. You have heard the evidence of Mr. Molesworth in regard to an ignition when there was a flame, he said, 10 yards long, when he and Robert Neil were working together: was that brought to your knowledge?—I never heard of it till this morning. It may have been anterior to my coming here.

289. He says it was during your management. It was not brought to your knowledge?—No.

290. James Fulton testified to a place being lit by Skellern: was that ever brought to your knowledge?—No, I have made inquiries from Mr. Fulton, and he says that it happened before Raynor had lost his eye; and he had lost his eye, I know, before I came.

291. Did that apply also to what happened in No. 3 bord?—I do not know; it was a sealed-off area six years and a half ago, which, of course, was before my time.

292. We may take it then, Mr. Fletcher, that the cases you reported were the only ones that were known to you?—That is quite true.

293. What is the area of the old workings?—I estimate them at 170 acres. Then there is also No. 3 district, which should be included, and that amounts to about 8 or 10 acres—not more.

294. What is your opinion as to the stability of the shaft-pillars: do you agree with Mr. Reed and Mr. Bishop, who have said they are unsafe?—No; but while I do not wish to pit my knowledge against that of older men like Mr. Reed and Mr. Bishop, I have been here three or four years making periodical inspections all that time, and in my opinion the shaft-pillars are safe.

295. Have you noticed any appreciable fretting during that three or four years?—No, I have not.

296. What is the object of putting in the new fan, Mr. Fletcher?—Well, the company are contemplating going in for some huge developments to the west, and to carry out those developments there will be required more air than the present fan is capable of producing, and with this in view the company has ordered a large-capacity fan. One has to order a fan with an indicated capacity in excess of that which is actually required, because you cannot get the capacity stated by the makers of a fan. That is due to the fact that the makers' tests are carried out under ideal conditions.

297. No instruction or suggestion was made to you by the Inspector or the Department as to the necessity for obtaining a larger fan?—No, that was provided in my plan of future developments.

298. Do you consider that for present purposes your present fan supplies adequate ventilation?—I do.

299. Now, Mr. Fletcher, what underground officials had you?—One underviewer, five day-shift deputies, one afternoon-shift deputy, and one night-shift deputy.

300. How many men were employed on the day shift?—About a hundred and fifty during the last six months.

301. And on the afternoon shift?—Twenty to twenty-five.

302. And on the night shift?—About four at the most.

303. Who was your underviewer?—Williams Gowans.

304. What were his qualifications?—He held a colliery-manager's certificate, first class, of New Zealand.

305. A competent, trustworthy man?—Yes.

306. And in regard to your other five officials, what were their qualifications and experience?—Darby and Smith, I understand, possessed deputies' certificates of service. Smith came from the collieries of Yorkshire, near Doncaster, where he had had practical experience. Darby came from Fifeshire, and had obtained experience at Kaitangata and also at Denniston.

307. And as to the other three men?—Peckham, Skellern, and the third man, Whorskey, were practically trained in the company's service here. I understand that Peckham was a worker in a gaseous mine in Australia for six years.

308. Would you say that they were thoroughly competent?—Yes, I consider them thoroughly competent.

309. To do any work that was required of them in the mine?—Yes.

310. Did you consider them competent to test for gas?—Yes, because they have found gas and reported it. That proved, I think, that their ability to test for gas could not be doubted. The other two men were McGill and Webb. McGill was on the afternoon shift, and was a man possessed of a lot of experience obtained in New South Wales, New Zealand, and Scotland. The night-shift deputy, Webb, holds a second-class Imperial certificate of competency. He comes from the Wigan district, where he held an official position in some large collieries.

311. I understand, Mr. Fletcher, that you yourself, before the establishment of the School of Mines here, took some trouble to give lectures on mining: how long did you do that?—I took an interest in the work for two years.

312. You delivered lectures on mining?—I tried to help the young men who wished to better their positions. I attended forty-six nights in two years. During the first year I had forty-two pupils, and twenty-two during the second.

313. Did your deputies or officials attend those lectures?—Yes, numbers of them.

314. After that, I think, the School of Mines was established here?—Yes.

315. I would like you to give us an explanation in regard to that panel referred to by Mr. Reed, the ventilation of which is said to be defective?—I must explain that on my underground inspections I could only take portions of the old workings and examine them at different

times, and I think it is about nine weeks ago since the underviewer and I travelled through No. 7 north and worked our way right up into that section. I can only give you the course of the air and how it was distributed by the brattice stoppings that we erected at that time. I cannot give you the data for any later time.

316. It would be the duty of your under-manager to see to that since your inspection?—I do not know that it would. The old-workings deputy was looking after that section.

317. Will you explain the position by reference to the plan [Exhibit DD]?—At the bottom of the winch dip in the old dip there was a current of air from 13,000 to 17,000 cubic feet per minute passing the point marked "J.F.," and a heavy three-ply brattice door was hung across the winch dip to deflect or divert the bulk of this air to the right from the point marked "B." This was diverted through the workings by the aid of brattice doors that were left in these places. It follows the line shown in pencil with arrows. There was a brattice door at the point on the plan marked "C." There were also brattices at the points marked "D" and "E." I went through the first cut-through to the left by No. 4 bord, then took the second cut-through to the left into No. 6 bord, and I am certain there was a brattice door at the point marked "F." I did not go through the door, but followed the pencil arrow down No. 6 to the point "G," and when coming along the winch level the underviewer told me that he had given instructions for brattice-cloths at points marked 1, 2, 3, 4, 5, and 6 winch level to be renewed to keep the air up into that panel section marked in green ink. I understand that was done.

318. Do you admit that is an unventilated cul-de-sac, that panel marked in green ink?—No.

319. When you went round it nine weeks ago there was a current of air?—Yes, because I travelled with it.

320. And there was sufficient ventilation in that section?—Yes, in my opinion.

321. In the section, including bords Nos. 4, 5, and 6?—It was sufficiently ventilated, in my opinion, with this exception, that in the top cut-through between 4, 5, and 6 I could not swear whether the doors were down or not.

322. Can you say how long it was prior to that visit you had been there?—I could not say, although they were getting coal from that section early last year, about fifteen or seventeen months ago, and the brattice was kept up to the point of finishing.

323. Were you in the habit of using that door?—I used it very often as a short-cut into the dip.

324. Can you speak as to the air that went through that door?—No, and I could not give you the exact time when I went through it last.

325. Did you ever find it stuffy there and foul, such as you would call unventilated?—No.

326. Do you say, Mr. Fletcher, that that section was adequately ventilated?—Yes, in my opinion, as far as the old workings are concerned.

327. Do you say that there was any danger of an accumulation of gas there?—No.

328. There were two occasions, I think, on which the fan was stopped: can you tell us those dates? One, I think, was Easter Tuesday, and the other was a Monday?—The fan would be stopped on Good Friday; there are two or three days in the year when we give everybody a holiday—Christmas Day and Good Friday.

329. The 13th April was Easter Monday: can you say whether the fan would be stopped on that day?—No; on Good Friday.

330. Can you say whether it was stopped on the 22nd March?—No, I cannot say from memory, but I know it was stopped on Good Friday.

331. Do you wish to say anything in regard to the Coal-mines Bill?—No; I think it has been threshed out. There is, however, one matter which I would like to refer to. I think the Royal Commission of 1911 recommended that all future appointees to positions as Inspectors of Mines should be required to hold higher qualifications than those of a colliery-manager. I agree with that, because I think it will raise the status of our Inspectors, although I have no fault to find with the present Inspectors. It will also be an encouragement for students of mining who are not satisfied simply to obtain a mine-manager's certificate.

332. *Mr. Napier.*] In regard to the inspection of the old workings, Mr. Fletcher, is it not a fact that for many years no special officers were appointed for that purpose until you came here?—Yes. It is a statutory obligation upon the manager, however, to see that all return airways shall be inspected once a week.

333. Is there not a direct power in the hands of the Mines Department to order the company to employ special officers exclusively for the inspection of old workings?—No, I do not think so.

334. And for very many years there were no special officials detailed for that duty?—The inspections were made intermittently.

335. For many years there were no special officials exclusively employed on that work?—That is so.

336. Was the appointment of the two officials for this work voluntarily made by the directors of the company?—It was done by the directors on my recommendation.

337. It was after you took over the management of the mine this regular inspection commenced?—Yes, shortly after.

338. I suppose from your experience you are able to say that gas frequently comes out from the working-places in some places?—Yes, in some places, but not in all places.

339. Now, supposing that a man had been working at such a place and went away to his lunch, and on his coming back a small quantity of gas ignited without inflicting any injury, would you call that a minor explosion?—No.

340. It would be an ignition?—Yes, an ignition of firedamp.

341. There is a marked difference?—Yes.

342. To occasion a dust-explosion in a mine I think Professor Dixon said it was necessary to have an intense flame: do you agree with that?—Yes, it is quite necessary, according to our teachings.

343. Then if that is so, would the ignition of a small quantity of exuding gas by a workman, such as I have described, cause a dust-explosion?—I do not think so.

344. There is no concussion?—No.

345. And if the two things are necessary and must be present to create the explosion, the absence of the concussion would prevent the explosion?—Yes, I think so, because the concussion is required to raise the cloud of dust.

346. Professor Dixon told us that there must be a concussion to raise the dust, and then an intense flame to ignite it. Would you consider that the ignition of very minute quantities of gas in the ordinary way, such as I have described, would be calculated to cause a holocaust in a mine?—No.

347. *Mr. Macassey.*] In regard to section 58 of the Coal-mines Act, which gives the Inspector power to close an exceptionally dangerous mine, if a responsible Inspector considered a mine to be dangerous to human life and called the men out would you refuse to obey the order, or would you take the men out and then wait until the appeal against the Inspector's order was decided?—I would obey the order first.

348. Under section 58 of the existing Act and Special Rule 14 the Inspector has full power to effectually control dangerous mines?—Yes.

349. *Mr. Wilford.*] I understood you to say, Mr. Fletcher, that you do not add to your previous evidence to the effect that you went into bords 4, 5, and 6 when you were last up there?—I was in bords 4, 5, and 6, but not right in the far end of them.

350. But in those parts of the bords shown on plan marked "AA"?—No, I cannot swear I was up in that part of the mine, except that I came through the bord opposite the point marked "B."

351. I want to ask you two important questions: you know under the Act you are required to keep that door locked?—Yes, I do know.

352. You know that you did not?—I know that I did not.

353. You know that some of the witnesses have sworn that Martin entered by that unlocked door?—Yes, some of them say that.

354. There was no lock on the door, was there?—I could not say.

355. What explosives were used in this mine up to the time of the disaster?—Curtis and Harvey's ordinary blasting-powder.

356. Is that the only explosive you used?—Excepting gelignite, which is used in stone drives.

357. Before the explosion what class of light did you use?—Naked lights.

358. Were they all of the same kind, acetylene, or others?—Oil-lamps and acetylene-lamps; colza is the oil used.

359. And that is the only description of light you used?—Yes, excepting the safety-lamps used by the examining deputies.

360. I mean for working purposes?—Naked lights—acetylene and colza-oil head-lamps.

361. What were the means of escape in the mine in case of accident?—There are three shafts. The two downcasts are pretty well a mile apart. The Taupiri West was an escape. The upcast has ladders in it. If the three openings into the mine were blocked no one could get out.

362. That is a contingency very unlikely to occur?—I think so.

363. Under ordinary circumstances would you consider this sufficient for escape purposes in case of an explosion in the mine?—It is a complex problem, which required to be answered with some thought. There are dozens of mines in the Old Country with only two shafts.

364. *Mr. Tunks.*] Supposing that Martin had been instructed to go through No. 5 to meet the other men coming up from the little dip, was there any other way except through that door which he could take, apart from the little dip?—Around No. 7 north.

365. But assuming that he had gone past No. 6, is there any other way that he could have gone without coming right back?—He could have gone right round.

366. Which was the shortest way through?—Through the door of No. 5.

367. *Mr. Dowgray.*] You said that there was a vast difference between an ignition and an explosion of gas. An ignition is still an explosion?—Yes, I suppose it is; although, in the course of reading reports of accidents in such papers as the *Colliery Guardian*, I have noticed that they do not call ignitions of gas "explosions."

368. Have you ever seen an ignition of gas in a mine?—No, never. I have seen gas, but not an ignition of gas.

369. You said most of your old workings acted as returns, except that part sealed off?—Yes, we scale all the return air through there.

370. But they are practically returns for the whole mine?—Yes, practically so, except where they converge at certain points. You can see it in certain places on the plan.

371. So that the old workings are practically returns?—Yes.

372. And under the Act they should be examined once a week?—Yes.

373. In connection with the Huntly mines being idle, I notice the *New Zealand Herald* of this morning says, "It may be noted that no work beyond repairing and clearing up is proceeding in Ralph's Mine." Had there been any men using monobel or blasting-powder in the Extended or any of the mines this week prior to to-day?—Yes, I think there was one shot fired over in Taupiri West.

374. Have there been any colliers working there?—Yes; one party of men got coal for the boilers.

JAMES BISHOP, Certificated Mine-manager, sworn and examined. (No. 6.)

Mr. Wilford: I ask leave, sir, to put in the evidence given by Mr. Bishop at the Coroner's inquest.

Evidence read by witness, as follows:—

"JAMES BISHOP, sworn, saith: I am a certificated mine-manager and have something like forty years' experience of mining. I have been in Ralph's Mine some years ago. I arrived here on the 15th September after the explosion. I entered the mine on the 16th, in company with Mr. Bennie and Mr. Woods. Between the 16th and the 24th I have been making almost daily inspection of the workings, with the object of assisting in the discovery of the bodies and the restoration of the mine. On the 26th September, with a view of restoring ventilation in No. 5, I went into the little dip section, and from the point of our striking the haulage level we counted six bords, and the sixth bord has a door and a stopping at the head of it. We went up the bord about a chain and found a stench arising from a body not recovered. There was too much gas for us to go up the bord. Mr. Woods managed to reach the body, and it was removed. The body was lying on the left side of the bord going up. We found it necessary to force a greater volume of air into No. 5 in consequence of the gas which was there. This was done, and by Monday, the 28th, the workings were so far clear as to enable us to investigate the fall near No. 6 bord. On entering the crosscut to No. 5 bord we found a second fall extending from a little below the crosscut for about a chain and a half down the bord. We encountered gas at the tail end of this fall. We then proceeded through to No. 4 bord, and down that to a crosscut which enabled us to get past those falls into No. 6. On testing for gas on the low side of No. 5 we found it there also. This fall in No. 5 was covered with dust produced by the explosion. We could not get to the top of the fall, but as far as we could see there was dust all over it. The fall in No. 6 was a new fall. There was no dust on it. It must have come after the explosion. The indications are that the explosion started either at the first or second crosscut between bords No. 5 and No. 6. The force of the explosion from the point of ignition seems to have been to the door and blown the stopping out. There are indications of a second blast extending down the bord. Another small stopping had been blown out. The bricks from the larger stopping had been blown about 2 chains down the bord. From that point the force seems to have travelled towards the main haulage-road, going west towards the bottom end of No. 7 and east with very considerable force to the shaft. The marks of force in the haulage-road going towards the shaft are very pronounced. Towards Taupiri West section the force extended for several chains in that direction also, as indicated by broken tubs. In my opinion, the accident was due to an ignition of a small quantity of firedamp augmented by the volume of dust which would be sent up in clouds. The inflammability of dust from this mine lends strength to this opinion. I produce a statement showing the inflammability of dusts taken from this mine, supplied by the Government Analyst. The dust was taken—No. 13 from bord W.C., No. 5 district; No. 14 was taken from near No. 6 cabin haulage-road; No. 15 from main haulage-way at No. 4 level; No. 16 from piece of Ralph's Colliery coal; No. 17 from brattice from near flat sheet, No. 5 jig. (Mr. Woods states that the dust No. 13 was taken from the spot marked 'Dust' on plan.) A copy of the report put in and marked 'S.' I believe Martin would be the man who caused the explosion through coming into contact with the gas with a naked light. There is not much dust in the mine as far as I could see. The greatest proportion of force was exercised in the main haulage-road. The portions of mine not affected by the explosion were not so dusty as to call for special precautions while the mine was being worked. Those portions would be fair samples of the rest of mine. Once an explosion is started it would find its own dust as it went along. Very likely there are a series of explosions. We tested for gas in the stone drive in Kelly's drive. There was a very small percentage of gas there. It was only found in small quantities in the roof. It seemed a very good plan on first sight to have a weekly examination of the old workings, but I think now there should be in future a stricter examination of the old workings. I would not blame a manager if he had not had the old workings inspected at all unless he knew there was gas there. If a manager knew there was gas in a particular old working he should make more frequent examination of that place twice or thrice a week. Falls occur more frequently in old workings than where the men are working. A fall might cause a liberation of gas in large quantities. Any percentage of gas I would consider dangerous if it was in the return air. Any percentage of gas would be dangerous if shots were being fired. I would not consider 2 per cent. of gas dangerous in the old workings. The safety of the mine depends largely on how the deputies perform their duties. They climb a ladder to test the air at the top of a stope, sometimes by a light on a pole.

"By Mr. Napier: I consider that in establishing a weekly inspection of old workings they—the management—did something not provided for by the Act and something that tended to the safety of the mine. The increase in size of the old fall must have taken place before the explosion."

1. *The Chairman.*] Is there anything, Mr. Bishop, which you would like to add to that statement before you are questioned any further?—No.

2. *Mr. Wilford.*] Are you at present employed by the Government, or by the Taupiri Company?—I am not employed at present by any one.

3. What was your last employment?—I was manager of the Point Elizabeth State Coal-mine. I came here to see if I could be of any service to Mr. Fletcher since the explosion.

4. Will you tell me what are "shaft-pillars"?—The pillars surrounding the bottom of the shaft, left to support the shaft.

5. Are they of any particular size, or of a size fixed according to requirements?—They are generally larger than any other pillars in the mine.

6. Of course the pillars must be of adequate proportions for the safety of the mine?—That is so.

7. Would you say, from your experience, that the pillars in this Ralph's Mine are of adequate proportions to support the shaft?—I scarcely think the shaft-pillars are such as are calculated to maintain the shaft in a proper condition. I think they are too small.

8. Is that probably due to the fact that they have been split or reduced in size ?—Yes, there are too many drives carried through them, and that has consequently reduced them in size.

9. I suppose that is because the coal there is easily won ?—I do not think any one would do it for that purpose. There must have been some other reason. I do not think they would rob the pillars for that purpose.

10. You say "*rob*" the shaft-pillars : is that a technical term. It seems rather gruesome to me ?—Yes, that is a technical term.

11. You say, then, that the shaft-pillars in Ralph's Mine have been robbed ?—I do not know how they have done it, but I do consider they are too small.

12. You say they have been robbed ?—The shaft-pillars are too small.

13. They have been robbed ?—No, I do not say that. They have taken big drives through and round the pillars.

14. And that has weakened them ? In your opinion, they are not as strong as they should be ?—That is my opinion.

15. Do you not think they should be strenghtened at once ?—I think steps should be taken at once in that direction

16. Should they be left a day ?—They may certainly be left a day.

17. Is there a possibility of the whole thing collapsing ?—No, I do not think there is any chance of that, but I would take precautions.

18. Would you take the responsibility of saying that there is no danger of their collapsing at present ?—I am not going to say they will collapse at present. There would be a gradual settlement if such a thing took place.

19. Would you tell this Commission that in your opinion they are unsafe ?—I cannot say that. There is a second outlet from this mine.

20. But this would be a very serious thing ?—Yes, for everybody concerned. I think steps should be taken to strengthen them.

21. Do you know how long it has been in that condition ?—No, I could not say.

22. In the course of your evidence at the inquest you said, I think, that a small quantity of gas would be sufficient to cause the explosion. Are you still of that opinion ?—Yes, I think a small quantity of gas would be sufficient.

23. We may take it that a small quantity of gas was sufficient to start the explosion. Do you still think a small quantity of gas started the explosion ?—Yes, there is one good reason for my conclusion, and that is that Martin's body was in no way burnt—even the hair was not singed—and if there had been a large accumulation of gas there I think the indications of fire and of burning would have been very much greater.

24. Might not Martin's body have been hurled back some distance ?—It would have been surrounded by flame.

25. There was a fairly large piece of coal in his head ?—Yes.

26. That either came there by the piece of coal being hurled with great force striking his head, or else Martin was himself hurled against the side ?—Yes.

27. You still stick to your opinion that it does not follow that a large quantity of gas was ignited to cause such an explosion, though such a thing is possible, large or small ?—Yes.

28. And there is no way to measure ?—No ; but if there had been an ignition of a large quantity of gas, I think it is only a common-sense conclusion that there would have been much more evidence of burning.

29. The clothes were stripped off him—there was nothing left on him but his boots ?—Yes.

30. His coat was found to the south of him ?—Yes, he was coming from that direction. [Plan AA discussed by Mr. Wilford and witness.]

31. I am right in saying that Martin's coat was found to the south of his body ?—Yes.

32. Is it not a fact that the coat was practically undamaged, although all the rest of the clothing was in pieces ?—Yes, but he might have had his coat on his arm.

33. If his coat was further south than he was, is it not fair to presume that he was hurled north ?—Yes, that is quite right.

34. He was nearer the door at the time of the explosion than his body was found ?—Quite so.

35. I suppose you will admit that bords 4, 5, and 6 are dead ends ?—That is quite true.

36. I mean that bords 4, 5, and 6 are cul-de-sacs ?—If the door was closed.

37. If the door was closed at the south end of No. 6 bord then those three bords were cul-de-sacs or dead ends ?—That is so.

38. Then they were gas-collectors if gas was there ?—Yes, they would accumulate gas.

39. It was an ideal place for a gas-collection if there was gas exuding, because there was no current of air to take it away ?—[Witness here pointed out to Mr. Wilford the course of the ventilation.]

40. You say that the ventilation comes in at the point marked "B," No. 4 bord, continues along that bord, then through the crosscut into No. 5 bord, and then through the crosscut into No. 6 bord, which is a dead end ?—As far as I know, that is so.

41. Do you know where the old fall is ?—I do.

42. Have you got the longitudinal section of those bords ?—This is the longitudinal section of the three bords Nos. 4, 5, and 6 [Exhibit BB].

43. I want to take No. 5 first—that is the middle one. You notice that the old fall cuts off practically the north end from the south end ?—Yes.

44. This is a plan of the conditions since the explosion ?—Yes.

45. Now take No. 6 bord : the fall does not cut off one end of the bord from the other. It would be possible to get over the new fall ?—Yes, there is a walking-track over it. The plan as drawn is on an exaggerated scale.

46. It is rather misleading, is it not ?—It is usual for civil engineers to do it that way, in order to show up these small places.

47. Did you find any gas in that new fall ?—No.

48. None at all ?—No.

49. Did you find any gas in the old fall ?—At the north end and at the south end.

50. There is no indication to show that any gas which caused the explosion came from the new fall in No. 6 bord ?—None whatever.

51. It must have come from the fall in No. 5 bord ?—That is my opinion.

52. Did you see any loose rails about there ?—There are rails projecting there.

53. They are sticking out at the north end of the old fall now ?—Yes.

54. Which way do you think Martin entered No. 6 bord—by the north end ?—From the position of his coat I think he must have come from the north end.

55. Did you not say at the Coroner's inquest that you thought he came from the other end ?—No, there is certainly nothing in my evidence to that effect as far as I know.

56. Your opinion now is that Martin may have entered by the door ?—Yes, and I believe he was going to work in connection with the removal of the rails.

57. It is higher ground at the door than at the north end ?—Yes.

58. Do not you find the most gas at the highest point ?—Certainly.

59. How would he have got from the door to the position where the body was found—he would have had to go downhill ?—I cannot say.

60. The highest point is where you find the most gas ?—That is so.

61. Therefore if the door is the highest point there would be much more gas there than lower down ?—Yes, there would be, provided always there was sufficient to fill up the workings.

62. *The Chairman.*] It would depend upon the height of the bord ?—It depends on whether there was sufficient gas, and my opinion is that there was not. The gas was met by Martin either at the crosscut, where the letter "B" is placed, or at the crosscut marked "P" on the plan.

63. *Mr. Wilford.*] Then, if your suggestion has any merit in it and he met the gas at B, he must have been hurled a tremendous distance, and how would you find his coat where it was ?—There was a small quantity. He may have reached a certain distance and then have got the second blast. If there was a large quantity of gas he would never have got through the door.

64. Are you suggesting seriously that he may have run with the first blast and then been caught with the second one ?—He may have.

65. Is it not a more reasonable theory that he threw his coat away when he was struck ?—It is more reasonable.

66. And if that is more reasonable, then it is also more reasonable that he entered at the north end ?—That is so.

67. That is axiomatic ?—Yes.

68. Will you tell me what merit there is in your suggestion ?—I am not assuming any merit, but that is the position as far as I can understand it.

69. It is not only because you found the other men down that way ?—Yes.

70. And taking the position of the coat, and the position of the body, and the ordinary condition that gas obtains in largest quantities at the highest point ?—Yes, there is something in that.

71. Now, if it took a week and a day to remove most of the gas from those bords, that is certainly proof that there was considerable difficulty in removing it on account of the dead ends, or that there was a very great quantity of gas present ?—There would be a large quantity of gas after the explosion, because the ventilation was all disarranged.

72. How would they get it out—by bratticing ?—By renewing the stoppings and carrying the air to the workings. The whole of the stoppings in the mine were practically knocked out and had to be replaced, and the gas could not be displaced until many of the stoppings had been rebuilt. This done, two full days sufficed to clear away the bulk of the gas.

73. How near would you think those rails are to Martin's body ?—About 100 ft. from the body.

74. And about how much less from the coat ?—About 10 ft.

75. Then we may take it that if Martin was standing where his coat was found at the time of the explosion he had got within 90 ft. of the rails ?—Yes.

76. On this plan we have got marked "No. 4 bord 29,540 cubic feet": what does that mean ?—It means that there was space for that quantity.

77. And the total space in bords Nos. 4, 5, and 6 and the stentons is 79,685 cubic feet ?—That is so.

78. That is to say, measuring the whole space to the roof, it would hold practically 80,000 cubic feet ?—Yes.

79. Did you go up from the main haulage-road along No. 5 section ?—Yes.

80. And is the road which comes to a dead end on the right side of the door—is that a travelling-road ?—I could not say that. I do not know what their practice was regarding the use of that road.

81. There is a dead end and the door on the right. You are going due west to the dead end, and then you come to the bord: is that not the travelling-road to No. 5 ?—I do not know which are travelling-roads there. When I entered this section and made the discovery of the body I came from the north.

82. Can you tell me the height of No. 6 bord ?—It is very irregular—in some places it is 10 ft., I should say.

83. What do you think is the highest point ?—It is about 6 ft. or 7 ft. high at the end of the bord and 10 ft. or 11 ft. in other places.

84. *Mr. Napier.*] With regard to your remarks as to the percentage of gas present, you said that you considered that any percentage of gas in the return airway would be dangerous ?—Yes, I do.

85. You do not mean dangerous inflammably, do you?—Yes, I do. I mean that with any gas in the return airway—say ½ per cent. or 1 per cent.—safety-lamps ought to be used. It is reasonable to assume that if you find 1 or 2 per cent., or even ½ per cent., in the return airway there must be some places in the mine giving off gas very freely to contaminate the air to that extent. The whole ventilation of the mine is in the return airway, and if that contains gas, even in small percentages, there must be some places giving off gas in considerable quantities.

86. Then it is merely because of the pollution of the air by gas, as the result of the leakage of gas somewhere, that you say it is dangerous?—Yes; that is, in the presence of naked lights.

87. But supposing that Deputy Wear fairly established that the percentage right through was 1 or ½ per cent., would you not consider that air or gas dangerous to men inflammably?—No, it might not be; but it is a very well-established fact that a very small percentage of gas may cause a very serious disaster in a working-place.

88. The gas-mixture will not explode unless the percentage is 5 or 6?—It is established that you cannot explode a weaker mixture with an ordinary flame.

89. By "dangerous" you do not necessarily mean that it has reached explosive consistency?—Not unless peculiar conditions are set up, and it has become possible to cause a flame with detonation.

90. As a prudent and experienced man you mean that any percentage would be dangerous, and would lead you to take precautions against that danger being increased?—Yes.

91. It is really a tell-tale of something that might exist somewhere else in the mine?—Yes.

92. Does not firedamp, even with a high percentage of gas, have a constant tendency to diffuse?—It has.

93. If good ventilation is provided the gas would be swept away or diluted almost as fast as it exuded?—That is so.

94. You said in your evidence at the inquest that the gas having ignited the coaldust would feed itself in its progress?—Yes, that is my opinion.

95. So that once you started a gas-explosion there might be a series or succession of explosions of the dust?—There might.

96. And the later ones might be even fiercer than the preliminary one?—That is so.

97. The latter explosions, of course, being dust-explosions, once the gas set fire to them?—Yes.

98. Now, you know, I believe, that the bodies were recovered some distance out, where apparently there could have been little gas, but where the flame was fiercer. Those bodies were considerably burned?—Yes, I understand they were badly burned.

99. More than Martin?—Yes.

100. Martin was not burned at all?—No.

101. And if there had been what Professor Dixon calls a fierce flame at or about where his body was found he would necessarily have been considerably burned?—If there had been a large quantity of gas when gnited Martin would have been much more badly burned.

102. Therefore it is conclusively proved that there could not have been a very large gas-ignition in the beginning?—That is my opinion.

103. Based upon the evidence?—Yes.

104. I think you said his coat was 10 ft. away?—That is so, according to this plan.

105. That is not a very great distance; he might have dropped it just before the explosion?—He might.

106. The force could not have been very great?—There must have been considerable force when once the explosion started, later on, if not then.

107. Now, Mr. Wilford suggested to you that because it took over a week from the date of the explosion to clear the mine of gas, therefore that proved that before the explosion there must have been a great quantity of gas there, or that the ventilation was defective?—I did not take Mr. Wilford to mean that at all.

108. Then the question had no meaning. Any condition that existed since this explosion—do you say that that is evidence of the quantity of gas present before the explosion?—None whatever. Mr. Wilford meant that there must have been a large quantity of gas present after the explosion, and it certainly took some considerable time to get in the stoppings and so on.

109. However, I want to get it clearly from you. Would the presence of any quantity of gas since the explosion be any indication or give any idea of either of the two things—*i.e.*, that there was defective ventilation before the explosion, or that there was a large accumulation of gas?—No, it does not.

110. Do you say that the rails which were protruding from under the old fall are still in their original position?—Yes, as far as I can see.

111. They are not loose rails?—No.

112. *Mr. Tunks.*] Do you know whether those rails extend right down the bord?—No, they do not, as far as I can see.

113. Those rails are not the heap of rails that were going to be taken out?—I cannot say what they were going to do.

114. Now, in your evidence before the Coroner you are reported to have said that if a manager knew there was gas in the old workings he should make careful inspection once a week. Did I understand you to mean by that that that should be done without such an incentive as the danger of an explosion or the presence of gas?—Yes, if a man knows that gas has been given off he should take every precaution.

115. Quite so; but you are speaking now of old workings?—Yes, but even in old workings you could have liberations of gas which would endanger the whole mine.

116. Is it usual in this country to examine old workings in the way that has been done in this mine?—No. I said in my evidence before the Coroner that I considered that the manager was doing some-

thing by means of this inspection which was not required under the Act, and I do not know any other mine where they do it so carefully. In a mine where the pillars are extracted it is not so necessary.

117. Is this mine not unique in that it has a lake and river over it ?—Yes.

118. Are there not mines in Australia which extend under the sea, like this one ?—Yes, but you have a different class of roof, and there they also leave the pillars.

119. A great deal has been said about watering the dust in the mine. Do you consider this mine a dusty mine ?—No, I do not, not as we understand dusty mines. Wherever there is small coal there must be some dust.

120. And do you consider that watering is necessarily effective to prevent coaldust-explosion ?—No, watering has been found very ineffective.

121. Have you seen this report published by the Legislative Assembly in New South Wales this year on the question of the best means of dealing with coaldust in collieries, with the object of preventing explosions of coaldust being initiated and carried through the workings ?—No, I have not had an opportunity of reading it.

122. It is dated the 22nd July, 1914. I would like to read you this extract to see if you agree with it. I will read the whole paragraph. It is under the heading of "The best methods to be adopted to remove coaldust or to render it innocuous": "In the first place, it may be pointed out that to remove the coaldust from many collieries to such an extent as to make an explosion impossible is considered by your Committee as impracticable. In support of this view the following quotation is taken from page 86 of the Second Report of the Imperial Royal Commission on Mines: 'It is quite clear that the entire removal of coaldust from a mine so as to render it completely immune against an explosion is out of the question. A great deal can, no doubt, be done in keeping sections of the mine absolutely clear, especially when they are specially prepared. Much can also be done by other methods, such as by preventing dust from entering the shaft, by making the tubs or trams dust-tight, &c. Most of the witnesses thought that the "primary" remedies offered the greatest safeguard, especially stricter precautions in the use of explosives; and it is obviously better to stop an explosion at its origin rather than to depend on checking it in its career when it may be found to be unmanageable. Unforeseen accidents, however, such as a sudden outburst of firedamp, the breakage of or defect in a safety-lamp, the 'personal equation' in the handling of explosives, have to be taken into consideration, and it is therefore inadvisable to rely only on such precautions. No doubt a certain proportion of the dust can be removed by filling it into tubs and sending it to the surface, but this is of no value from the point of view of preventing the extension of an explosion. Having regard, however, to the enormous extent of the roadways and working-places of a modern colliery, the increasing depth of cover, and, in some cases, the temperature of the strata, it is not, in our opinion, practicable to maintain a dusty mine throughout all its ramifications in a constant state of safety in relation to coaldust-explosions. We emphatically recommend, therefore, a remedy such as stone-dusting of a permanent character in preference to watering, which, by evaporation, may become useless within a few hours if not renewed. In no case within our experience, where the seam is dry and dusty, have we observed any mine so thoroughly treated by watering as to prevent a coaldust-explosion being carried through the workings; and, while thorough treatment by watering would undoubtedly ultimately arrest an explosion, the impracticability of doing so is fully recognized by many authorities; and in effect, therefore, to look upon watering alone as a remedy for coaldust-explosions is to lean upon a broken reed." Do you agree with that ?—I do.

123. Do you know whether the use of inert dust has ever been tried in New Zealand ?—No instance of it has ever come under my notice.

124. So that this process of treatment by inert dust may be looked upon as quite in its trial stage ?—It is under trial, and it has not proved to be effective so far.

125. *The Chairman.*) You have no information yourself as to what is the most effective method ?—No, it is very hard to decide. It is best to keep the mine clear of dust.

126. That would mean taking it out of the mine ?—Yes, and that is quite impracticable.

127. Somebody has suggested reversing the ventilation ?—I do not know what would be the effect of that.

128. The ventilation always running in the one current is said to have the effect of leaving coatings on the pillars, and so on, but by reversing the current you would dissipate that dust ?—I think you could get exhaust-fans to take it up to the surface, but to send it one way to-day and another way to-morrow would be no benefit.

129. I think you said at the inquest that you thought there should be a stricter examination of these old workings in the future. What did you mean ?—I meant a stricter examination for fires and gas. It was not made clear that a strict examination for gas was made.

130. I understand that was not part of the men's duties. What would you do supposing you had charge of that mine and wanted a proper examination of those workings made: what instructions would you give to the inspector who went down to see them ?—That all the workings should be examined for gas. It is not a complete examination unless they are all examined.

131. Would you think it sufficient for the examining official to be silent on the point if he found no gas ?—It is taken for granted that if it is not found he says nothing about it.

132. Would it not be an improvement to say that he did not find any gas ?—Yes, it would be an improvement.

133. You said that in the examination of these old workings the manager did more than he was required to do by law—something extra ?—It is not provided for in the Act. The Act only prescribes the examination of the actual working-places.

134. Do you think it is the manager's duty to look after all the workings in the interests of the safety of the mine ?—Yes, and if the manager knew that his men were going to do work in the old workings he should have that place specially examined.

135. If all those men were going down to take out those rails should there not have been a special examination ?—I think the management must have anticipated that the places were to be examined. I do not know their custom, of course, but I think it should have been done.

136. You marked two places on the plan "B" and "P" where Martin might have come into contact with gas ?—Yes.

137. Could you suggest where that gas originated ?—In the fall of No. 5 bord.

138. That is the result of your examination ?—Yes, and I have examined many other places with the object of finding any other exudation of gas to account for the disaster, but that is the only place where I found gas exuding from the strata overlying the coal.

139. You said that this is not a dusty mine: that is, in comparison with what ?—Just as we know coal-mines. There is a lot of small coal about in every working-place. This is certainly not a dry and dusty mine as compared with the mines of the Old Country, in which you find dust flying in every direction. You are wading in it up to your ankles sometimes.

140. Do they have explosions there ?—Yes, they do, and very bad explosions.

141. I see it is mentioned that they did not have explosions until they had improved the ventilation and brought in more oxygen ?—Some scientists say that the fine particles of coaldust are very ready to absorb oxygen, and thus become like gunpowder.

142. Supposing the oxygen were less in percentage, would it conduce to safety ?—That is the most recent proposal of a Dr. Harger. He proposes that a greater proportion of carbonic acid should be introduced, and that oxygen should be reduced. Then it becomes a question as to whether humanity could live in the air with that reduced amount of oxygen.

143. Have you ever studied that aspect of the question, as to the reduction of the oxygen ?—Only from technical papers. I have read of Dr. Harger's research. He has put his papers before all the technical associations in England.

144. *Mr. Brown.*] Before the world ?—Yes.

145. *Mr. Dowgray.*] Following up that proposal, would you recommend that the percentage of oxygen should be reduced to 17 per cent. ?—No, I do not think I would. I would not experiment upon myself that way, anyhow.

146. We have had a great deal said on the subject of working-places. A great deal hinges upon this matter. As a mining man, what is your interpretation of a man's working-place ?—As we know it—you and I—the working-places of a mine are the places where coal is being obtained. In saying that I do not say that because a man is sent into an old working it should not be his working-place for the day. His working-place is the place where he works.

147. The terms "a man's working-place" and "working-faces" are two different things ?—No; that is only a confusion of terms. "Working-face" and "working-place" are just the same.

148. *The Chairman.*] Has "working-place" any technical meaning ? Has it a distinct meaning ? What would a mining man understand by it ?—From long usage it has been looked upon that where coal was being worked was a working-place, but, generally speaking, where a man may go to is his working-place for the time being. Supposing Mr. Dowgray got a cavil in a certain pit, and I met him on the way, I would say, "Have you got a good working-place ?" but not "a good working-face."

149. You would certainly define it as the place where you were going to work ?—Yes, it would be the place where the man was going to work that day.

150. You said that you would not consider this a dusty mine ?—I do not consider it a dusty mine.

151. In view of the explosion, do you consider it a dusty mine now ?—That puts it in a different position; every precaution will have to be taken now.

152. That is, since you learned of the explosive nature of the dust ?—I had no knowledge of it before.

153. But since then you think the mine will have to be watched very carefully ?—Yes.

154. You stated that nothing that has occurred since the explosion will have any bearing on the explosion—that is, in reference to the accumulation of dust ?—Yes.

155. Would the very fact that you discovered upon your examination that that particular part of the mine held large accumulations of gas since the explosion has occurred, would that not lead you to believe that the strata of that particular part of the mine contains an enormous amount of CH_4 ?—It leads me to the conclusion that the strata does contain CH_4. Whether an enormous amount or not, it would not require a very great exudation to accumulate a considerable quantity in fifteen days.

156. The explosion occurred on the 12th ?—And it was not until the 28th that I made my examination.

157. Did you discover the gas before then ?—Yes; but we could not get any air to it.

158. That large area was filled with gas before the 28th ?—Yes; perhaps four or five days before.

159. I believe the old workings of this mine constitute the return airway ?—The air scales through them.

160. Evidence has been led to show that the old workings were the return of the mine ?—Yes.

161. If the old workings are the return airways of the mine, and evidence has been led to show that the management took extra precautions by appointing two inspectors to examine them once a week, claiming that by so doing the manager was doing something more than is required by the Act, do you think it is an extra precaution to have the return airways—that is, the old workings—examined once a week ?—I think that is the rule.

162. Then they are only doing what is required of them by the law ?—I do not think the whole of the return air passes through the old workings.

163. But the very fact that it was scaling into the old workings would constitute it a return ?—Yes.

164. There has been something said about rails protruding from the fall in No. 5 bord ?—Yes.

165. You will have noticed that evidence has been led here by Deputy Wear that that fall has increased at each end very considerably ?—It has certainly increased at the upper end. I do not know anything about the other end.

166. I understand it was increased at both ends ?—He said, "longer and higher."

167. Is there any possibility that the rails had been lying there, and that the men had been sent there to remove them ?—I cannot say whether the men were going to lift them or not.

168. They were not entirely exposed when I saw them ?—The manager could not have been aware that the old fall had come down or that it was in the state it is in now.

169. The deputy stated in his evidence that the fall is greater ?—There would have been more of them exposed.

170. It is quite possible, do you think, that they were ordered to be lifted in case they were covered up ?—It might.

171. You know that it is provided in the British Coal-mines Act that where there is ½ per cent. of inflammable gas in the return airways that would constitute a safety-lamp mine ?—Yes, that is my contention. It is to be assumed from that that gas was coming in in quantity.

172. And ¼ per cent. taken from six samples in one split by the Inspector of Mines in the ordinary ventilation would be held to prove that the ventilation is not adequate ?—Not sufficient to dilute it entirely.

173. Do you agree with that ?—Yes.

174. *Mr. Napier.*] Mr. Dowgray asked you a question regarding the gas contained in the strata: what was your answer to that ?—It was proved that the strata did contain CH_4, whether in large or small quantities.

175. In answer to another question, Mr. Bishop, as to whether you considered this a dusty mine, in view of what you now know and of what has happened since as to the inflammability of the dust, would you not now consider it a dusty mine ? What relation has the inflammability of the dust to the quantity of the dust ?—It has no relation to the quantity.

176. So that I may take it that because the dust is more inflammable than ordinary bituminous dust it is no proof that this mine ought to be considered a dusty mine, when it was not considered a dusty mine before ?—It may not be considered a dusty mine and still it may be necessary to take extra precautions.

177. *Mr. Dowgray.*] As to the question put you just now, you said you would not consider it a dusty mine. You were referring to the amount of dust. I understand you to mean that owing to the inflammable dust in this mine, though the amount of dust might not be very great, it may be sufficient to warrant it being considered a dusty mine ?—It would render greater precautions necessary. It does not require a large quantity of dust to make a dust-explosion. One authority has set up the idea that a large quantity of dust may help to extinguish the explosion, even though it set up the explosion in the first place.

178. Since you learned of the inflammability of the dust in this mine would you say that it is a mine in which the ordinary blasting-powder should not be used ?—It would be better to do without it. The safest English explosive to be got.

179. And do you consider that other precautions should be taken by means of the appointment of shot-firers ?—I think that is a wise precaution in any mine, whether it is a safety-lamp mine or otherwise. No miners should be allowed to fire their own shots.

180. *Mr. Brown.*] Is it not customary, when men are sent into old workings to do anything, that the deputy goes or sees that the place is safe before the men go in ?—Yes, it is customary, and he should do so.

181. That door in No. 6: would it be perfectly tight with the pressure on it ?—No.

182. Is it not a fact that it is a most difficult thing to make any stopping practically tight in a mine ?—Yes.

183. Then, if that door was not absolutely tight, would there not be a certain amount of ventilation going down No. 6 ?—A little.

184. Sufficient, probably, to remove an accumulation of gas ?—It would be sufficient to dilute some of the gas.

185. It has been suggested that there was practically 80,000 cubic feet of gas in those bords 4, 5, and 6 and the stentons adjoining ?—There is space for that quantity.

186. If that quantity were mixed to its highest explosive point with air, would the result not be an explosion with one solid mass of flame ?—Yes, it would be very disastrous. I do not think we would have seen any sign of Martin under those conditions. Such an explosion would be to the extent of eight times its bulk.

187. If 80,000 cubic feet of gas were there, as has been suggested, and was ignited, you would have 640,000 cubic feet. If that place was charged with gas to that extent the force would be something terrific, and there would be an unmistakable sign of burning all round those bords ?—Yes; even a 1,000 ft. would result in enormous burning.

188. In gas-explosions and reports of them is it not a fact that the ribs of the bords and the stentons show unmistakable signs of charring, and become absolutely coked for 2 in. in ?—That is so.

189. In regard to the proposed amendment to the Coal-mines Act, what is your opinion of clause 48 (*a*) in regard to workmen's inspectors: should those men not have a practical experience as miners ?—Yes, that is to be inferred—that they are practical men with experience. It should be made clear in the Act.

190. According to the section they can appoint anybody to make that inspection ?—They may appoint two persons, whether employed in the mine or not—that is the reading of the clause.

191. In your opinion, should these men be qualified men, with at least five years' experience ?—I think it is quite reasonable that they be practical miners.

192. Clause 48 (*e*) says that "The persons so appointed shall make a full and accurate report in writing under their hands of the result of their inspection, and shall within twenty-four hours of the making of such inspection furnish a copy of such report to the mine-manager." Is it not fair to expect them to report the result of their inspection in the office of the mine as soon as they come out from the mine, without waiting till the next day ?—I think, the sooner the better.

193. When a man examines a mine he reports immediately on what he has seen, whether he has to make an examination prior to the men going into the mine or an ordinary examination—he always reports immediately he comes from the mine. Do you not think the same rule should apply to the examination and the report by the workmen's inspectors ?—I think it is quite reasonable to ask them to report immediately they leave the mine.

194. *The Chairman.*] Would not a man make a better final report if he were allowed to make a preliminary report, and then after some time to make a final report ?—It has been the practice to make the report in the report-books as soon as they come up. They have always done it straight away with us, and it is better for all concerned to have the report made forthwith when everything seen during the inspection is fresh in the minds of the inspectors.

195. *Mr. Brown.*] In regard to section 48 (*f*), which provides that if the workmen's inspectors report the mine as dangerous they may request the manager to cease work and withdraw the men, if the workmen or anybody who examines the mine is to have the same right as the manager in regard to the withdrawal of the men should he not have the same qualifications ?—I do not know that he should. It is not worth while setting up that idea. I think if you gat practical miners to make the inspections there will not be any trouble.

196. Should they not have some qualifications ?—Yes, the qualifications of a practical miner.

197. Clause 13 of the Bill deals with the height of lifts and pillar workings. You will see there that lifts are limited to 10 ft., and the Inspector is to determine the height it is to be worked up to ?—Yes.

198. Assuming that it is 12 or 14 ft. high with a clean hard roof, would it not be unwise to work to that and leave the coal there ?—You could not do it, the cost of keeping up the coal over 10 ft. may be so excessive; and, again, it may be dangerous to attempt it.

199. Would it not be more dangerous than if you took it right to the main roof ?—Yes, I think so.

200. Who is in the better position to judge—the man who has the whole supervision of the workings, the manager, or the man who comes in and inspects once a month or perhaps less ?—I do not look upon this clause seriously: it is a clause that cannot be worked.

201. Is there any other clause in the Bill you would like to refer to ?—I do not think there is, except that one which provides for the Committee on special rules (clause 9). I think the construction of that Committee is wrong. The Inspector of Mines should not be on it.

202. You are of the opinion that the constitution of the Committee is wrong ?—Yes, it puts the Inspector in a wrong position. It should be the Magistrate instead of the Inspector. I do not think it is an objectionable clause if you get reasonable men on the Committee.

203. *Mr. Dowgray.*] Do you agree with clause 21 (*a*) in the schedule to the Bill, which provides that "All deputies shall during their rounds examine the roof and sides of the mine, irrespectively of the examination by workmen and workmen's inspectors ? Is not that very necessary ?—I think that is quite right and necessary.

204. *Mr. Brown.*] You heard Professor Dixon give his evidence: have you ever come across any reference to him in the mining works ?—Yes, I have known his name for a long time.

205. Is he not a recognized authority ?—Yes, on the analysis of coaldust and the chemistry and behaviour of coaldust.

206. Would you mind reading that out [book handed to witness] ?—[Witness read as follows.] "Transactions of the Institution of Mining Engineers, Vol. xlvii, Part 2, 1913–14.—The president (Sir Thos. H. Holland) wrote regretting that, in consequence of an important meeting in London of the Royal Commission on Navy Fuel, he could not be present at the general meeting of the society to support the proposal to elect Professor Dixon as a honorary member. Professor Dixon was, however, well known to the members of the society, as his researches had had so direct and important a bearing on problems connected with coal-mining. He had served on the Royal Commission on Explosions of Coaldust in Mines and on the Royal Commission on Coal-supplies. He was still a member of the Home Office Committee on Explosions in Mines, and thus continued, purely in the public interest, to devote his time and unusual ability to the solution of problems that added to the safety and amenities of the miner. It was now twenty years since Professor Dixon had delivered the Bakerian lecture to the Royal Society on the 'Rate of Explosion in Gases,' and the researches then described had formed the basis on which progress had since been made not only in regard to the purely theoretical problems, but in regard to the practical application of the principles established. Apart altogether from the way in which Professor Dixon's work had been of direct value to the mining community, his position in the scientific world was such that the society might well regard it as an honour to include his name in its list of members. After a distinguished career at Oxford as a student, as a Fellow, and as a lecturer, Professor Dixon had in 1886 succeeded Sir Henry Roscoe as Professor of Chemistry at the Owens College, having been elected in the same year a Fellow of the Royal Society. Since then he had been president of the Chemical Society in London, and in 1913 the Royal Medal of the Royal Society was awarded to him in special recognition of his contributions to chemical science. His own direct contributions to science form but a part of those due indirectly to his activities, as he had now for twenty-eight years been in charge of one of the largest and most active chemical schools in the country."

Mr. BISHOP recalled.

207. *Mr. Macassey.*] Under section 58 of the Act, if the responsible Inspector of Mines considers a mine exceptionally dangerous he may move to have the men called out?—I would agree to the calling-out of the men, but I would take any steps I thought necessary afterwards.

208. Under section 58 and Special Rule 14 you think there is full power given to the Inspector to control dangerous mines?—Certainly.

JOSEPH MOUNT BROWNLIE, Horse-driver, sworn and examined. (No. 7.)

Mr. Wilford: I ask leave, Sir, to put in the evidence given by Mr. Brownlie at the Coroner's inquest.

Evidence read by witness, as follows:—

"JOSEPH MOUNT BROWNLIE, sworn, saith: I am a horse-driver employed in Ralph's Mine. I went down on the morning of the accident at 7 a.m. I went along to the cabin about 100 yards from the shaft. I waited for Smith, the deputy. He told me to go to the stables and get my horse. I did that. I went down the rope-walk. There were four of us at the stable. We put the harness on and went to No. 2, to the little dip. We only got through two doors and got on the turn. We had left Thompson in No. 2. We had got through the two trap-doors when we felt a gust of wind come towards us. It lifted Morton into the old workings and threw me against the trap-door. I was not knocked about at all. I did not see any flame nor hear any sound. There was a smell of something—not fresh air. We then came back to the shaft by another way, the three of us. The air was good along this way and at the foot of the shaft. It took us ten minutes to get to the shaft from where we were struck by the gust of wind. It would be about 7.20 when we met the wind. I have been working in the mine about four years. I have never heard of any complaints among the men of insufficient air or gas. It was always looked upon as safe. I took two boxes of explosives to the cutting-machine in No. 6, Wilson's gig, on the Thursday, and on Friday took two cases to the stone drive. I saw Darby: he was at the telephone at the shaft-bottom. I thought he was getting the word from No. 6 cabin.

"By Mr. Bennie: I have driven in No. 6 and No. 6 special. I have not seen much coaldust on the road from No. 6 cabin to the door—*i.e.*, the first door. There would be a little at the side, but the track was rather slushy. I have been travelling round that way since the strike. The track was watered by Ransome. I could not say how far it was kept watered.

"JOSEPH MOUNT BROWNLIE recalled: On the day prior to the accident I got instructions from Deputy Smith to take rails from the little dip. A fortnight before I had been drawing rails from the same section. Smith gave me Alexander McGill and Mortrum to assist me, and said he would send others to assist—four others. This was on the Saturday morning. He did not mention names. I was at the shaft-bottom when I got the instructions. We were to take the rails to the trap-door leading to No. 5 section. The four others would come through the trap-door from No. 5 to meet me and help me to lift the rails. I was one of the first to go down the mine that morning. I did not see the four others. On the Friday evening previous to the accident I spoke to Allen and Baker, and they said they were going to the little dip to help to draw rails. I think Roper and Jackson were also to help. Martin worked in No. 5; he was a contract trucker. I do not know what Martin would be doing there that day unless he went to draw rails for No. 5. The bodies of Allen, Roper, Baker, and Jackson were found just on the No. 5 side of the door that was blown out.

"By Mr. Tunks: I would have brought the rails right up to the door with the horse, and they would then have been pulled through the door, and we would all have taken them to No. 5 flat sheet. The whole seven of us would have gone right to the bord to help to draw the rails.

"By Mr. Napier: I did not know what Martin was there for. No. 5 truckers were there a fortnight before drawing rails. By the 'trap-door' I mean the door that was blown out."

1. *Mr. Gould.*] Did you see the bodies of Allen, Roper, Baker, and Jackson down the mine?—No, not on the Saturday morning.

2. You have no knowledge of your own as to where they were found?—No.

3. Who gave you your instructions the previous fortnight to draw the rails?—Mr. William Smith, the deputy.

4. That is the same man who gave you the instructions on the Saturday of the disaster?—Yes.

5. Who assisted you the previous fortnight?—Baker, Jackson, Broadbent, Wilson—I do not remember the rest.

6. Baker and Jackson were lost in the explosion?—Yes.

7. On the previous fortnight, where did those men meet you?—In the little dip.

8. Did you on that occasion take the horse round to the little dip by the same road which you followed on the morning of the accident?—Yes.

9. And which way did the other men come to you?—Through No. 5.

10. What did you do at the little dip?—I was sent there to draw rails and take them to No. 5.

11. The whole of you?—Yes, seven of us.

12. And you all took them down to the door and had put them through?—Yes.

13. Can you point out just where you were at the time of the accident?—Yes. [Spot pointed out by witness.]

14. Which way were you going?—I was going along the old winch level, and in along the horse-road into the old workings.

15. Just where were the rails that you were to lift on the morning of the accident: were they at the same place as you were lifting them from on the fortnight previously?—Yes.

6. In which bord was that?—I could not say. It was in Legg's bord.

17. Can you indicate which side of Legg's bord ?—No.

18. Did you notice falls between the place where the rails were and the door where you were to put them ?—I noticed them when I was driving there. I think it is the second bord off the trap-door.

19. That is the old fall ?—Yes.

20. How far were the rails from that spot ?—I could not tell you.

21. How many bords away ?—I think it was the fourth bord away ; but I am not sure.

22. Did you notice some rails at that fall ?—No ; I was not in it that day.

23. You mean you were not in that particular place when you went there into that section a fortnight before ?—That is so.

24. Were you in old workings when you were struck by the blast ?—They are old workings now.

25. When you were in there on the morning of the accident, would you call them old workings then ?—Yes.

26. Did you pass through any doors leading to that spot ?—Two doors.

27. Were they open or shut ?—Shut.

28. Were they locked ?—No.

29. Were there any locks on them ?—No.

30. Did anybody give you any special instructions as to opening or closing those doors ?—You do not need to close them—the wind closes them.

31. Was anybody there looking after the opening and closing of those doors ?—No.

32. Are any of the bords that you passed, forming part of the old workings, fenced in any way ?—Yes.

33. Are all of them fenced, or how many, about ?—Nearly all of them are fenced along the old horse-road.

34. I mean those leading down No. 5, near where the rails were to be lifted : are any of those bords fenced ?—Not that I know of ; I do not think so.

35. Are any of the bords forming part of the old workings leading off the old horse-road unfenced ?—No, I think they are all fenced in.

36. Why was it that you went on that roundabout journey to get to that point ?—Because I could not get the horse through the trap-door—it was too small.

37. The more direct route was through the trap-door, but you could not get through that way owing to the presence of the horse ?—Yes.

38. Was there any other way for you to get there except that way ?—I could have got there by going through No. 5.

39. Were you able to go through the dip with your horse ?—Yes, the way I did.

40. You expected the other men to come through the trap-door to meet you ?—Yes.

41. Was that in consequence of anything you heard from Deputy Smith ?—Yes.

42. What did he say ?—That I was to go that way, and that he would send the other men down the other road.

43. Did he use the words, " the other road " ?—That is what I understood he would do.

44. What were Deputy Smith's words when he told you about these other men ?—He said he would send over four men down to meet me.

45. Did he indicate which way they would come ?—That is the only way that I know of.

46. Answer my question, please : did he indicate which way they would come ?—No.

47. Did he mention that trap-door ?—No.

48. Did he mention which way they were coming ?—No, he did not.

49. *Mr. Tunks :*] Are you quite sure that it was the fortnight previously that you went to draw rails ? Was not the mine working the previous fortnight ?—I do not think so.

50. Are you quite sure ?—I would not say ; I am not sure.

51. If the mine had been working you would have been at your working-place ?—Yes, at No. 6.

52. You would only have been drawing rails if it was an off Saturday ?—Yes.

53. You are not quite clear whether the mine was working or not on the Saturday a fortnight previous ?—No.

54. Did I understand you to say that you saw Darby or Smith ?—Darby.

55. He was at the telephone, and after he had been at the telephone did you get your instructions where you were to go ?—Yes.

56. Then, may I understand this : that you would not have started until you got your instructions from Darby ?—From Smith.

57. I mean from Darby at the telephone, who got them from Smith ?—No.

58. You did not hear what Darby was saying at the telephone ?—No.

59. But did you know that that telephone connected with No. 6 cabin ?—Yes.

60. And that the usual routine was for the deputy to ring up No. 6 cabin before the men started to work ?—Yes.

61. And get the word from the examining deputies ?—Yes.

62. Then, when you were waiting for the word to start on your round did you know where these men were ?—No.

63. You did not know where Allen, Roper, Baker, Jackson, and Martin had gone to ?—No.

64. You said, I think, that you had seen the old fall in No. 5 alongside the bord with the trap-door when you were driving there : how long ago ?—Before the strike.

65. Which trap-door did you mean—the one that is blown out since the explosion ?—The small door at No. 5 section.

66. You say that that had existed there at the time of the strike ?—Yes.

67. Were you working there then ?—I was a horse-driver on that section.

68. Are you quite sure of the bord in which the fall was—that it was in the bord alongside the one that had the trap-door ?—I would not be quite sure, but I have not been in any other bord since the strike.

69. Was it there that you were going for the rails on this occasion ?—Not where the fall was.

70. Did you see the fall frequently before the strike ?—Once when I went up for a trucker.

71. Where was he working ?—Up close to the fall.

72. Through that door ?—In the little dip, this was.

73. Was that door in when you were driving there ?—No.

74. So that that door has only recently been put in ?—I think so.

75. Was it not there before the strike ?—Not that I know of.

76. Do I understand that you are not able to say exactly where the rails were which you were going to lift that morning ?—I could not say the number of the bord.

77. Were they in the same bord from which you had taken them previously ?—Yes.

78. Had Martin been with you previously ?—No.

79. Did you know that Martin was going up with you on the 12th ?—No.

80. You say you did not expect to find him there ?—No ; I did not see him at all that morning.

81. Well then, you say the trap-door was not there when you were driving there. Was there any stopping there at all ?—I do not think that bord was through when I went up there that day.

82. And you were only there the once ?—Yes.

83. Are you working in the mine now ?—No.

84. On the previous occasion did you take the rails through that trap-door ?—Yes.

85. But you did not see the fall ?—No.

86. You were working there the whole day on that previous occasion ?—Yes.

87. And the same deputy was there ?—Yes.

88. Deputy Darby was also in charge on the previous occasion ?—Yes.

89. Did Deputy Smith come anywhere near you on the previous occasion ?—Yes ; he was in before us that morning.

90. Into this place where you were to draw the rails from ?—Yes.

91. So that before you went into it the deputy was before you on the previous occasion ?—Yes.

92. And it was the same deputy who was in charge on the 12th ?—Yes.

93. Do you know which way the deputy went in on the previous occasion ?—He must have gone through the door.

94. With his safety-lamp ?—Yes.

95. *The Chairman.*] Were there any instructions given to you and the men as to entering these old workings ? Are there any general instructions given to workmen in regard to entering these old workings ?—I could not say whether there are or not.

96. Have you ever been told ?—Yes ; I have been told often not to go into the old workings.

97. Do you know of any other men who have been told ?—I do not know.

98. *Mr. Dowgray :*] You say that on the fortnight previously the deputy had been in that part of the mine. What indications have you that he was there ?—He was there when I went in—I saw him.

99. He must have come round the other way. Did he give you your instructions at the shaft-bottom in the same way as he did on the 12th ? Was it Deputy Smith you saw before you went down the old dip ?—Yes.

100. And it was Deputy Smith on a former occasion, too ?—Yes.

101. He sent you down the same way ?—Yes.

102. But when you got down to that part of the mine he was there ?—Yes.

103. He visited it along with the other men ?—The other men were not with me that morning.

104. He had got in before the other men ?—Yes.

105. Were Deputy Darby and Deputy Smith together that morning ?—Yes.

106. On that occasion when you arrived at this door the deputy was in there making his inspection ?—Yes.

107. Had he a satefy-lamp with him ?—Yes.

108. On the occasion a fortnight previous to the 12th, when you arrived at the cabin you went the same way you were told to go on the 12th. You met Deputy Smith when you reached the point to which you were going ?—Yes.

109. Then he must have made his inspection after he sent you down the little dip ?—He must have.

110. He was not amongst the men who were discovered on the No. 5 side of the door ?—I could not say.

111. Did the deputy give you just the same instructions on the 12th as he did on the previous occasion ?—Yes, he told me to go to the same place where I was a fortnight before. He told me that on the Friday morning going to work. He did not say whether there would be anybody coming down to see us.

112. What was the custom in this mine : does the deputy tell everybody that the place is safe ?—I do not know.

113. How do you know that the mine is safe ?—They ring up and the deputy tells us to go—that it is all safe.

114. He did not tell you that that particular place was safe that morning ?—No.

115. On the previous occasion had you to get your horse after Deputy Smith had passed you down the little dip ?—Yes.

116. And that would take some little time ?—About eight minutes from the shaft to the stable.

117. And how long to get the harness on ?—Not very long.

118. *Mr. Napier.*] You said that on the previous occasion the deputy told you to go along—that it was all safe. Was that the custom in the mine ?—Yes.

119. Was that custom observed on the previous occasion—a fortnight before : you said he rang up and got the answer " All safe " ?—He said, "All safe."

120. You are speaking of what happened a fortnight before the 12th ?—Yes.

121. And that was the custom ?—Yes.

122. You would not go to work on any morning unless you got that word ?—No.

123. Now, coming to the morning of the accident, have you any doubt that a similar word was given to you by the deputy before you started ?—No.

124. You have no doubt ?—No.

125. *Mr. Dowgray.*] I am not at all clear in regard to this matter. Pay-Saturday is a different day from a working-day ?—Yes.

126. What was the usual custom in this particular mine ? What term does the deputy use on such mornings ?—He told me I had to go to No. 5 through the dip to draw the rails there into No. 5.

127. On that particular morning did he use the term that it was " All safe " ?—He said it was " all right," and that I was to go to No. 6 cabin, and that the others would be told where they had to go. He would send me through into the dip with my horse that morning.

128. He told you to go to No. 6 cabin ?—He told every one to go to No. 6, but I had to go to the stables and get my horse.

129. Where were these other men going ?—I cannot say—some to different parts. And the word " All right " was meant in a general sense.

130. Did he say, " You can go down the little dip—she is all right there " ?—No.

131. He said, " You can go, boys, she is all right " ?—Yes.

132. *The Chairman.*] What do you suppose he meant by the words " all right " : what does that convey to your mind ?—That the mine was safe and that we could go on with our work.

133. *Mr. Dowgray.*] What impression had you when you met the deputy on the previous occasion ?—I never thought anything.

134. Did you not think he should be there with the safety-lamp ?—No.

135. Did the other fellows come after he left you ? When did the other men join you on the previous pay-Saturday—were they long after the deputy ?—No.

JOSEPH YOUNG sworn and examined. (No. 8.)

Witness read and put in his evidence given at inquest, as follows :—

" JOSEPH YOUNG, sworn, saith : I am a miner employed at the Huntly Mine. Up to about a fortnight before the 12th September I was employed with Mr. Wear inspecting the old workings. I had been employed at this for about two years. The results of the inspections would be reported in the book every day. I wrote the reports, and Mr. Wear signed them. I have also signed the reports. On the 23rd March, 1914, we found a large accumulation of gas in No. 7 working. Gas was also found on a second occasion on the 14th April. We found gas in 5, 6, 7, and 8 bords in No. 7 south, occurring at intervals of three weeks, and came to the conclusion there was something wrong with the fan. The reports do not state the extent of gas. I cannot say that steps were not taken to remedy the presence of gas when it was reported. We could not visit that place for another week. We have found gas in No. 5 south, little winch level in the little dip section, No. 7 north, and No. 7 south. In my opinion, the gas found in these places was in dangerous quantities. Gas was found in the winch level in the little dip section on 29th April. I think this is the last occasion gas was found in that level ; the level was inspected every week. There is a good bit of dust in that level. I would not consider it the dustiest part of the mine. There were four fairly big falls there. I did not see any indication of spontaneous combustion having taken place there, nowhere in that section. I do not think we tested for spontaneous combustion, as we did not think it necessary. I have had twenty-five years' experience of mining. If we found a small quantity of gas—under 2 per cent.—I would not consider it dangerous. We would make a test at every face, or where there had been a fall. We would average one fall a month. This is a rough estimate and probably excessive.

" By Mr. Tunks : The four falls were composed of fireclay and coal. These are the falls we expect to liberate gas. This material could generate spontaneous combustion. It is only a rough guess to say there is a fall every month—that is counting the big and the little. Every fall would be reported in the book.

" By Mr. Dixon : I have known men go into the old workings instead of the lavatory with naked lights. I consider it dangerous. I reported it verbally. In some parts they would only have to step through the fence. The miners would know they should not go there. A copy of the Coal-mines Act and regulations is posted up at the pit-head.

" By Mr. Napier : I vouch for the accuracy of these reports. All falls ought to be reported. If they are not in the book they ought to have been. The falls that I mentioned were all reported. There were no falls recorded in the month of August. When I vouch for the accuracy of the reports I only vouch for the reports in my handwriting. I believe the other portion is equally accurate. When we visited a place where gas was reported a week later we sometimes found gas there, but in different quantities. It was our duty to report the discovery of gas in any quantity. Anything over 2 per cent. I should report. The book does not distinguish between dangerous quantities of gas and otherwise. Every quantity of gas I should consider dangerous. I do not agree with Mr. Wear's opinion that gas was only dangerous on one occasion, or on two occasions at the outside. Any gas I discovered in the mine I would report irrespective of quantity. You could not tell from the book whether the gas men-

tioned was in dangerous quantities or not. If we had considered it necessary to test for combustion with the iron bars we would have done so. The 14th August was the last day I inspected. I usually agreed with Mr. Wear in the opinion he formed of the inspection. We got on well together.

"Re-examined: George Hancock was one man who was going into the old workings, and Mr. Wear stopped him. I have found traces of men having been in the old workings on other occasions. I have seen their lights there. I would mention the matter to Mr. Wear. It was a common occurrence for men to go into the old workings instead of going into the lavatories. I have warned men from time to time. I have verbally reported it to Mr. Wear on occasions.

"By jury: I left the position with Mr. Wear through bad health. It was a case of slow poisoning due to carbonic acid and to air being polluted by men, horses, and shooting.

"By Mr. Dixon: I may have said to you before the explosion that there might be an explosion. I don't remember saying it, but I may have said it after discovering the two big accumulations of gas."

1. *Mr. Wilford.*] Have you passed the gas test, Mr. Young?—Yes.

2. Under whom?—Under Mr. Frank Reed, the Government Inspecting Engineer of Mines. I have my certificate here if you wish to see it [certificate produced and read by witness as follows]:—"Department of Mines Court, 20th December, 1913.—This is to certify that Joseph Young, of Huntly, has proved his ability to distinguish with a miner's safety-lamp the correct percentage of methane (firedamp) present in mine-air.—FRANK REED, Inspecting Engineer of Mines."

3. Mr. Wear has no certificate such as you have?—That is so.

4. As a matter of fact, did you leave that mine because you were in ill health, or because you feared a catastrophe?—I left the mine through bad health as the result of working in it. I have not a doctor's certificate to that effect, but I can get one if it is necessary, because I know the doctor is prepared to corroborate my statements. He told me I was suffering from slow poisoning by carbonic-acid gas in the mine.

5. You have been twenty-five years in mines?—Fully that. I was thirteen years of age when I first went into the mines.

6. Where was that?—Kaitangata.

7. Were not you really of opinion that there was trouble coming in Ralph's Mine because of the gas?—I did not like it. The accumulations were too large for me, but a man gets careless and is apt to take no notice.

8. Did not the fact that there was a possibility of an explosion down in the mine cause you a good deal of concern and worry?—I will admit that it did on two occasions.

9. What were those special occasions?—You will find them in the book—accumulations of gas in No. 7 south.

10. That was on the 23rd March, 1914?—I could not swear to the date, but it is in the book.

11. Is this the book [book preduced]?—Yes.

12. The date is 23rd March. I understand you found a large accumulation of gas in No. 7 south?—There was a large accumulation of gas, but whether it was on that date I could not say.

13. That was the report quoted at the Coroner's inquest?—But as I say, I could not swear to the date.

14. What do you mean by "a large accumluation"?—I mean hundreds of thousands of cubic feet.

15. Do you mean hundreds or thousands?—I mean anything up to a hundred cubic feet.

16. As much as a hundred?—Yes.

17. More than that?—Yes. I will work out the amount of gas that was present on that occasion. [After figuring] I say there was over 30,000 cubic feet of gas—33,600 cubic feet, I make it.

18. Will you tell us how you arrive at that?—I reckon there were four bords, 14 ft. by 6 ft. high. I am allowing that you could not get within 100 ft. of the place.

19. Now, did you make any special report on that startling discovery?—Mr. Wear went for the underviewer on one occasion. I went myself on another occasion.

20. Did you make a special report?—It is there in the book.

21. He did not mention the quantities of gas there?—No, you never do.

22. Now, will you look at this report-book and the report in it dated 14/4/14 [book handed to witness]: is that your report?—That is my handwriting.

23. That is your report, is it not?—Yes. "I, the undersigned, have examined old workings and return airways in the above-named sections (Nos. 6 and 7 south sections); found gas in 5, 6, 7, and 8 bords; No. 7 south section ventilation bad; No. 6 section safe, no sign of heating, ventilation good."

24. Did not these discoveries of gas recur—that is to say, did not you find them at intervals of a few weeks?—Yes, but not in such vast quantities.

25. You know which is No. 5 south, little winch level?—Yes.

26. Have you found gas in No. 5 south, little winch level?—I think that is a mistake. There is no winch in No. 5 south.

27. Is that not your signature [report produced]?—Yes. "We have found gas in No. 5, little winch level in the little dip section," and so on. But that means they are all different places, and not that the little winch level is in No. 5. This report is quite correct.

28. In your opinion, unquestionably the gas was found in dangerous quantities because it is over 2 per cent.?—Yes, that is what I have said all along.

29. Now, on the 29th April, 1914, your book says, "No. 1 Limb's heading and little dip north section: I, the undersigned, have examined old workings and return airways in the above-named section; found gas in three fall little dip section. All rest of sections safe. No sign of heating. Ventilation good"?—Yes, that is right.

30. Whereabouts is that point on the plan ?—[Witness indicated point on plan.]

31. That is about the locality referred to in your report of the 29th April, 1914 ?—Yes, sir.

32. Is there a good deal of dust in that part ?—No, there is dust there; but it is not the dustiest part of the mine.

33. Which do you consider the dustiest part of the mine ?—Close to the travelling-road where most of the men travel. [Plan, Exhibit AA, discussed by witness with Mr. Wilford].

34. Do you know bords Nos. 4, 5, and 6 ?—Yes, I know them.

35. Do you know where the big fall is ?—Yes, the first bord down on the left.

36. Do you know the new fall at No. 6 ?—No.

37. Do you know this door ?—Yes.

38. Was it ever locked ?—No.

39. Has it got a lock on it ?—Not that I know of.

40. At the other end is the bord fenced off ?—I do not know that that particular one is fenced off, but they are fenced off along the roadway.

41. You said in your evidence before the Coroner, "We would make a test at every face or where there had been a fall. We would average one fall a month." That, of course, you qualified by saying that it was only a rough estimate and might probably be excessive. You also said there were four fairly big falls there: where were you referring to ?—In this little winch level. That was one of them which we have been speaking about.

42. In this particular bord we are discussing, in No. 5, is one of the falls referred to by you. You say there are four fairly large falls: where were the other three ?—There are two on this side of it, nearer the winch.

43. Nearer No. 5 section ?—No, further away from No. 5 section.

44. Do you know of any man getting burnt while you were there ?—Everybody knows about Kelly getting burnt.

45. Do you know whether Kelly was burnt twice ?—I could not say. You do not want hearsay evidence—then I do not know.

46. Do you know the names of any men who were burnt except Kelly ?—No.

47. Is that the only man you know of being burnt ?—Yes. I have never seen anybody else but Kelly. I knew that he was burnt because I saw him afterwards.

48. Did you know of Conn being burnt ?—Yes, but that was in the Extended Mine—I was speaking of Ralph's.

49. Do you know of any occasions when men have been drilling holes and got a flame—that was in Ralph's ?—You mean, have I seen it ? I say, No.

50. *Mr. Napier.*] I think you told us that you were suffering from carbonic-acid-gas poisoning ?—That is so, sir.

51. And that that was the reason why you left the mine ?—Yes.

52. I suppose you believed that there was a large quantity of carbonic-acid gas in the mine ?—I did not say so.

53. But was there ?—No. I was in it so long that it was beginning to affect me.

54. Was there only a little of it there ?—I have no means of answering that question.

55. Then you cannot give us any idea of the quantity ?—I only know it was there.

56. And I suppose you breathed it ?—Yes.

57. When you went round on your inspection did you walk ?—Yes.

58. Upright ?—Yes.

59. You did not crawl on your hands and knees ?—No.

60. Do you say you breathed the carbonic-acid gas as you walked ?—That is so, sir.

61. You did not find much inconvenience, I suppose, from breathing the carbonic-acid gas at the time, but it was only your being so continuously there which weakened your health ?—Yes, only at times you could tell it was there. You could not get the extreme limit. I have never lost my light.

62. I suppose you would lose your light in carbonic-acid gas ?—Yes, at the extreme limit.

63. The mixture of gas with carbonic-acid gas would tend to make an explosion more possible ?—I do not think so.

64. I mean to say, would firedamp and carbonic-acid gas be likely to explode ?—Yes, but I was not speaking of firedamp.

65. But I want your opinion ?—I have no opinion on that question.

66. You have said that there would probably be an explosion in the mine ?—I do not say I admit that.

67. Do you deny it ?—It is probable, but I could not swear to it.

68. You said that probably there would be an explosion. Had you in mind the carbonic-acid gas and the injury it was doing you ?—Yes.

69. Then you believed, of course, that the presence of carbonic-acid gas might tend to make an explosion if ignited ?—No, I do not know too much about it. This gas is a non-supporter of life and combustion: it will not explode. You are speaking about CO_2. It has nothing to do with an explosion.

70. Then, when you spoke to those persons about an explosion you had not in mind the presence of carbonic-acid gas ?—Certainly not.

71. What is the position of carbonic-acid gas—where is it found ?—It has been found in the roof as a mixture.

72. Then, it is not found near the floor ?—It is always found near the floor.

73. Did you continually breathe it at your own height when walking through the mine ?—That is so. You must also remember that a man has to stoop down and write his date on the floor very often.

74. Was that the case with you—that you only detected the carbonic-acid gas when you stooped down ?—That is not so.

75. You really felt it when you were walking through ?—Yes.

76. In answer to Mr. Wilford you said that you found that these accumulations were recurring ?—Yes.

77. That is, of course, coming back ?—They were there on different occasions.

78. Does that mean that they disappeared or were removed, and that other gas came in similar quantities ?—I could not answer that question. I am only speaking of my examination.

79. I wanted to find out the meaning of your own language. Mr. Wilford said "recurring" and you agreed. I want to see whether you mean that ?—It is not fair to ask me to swear that that was the same gas.

80. I want to know what you meant by the evidence you gave this morning. You said you found large accumulations of gas at recurring intervals ?—Yes.

81. Was that gas of the same kind—is that what you meant ?—That is so.

82. Do I understand you to say that what you meant was that the gas had been removed from time to time, and then that the gas came back again ?—I could not say.

83. Do you suggest that it was the same body of gas ?—I do not suggest anything.

84. You do not suggest anything ?—Not as regards that.

85. Either the gas remained or it was removed ?—That is clear.

86. What is your opinion: did it remain in its original state, or was it removed and did it come back later ?—I could not answer that question. All that I know is that the gas was there several times.

87. I am afraid that is not sufficient. You said you found the gas at recurring intervals—that was, that there was gas there from time to time ?—I will not swear that that was the same gas. All that I know was that the gas was there.

88. Was the gas removed after your report had been made in the book ?—I do not know.

89. Did you always report the presence of gas ?—Yes; I saw by the book that it was removed, according to Mr. McGill's report, and I expect that is right.

90. If you found gas and you reported it in the book, and then afterwards you did not find gas on your subsequent visit, would the inference be that it had been removed or become diffused ?—If we found gas on one visit, and then the next time there was no gas, any intelligent person would know that the gas has been removed or diluted.

91. Your conclusion, as an intelligent person, would be that the gas had been removed or dissipated ?—Yes.

92. How long were you inspecting ?—I was not inspecting—only assisting.

93. How long ?—Two years.

94. I suppose that you would consider that 33,600 cubic feet of gas was a dangerous quantity ?—Yes.

95. Would you not consider it your duty to report that quantity either to the underviewer or the manager, so as to endeavour to protect your fellow-men ?—You will see that the underviewer was informed on both those occasions.

96. You informed the underviewer that there was over 30,000 feet of gas ?—No, we did not mention any quantity. We brought him in and showed him the gas. On one occasion they disputed my accuracy. I said there was 2 per cent., and they said 7 per cent., but they went higher up than where I tested.

97. On one occasion you reported to the sub-manager the presence of gas, and he disagreed with you as to the quantity ?—Yes.

98. Can you say whether anything was done by him or under his orders to remove that gas ?—I would not know, but there must have been something done because there was none there next time.

99. Then something must have been done ?—Yes.

100. And I suppose you passed this place once a week ?—Yes.

101. So that you passed the place where there was 30,000 cubic feet of gas, say, one hundred times ?—In two years; yes, easily.

102. And on two occasions only there were large accumulations ?—Yes.

103. And they were removed or dissipated during the week ?—Yes.

104. Was it a flare-out, or a small escape of gas which accumulated between the dates of your inspection ?—It came from a feeder.

105. A small feeder emitting the gas all the time between the dates of your inspections ?—Yes.

106. When you found the 33,000 feet of gas it must have been fairly stagnant: was it moving ? If so, then the gas was being diffused by air-current ?—Quite correct.

107. On the second occasion when you discovered the 30,000 ft. of gas, was the sub-manager there ?—On the two occasions he was there.

108. Have you any idea whether proper steps were taken to dissipate that gas ?—I suppose you are aware that we realized the danger when we went for the underviewer.

109. Have you any doubt that he did not take precautions ?—I do not know.

110. The disappearance of the gas is the best proof ?—That is so.

111. Do you know how the gas would be dissipated except in the natural way by ventilation ?—I do not know any other way.

112. You do not know what special steps can be taken ?—I know what should be done.

113. You should shift it with ventilation: was that done ?—It must have been done, because the gas disappeared.

114. Did you report any inadequate ventilation near where this gas was ?—The fact of the gas being there showed lack of air.

115. You made no special report about the 30,000 ft.: did you discuss with Wear the amount ?—No.

116. Did you discuss with him how deep it went into the place ?—He could see for himself.

117. He disagreed with you at times ?—There was an error of judgment on his part. He forgot I had left there three or four weeks.

118. What date was that ?—About a couple of months ago.

119. As a matter of fact, you wrote all Mr. Wear's reports ?—Yes.

120. And he signed them ?—Yes, after I had read them out to him.

121. You concurred in the report ?—I do not know; he was the man in charge of the work.

122. You do not know whether you agreed with his reports ?—I do not know that I was responsible for the reports.

123. But you agreed that what you had written down was a fair account of what was seen ?—Yes, I think so.

124. Did Mr. Wear dictate the words to you ?—No, not necessarily so.

125. They were your own words ?—Probably I might refer to him as to where we found gas. It was read over to him.

126. You do not think you should have specially referred to the finding of gas in the book ?—No, when I report gas I always consider there is danger.

127. So that if gas had been found in very small quantities on ten occasions, and you reported it "Gas discovered," the management might be misled if they assumed that you had discovered it in smaller quantities ?—That would be the manager's business.

128. Always to go and assume the quantity when you reported it ?—I did not say that, but I consider that my duty ended there.

129. Without in any way testing the quantity ?—Yes, we may have mentioned it verbally.

130. Do you suggest that you or Wear mentioned the quantity ?—No, the presence of gas in large quantity.

131. You say you considered the dustiest part of the mine was the haulage-road ?—No, I said the travelling-road.

132. And you said the reason for that was that the men walking up and down ground down the floor and made it dusty ?—That is so.

133. What is the floor ?—Fireclay and stone, and in some places coal.

134. How much stone floor is there, and how much fireclay ?—I could not say, only I remember places where there is more than 50 per cent. of stone.

135. You are aware that the central portion was watered ?—Yes.

136. In that part the traffic of the men would not make it dusty ?—No.

137. The men have told us that there was too much water—that it was slushy ?—Yes, that is so, to my knowledge.

138. *Mr. Tunks.*] When did you get this gas-testing ticket, Mr. Young ?—20th December, 1913.

139. Where were you tested ?—At the Auckland Exhibition.

140. Who made the test ?—To the best of my knowledge, it was Mr. Reed.

141. Were you shown a diagram before the test was made ?—Yes, I had all those instructions.

142. You mean, immediately before the test was made ?—You saw the diagram; it illustrates the various heights and percentages.

143. And directly after that you were shown the lamp in its testing-place ?—Yes.

144. I suppose if I had been present and had been able to see the gas I could have got a certificate, too ?—I am not too sure about that.

145. Had you to answer any questions in regard to mining ?—No, I do not think so.

146. Now, you have told us that on two occasions you found a large quantity of gas—24th March and 14th April ?—I did not swear to the dates.

147. Which was the occasion on which the large quantity was discovered ?—They were both large quantities.

148. You cannot say those are the dates ?—No, but to the best of my knowledge they are.

149. You had one in March and one in April ?—Yes, I think those were the dates.

150. Why did you not leave the mine, then, if they frightened you ?—Familiarity breeds contempt: I suppose that was the reason.

151. Did you report these accumulations to anybody else except the under-manager ?—No.

152. You did not mention them to any of the men ?—Not that I am aware of. One man says that I did, but I do not remember it.

153. You did not report them to any person connected with the union or anything of that sort?—No, certainly not.

154. Did Mr. Wear ever tell you what he put in the report-book ?—I could not say that he did, because each report is so similar. If you get gas you report it, if you do not get gas you say nothing about it: that is the difference.

155. You had a free hand as to what you should put in the report-book ?—No, I could not put in anything I liked.

156. Did you have any argument as to what should go in ?—No.

157. You always agreed ?—Yes.

158. How long ago is it since you left the mine ?—About five or six weeks.

159. So, notwithstanding these large accumulations of gas, you remained in the mine from April until five or six weeks ago ?—That is so.

160. What are you doing now ?—I have not been doing anything particular for two or three weeks.

161. Nothing at all ?—A few days in the bar.

162. Have you previously worked in the bar while you were in the mine ?—Yes, in the evenings.

163. A fair amount of carbonic-acid gas there ?—I do not know.

164. *Mr. Macassey.*] If you considered this mine so dangerous, why did you not report the matter to the Inspector of Mines ?—I was only an assistant.

165. Or report it to the manager ?—What sort of a time would I have had if I had done that ?

166. So that notwithstanding that the mine was dangerous to your fellow-workmen you did not report it either to the manager or the Inspector ?—No, the manager knew all about it.

167. *The Chairman.*] You say that this accumulation of gas measured 33,600 ft. : that was got out of four bords, 14 ft. by 6 ft. Were those bords all connected ?—Yes, they were all connected by cut-throughs.

168. That was one lot of gas ?—In one part of the mine.

169. And there was another accumulation in another part ?—Yes.

170. Will you describe the effect which this carbonic-acid gas had on your health ?—I consider that I was there too long. After about eighteen months I felt it affecting me ; I got a nasty yellow colour ; I could not eat, or sleep, or smoke.

171. Did it affect any other men in the same way ?—Yes, there was a man there before me who got the same trouble.

172. Why do you attribute it to the carbonic-acid gas ?—The doctor told me that was his opinion.

173. Carbonic-acid gas is heavier than air ?—Yes.

174. If you breathe it at the height at which you walk that would indicate that the drive was full of it ?—We have some eminent men who tell us that CO_2 is found in the roof.

175. But it was diluted with gas ?—I would be stooping down—that would be 18 in. or 2 ft. from the ground.

176. How do you account for other people not feeling it ?—There was another man to whom I referred.

177. That is only two ?—We have been doing that work too long.

178. *Mr. Dowgray.*] I believe you said that you wrote all the reports when you travelled with Mr. Wear ?—That is so.

179. Why had you to write them ?—Mr. Wear is not a very good scholar.

180. Is he altogether illiterate ?—He can sign his name, as you can see in the report-book.

181. So that if you say you found 36,000 ft. of gas in a place, he would have no method of showing whether you were right or wrong ?—I did not tell him.

182. He would not have any method of finding it out ?—No, though he is very good at mental arithmetic.

183. He could have worked out the amount of gas ?—No, I do not think so.

184. Owing to his being illiterate you had to write his report ?—Yes.

185. In reply to a question by Mr. Napier you said you got a 2-per-cent. test in one place, and that the manager disputed it and he got a 7-per-cent. test. Mr. Napier put it to you as to whether it was not a sure sign that the gas was being diluted. Would it not follow that they were further in than you ?—That was so. He wanted to say that the gas was moving.

186. You get a higher test by going into it ?—Yes.

187. You suggested that the gas was not moving ?—I said it was not moving.

188. The gas is stationary ?—Yes.

189. There is only one method of shifting gas or diluting it—by ventilation ?—Yes.

190. If precautions were taken to remove that gas by ventilation, on your next visit would you not be able to see the method that had been adopted ? If brattice had been used it would still be there ?—Yes.

191. When you returned was brattice there ?—In some cases it was just the same. It was old workings, and probably the intakes had been interfered with. A little air might have been taken from the intake airway.

192. But there were no particular signs where you entered that place ?—Yes, I have been there and put it there myself.

193. How would you account for such an amount of carbonic-acid gas in the return airways that it was harmful to your health ?—In the old workings there were places where the ventilation was not good. There was decaying vegetation.

194. Would there be carbonic-acid gas if the ventilation was good ?—No.

195. If the ventilation was fair would there be sufficient carbonic-acid gas to injure your health ?—No.

196. When you were asked why you did not report this large amount of gas to the Inspector of Mines you said, "What sort of a time would I have had ?" What did you mean by that ?—I would have been exceeding my duty. That was the manager's duty.

197. Do you not go past what is other men's duty to report anything dangerous ?—No.

198. Have you passed as a deputy ?—Yes, but I was acting only as a shiftman.

199. You said, "What sort of a time would I have had ?" Do you think the manager would have reprimanded you for exceeding your duty ? Would the manager have given you a "hot time" ?—I think I would have been overstepping my duty, and the manager would have been justified in penalizing me.

200. But the manager would not inspect that book every day ?—Yes, his signature is in it.

201. You admitted that you considered the large amount of gas was dangerous ?—Certainly it was. I still stick to my first statement that any gas in sufficient quantity for me to report is dangerous. That is my idea. The fact of my reporting it and of their removing it is also proof that it was dangerous.

202. In regard to that question put to you by Mr. Wilford and by Mr. Napier as to the gas recurring, do you mean that you discovered it in one place and when you returned to it it was there

again ?—When we came back to examine that place we found it in the same condition as it was before.

203. When you came back the same condition prevailed; you could not tell whether the gas had been removed or not ?—When we found there was no gas there we came to the conclusion that it had been removed.

204. If the brattice had been put there it would still be there ?—Yes, it was still in No. 7 south when I was there last.

205. Then the defect must have been somewhere else in the mine ?—It must have been.

206. *Mr. Brown.*] Were you there when the manager and Mr. Wear went into those bords in No. 7 south, where you claimed there was 33,300 ft. of gas? You said somebody went with you: How much farther in the bords did he get than you ?—I should say, about 50 ft.

207. Then you made your calculation from where you stood ?—Yes, that is so; but I allowed another 100 ft.

208. But if the manager could get in much farther than you had got in there could not have been that quantity in those bords? I was standing on a form, and they went up the bord and were sitting down and had their lamps on the floor.

209. Did you assume that the bords were full of gas from a given point ?—Yes, from where they tested.

210. Is your calculation based on from where they tested ?—Yes.

211. Now, I think you said that you were afraid that it was dangerous ?—Yes, I was a bit afraid. I admit I did not like it.

212. In the interests of all concerned do you not think it was your duty to make some special report upon this matter ?—No, I was not worrying about that trouble much.

213. I think you led the Commission to believe that possibly you would get a bad time for overstepping your duty if you reported these things ?—I still think that.

214. Are you aware that there is provision in the Coal-mines Act whereby you could lay a complaint to the Inspector of Mines—sections 50 and 51 ?—Yes, probably; but a man would be very officious to do that.

215. I wish to draw your attention to the fact that there is a clause to protect you even if you desired to inform the Inspector of Mines that there was danger there. You could do so, and he would investigate it ?—I was not the Inspector—I was simply assisting him. I do not see how I neglected my duty. I will humbly admit it if you can point it out.

216. *The Chairman.*] You know the provisions of sections 50 and 51 of the Coal-mines Act ?—Yes, but I still hold that we have done our duty.

Mr. Tunks: I would like to place it on record that the 23rd March was a Monday, and that the 14th April was the Tuesday after Easter Monday.

ALEXANDER PENMAN, Acting-manager, Ralph's Mine, sworn and examined. (No. 9.)

1. *Mr. Wilford.*] Were you down to the locality of bords Nos. 4, 5, and 6, shown on the plan marked AA, last Friday ?—Yes.

2. Were you in the place last Friday, near No. 6 bord, where Martin's body was found ?—Yes, I accompanied Mr. Morgan and Mr. Reed.

3. Were you in the vicinity of the new fall ?—Yes.

4. Were you where the old fall was ?—Yes.

5. I have marked a point on this plan [Exhibit AA] WX. Is that about the position where you saw the rails that day ?—No, they were here [point indicated] at AP.

6. That is where you saw the rails last Friday ?—Yes.

7. Clear of the fall ?—Yes. The position of the fall is not strictly accurate, as the batter comes down to the point marked AP, and covers the end of the rails.

8. *Mr. Tunks.*] Are these rails torn up ready to be taken away, or lying in their ordinary position ?—They are lying in the position in which they were used.

9. Do they go right down the whole way ?—The sweep rails are lifted out.

10. And is there a large quantity or a small quantity ?—There are only two rails to be seen.

11. Had you ever worked in Ralph's Mine before the explosion ?—Four years ago.

12. But not immediately before ?—No.

13. *The Chairman.*] What do you mean when you say that there were only two rails to be seen ? Are there more rails there ?—The batter of the fall is over the end of the rails. Nobody knows how many are there.

14. You can only see two ?—Yes.

15. *Mr. Brown.*] How much of the rails are showing out from under the fall ?—10 or 12 ft.

16. And what length rails are they ?—About 18 ft. rails.

17. You do not know ?—No.

18. There is 10 ft. or 12 ft. showing clear of the fall ?—Yes.

WILLIAM WOOD, Manager, Extended Mine, Huntly, sworn and examined. (No. 10.)

Witness reads evidence given by him at Coroner's inquest, as follows:—

"WILLIAM WOOD, sworn, saith: I am a certificated mine-manager, and manager of the Extended Mine at Huntly. I heard of the explosion at Huntly on the 12th September, about 7.45. I organized a search-party and went down Ralph's shaft. I went to the top of the little dip, and could not get any farther for smoke. One of the deputies told me he thought the air was short-circuited, and three or four of us went down to the little dip and found that some of the doors had been blown away. These were the doors in the horse-road, and they were blown to pieces. We had to come back to the top of

the dip as the air was bad. We then went to Taupiri West shaft. From what I saw myself, and from what I heard, the figures on the plan Extended A represent approximately where the bodies were found. I went down the mine on Saturday last, 26th September. We travelled from the shaft and followed the road through the little dip, through the old dip, and came in by the winch level. We followed down the winch level to a point marked "Martin," and there we found the body of deceased Martin. It was not covered. It was in the old workings. I cannot say what he would be doing there. I was accompanied by Constable Wright and others. We merely got the body without examining the mine. I examined that portion of the mine yesterday in company with Professor Dixon and others. A cross within a square marks on the plan where there was a large accumulation of coaldust piled up against the pilar at the end of the bord. The dust appeared to have been blown down the bord from the direction of the body. In my opinion, the explosion originated in the vicinity where the body was found. The body was about a chain or chain and a half from the door marked on the plan. There was no sign of the door. We found bricks that had formed part of the stopping blown back to the spot marked with a circle with a cross in it. A fall had taken place apparently after the explosion, marked on the plan "New fall," and there was a fall which I took to be an old fall marked on the plan "Old fall." I have inspected other portions of the mine near where the explosion occurred. I have inspected all No. 5. All the signs show that the explosion originated at this spot. My opinion is that the explosion was caused by this man going into the old workings with a naked light. I have been in all the workings of the mine, except Taupiri West and No. 6 gig. The other parts have been examined by other parties. All the indications show that the explosion occurred at the place where I have indicated. I have never worked in Ralph's Mine. I do not think it would have required a very violent explosion to have blown out the door. I attribute the disaster to gas and coaldust combined. I could not tell what the place had been like previous to the explosion. About 4 ft. from the floor we found a white scum in the bords. It was from the floor to 4 ft. high. The old fall was about a chain in length, but we could not see how high it extended. I cannot say how long before the explosion the fall occurred. It was inspected on the 9th September by Wear. It was prior to the explosion that this fall occurred.

"By Mr. Bennie: There was fine dust against the pillar I have mentioned.

"By Coroner: I think a weekly inspection of these old workings was sufficient. I still think so, provided that before men are sent to work in them an examination is made of them.

"By Mr. Bennie: I have never known of any accumulation of gas in the old workings of Extended Mine. If there had been I should certainly have taken steps immediately to remove it."

1. *The Chairman.*] Have you anything further you would like to add to that statement?—There is only this: now that I have had the opportunity to make a better examination of that scum to which I referred, I would like to say that I do not think it has been caused by the fireclay floor.

2. *Mr. Wilford.*] Do you know where Hopper's body was found?—No, I scarcely knew any of the men in Ralph's.

3. It is No. 36?—That body was recovered on the night shift: I know nothing of it.

4. If No. 36 marked on the plan is Hopper's body you know its relative position to Martin's body?—Yes.

5. And you know the door at the end of bord No. 6?—Yes.

6. Would it be possible for anything to be hurled from the position where 43 is marked on the plan in No. 6 bord, where Martin's body was, through that doorway to where 36 is marked, or from 36 to 43? I want to know whether in your opinion any form of explosion could hurl an object from 36 to 43, or *vice versa?*—Yes, I believe it could.

7. Either way?—Yes.

8. That is to say, the open spaces are such that it would be possible for something in the vicinity of Martin's body (43) to be hurled to where 36 is shown?—Yes.

9. Did you notice that Hopper's body had a foot off?—I do not know.

10. Did you see a spare boot beside Martin's body (43)?—Yes.

11. With no foot in it?—That is so.

12. No lace either?—No.

13. And the nails are hardly worn?—That is so.

14. Do you know that Martin's body has two boots on?—Yes.

15. That is, all the clothing on poor Martin was his boots?—Yes.

16. It is quite clear that he had two boots on?—Yes.

17. Therefore the boot that was alongside Martin's body was not one of the boots he was wearing?—Certainly not.

18. It is possible it was a boot he was carrying—wildly possibly?—Yes.

19. It is also possible he was carrying his coat?—Yes.

20. His coat was not damaged?—I do not know. I have not seen it.

21. There was no other clothing of Martin's found?—I do not know.

22. You did not see any?—I do not think so.

23. Where is that boot?—The last time I saw it it was lying in the road.

24. You do not know whether Hopper had a foot missing?—No.

25. If 36 is Hopper it is possible for an explosion to have carried something from one to the other—from Martin to Hopper, or from Hopper to Martin?—Yes.

26. Do you agree from the position of Martin's body that the probability is that he entered bord No. 6 on the north end—the opposite end to the door end [plan explained]? From the position of that body and the position of the coat, ahead of where the body is, does it look to you as if he entered at that end or came in through this door?—My opinion now is that Martin came through the door.

27. It is higher there at the door than at the other end?—Yes.

28. Therefore if this place had gas in it, the most gas was there at the higher end?—Yes.

29. Therefore he would have to go through the most gas to the place where there is less gas?—No, I do not agree. I do not hold that there was gas in that bord at all on the morning of the explosion. The gas came out when he opened that door.

30. Your suggestion is that he came through that door ?—Yes, and that that gas was exploded. Then more stuff fell and liberated a great accumulation of gas.

31. You have nothing to base that upon except your opinion ?—Yes, it is my opinion.

32. The fact that the coat is nearer the door than the body—does that lead you to believe that the explosion took place where Martin was ?—The explosion drove Martin's body north.

33. And it must also have gone over that fall ?—No, that fall fell after the explosion.

34. And it must also have gone through the door and then round there and round to where Hopper and these men were ?—Yes.

35. Did you know that Martin was that morning going for rails ?—No, I did not know anything about Ralph's immediately prior to the explosion.

36. Mr. Alexander Penman has told us that there are two rails lying at the point marked AP, and protruding at least 10 ft. out of the spoil of the fall. Now, if Martin was sent to get rails there, do you think it would be more likely that he would have gone through this bord and then lit the gas and been driven away; or do you think he had just come in when the gas met him ? Is the route by the door the shortest way ?—Yes.

37. The force of the explosion, you think, came down No. 6 into No. 5, and went up and down the haulage-road ?—Yes, part of the force of the explosion.

38. When these men came down the shaft at the end of the haulage-road, where would they go to get the word that all was right and that they were to go to work ?—They would be told to go down to No. 5, and be told there where they were to go.

39. Is it not likely they would be at No. 6 ?—Perhaps Darby, or Smith, or Gowans would tell them to go to the cabin.

40. You do not know what was the usual thing ?—I do not know.

41. Where is the nearest intake airway coming down that haulage-road ?—You have an intake airway all the way down.

42. Then if they were at No. 5, this would be the quickest way in: down the travelling-road at No. 5 section, past the jig, and then up through this kind of labyrinth through the door into No. 6 ?—Yes.

43. Then the reason why you would expect them to go through that door is that it was the quickest way ?—Yes.

44. Is it the shorter way if they start from the shaft-bottom ?—Yes, I should think so.

45. Is not that a very important question ?—It can be easily answered upon reference to the plan [plan referred to].

46. Do you suggest that if these men started from Ralph's shaft to go to No. 6 it would be shorter for them to go down No. 5 and thence into No. 6, or take the other road round ? Which is the shorter ?—[After taking measurements from the plan.] The way up the haulage-road is about 60 chains, and the other way about 70 chains. There is no doubt that the haulage-road is the quicker way.

47. *The Chairman.*] Which is the easier ?—The main haulage-road is both the easier and the quicker.

48. *Mr. Wilford.*] Of course you have no knowledge as to whether Martin was sent down the haulage-road or round the other way ?—No.

49. One witness this morning, a horse-driver, who was in the party at No. 6 on the morning of the explosion, told us that on the previous pay-Saturday morning he was sent to the same place practically for the purpose of lifting rails with other men. He said that on the previous occasion he went to that place by the deputy's instructions by way of the winch level ?—Yes.

50. He would have to take a horse ?—I do not see how he could take a horse there at all to No. 6, because that is up a jig.

51. Could he get to the end of No. 6 ?—Not with a horse.

52. There is no way that he could get close to No. 6 with a horse ?—Not that I am aware of.

53. Did you go with Mr. Bennie round portion of No. 5 district recently ?—Yes.

54. Did you find gas in several places ?—I did.

55. Did you find it in several places, from the floor as high as you could reach ?—Yes.

56. And if there is gas to as high as you can reach, is it fair to assume that it extends to the roof ?—Quite fair.

57. Then, if you can find gas as high as your extended arm will reach above your head—or as high as you can distinguish it with a lamp—it is certain it extends to the roof ?—Practically certain.

58. The last place where it is is, of course, on the ground ?—Yes, generally.

59. Is not that on account of the lightness of gas as compared with air ?—Yes. That is the last place [on the floor] you would expect to get CH_4.

60. And if you got it on the ground it must be also in the roof ?—Yes.

61. Did you take any samples of that gas ?—I did not take any myself, but I was sitting beside Mr. Reed when he took some.

62. What were they taken in ?—Small sampling-bottles.

63. And samples of coaldust ?—Mr. Reed took them, and Mr. Bennie gathered them up.

64. And samples of brattice ?—Yes.

65. Did you on that trip see any ladder by which a man who desired to inspect for gas could reach the roof of a bord which was above his reach ?—On that trip, no.

66. As a matter of fact, in the whole distance you travelled did you not see only one ladder, which was broken ?—That time, yes.

67. When was that ?—I believe that was the Friday after the explosion, but I would not be sure of the day.

68. Did you make any tests yourself that day ?—What do you mean by "tests" ?

69. Did you test any other bords for gas ?—When I was by myself or in company with Mr. Reed, it was I who generally did the testing for gas.

70. Can you make any calculation from the tests you made then as to the quantity that was present in a given area ?—No, because I did not have any measurements of the bords. You would require that.

71. Taking the area you were in, would the amount of accumulation run to hundreds of cubic feet, or thousands, where you were then ?—I could soon give it to you by measuring the bords.

72. Would it be a couple of hundred thousand cubic feet ?—It would be less than 200,000 ft.

73. Much less ?—I make it, roughly, 100,000 cubic feet.

74. How many days after the explosion ? There was still 100,000 cubic feet of gas in the air on the Friday after the explosion ?—Yes.

75. Will you put this Commission in possession of the locality where this huge accumulation of gas was ?—Yes.

76. Was it in the area defined as Nos. 4, 5, and 6 bords ?—We were not in that area at all.

77. About where was it ?—In No. 5 section.

78. How close to No. 5 section was the area in which you estimated 100,000 cubic feet of gas might be accumulated ?—[Messrs. Brown and Dowgray are aware of the position of the area referred to, and will inform the Chairman.]

79. Did you penetrate far into these bords which you have pointed out to me as containing the gas ?—We went up a bit, and Mr. Reed took his samples.

80. Did you go into them all ?—No, only some of them.

81. When you got your test were you quite satisfied that the place was full of gas ?—Yes.

82. I suppose you got rid of the gas ?—Yes.

83. What trundled it out ?—The ventilation took it out.

84. How long after the explosion was it before it was clear of gas ?—Eleven days.

85. Was it absolutely clear of gas ?—Yes, I could not get a cap.

86. Right up to the top of the bords ? But you cannot get to the top of some of them ?—No, not to the top.

87. You have not tested the bord thoroughly until you test to the top of it ?—No.

88. You cannot say afterwards that there was no gas there ?—If I did not detect it I would report the place clear.

89. You have no evidence that there was no gas right up to the roof ?—No.

90. *Mr. Napier.*] When you speak of gas being present to the extent of 100,000 cubic feet, do you mean gas-mixture ?—Yes, certainly.

91. Not pure gas ?—No ; if it were pure gas it would not explode.

92. What would you estimate the percentage of gas to be in that mixture ?—I could not properly estimate that. The report on the sample was read out at the inquest. Dr. Maclaurin said there was about 9·7 per cent.

93. You referred, at all events, to the mixture that you found ?—Yes.

94. With regard to the route which Martin must have followed, would he not travel the road with fresh air ?—Yes. Moreover, it is quicker and easier walking.

95. And there is more fresh air ?—Yes, than round about by the little dip.

96. *Mr. Dowgray.*] If those men were sent to lift rails at the particular part of the little dip, and to convey them to No. 5 section, it would be necessary for them to go through that door ?—Yes.

97. That would be the course they would have to take ?—Yes, so far as I know.

98. If you were sent to lift rails in the little dip and to convey them to No. 5 section, which way would you go ?—The way the deputy sent me.

99. Does the deputy always send them ?—Yes, in the Extended Mine, where I am.

100. You are talking about the Extended ?—I do not know what their rule was in Ralph's.

101. Regarding that place where they were sent to lift rails, it was the working-place for that working-day ?—If they were sent there to lift rails, yes.

102. And the road leading to that place would be the travelling-road to it ?—Yes, that is correct.

103. *Mr. Brown.*] Which way were the bricks blown out of that stopping ?—They were blown down the bord [explained by diagram].

104. Then if Martin came through that door and got down to where that first fall is—the new fall—or somewhere about there, which way would his body go—the same way as the bricks, or the other way ?—That all depends. I do not think he got as far as that new fall when he ignited the gas.

105. You presume he ignited it at that stenton ?—Yes. I think there has been a lot more falls since the explosion.

106. *Mr. Dowgray*]. You stated that in your opinion Martin had entered that door ; the air rushing through the door drew the gas out and he ignited it ?—Yes.

107. And, according to the position of his body, he got a considerable distance down there ?—Yes.

108. I take it that the line of greatest force is through by No. 5 ?—Yes, so far as we can judge.

109. Is it not reasonable to assume that he had come through the door and met the gas ?—But I say he was at the cut-through when he met the gas. It was a minor explosion first.

110. Would a minor explosion blow out that stopping ?—That is my opinion.

111. *Mr. Brown.*] If there had been a very large accumulation of gas in that bord, would there be any signs of burning on the rib sides ?—If there had been a large accumulation of gas in that bord I do not think we would ever have seen Martin.

CHARLES ALLEN, Labourer (Ex-miner), sworn and examined. (No. 11.)

1. *Mr. Wilford.*] What are you, Mr. Allen ?—At the present time I am a labourer, but my occupation has been that of a miner up to two years ago.

2. How long were you mining ?—Forty years.

3. Do you know the Taupiri Mine fairly well ?—Yes.

4. How long were you working in the Taupiri Mine ?—Fourteen years—in and about the mine.

5. Which mine ?—The whole three—Kimihia, the Extended, and Ralph's. I have been in Ralph's for seven years.

6. When were you last working in Ralph's Mine ?—I was one of the men discharged in the first trouble here. I was on the executive of the union, about two years ago.

7. You have not been in the mine since then ?—No.

8. You are not allowed in ?—No.

9. Do you know of any instances in Ralph's Mine of gas being found, after a long drill has been used in drilling ?—Yes, sir.

10. How long ago ?—The first case was, I think, when I had been in Ralph's Mine not more than a month.

11. How long ago ?—About nine years.

12. Then, later on—on how many occasions ?—On three occasions I have known gas to be lit twice in one place and once in another.

13. You are quite clear that the gas came in after the bore ?—The first time it was just before knocking-off time. I put in a 4 ft. 6 in. hole the full length of a drill. Not having sufficient powder for a charge I went out, and when I came back there was a slight explosion of gas from the hole.

14. You lit it with a lamp ?—Yes. In the same place later on we put a hole up in the roof to test for cover, and a good deal of gas exuded.

15. Do you remember three years ago something of that nature occurring when Mr. Fulton was there ?—Yes.

16. Where was that ?—In the little dip section.

17. Will you explain it ?—We were working in a heading. It was the time that the men started at 7.30 a.m. and did not have crib till 12. Just as we were coming back Skellern walked up to the place and immediately there was quite a flash of gas. It was exuding from the cutting.

18. Skellern was then the deputy ?—No, he was the shot-firer.

19. Who was the deputy ?—Darby.

20. Was he there then ?—No, only Skellern.

21. Those three instances you know of and remember quite distinctly ?—Yes.

22. Do you know any instances of burns other than Kelly's case ?—No.

23. *Mr. Tunks.*] Where did that ignition take place—the one you referred to as having occurred just before knocking-off time ?—In the little dip section.

24. Were they all in the little dip section ?—Yes.

25. You referred to one case which happened about three years ago—can you fix the date ?—No, it was three or three and a half years ago.

26. Who was in charge of the mine at that time ?—Mr. Wright.

27. It was before Mr. Fletcher's time ?—Yes.

28. Can you show on the plan of the little dip section where the first of these cases occurred ?—I know where it was.

29. Can you describe the place—perhaps Mr. Fletcher can then fix it on the plan ?—In the first place it was on the horse-road, about the short road going into the workings from the first turn on the right—the third or fourth bord on the right-hand side.

30. How far would the bord be in ?—We had just broken it away. We had just got the 14 ft. We would be in about 2 or 3 yards, counting from the 6 ft. narrow.

31. Was that where it happened twice ?—Yes.

32. Whereabouts was the other one ?—In the winch dip on the righ-hand side of the heading. I do not know what you call the heading.

33. What did you do about these cases ?—In the first instance, Mr. Hall was deputy and I reported both cases to him. In the second case, I did not consider it necessary to do so, because the official shot-firer was there.

34. Was any damage done ?—I do not know that there was.

35. Was any damage done on any of the occasions ?—No.

36. Anybody burned ?—I do not know whether Skellern was. He might have got a little singed.

37. You do not know whether anybody was burned—Skellern did not complain ?—It is such a long time ago I cannot say.

38. You were not burned ?—No.

39. Were any of you burned ?—No.

WILLIAM GEORGE WRIGHT, Police Constable, sworn and examined. (No. 12.)

1. *Mr. Wilford.*] You are a police constable stationed at Huntly ?—Yes.

2. You were a member of the rescue party which first went into the mine after the explosion ?—That is so.

3. The first or second man ?—Yes, Mr. Jolly and myself were the first to go down.

4. I want to question you as to the positions in which some of the bodies were found. While working in the rescue party you helped to bring out some of them ?—Yes, but as it was the first time I had ever been down this mine, and it was practically pitch dark, it would be hard for me to say where some of the bodies exactly were discovered.

5. In regard to Martin and Hopper, you know where Martin's body was found [No. 43] ?—Yes.

6. Have you ever been down there ?—Only to get the body.

7. I want you to tell the Commission what clothing was on Martin's body when he was found ?—Just his boots and his socks to the top of his boots.

8. Cut off, as it were, along the top of the boot-leather ?—Yes, he had not a stitch of clothing on him except the portion of his socks inside his boots and his boots.

9. Did you also see his coat ?—No.

10. You do not know the position where his coat was found ?—No.

11. Did you find a boot near Martin's ?—Well, a few yards from him.

12. About how far from Martin [Plann AA explained to witness] ?—I know that we counted six bords up and we went up the sixth. We went down the little dip way.

13. You know where the door was blown out ?—I have an idea, but I did not see it.

14. If the point marked 43 is where Martin's body was found, could you in any way define where the other boot was ?—The only thing I know was that when we came up the bord I picked up a boot and said, "I have found one of his boots." Mr. Wood, the mine-manager, replied, "That is not his boot, he is up farther." So I dropped it.

15. You found that he was up farther, and that Mr. Wood was right ? Yes, I took the boots off Martin's body.

16. Did you help to bring Hopper out ?—I did not know which was he. I helped to bring a good number out, and may have done so.

17. You are quite certain, however, that the boot you found was picked up before you reached Martin's body ?—Yes, I am certain.

18. Did you bring the body out the way you went ?—Yes, we rolled it in a canvas and went back the same way as we came. We brought it right back to the shaft.

19. Did you go in through that door afterwards [door indicated on plan] ?—No.

20. *Mr. Tunks.*] The boot which you found was embedded ?—I think so, but I do not know for certain. I just picked it up and dropped it again.

21. You do not know anything about it—whether it was a right-foot boot or a left ?—No.

22. *The Chairman.*] Has it been ascertained since to whom the boot belonged ?—I do not know.

23. *Mr. Dowgray.*] Did you see Martin's body after it was brought to the surface ? Was it recognizable ?—No, nobody could recognize it as Martin.

24. How did you recognize it as Martin ?—Mr. Malloy, with whom he lived, recognized his boots as those of Martin. Martin had also long hair, and that was also recognized.

25. Is there not a similarity in miners' boots ?—Possibly, but Mr. Malloy recognized them at once. Martin also had five false teeth, and his sister identified them. The only trouble in connection with identification was as between Smith and Baker. Smith was buried for Baker, but when Baker's body was recovered and identified the mistake was rectified.

JOHN JAMES CLOUT, Head Banksman, sworn and examined. (No. 13.)

Witness read evidence given by him at Coroner's inquest, as follows :—

"JOHN JAMES CLOUT, sworn, saith : I am a tip banksman at Ralph's Mine. I was on duty on the morning of the accident. The deputies go down in the first cage. I saw Mr. Gowans go down that morning. Smith and Darby would go down in the first two cages. I got the signal from below from the onsetter 'all clear,' and I let the others down. I lowered four cages that morning and then went away to do some other work. Shortly after I left the pit-head I heard a roar and saw flames come up the shaft. The deputies were let down at 7 a.m., and the miners went down straight after.

"No questions."

1. *Mr. Wilford.*] You got your signal from below from the onsetter "All clear" ?—Yes, when he went down.

2. I want you to say when the men went down ?—As 7 o'clock.

3. Are you positive ?—Yes, when the whistle blew.

4. But the whistles do not blow together ?—That is the different mines.

5. Are they supposed to have the same time ?—They keep their own time.

6. Can you tell whether the deputies had gone down before ?—They went down in the first two cages—of course that was before my time—the examining deputies.

7. You do not know what time they went down ?—No.

8. Who does ?—The driver who was on shift would know.

9. Who was he ?—Starr, I think.

10. Would he have any record of the time when the examining deputies went down ?—I could not say.

11. What is the usual practice—I know only what the Act says ?—I do not know ; I am never there.

12. Do you know whether, on Saturday morning, things are done a little more laxly than on regular mornings ?—No, it should not be so.

13. It should not be so, but is it ?—I do not know. I do not think so.

14. Who were the deputies who went down ?—Smith and Darby.

15. How many cages did you lower that morning ?—Four.

16. Have you any check to show that ?—Yes, we keep the tally. We marked every cage down, but the tally was blown away.

17. And it is from memory that you say you lowered four cages ?—Yes.

18. How far had you gone from the pit-head when you heard the roar ?—I was by the tippler.

19. What was the distance ?—About twenty or thirty yards. I was working there.

20. Is it part of your duty as head banksman to take delivery of whatever comes up from down below ?—No, that is the brakesman's duty.

21. If some hot stuff comes up from down below, would it pass under your eyes ?—No, unless I was there.

22. Have you seen hot stuff coming up from down below ?—Only on one occasion.

23. Did you say that only on one occasion you have seen hot stuff coming up from down below ?—Yes, to my knowledge.

24. Were you ever working down the mine at any time ?—Yes, at several times I have been on down the mine.

25. Were you ever down there with Molesworth ?—No.

26. Did you ever at the top of the mine have any hot stuff handed to you by Molesworth ?—Yes.

27. He told us that he once handed to you a piece of stuff, and it was so hot that you had to drop it ?—Yes, he drew my attention to it when it was coming over the picking-belt.

28. And is that the only time ?—Yes.

29. Now, has it not been discussed among the men both below and above that there was a good deal of gas escaping there in the mine ?—Not to my knowledge.

30. Have you never heard of men talking about " another escape of gas " ?—No.

31. Never at all ?—No.

32. Even when a man had found 33,000 cubic feet of gas, you have never heard it discussed as a gaseous mine ?—No. If I were in the braceman's place I might.

33. Have you ever heard Mr. Dixon say anything of it—on the 26th July, for instance ?—No, nothing.

34. Do you know nothing about an occurrence on the 26th or 27th July ?—I do not.

FRANK REED, Inspecting Engineer of Mines, sworn and examined. (No. 14.)

1. *Mr. Wilford.*] What are you, Mr. Reed ?—I am Inspecting Engineer of Mines and Consulting Engineer of the State Collieries of New Zealand.

2. What qualifications have you ?—I have many qualifications.

3. Will you give me your qualifications: we may take them shortly as we did those of Professor Dixon ?—I hold the following diplomas: British First-class Colliery Manager's Certificate, First in First Class, at the Government Examination, N. District, England, 1884; New Zealand First-class Colliery Manager's Certificate, 1887; Diploma on Mine-gases and Ventilation, Durham University, 1884; Licensed Surveyor's Diploma, New Zealand, Western Australia, and Tasmania; Examiner on Mine-gases and Ventilation during past eight years at the Government and Schools of Mines Examinations; member of the Royal Commission on Mines, 1911; formerly Mining Engineer and Inspector of Collieries to the Government of Western Australia. I have had thirty-four years' practical experience at the mines of England and the colonies. I am also a member of the Institution of Mining and Metallurgy (London).

4. Mr. Reed, how long have you known Taupiri ?—The collieries for about eight years.

5. Have you ever inspected the Taupiri collieries ?—Several times.

6. Under the Coal-mines Act have you any responsibility in regard to the inspection of mines ?—Not as Inspecting Engineer of Mines.

7. Is New Zealand divided into districts under the various Inspectors ?—Yes. When I first joined the Department there was no section of the Act which authorized me to enter a mine, and, at my own request, I was gazetted as Inspector of Mines without a district, because my right of entry into the Kaitangata Mine was questioned by the late Mr. R. Lee. I was gazetted an Inspector of Mines to enable me to enter any mine which I wished to examine, but I have no district under section 23 of the Coal-mines Act.

8. The District Inspector here is Mr. Bennie ?—Mr. Boyd Bennie.

9. Mr. Reed, when did you first become aware of there being any danger in the Taupiri Mine ?—I was unaware of any danger until last Christmas.

10. Prior to that you had had no facts brought to your notice which would lead you to form a conclusion that the mine was dangerous ? No. I knew of no defects in them. I refer to both the Taupiri Company's mines.

11. How did you become aware of the condition of the mine ?—I was demonstrating on firedamp at the Mines Department Court at the Auckland Exhibition.

12. You were in charge of that ?—Yes. I put up a firedamp observatory and a mine-rescue apparatus for the Mines Department. I used to grant certificates to all-comers who would qualify to detect firedamp with a miner's safety-lamp. While I was demonstrating there I found a number of candidates coming from the Taupiri collieries to get their tickets. I was surprised, and asked, " Why do you come here; you have no gas in your mines," and they replied " Haven't we."

13. Your suspicions were aroused ?—Yes, by the number of men that were coming from the Taupiri mines.

14. Miners to qualify at testing for firedamp ?—Yes.

15. This was about Christmas time, I understand ?—About December they started to come.

16. Then, having your suspicions aroused, did you communicate with the District Inspector ?—I did more than that. I want to tell you how I got to know that there was gas in the mines here. I said no more, but another official came along and got into conversation with me and told me there had been burnings in the mines as the result of gas-ignitions. As soon, however, as he discovered I was drawing him he asked me to treat the information in strict confidence.

17. From information you received you considered it was worth looking into ?—I did, and I wrote to Inspector Bennie a private letter, as I have no authority to write officially.

18. You have no power officially to write to Mr. Bennie ?—No, as he stated. I have no power over Inspectors of Mines; but the new Act will possibly give me power, because it makes the Inspecting Engineer also Chief Inspector of Mines.

19. You wrote Mr. Bennie then ?—Yes, a private letter.

20. In consequence of what you knew you wrote Mr. Bennie ?—Yes.

21. And as a consequence of your letter, did Mr. Bennie write to anybody ?—Mr. Bennie did eventually write to somebody, but I asked him to see if he could make inquiries himself by going to the union, but the men would say nothing. Mr. Bennie then came to the Exhibition, and said that the men would not divulge anything. I told him then to write to Mr. Fletcher for a statement of all the instances of burning, and that we would accept it as being written without prejudice. Mr. Fletcher then wrote Mr. Bennie a letter referring to three cases of burnings by gas.

22. This is Mr. Fletcher's letter dated 14th January, 1914: "To the Inspector of Mines, Thames.—"I beg to acknowledge your letter of 8th instant regarding accidents by powder, explosions, and the ignition of firedamp. In the Extended Mine there were two cases of burning by explosions of firedamp during the past two years, but not serious. The first occurred to David Conn, a shift man. There had been a fall of roof at the face of the west heading, and he with other men had been sent to repair same. During the course of repairs slabbing had to be done, and while putting the slabs into position overhead he got his naked light which was on his head too far into the fall; some gas which had apparently collected in a pocket was ignited and he received burns to both arms: date of occurrence, 16/2/12. This place had been inspected and reported 'all clear' just previous to the shift commencing. The next occurred to William Willcox, who was a roadman at that time. It appears that on the previous afternoon this man had commenced to lay a turn into a cross-heading, which was driven in a distance of 15 yards and brattice carried right to the face. He did not complete the laying of the turn, but went in a little earlier next morning, but not before the examining deputy had inspected the place. At the point where he was laying the turn, 15 yards back from the face, an ignition of firedamp took place. Mr. Wood, the certificated manager, in company with Deputy Duncan and Assistant Deputy Wood, immediately inspected the place after the accident, and found no trace of any gas. It may have collected in a roof-cavity through a disarrangement of the brattice, but Mr. Wood is of the opinion that the acetylene-lamp he was carrying at the time on his head exploded. I might add that these explosions occurred during the time the small fan was doing duty, and there is no doubt—although plenty as regards quantity to comply with the Act—there was not sufficient volume to keep down small accumulations during the time the mine was not working; but since the new fan has been erected these troubles are things of the past: date of occurrence, 26/3/12. Regarding the burning of Alexander Reid by an explosion of blasting-powder on the 14th December, 1912, this accident was reported to you under date 16th December, 1912. In Ralph's Mine a roadman named Arthur Ruston went into an old bord in Dooley's dip to lift some rails near the face, and he ignited a small accumulation of gas near the face with his naked light. He escaped without injury." There are only two names in that letter of men burnt—Conn and Willcox?—Yes, that is so. I was told of another man, but his name I cannot remember.

23. That letter of the 14th January was the first intimation that you or the Department received from the management?—It was the first information on the matter which reached any officer of the Department from the manager. The claims on the Coal-miners' Relief Fund in respect of such injuries are certified to by the Inspector, and go forward to the clerks in the office to pay the money. The burns to Willcox are said to be on the face, due to gas, but it might have been gas on the surface for all the Department knows from the doctor's certificate. These are vouchers for the payment out of the fund, and they do not come to me at all. [Coal-miners' Relief Fund files.] They are not reported to the Department.

24. When you got the information contained in the letter of the 14th January about burns by gas-explosion, did you report it?—I did at once to the Under-Secretary for Mines.

25. Show me your report?

Mr. Macassey: I understand that the Commission has asked for the file, and I put it in accordingly. [File, 14/1194.]

26. *Mr. Wilford.*] Will you please turn up the letters yourself and hand them to me. I want first your report which you wrote after receiving the information contained in that letter on the 14th January?—I wrote six letters, but they are not all here.

27. You wrote six letters, all in connection with the Taupiri Mine?—I wrote six letters to the Under-Secretary before the explosion regarding the danger of such.

28. Are your letters not there on the file?—No, but I have copies of them. The first letter was at the end of January. Some important letters are missing.

29. Then, tell me the dates of any letters that are not there?—I will tell you the dates and the contents.

Mr. Macassey: Is there another file, because, if so, we will wire for it?

30. *Mr. Wilford.*] You say that you saw those letters on the file?—Yes, but files are sometimes split up. The last number I saw on the file was 14/11/94. I will refer to my letters, and tell you what are the dates of them.

31. You have said that since January of this year you have written six letters on the subject of the explosion—after the explosion?—Six or seven before the explosion, and two after. The first letter was about the end of January, in which I sent on Mr. Fletcher's letter of the 14th January. Mr. Bennie sent it to me, and I sent it on to the Under-Secretary with my remarks. I will tell you what I said in my letter. I put a covering memo. on it before sending it. The date of my memo. is 28th January, 1914.

32. And the contents?—It was to the effect that I regretted to report that there had been some ignitions or explosions in the mines at Huntly which had been concealed by the management, but Mr. Fletcher had now reported them without prejudice to himself.

33. I will read this memorandum of yours. The date is 28th January, 1914, and it is headed "Unreported Explosions of Firedamp at Taupiri Coal-mines." It is addressed to the Under-Secretary for Mines, and runs as follows: "I regret to report to you a breach of the law by the Taupiri Coal-mines (Limited)—viz., a miner, William Willcox, was seriously burned by an explosion of firedamp, which accident was not reported to the Minister and Inspector, as required by section 62 of the Coal-mines Act. The first intimation I received of this was on or about the 2nd January, and from a source I must regard as confidential. Upon the same day I referred the matter to Inspector Bennie, who informed me that no gas-explosions at the Taupiri mines had been reported to him. I thereupon asked him to investigate and report, and, if he could not otherwise obtain information, to request Mr. James Fletcher, the certificated mine-manager, to report to him now, without prejudice to himself. This report I have received and attach hereto. You will observe that four gas-explosions are admitted. For burns received as the result of an explosion William Willcox obtained relief from the Coal-miners' Relief Fund for three weeks. All explosions in coal-mines are most serious, as the conditions

for a colliery disaster are all present. Section 62 provides for a report of any accident attended with serious injury to any person. Under the conditions by which I became aware of the above facts, I cannot recommend further action being taken, although the payment to the sufferer, William Willcox, on account of his injuries, is evidence of an independent nature. In view of any subsequent explosions, perhaps you may consider it advisable to place on record our knowledge of these past events.—FRANK REED, Inspecting Engineer, Mines Department." That is your letter of the 28th January ?—Yes.

34. Did you receive any reply from the Under-Secretary to that ?—No.

34A. What was your next communication, Mr. Reed ?—At the beginning of the present session of Parliament Mr. Blow sent me a proof of a Bill to amend the Coal-mines Act for my revision and suggestion. After I had revised it I reported to him.

35. Is this your letter dated 27th June, 1914, headed " Firedamp and Fine Coaldust reported at Taupiri Coal-mines " : " The Under-Secretary of Mines.—The Inspector for Mines, Mr. Bennie, in his monthly report hereunder for May reports that firedamp and fine coaldust exist at the Taupiri coal-mines. These are the conditions which occasion colliery disasters. Ignitions of gas causing men to be burned have been reported from these mines lately. The Royal Commission on Mines, 1911, recommended amendments and additions to our Coal-mines Act to provide for better ventilation, laying coal-dust safety explosives, safety-lamp regulations, &c. Our Act is generally obsolete, being based on a British Act long since repealed. If a disaster occurs as the result of an inadequate law the Inspection Branch of the Department cannot be held responsible. The Brunner and Kaitangata disasters cost a hundred lives. It is the unexpected that happens.—FRANK REED, Inspecting Engineer, Mines Department" ?—Yes, that is my letter.

36. What was your next communication ?—I wrote to the Under-Secretary asking him to have preference given to the Coal-mines Bill if only one Bill was to be passed. The Mining and Coal-mines Bills had both been prepared. I asked him to give preference to the Coal-mines Amendment Bill if only one Bill was to be passed, as I feared a holocaust in these mines.

37. You stated that ?—I did.

38. Have you a copy of that letter ?—Not the one in which I used the word " holocaust," although I have used it several times in connection with this mine.

39. This is your letter, dated 29th July, 1914. It is headed " Explosions of Gas at the Taupiri Collieries " : " The Under-Secretary for Mines.—I would be obliged if you would ask Inspector Bennie why in view of the four gas-explosions by which persons were burnt at the Taupiri Company's collieries at Huntly, which he reported to the Inspecting Engineer in January, he did not then insist, in accordance with Special Rule 14 under the Coal-mines Act, ' that the manager shall direct the underviewer to see that locked safety-lamps are used and naked lights excluded wheresoever and whensoever danger from firedamp is apprehended.' The ignition of firedamp recorded hereunder, by which a collier (Kelly) was burned was caused by a naked light carried by Kelly in Ralph's Taupiri Mine; it might have been a holocaust. The seriousness of these frequent explosions at Huntly cannot be lightly passed over. The responsibility of our Department is enormous. Should another Kaitangata or Brunner disaster occur the public would justly condemn us. Inspector Bennie and Mr. Fletcher, mine-manager, should be made to realize the responsibility of the situation. Only approved safety-lamps and permitted flameless explosives should be allowed at the Taupiri coal-mines, such mines being adjacent underground. The recommendations of the Royal Commission on Mines, 1911, if given effect to in the Coal-mines Bill, will immensely strengthen the hands of the Mines Inspection staff to secure conditions of greater safety. The existing Act is obsolete.—FRANK REED, Inspecting Engineer, Mines Department." That letter was written by you, Mr. Reed, on the 29th July ?—Yes, on the 29th July.

40. Later on, were you still uneasy ?—Yes, I was very anxious.

41. When did you next write on the subject ?—I think the next letter is dated the 13th August, and then another a little later.

42. Then, from the file it appears that, in accordance with your request, Mr. Reed, the Under-Secretary wrote to the Inspector of Mines asking for a report. Mr. Blow's letter is dated the 4th August, 1914, and is as follows : " Gas-explosions at the Taupiri Collieries.—The Inspector of Mines, Thames.—With regard to the ignition of firedamp on the 9th July at Ralph's Mine, by which William Kelly was burned, as reported by you on the 24th July, will you please inform me, at your earliest convenience, whether, considering that other accidents of a similar description have recently occurred at the Taupiri collieries, locked safety-lamps should not in future be used and naked lights excluded at Ralph's Mine, in accordance with Special Rule 14. Also please inform me if you recommend a prosecution of the manager for the aforesaid negligence, by which a disastrous explosion might have been caused. The sinking of a new air-shaft, the proposed installation of a new fan, and the air-measurements, as reported by you, have no bearing upon the past ignitions of gas and burning of several miners.—H. J. H. BLOW, Under-Secretary " ?—Yes, that is correct.

43. Then, in reply to that letter, the Inspector of Mines reported as follows, on the 7th August, 1914, to the Under-Secretary : " In reply to your memo. of the 4th instant, I beg to state that after careful consideration I am of the opinion that to prosecute Mr. Fletcher, the mine-manager, for a breach of Special Rule 14 in the case of William Kelly, burnt by an ignition of gas in the company's mine on the 9th July last, I may fail to get a conviction, but the moral effect of such a prosecution will be to produce more effective supervision, the value of which we cannot foresee. In view of the alleged previous burnings by gas in the mines, apart from that of the 4th instant, which may be necessary to prosecute, I, as Inspector of Mines, received no help from the Miners' Union or their check inspectors, who are, as at present constituted, the creation of the mining company's directors. I have had no complaints from the union officials or any one of its members, either written or verbal, for over twelve months past. I may say that there is very little carburetted-hydrogen gas found in the mine, but for some time past small quantities have been found and reported by the examining officers of the company. In view of that I have repeatedly requested that the roads in the mine where dry coaldust has accumulated should be adequately watered, and all shots fired in the mine to be fired by the fireman and deputy as required by Special Rule 25 (*d*). The manager has not complied as fully as I would like. The foot-tracks of the travelling-roads only have been watered, and while the manager has informed me in writing that shots are being fired by officials, I am not quite sure that this is so. I cannot

recommend that safety-lamps only be used in these mines for two reasons—(1.) Very little gas is found in the miners' working-places, it has practically always been found in falls of the roof of the old workings, and two officials are specially appointed to examine the old workings—during the week daily inspections are made and a full round of the work is made during the week. (2.) The working-places are 10 ft. to 18 ft. high. The light from a safety-lamp is very poor, and if the mine is to be worked as at present by present methods, there will be a great increase in the number of accidents to miners, and serious accidents, if not fatalities, as the result of defective lighting. The safety-lamps will be damaged, and the end in view defeated. To prosecute for a breach of Special Rule 14 in Kelly's case will at least have the effect of producing stricter supervision. Therefore I now ask permission to summons Mr. Fletcher under Special Rule 14 of the Coal-mines Act, 1908, and also permission to employ a solicitor. —B. BENNIE, Inspector of Mines" ?—Yes, and then that report was sent to me.

44. Yes, the Under-Secretary minuted it on to you as follows: "The Inspecting Engineer,—I should be glad to have your views upon this matter, particularly upon the proposal to prosecute contained in the last paragraph.—H. J. H. B., 11/8/14" ?—Yes.

45. In response to that you wrote the following minute to the Under-Secretary: "The Under-Secretary for Mines.—Ignitions of gas by which men have been burnt have occurred frequently of late at the Taupiri collieries. A prosecution would do good even if it failed (owing to our obsolete and weak Coal-mines Act), for it would show the public that the Mines Department were alive to the danger, and it would cause the management of the company to give greater attention to the safety of the mine in future. Should an explosion occur, the fact that we had prosecuted would be appreciated by the public. I recommend that Inspector Bennie consults a reliable solicitor, and if we are considered by him to have a fair chance to secure a conviction, proceedings should be taken, and I will go north to assist the Inspector.—FRANK REED, 11/8/14" ?—Yes.

46. Then there is a memo as follows: "Hon. Minister of Mines.—Please approve action being taken in accordance with the Inspecting Engineer's recommendations.—H. J. H. BLOW, 15/8/14." And then a minute: "Approved—W. F., 15/8/14." That is the Minister of Mines; you know that?—Yes.

47. Now, what was your next communication on this matter?—Two days after writing that last minute I wrote again on the 13th. The letter is not on the file, however; but I have a draft copy of my letter here. My original letter is probably on the file containing Mr. Bennie's monthly reports.

48. Your letter of 13th August, 1914, is as follows: "Dangerous Conditions at the Taupiri, Waipa, and Hikurangi Collieries.—The Under-Secretary for Mines.—In your report for July by Inspector Bennie hereunder you will see reference to seriously bad conditions at Taupiri Mine, firedamp being plentiful and men having been burnt thereby. At Waipa Mine the Manager ignores the law *re* explosives and is constructing his drives too wide for safety. At Hikurangi Mine an underground fire is being produced by dangerous mining methods. I recommend the perusal of the Inspector's report by the Minister and yourself. With the present obsolete Coal-mines Act the Inspector's hands are tied. The importance of passing the Coal-mines Bill must be now evident.—FRANK REED, Inspecting Engineer, Mines Department" ?—Yes.

49. That was a month before the explosion?—The Under-Secretary wrote and asked me to explain where the Coal-mines Act was obsolete and ineffective to deal with the defects reported by Inspector Bennie. I prepared for him a tabulated report, a copy of which you have in your hand.

50. You received a request from Mr. Blow to give particulars regarding the dangerous practices existing in the Auckland collieries as reported by Inspector Bennie, and also as to a clause in the Coal-mines Bill which would enable those practices to be suppressed. In reply to that request you furnished this statement, dated 15/8/14, signed by you: "The Under-Secretary for Mines.—The following are particulars regarding the dangerous practices existing at the Auckland Collieries, as reported by Inspector Bennie this month; also the clauses printed in the Coal-mines Bill, which will enable those practices to be suppressed. The urgency of the matter must be evident—FRANK REED, Inspecting Engineer of Mines, 15/8/14:—

Name of Colliery.	Dangerous Conditions reported by Inspector Bennie for July, 1914.	Coal-mines Act.	Remedy provided in Coal-mines Bill.
Taupiri Coal-mines (Limited)	Firedamp prevalent; several miners burnt by ignitions of gas. (Disastrous explosion possible).—F.R.	No provision in Act to enable Inspector to order the use of safety-lamps only	Clause 7 (*h*) (iii) that no lamp other than a locked safety-lamp shall be allowed or used in any place in a mine in which there is likely to be any quantity of inflammable gas as to render the use of naked lights dangerous.
Waipa Collieries (Limited)	Bords (working-places) are driven 18 ft. wide, being too wide for safety, as falls of roof are liable and have occurred. (The most prolific cause of mining fatalities.) —F. R.	No provision in Act for Inspector to regulate width of bords	Clause 14 (4) (8) gives Inspector power to have workmen withdrawn. Clause 9 provides for making additional rules to regulate width of bords; also clause 18 (*a*). Also clause (46B) (*f*) gives power to workmen's inspector to notify manager of a dangerous part of a mine.
Hikurangi Coal Company (Limited)	The manager, who has been convicted for breaches of the Coal-mines Act, is now extracting coal from under the main haulage-drive. The mine is collapsing, and is on fire in one section (the Night-caps Mine disaster was thus caused).—F.R.	No provision in Act for Inspector to prevent workmen entering a dangerous place, and to prevent manager working his mine in a dangerous manner	Clause 14 (4) (3) gives Inspector power to have workmen withdrawn.

That is your statement?—Yes.

51. I want to put on record particularly what you said on the 15th August about the Taupiri Coal-mines (Limited): "Firedamp prevalent, several miners burnt by ignitions of gas. (Disastrous explosion possible.)—F.R." ?—That is so.

52. And you recommended alterations in the Act ?—I recommended those nearly three years ago. I was asked a question as to whether the new Bill would rectify the defects in the old Act, and that is part of my answer.

53. The suggested remedy is provided in clause 7 (*h*) (iii)—that no lamp other than a locked safety-lamp shall be allowed or used in any place in a mine in which there is likely to be any quantity of inflammable gas as to render the use of naked lights dangerous ?—Yes, that is in the clause in the Bill.

54. You directed the Under-Secretary's attention to it to show where the remedy was provided ?—Yes, at his request.

55. On the 15th August you said in regard to these mines: "Disastrous explosion possible" ?—I did.

56. What was your next communication ?—I was still very nervous, and so I got some electric safety-lamps and brought them up to Mr. Bennie at the Thames eight days before the explosion, so that I could demonstrate the use of them to him, and show that they gave a good light for the roof. I went to the Waitangi Mine and experimented with them, showing Mr. Bennie what these lamps could do. Mr. Bennie was rather doubtful that safety-lamps would give enough light for examining the roof, and that is the only point upon which we differed. I took these electric lamps up to him to show that they gave an excellent light, and subsequently asked him to take them to Mr. Fletcher and try and induce him to use similar lamps at Ralph's Colliery.

57. Did you make a special trip to the Thames for this purpose—to take those lamps ?—No, I went up to have a conference with Mr. Burgess and the Inspectors. We went down the deep-level mine there, which is dangerous. Mr. Bennie and I were discussing the dangers of the Thames Mine, and I said, "It is dangerous, but not nearly so dangerous as Ralph's Mine at Huntly, by a very great deal." This was on the Saturday evening before the disaster. I went to Greymouth after that, arriving there on Thursday, the 10th. I went to the Port Elizabeth State Colliery, of which I am the Consulting Engineer, and in conversation there with the manager, Mr. I. A. James, I told him of the conditions existing at Ralph's Mine, and that I feared a disaster.

58. How many days was that before the explosion ?—One day before—on Friday. The next day I was in his office drafting letters with Mr. James when his clerk came in and said that Ralph's Colliery had exploded and many men were entombed. I was not surprised, and Mr. James said, "Mr. Reed, you told me yesterday it was likely to happen."

59. Then there is on this file another minute dated the day of the accident (12/9/14). It is from Mr. Blow to the Minister of Mines, and was apparently written by the Under-Secretary on receipt of advice concerning the disaster. The minute says, "This shows that the fears of the Inspecting Engineer were well grounded, and points to the urgent necessity for proceeding with the Coal-mines Amendment Bill" ?—Yes.

60. Then we have it, Mr. Reed, that on six or seven occasions this year you warned the Mines Department of what might happen ?—Yes. Might I also say that I have never made such a prediction or such statements about any other collieries. This is the first occasion on which I have predicted a disaster in this country; I have never been in the country when one happened.

61. Were you very uneasy about the matter ?—I was. I think the letters show that.

62. Now, the chief point you make in your letter of the 13th August, which accompanied that tabulated statement, is in regard to safety-lamps ?—Yes.

63. Do you consider, Mr. Reed, that there is any doubt about there being a necessity to use safety-lamps in the Taupiri mines ?—It is absolutely necessary.

64. Is it arguable ?—Not at all. I may say that I was born and brought up on the Durham Coalfield. I have thoroughly understood the danger of firedamp for thirty years. This is a safety-lamp mine always—after the knowledge of the first ignition.

65. In your opinion, if safety-lamps had been used in this mine would this disaster have occurred and all these lives been sacrificed ?—No, this disaster has been proved to have been caused by an ignition of gas by a naked light; the other day I measured at one part of the mine 350,000 cubic feet of explosive mixtures—within the last ten days.

66. I want to ask why, occupying the position you hold, you did not help to see that legislation was placed on the statute-book long before this requiring the use of safety-lamps in such mines as Ralph's ?—I was a member of the Royal Commission on Mines in 1911, and that Commission reported strongly in favour of them. It is there in print, and you can see it on pages 12 and 13. I think the Commission has copied the British statute into its recommendation. It gives the Department and the Inspectors a great deal of power as regards the ordering of the use of safety-lamps. Under it the Inspector of Mines would have almost unlimited power. On pages 12 and 13 of the report of the Commission there appear recommendations covering the use of safety-lamps in mines.

67. Are those recommendations almost copied from the English Act ?—Yes, and from the report of the Royal Commission in England.

68. The Commission reported that safety-lamps were required, and also that legislation was necessary ?—I do not think we said anything about legislation; we recommended that it be placed on the statute-book.

69. This Bill (Coal-mines Amendment Bill, 1912) was introduced in 1912; did it ever see the light of day ?—Yes, that is a copy of the Bill introduced by the Minister of Mines during the session following our recommendation—that would be 1912.

70. This Bill contains the recommendations of the Commission ?—It contains a good many of them.

71. Does it contain the recommendation of the Commission with regard to safety-lamps ?—Yes, it does—it is practically verbatim from the Commission's report.

72. Which is the clause in the Bill of 1912 which contains the provision for enforcing the use of safety-lamps ?—Clause 46 (*a*), I think it is. On pages 7, 8, and 9 of that Bill of 1912 appear the recommendations of our New Zealand Royal Commission as regards safety-lamps, in statute form.

73. Then, I can put it this way: that the Commission having sat and made recommendations among which was one regarding the use of safety-lamps, a Bill was drawn embodying these recommendations and introduced into Parliament ?—I do not know if it was introduced into Parliament.

74. Do you know whether it went before the Goldfields and Mines Committee ?—I do not know.

75. Your copy says, "As reported from the Goldfields and Mines Committee, House of Representatives, 17th October, 1912" ?—Yes.

76. That is two years ago, nearly ?—Yes, two years this month.

77. After that Bill was reported from the Committee, did a deputation come to Wellington on the matter ?—Yes.

78. I got it out of Mr. Fletcher in the witness-box that he went down to Wellington as a member of a deputation to oppose the Bill ?—Yes.

79. Did you know of that deputation ?—Yes, sir, I was asked to attend it by the Under-Secretary.

80. And did you attend it ?—Yes.

81. Did the deputation oppose or support that Bill ?—They opposed it clause by clause, but the Minister supported me by contending for the Bill.

82. That is to say that the Minister of Mines, notwithstanding the opposition of this deputation, stood by you, and said the Bill would go on ?—Yes, he told them straight that it would go on.

83. Were Mr. Dowgray and Mr. Brown on that deputation ?—One of them was.

84. Which one ?—Mr. Brown.

85. Did the Bill go on ?—No, it has not become law yet, but it is going to.

86. Now, be serious. If that Bill had been passed two years ago and safety-lamps in such mines as this had been the law of the country, could this accident have happened ?—I decline to answer that question.

87. But the want of a safety-lamp caused this explosion ?—Certainly, it was a naked light which caused the explosion.

88. Now, let me pass on to another point. I want to ask you this: is there not a large area of old workings in the Taupiri Mine which, unless adequately ventilated would accumulate large quantities of gas ?—There is an immense area. I have scaled off on the mine-plan 250 acres in Ralph's Mine and another 250 in the Extended Mine. It is open pillar work and it is unique. They dare not take these pillars down. It means the maintenance of perhaps a hundred miles of bords and stentons, and that requires an enormous amount of ventilation to carry away the gas given off.

89. Do you agree, Mr. Reed, with the statement made by Mr. Bishop yesterday that this mine is unquestionably unique ?—It is; Mr. Bishop is right.

90. And if that is so, then the rules in regard to ventilation of some mines would not be applicable or may require to be particularly rigorously carried out in a mine like this which has so many difficulties ?—Yes, this mine requires special attention. It is a difficult problem. Perhaps Mr. Bishop and men of his capability could deal with it. It requires very special provision in regard to the distribution of the air.

91. When you were talking about the shaft-supports, did you also agree with Mr. Bishop that the shaft-pillars have been robbed and split ?—Yes, Mr. Morgan and myself were measuring the air round those places last week, and we observed just what you say—the shaft-pillars had been split and robbed. They had got the easily won coal to the loss in stability of the shaft-pillars.

92. Is that dangerous ?—It is. It is only a question of time when the coal frets away and there will be no factor of safety. Then the ground will collapse.

93. Of course there is an outlet to that mine at West Taupiri ?—Yes.

94. It would be a dreadful calamity if the Taupiri ventilation went wrong and Ralph's shaft went in ?—I do not think it is so dangerous as that. It would not go with a crash, it would give warning. It is not an immediate source of danger, because they have two other outlets to the mine.

95. That is, if the other way is clear ?—I do not regard as a great risk to human life the insecurity of the shaft.

96. Now, you have admitted or told me that there is a large area of open workings which, unless adequately ventilated, would collect large quantities of gas. As men have received burns by ignition in better-ventilated working-parts of the mine, is not that proof that gas was being given off in such workings ?—Yes, I understand that the men have been burned at places where they were working—that is, where there is an intake current of air. The current of air is concentrated where the men are working. If burns are received where there is a current of air how much more so will the men be burned where there is no air-current—that is, in the old workings ?—That is natural to understand.

97. As men have received burns in better ventilated working-places, it is only reasonable to assume that the danger would be more serious as the workings advanced ?—Yes.

98. Are the bords very high in places ?—Yes, sir. Some of them in Ralph's Mine are higher than I have ever seen elsewhere.

99. That, of course, makes it very difficult to inspect ?—Yes, naturally, very difficult to inspect, for danger from falls and for gas.

100. Should not a practical man like Mr. Fletcher know that mines like this are very difficult to inspect ?—Of course, as a practical man, he must know that the high places are difficult to inspect.

101. If a man knows that these places are so difficult to inspect, should not so much more care be taken to see that they are properly inspected ?—That stands to reason.

102. That is a natural corollary ?—Yes.

103. Can you tell me whether any flame-producing explosives were used in Taupiri ?—There is nothing else used in New Zealand. There is not an explosive which is on the English permitted list used in any mine in New Zealand at present, but there is going to be, I hope.

104. Is a permitted explosive one which gives no flame, or the merest amount of flame ?—It is a "permitted" explosive when it has passed the British Home Office test, and will explode without producing flame in an inflammable mixture of gas and air or coaldust. They have a Board at Home which tests these explosives.

105. You say they are all flame-producing explosives which are used in New Zealand mines ?—Yes, because the law does not give us direct authority to insist upon flameless or permitted explosives only being used.

106. Do you consider this mine a dusty mine ?—I do not consider the quantity of the dust dangerous, but I think it is a dangerously dusty mine.

107. You mean that the quality of the dust—the inflammable nature of it—makes it a dangerous mine ?—Yes, tremendously so.

108. Have you got an analysis of the dust made by Dr. Maclaurin ?—This is the original certificate and report of the Dominion Analyst. I will read that part of the report which shows the inflammability of this dust. I will put the whole report in. [Report put in—Exhibit CC.]

109. How many samples were sent to Dr. Maclaurin ?—There was one sample of coal and four of dust, one of brattice and about thirteen of gas, taken by me. These included three samples of dust from the mine, and a large piece of coal which Dr. Maclaurin converted into dust. Professor Dixon did not state it was a piece of my sample which was analysed. He went to the Dominion Analyst and obtained one of my samples, and reported the result without any acknowledgment that it was my sample he had tested.

110. Was the sample which Professor Dixon produced here in a bottle the sample that you had taken from the mine and given to Dr. Maclaurin ?—Yes, that is so.

111. Where did you get those samples which you sent to Dr. Maclaurin for analysis—in what particular place ?—I put the localities down as I collected the samples. Sample No. 13 was dust from bord in No. 5 district near where the W.C. pan was. Sample No. 13 was the one which was taken when Mr. W. Wood and Mr. B. Bennie were present. It was taken from the first bord on the left-hand side going up the jig. Sample No. 14 was taken when Mr. Bennie was present; it was dust from near No. 6 cabin on the haulage roadway. No. 15 was dust taken from the main haulage roadway at No. 4 level. No. 16 was a piece of coal from Ralph's Mine. No. 17 was a piece of charred brattice from near the flat-sheet, No. 5 jig.

112. Now, did the result of those analyses show that the dust was extraordinarily highly inflammable ?—Yes, very much higher than anything else Dr. Maclaurin had tested here. The flame from Ralph's coal-dust projected the longest distance, and he tested for comparison Westport–Stockton bituminous coal, Aberdare bituminous coal, New South Wales coal, and Welsh anthracite. The Huntly sample gave a flame which ignited cotton-wool at a distance of 20 in.; Westport–Stockton, 16 in.; Aberdare, 13 in.; while in the Welsh anthracite was only $2\frac{1}{2}$ in. The Doctor states in his summary that "These results show that the Huntly coaldust is very inflammable, and that the flame of the ignited dust travels greater distances than ordinary bituminous coals such as Westport–Stockton and Aberdare. Such properties would render the coaldust very affective in carrying on and intensifying an explosion once started." I may say that I tested it before. I tested roughly after the disaster with Mr. Alison, a director of this company. I was astonished at the result. It went off like gunpowder. That was on the 17th. I expected to find it similar to ordinary coaldust, and did not know that it was so inflammable.

113. I ask you whether the manager has the right at any time to send such samples to the Government Analyst for testing purposes in order to find whether or not his coaldust is inflammable—can Mr. Fletcher, or Mr. Alison, or anybody else send a sample and have a test made ?—Yes, anybody in New Zealand can send a sample of anything to the Dominion Analyst for examination. His Department analyse samples for the public.

114. Therefore there is no difficulty in the way of any manager of any mine getting his coaldust analysed ?—I do not wish to suggest anything against the management in this connection.

115. In regard to the mine-air, part of which was taken in the vicinity of No. 5 jig, Ralph's Colliery, was that analysed ?—Yes, I took eleven samples the week after the disaster from different parts of the mine, and they were analysed. Mr. Wood was with me when I collected them.

116. By whom were they analysed ?—By Dr. Maclaurin. They were taken on Friday, the 18th September, six days after the explosion.

117. Will you tell me as nearly as possible where you took those samples of mine-air ?—I can show you on the plan, as could also Mr. Wood.

118. Were any samples taken in the region where Martin's body was found ?—No, we had to go down to a lower part of that district by about 30 ft.—the upper part of the No. 5 district was full of gas. I measured 350,000 cubic feet of explosive gaseous mixture. At my request Mr. Wood took me on the Friday morning to where firedamp had been found by Deputy Mills, who had marked the places in chalk. When we found gas in such great quantities it was considered only safe for us to have one oil safety-lamp; in addition I carried an electric safety-lamp. The highest point in the district was at that door which was blown outwards. That is on an anticline or crown which rises in all directions towards the door [places from which air-samples were taken indicated on plan by witness]. We ascended from the bottom of the bords as far as we could go towards the faces. We always obtained a distinct gas cap on the floor. We did not raise the lamp any higher because of danger. Mr. Wood withdrew his oil safety-lamp, and I went into the gaseous mixture with my electric safety-lamp. I

bottled enough samples for analysis up to a height of 6 ft. 6 in. from the floor. We went round the lower end of the rising bords, and there was no doubt about the quantity of gas present. There was 40 chains of bords filled with a gaseous mixture. I can show you those bords on the plan. They are 14 ft. wide, and average 10 ft. high. The area in question would be a cul-de-sac for gas. Towards the roof there was no ventilating-current. If you get gas at the bottom of a rising unventilated bord which has been a dead end, or is communicating with another bord falling in the opposite direction, you may rest assured that if there is a gas mixture down at the lower end of the inclined bord it is full right up to the top or apex.

119. Is it not on the same principle that if you go through a bord and find gas on the ground you need not look for it up above ?—You are perfectly right. There was 40 chains of bord 14 ft. wide and 10 ft. high full of a gaseous mixture; I cannot state exactly what percentage of gas was in the mixture; but there was 350,000 cubic feet of gaseous mixture above 5·6 per cent., the minimum explosive limit. I think nobody would dispute either the quality or the quantity I found. The most explosive proportion of firedamp when mixed with air is about 10 per cent. The limits of the explosive-point are from 5·6 to about 16 per cent., although the margin is somewhat in dispute. The samples that I took on the floor at the very bottom, according to Dr. Maclaurin's analysis, went 1·8 per cent. of methane (CH_4). It must be remembered that the report of the analyst is generally slightly less than the actual percentage taken in the mine, because there is bound to be some little leakage in the sample-bottle. At the bottom of the bords where we began to test for gas, the samples contained, according to the analysis, 1·8 per cent., 3·7 per cent., and 1·65 per cent. Then, at the level of my cap it was 5·4 per cent. and 9·4 per cent., about the most explosive mixture: but I did not go nearer the roof because we could not have lived there. We only tested our way up the foot of the bords because we would not have survived if we had gone farther up towards the top. These samples were not taken to ascertain the maximum percentage of gas present, but to prove that the foot of the poorly ventilated bords did contain gas. I could have got 10 per cent. of gas, the most explosive mixture, in every bord by going up a little farther.

120. You tested low ?—Yes. None of these samples contained afterdamp—the analyses shows that.

121. You measured the accumulation of gas: supposing you could measure the total emission after the explosion, would that measured by you be the whole amount emitted in those six days ?—No.

122. Was there any afterdamp when you tested at all ?—No, my samples were remarkably free from afterdamp.

123. *Mr. Brown.*] What was the percentage of oxygen ?—17 per cent. was the lowest.

124. *Mr. Wilford.*] If there was ventilation after the explosion, would some of the gas be removed as well as the afterdamp ?—Yes. It is more easy to remove the firedamp than the afterdamp.

125. That is to say, any computation of 350,000 cubic feet would be rather under the mark ?—To the extent of the amount of gas that had been carried away by the ventilation. There was ventilations of sorts after the explosion, otherwise my samples would have contained afterdamp. No doubt the indifferent ventilation carried away firedamp too. That is easily understood, as I got some firedamp in the main return.

126. Then, you say that from your test there is no question whatever that there must have been more gas there than you have measured ?—Given off since the explosion during those six days—certainly.

127. Can you tell me how much gas it is necessary to have to start an explosion ? I understand that you must have a concussion and a flame ?—An ignition of gas, a concussion, rising the coaldust. An ignition of gas to give the concussion which raises the dust. Professor Dixon went into that matter very thoroughly, and he is an expert upon the subject. He said a very small quantity of gas will cause an explosion.

128. Are there any authorities on the subject ?—Yes; there is no doubt that a very small quantity of gas is sufficient to cause an explosion. The highest authority on the subject is Sir R. A. S. Redmayne, Chief Inspector of Mines in Great Britain. He has written a work on the ventilation of mines, printed in 1911, and on pages 216 and 217 he lays down this principle.

129. Will you read us what he says on the point; I am anxious to know just how much gas it is necessary to have to cause an explosion ?—Professor Dixon, who is an authority upon the subject of dust-explosions, says that a very small quantity will start an explosion.

130. You are not contradicting the Professor ?—No, he is an authority on the subject of coal-dust explosions, but Sir R. A. S. Redmayne is a higher authority—I believe the highest authority in the world—regarding explosions in mines. He says: "Now, a mixture of 9½ vol. of dry air to 1 vol. of firedamp contains exactly the proper proportion of oxygen necessary to affect complete combustion of the firedamp, and ought therefore to be the most explosive mixture that can exist—one through which the flame would be expected to travel with the greatest rapidity. But that part of the mixture through which the flame has passed expands under the influence of the heat of combustion, and drives the still unconsumed part in front of it; the velocity so acquired by the latter must be added to the normal velocity of the propagation of the flame. The pressure due to the combustion of the above mixture when ignited in a closed space is equal to 102·6 lb. per square inch, and the calculated temperature of combustion is 3,902° F. The resulting damage from the explosion of, say, a few hundred cubic feet of such a mixture in a mine can therefore be well imagined." He goes on to say that, "It has been very generally observed that—(1) Little damage is done near the point of origin of the explosive flame, and for, say, 50 to 80 yards therefrom; (2) then great damage is evidenced; (3) and after the cessation of the advancing explosion there is evidence of a 'back-lash' or rebounding force."

131. Supposing you describe it in your own words ?—As Mr. Fletcher says, the flame seeks for oxygen—the flame travels where there is the freshest air: it rushes forwards and then backward—so that the track of an explosion in a mine gives uncertain evidence of the point of origin. It will travel wherever there is oxygen.

132. What kind of a pace does it travel at ?—A tremendous pace. The temperature is 3,900° F.

133. Did you visit the spot where Martin's body was found ?—Yes, three times.

134. The position is marked " 43 " on plan AA ?—Yes.

135. Judging from the position of that body, can you say which man ignited the gas and started the explosion ?—I am satisfied in my own mind that it was Martin who started the explosion. I would like to say that six days after the explosion I reported to the Under-Secretary for Mines, before that body was found. I said that as the result of my inspection on the 17th and 18th I believed that I had discovered the origin of the explosion and the locality where the gas was ignited. I then thought the next man to Martin had ignited the gas. Previously Mr. Wood discussed the matter with me and I considered that the highest body up the bords was that of the man who had ignited the gas. Subsequently Martin's body was found farther up, and it was then clear to me that it was he who ignited the gas.

136. You sent a report a week previously ?—Yes, on the 29th September I reported that I believed I had found the point of origin.

137. In regard to the position of the other bodies, especially in regard to No. 36, do you know where No. 36 was found ?—Yes, No. 36 was the man whom I first thought had caused the explosion.

138. It is a remarkable thing for an explosion to take any course—backwards and forwards ?—No.

139. Then you cannot take any notice of the course of the explosion—it went both ways ?—Yes.

140. But the men further away would get the greatest force ?—Yes, most assuredly, unless they were sheltered.

141. Do you know that there was one of the victims in the act of making water—the fly was unbuttoned and the skin burned ?—Yes, it may have been.

142. Do you say that according to Redmayne's book the force of the explosion gathers as it travels from the point of ignition ?—Yes, that is so.

143. Would it strike as hard in the main haulage-way after it came out of No. 5 ?—Yes, much greater in the main road. There were the necessary conditions there to cause an explosion of dust.

144. It increases in strength as long as it has got the material to feed on ?—Yes.

145. *The Chairman.*] When once the gas has ignited and the concussion has taken place, the explosion of dust would keep on going ?—Yes, certainly.

146. To propagate you would not want further supplies of gas ?—No. I am excluding the idea of a blown-out shot. Further gas is not necessary after once the ignition has taken place. The concussion raises the dust and the flame travels through it, thus the explosion continues, gathering momentum. I do not think there is a limit to the momentum.

147. What was the height of the bord where Martin's body was found ?—11 ft.

148. Is it a uniform height of 11 ft. from where Martin's body was found to where the new fall is, or is it dome-shaped near the new fall ?—It is higher there.

149. If that new fall in No. 6 bord took place after the explosion, would that make any difference for gas-testing conditions—the mere fact that there is a fall there, and the fact that you had got a lot of new material [plan discussed with Mr. Wilford by witness] ?—The air comes in at the point marked " B " in No. 4 bord on plan AA and goes out at bord No. 6 via the point marked " B "; unless there is something in the nature of stoppings and brattice to direct it or convey it to the south end of those bords, it is natural that it will short-circuit and leave these bords unventilated. How can air go a long journey round these places unless directed ?

150. That is absolutely a gas-pocket ?—Not only is it a gas-pocket, but the whole panel is a magazine for gas. The whole panel contains stagnant air. It is easy to mislead non-experts, but I would like this settled. [Plan discussed by Commissioners, Mr. Wilford, and witness.] The area enclosed by me with a dotted green line on plan Exhibit DD is absolutely unventilated. This plan is certified by Mr. George Langford, the surveyor to the Taupiri Company, and shows a supposed course of the ventilation of the mine. Upon close inspection of it I observe that a certain section marked by me in dotted green line, containing the point where Martin's body was found, and the old and new falls and several bords, is isolated and constitutes a panel—that is, not being connected by air-courses in the old workings on any side but one—that is, the north-east. Air would traverse the north-east extremity of such panel marked by me in solid green, by which solid line it would short-circuit unless directed up and down the bords including Nos. 4, 5, and 6 and others by means of brattices and stoppings, of which there is not the slightest trace to be found. These bords rise, as shown upon plan AA, towards their blind ends. Bord No. 6, however, had a door which for ventilation purposes is practically a dead end. All gas given off from falls or other sources within that area would find its way to the upper ends of those bords, and there lodge, and would remain stagnant and would accumulate. I think you can see that there is no trace of brattice, or stoppings, or material for directing the air in that section. If there were but one or two of such that would not ventilate the section, because it would require a thorough system of brattice to send the air round. Brattice is always supported by frames. If an explosion had burned the brattice the frames would remain, as I have found in other parts of the mine the frames and also generally the brattices intact. All the conditions, therefore, are favourable for the lodgment here of an accumulation of gas, and also the production of a large volume of inflammable gas, such as would create a disaster in any colliery. There are two possible theories as to how Martin got there. If he got there through the southern end of bord No. 6 a miracle was performed. I will explain how.

151. First of all, the ground is highest there ?—Yes. The specific gravity of CH_4 is 0·55, or a little more than half the weight of air, air being 1. Well, the miner always looks for gas on the roof. The ends of these bords are the roof of that panel—the apex of the roof. They filled first. The firedamp given off at lower points finds its way slowly up like smoke. The firedamp given off at the fall

filled the dome and overflowed upwards first. There is reason to believe that firedamp was given off at one or both of these falls; consequently the dome of one or both of these falls filled first. The gas then entered the three bords and accumulated. The gas at the blind or highest end of the bords would no doubt be very pure. If Martin opened the door, as miners do not stand long with the door in their hands, there would perhaps be introduced 100 cubic feet of oxygen into that 68,000 cubic feet of gaseous mixture which Martin ignited. I have taken it as 68,000 cubic feet, but the company's surveyor makes it 78,000 above Martin's head in those three parallel connected bords. The oxygen which Martin could introduce would render the conditions more dangerous because firedamp when present in greater proportions than 16 per cent. is not explosive and it is reasonable to assume that at that higher point it would be greater than 16 per cent.—at any rate, for a short distance. Therefore, the oxygen in the atmospheric air which Martin might have admitted by the door would dilute that rich CH_4 and produce an explosive mixture to be ignited by his-cap lamp; if so, that would be the point of origin of the explosion. But I have more to say, and will show that he could not have entered bord No. 6 by the door. You have it in evidence that his coat was found in my presence. We looked for it at a certain point, about 10 ft. or so up the bord from his body.

152. Who found the coat?—The acting-manager, Mr. Penman, who was with me. I said, "What things he had with him will have gone up the bord," and Mr. Penman went along a little bit and found the coat on the ground covered with dust at the place where we expected to find it.

153. You expected to find his coat?—We said, "We will find his coat," and we had found it there within two minutes. Mr. Penman found it.

154. What did that tell you?—That the coat had been blown away from him. He had carried it on his arm. It had been blown up by the force of the explosion towards the door, being a light article. It was not burnt. Martin was apparently walking up the bord when he walked straight into the gaseous mixture. Having a naked light he could not detect gas until the explosion occurred. He walked into this gaseous mixture, which was at first non-explosive, but it got richer and richer as he ascended, until his lamp entered the 5·6-per-cent. mixture, when the explosion took place. His body was not carried a great distance. He was not very much injured. A piece of coal was embedded in his head, but the upper part of his body was uninjured. This supports Redmayne's statement that the explosion is not so great at the point of ignition. Even his hair was not burned. His lower extremities were shattered, and very much injured. I have told you, I think, that I measured 68,000 cubic feet of gaseous mixture above his head. That would be explosive when increased in volume by the richer gas towards the roof. There would, however, be more than 100,000 cubic feet of explosive mixture owing to the plus CH_4 contained in the roof. That is not strange considering that between the day of the explosion and the following Friday I measured 350,000 cubic feet in the vicinity. I also subsequently tested the gas with others, and we all got plenty at the big fall. I went up that fall, and had great difficulty in coming back owing to excessive gas in my lungs.

155. You have got gas there since?—Yes. They put brattice up, but notwithstanding the brattice Mr. P. G. Morgan, Mr. Penman, and myself went up to the end of the brattice at the fall on Friday last; and Mr. Penman got gas at the end of the brattice, where there was a considerable volume of air passing. An explosion took place there and put his light out, and this happened after the ventilation had been well restored and a perceptible current was flowing close to where the gas in the lamp exploded.

156. Did you see any rails in the region where Martin's body was found?—Mr. Morgan, Mr. Penman, and myself saw a pile containing some rails near the place.

157. Mr. Penman has told us that he saw two rails about 10 ft. out from the fall, and that they may have been 5 ft. or 8 ft. in it?—I could not say anything about the number of rails which were sticking out. They were protruding a foot or two above the ground, and I assumed naturally there was a pile.

158. But there were rails there?—Yes, certainly.

159. Would the line W—X on plan be about the spot?—Yes, about it. They were put at the end of the fall.

160.—Mr. Penman puts them at A P?—Somewhere there.

161. In No. 5 bord?—Yes.

162. That is about half a minute's walk from where Martin's body was found?—Yes.

163. If those were the rails that Martin was sent for that morning he was within half a minute's walk of them?—Yes.

164. What kind of an incline was he walking up?—The incline is about 1 in 11.

165. Should not the place where Martin had passed to have got there have been inspected that morning before he went there, and chalked?—If he was to work there it should have been inspected with a safety-lamp; the law requires that all working-places must be inspected before the men enter them. As to chalking, they only chalk the faces where the men are working; they would not of necessity chalk along the travelling-road.

166. Should not the place where Martin passed to get those rails have been inspected that morning?—Yes, that is compulsory.

167. From what you know now, from your observation and from what you have heard others testify, is there any doubt that if an inspection had taken place gas would have been discovered in that bord that morning?—Yes, certainly, it would have been found that morning.

168. That is, if it had been properly examined?—Yes.

169. That is to say, if the company had provided an efficient inspection of bord No. 6 on the morning of the 12th September by a man with a safety-lamp, these lives would not have been lost?—That is true, absolutely. Nobody can contradict it.

170. Did you make an air-test measurement on your last visit?—Yes, with Mr. Morgan and Mr. Penman.

171. You took an air-test measurement with Mr. Morgan and Mr. Penman ?—Yes.

172. Can you give me the result of that air-test ?—We took it in the main return, to see what the fan was producing. The manager was with us and said the fan was running under normal conditions.

173. When was this ?—Last Friday, 2nd October. We went down into the mine with Mr. Penman, and asked him to show us the best places in the main return airways communicating with the upcast shaft. We selected two places which were suitable for air-measurement. In the main return, little dip, we got 31,995 cubic feet per minute. In the other main return we got 11,600 cubic feet per minute. We used two anemometers, and both Mr. Morgan and myself took the air-measurements, so that there was no error.

174. You checked each other ?—Yes. The total air was 43,630 cubic feet per minute. I also took air samples of the main return-air, possibly still short-circuited somewhat. It appeared to be very good air.

175. *Mr. Dowgray.*] It may have been short-circuited ?—Yes, Mr. Penman said it was. The ventilation of the mine is far from being restored yet.

176. *Mr. Wilford.*] Is not such a test as that worthless for the purpose of the mine, unless the air is not distributed into all the workings ?—We were testing to see what the fan could do. Of course, you must distribute it throughout the workings of the mine to remove accumulations of gas.

177. What is the use of that test if the workings are not ventilated ?—Of course, the quantity of air produced by the fan does not prove adequate ventilation.

178. It does not prove distribution ?—No, that is so, although that fan under normal conditions would be adequate to supply the mine with the minimum quantity of air required by law—much more than the maximum quantity. With such a difficult mine to ventilate, if I were installing a new fan I would put in one with a capacity for 200,000 cubic feet per minute. I find that the area of workings in the Extended Mine is practically the same as at Ralph's Mine, whereas the fan at the Extended Mine has four times the capacity of that at Ralph's. If it were not necessary to put in a new fan at Ralph's with a capacity of 200,000 cubic feet, probably one would not have recently been ordered.

179. It has been said, Mr. Reed, during this inquiry that the law does not allow Inspectors to enforce the use of safety-lamps. Have you anything to say on that point ? Section 56 of the Coal-mines Act deals with " defects not provided by extra express provisions in the Act " ?—But as regards safety-lamps there is special provision in Special Rule 14.

180. That rule says, " The underviewer, under the direction of the manager, shall see that locked safety-lamps are used and naked lights excluded wheresoever and whensoever danger from firedamp is apprehended, and shall see that proper caution-boards or signals are placed and maintained for the purpose. He shall also examine the lamps, and shall immediately withdraw any that he may find unsafe. The underviewer or his deputy shall see that the roof and the sides in all working-places are properly secured by the person working in them, and that the roof and sides of every travelling-road be made and kept secure. The underviewer or his deputy shall visit every working-place as often as is practicable during each shift." Which part of that rule do you rely on ?—The first portion. The most important is this : " The underviewer, under the direction of the manager, shall see that locked safety-lamps are used and naked lights excluded wheresoever and whensoever danger from firedamp is apprehended, and shall see that proper caution-boards or signals are placed and maintained for the purpose." That is the allusion which prohibits the application of section 56. I am not a lawyer, but Mr. Macassey is reported in the *Dominion* of the 25th September to have said that the Inspector of Mines could not enforce the use of safety-lamps, but provision would be made in the new Bill.

Mr. Macassey : My remarks referred to Mr. Miller's opinion, and the point was that there was no reasonable ground for apprehending danger from firedamp.

181. *Mr. Wilford.*] Following on my question as to what part of Rule 14 you relied on, and your answer, I want to ask you this : considering the fact that Mr. Fletcher, on the 14th January, 1914, wrote to the Inspector of Mines admitting three burnings through gas-ignitions in the Taupiri mines, should not precautions have been taken by him in the way of safety-lamps ?—That is a matter of opinion. Mr. Fletcher may have acted honestly upon his opinion. I think they should have been in use. My letters show that fully, and they were written before the event.

182. I got the loan of Professor Dixon's evidence and my cross-examinations of him before this Commission, and I noticed on page 14 of his evidence that he said, " You will find gas if there is only 2½ per cent. present " ?—Yes, he said that.

183. What are the recognized authorities on luminous flame tests ?—The British Royal Commission's last report, and Professor John Cadman, who went into details of the subject. I find that I myself can easily read 1¼ per cent. I have been experimenting considerably on this subject. At my request the Government imported gas-cap observation-machines, which have been established at the principal coal-mining centres from Whangarei in the north to Invercargill in the south. I had one of the machines at the Mines Court in the Auckland Exhibition, and I proved many times that I can easily see a 1¼-per-cent. cap, and a man with better eyesight can read ¾ per cent. I can produce the British Home Office rules upon that subject and the Royal Commission report. I would refer you to the report therein of Professor John Cadman, of the University of Birmingham, who was the expert appointed by the Home Office to investigate and make experiments on the subject.

184. What I want to know is whether you can find gas at less than 2½ per cent. ?—Yes, Mr. Young read 1¼ per cent. distinctly. I can do the same.

185. When I had Mr. Wear in the box, I asked him how he tested for gas, and he held his arm up, not quite straight over his head, but at an angle, like that [position demonstrated]. I took a lamp and placed it in his hand, and suggested that at that height it would be impossible for him to detect gas by the flame, because he could not see the cap ?—That is not the way to hold the lamp. To hold it up like that is the action of an amateur. Of course, the range depends upon a man's eyesight.

186. When does the cap run to a triangle ?—At about 3 per cent. At 2 per cent. it is a truncated cone. [Diagram explained against the light of a window.] I have here the instructions issued by the Home Office to firemen and deputies for gas-testing in mines. [Instructions read by witness.] Here in Huntly they are using petroleum or kerosene in their lamps. The gas-testers should use colza oil.

187. I want to ask you another point, Mr. Reed, *re* Mr. Miller's opinion ?—I glanced through it.

188. Did you see the statement of facts submitted to Mr. Miller by Mr. Bennie ? This is a copy of the letter to Mr. Miller upon which the opinion was framed : " On the 9th July ultimo, a miner named William Kelly was burned by an ignition of CH_4 gas in the Taupiri Coal Company's mine. The examining deputy reported finding gas in Kelly's working-place on the 1st July ultimo, but on each succeeding morning up to and including the 9th July (date of accident) the examining deputy reported the place clear (safe). The Coal-mines Act, 1908, section 60, states, ' Accident in mine *prima facie* evidence of neglect.' Special Rule 14, Second Schedule, Coal-mines Act, 1908, states, ' The underviewer, under the direction of the manager, shall see that locked safety-lamps are used and naked lights excluded wheresoever and whensoever danger from firedamp is apprehended.' The manager did not order safety-lamps to be used, and Kelly was using a naked light. Under the above circumstances, is the manager guilty of a breach of Special Rule 14, Second Schedule, Coal-mines Act, 1908 ? " I want to know are those facts which were submitted by Mr. Bennie to Mr. Miller sufficient to enable him to give any opinion other than the one he did ?—If I were consulting lawyers I would tell them the whole of the circumstances as to all the ignitions.

189. At any rate, before any one could arrive at an opinion they would want to know the whole of the conditions in regard to the explosions ?—Yes, and more than that—very much more.

190. What more ?—They should know the unique conditions of the mine as regards the accumulations of gas in the old workings. There are other things also. I have them all down in my notebook—reasons why special measures should have been adopted at this mine.

191. Have you got them tabulated ?—These are the reasons why I wrote those six letters which foretold this disaster : (1) The large area of high workings to be adequately ventilated; (2) prequency of gas-ignitions, any of which might have occasioned a holocaust, dust being present; (3) weakness of the Coal-mines Act; (4) naked lights and flame-producing explosives in use; (5) inexperienced men generally as far as gas-testing is concerned. As we have only one other known gassy mine in New Zealand, our New-Zealand-born colliers have no opportunity of studying the gas problem like the Home colliers, and from what I have seen of those coming up for their certificates, as examiner, I have found that they are generally tiros at the gas-test. I refer to the New-Zealand-born miners. The majority of the young men about these mines are New-Zealanders who have never had an opportunity of qualifying in gas-testing. As officials, however good and willing, they would not know gas when they got among it. Another reason for fear is the smallness of the fan. A fan with a capacity of 45,000 cubic feet a minute, although it supplied the minimum of 150 cubic feet of air per man per minute required by the Act, was inadequate to clear the noxious gases from such an enormous area of old workings standing open. Those are the reasons which caused my fears, which were based upon my experience at Durham, where we regarded an ignition of gas as a most serious thing. If such an occurrence happened without any one being injured it was looked upon as a let-off. If an ignition took place and there was not a disaster as a result we were thankful for it. Professor Dixon has said that a small quantity of gas would ignite a dust-explosion, which confirms my fear.

192. Do you know of any power under the present law by means of which the Inspector of Mines can increase the minimum quantity of air to provide adequate ventilation in old workings ?—Yes, section 40, subsection (1).

193. Although the Act provides a minimum, there is nothing to prevent the Inspector from increasing it ?—Not in the least ; then there is Special Rule 3 as well.

194. This is a question to which I want you to be careful about your answer : Was the ventilation provided by the Taupiri Company sufficient for the ventilation of that particular mine—I mean everywhere, old and present workings ?—As I was not in the mine before the explosion for a long time, I am unable to say what portions of the mine were well ventilated and which ill ventilated ; but a fan of 45,000 cubit feet capacity is inadequate, and I understand that Mr. Fletcher has already ordered one of 200,000 ft. capacity, so that he appreciates the fact that his fan is inadequate. Possibly a wiser man would have installed a larger fan years ago.

195. Under Special Rule No. 1, after dealing with the responsibility of the manager and the operative details of the mine being under his daily supervision, it says, " He shall be responsible for the appointment of a sufficient number of competent persons to carry out the requirments of the Coal-mines Acts and the special rules, and also to see that the working of the mine is carried on with all reasonable provisions for the safety of the persons employed." Did the company, in your opinion, appoint a sufficient number of competent men to carry out the Coal-mines Act and to see that the mine was carried on with all reasonable provisions for the safety of the persons employed ?—That is a question upon which I would not like to express an opinion. It is not fair to ask me to express an opinion, as I was not in the mine for a long time before the explosion.

196. I want to sum up your evidence-in-chief with a few questions : Was this explosion caused by the use of a naked light ?—Yes.

197. Would the use of a safety-light by Martin, instead of a naked light, have prevented the explosion ?—Yes, if the safety-lamp was in a safe condition—that is, if it was an efficient safety-lamp, and he had handled it properly. The explosion then would not have occurred.

198. Was there, in your opinion, an accumulation of gas in bords Nos. 4, 5, and 6 ?—Yes, a large accumulation, in my opinion.

199. Could the presence of that gas have been discovered if an examining deputy had visited those bords prior to the workmen going in ?—Yes, certainly.

200. Are not the ends of bords Nos. 4, 5, and 6 higher than the line on which the mixture becomes explosive in those bords ?—To the best of my belief. The ends of those bords 4, 5, and 6 are the highest points in the panel which I have marked in green lines upon the plan, and that panel represents the area affected, but I would like to say that I am not counting the tops of the falls, which are higher than the faces of the bords.

201. Was there any sign after the explosion of their having been any bratticing or any form of conducting pipes for taking the air into those old workings, and especially into bords 4, 5, and 6 ?—Within the area in bords 4, 5, and 6 which I have marked in green on plan AA, the air is certainly short-circuited. The panel which I have marked in green line upon the plan shows no doors or stoppings by which air could have been directed up the bords. Therefore if the plan is correct the whole of that air was short-circuited, and the surveyor has shown upon the plan in arrows that it is short-circuited. They are red arrows put upon the plan by the surveyor of the company showing it to be short-circuited.

202. Was there any sign of bratticing having been in those bords Nos. 4, 5, and 6 ?—I saw no signs of it, and I examined three times most carefully.

203. Is there any sign of staging upon which the bratticing could have been carried ?—The only bratticing I saw was brand new bratticing up to the fall in No. 5 bord. It was placed there between my visits after the explosion.

204. On the course that the explosion travelled, where there had been bratticing did any part of the staging still remain ?—Yes, nearly the whole of the staging, and the brattice was torn in shreds but hanging thereto in places.

205. Can you trace the brattice or the staging along the course of the explosion ?—Yes, wherever I went in the new workings, but there never is any brattice maintained in the old workings.

206. When you estimated something like 350,000 cubic feet of gaseous mixture in the bords, that was after the explosion ?—Six days after the explosion.

207. Are you satisfied that the amount that you then measured did not represent the amount that had been given off in those six days ?—That is my firm belief.

208. It is a fact that in the air you took samples there was no afterdamp—that there had been a through current of air which had carried away the afterdamp as well as the gas ?—Some current of air—whether it was a through current or a side current I could not say.

209. The door which opens into No. 6 is placed at the highest part of No. 6 ?—Yes.

210. And therefore if a man entered that bord by that door he would come in where the mixture was strongest ?—If he entered through the door, yes, providing the door was ordinarily close fitting.

211. If a man entered at the opposite end of bord No. 6, it being lower than the entrance where the door is, the mixture would be weaker ?—Yes.

212. And as he ascended towards the door, the mixture would become stronger ?—Yes, provided there the accumulation reaches to the top and the door is closed.

213. Is it necessary, in your opinion, that these old workings should be protected by locked doors, or fences, or both ?—If the doors are intended to keep people out they should be locked as required by special rule, and if they are intended to admit some air they should be fitted with ventilators and regulators so that each bord would have its proper air-supply. The air would then be distributed through the whole section, instead of being sent by the shortest way only. I would not trust a fence in any dangerous ground. I consider that the doors should be locked, and there should also be danger notices threatening the men with prosecution for trespass.

214. *Mr. Napier.*] Would you please tell us what are your official duties in regard to State coal-mines ?—I am Consulting Engineer for the Department in regard to State coal-mines.

215. You consult with whom ?—With the Under-Secretary whenever he requires advice in connection with the State collieries.

216. Supposing we confine your description of your duties to those regarding the coal-mines ?—I am on the Board of Examiners for all mining officials. I am consulted regarding State coal matters.

217. I want to know what are your duties with regard to privately owned coal-mines ?—I have no statutory duties at all. I do what the Under-Secretary tells me to do. If he wants me to report upon a special subject I do so. I am not authorized to communicate direct with my colleagues the Inspectors of Mines. I am not authorized to write an official letter to anybody in New Zealand or to my colleagues; all correspondence goes through my chief—the Under-Secretary for Mines. If I notice anything alarming, such as this Taupiri case, or if I have any special matter regarding the safety of the mines, &c., to report, I address my chief, the Under-Secretary. If I see anything that should be reported in connection with the inspection I write to the Under-Secretary, and draw his attention to any officer who I think is not performing his duty. Sometimes I may draft the letter, but it always goes through the Under-Secretary. If I find that a mine is using dangerous explosives, such as this Taupiri Company is using—flame-producing explosives—I communicate with my chief, and he writes to the Inspector of Mines for the district advising him what to do, which is generally repeating my request, but I have no official position as regards the Inspectors. I am consulted by my chief, and I advise him to the best of my knowledge. I also examine miners who are applicants for certificates of competency upon the safety provisions, together with my other colleagues on the Board. I edit the Mines Department annual report for Parliament. I am editor of the Government mines report upon all coal and gold mines. I prepare and collect all statistics of all mines in New Zealand, both coal and gold mines. I have to do with most of the problems in connection with mining matters, such as roads on goldfields and subsidies for mining fields. These matters are frequently referred to me.

218. Is that a fair summary of your duties ?—In the main. There may be other matters of detail, but that is the general outline of my work.

219. Among your duties are you required to report as to whether the Inspectors of Mines are doing their duty ?—If I am asked to report as to their duty, I would do so. If I see defects, such as I