619. Assuming that there was a certain amount of coal-dust in the mine, would not the coal-dust accelerate the gas-explosion?—Yes, had there been a gas-explosion.

620. Assuming that there was a gas-explosion accelerated by coal-dust, would not you have carbonic oxide as a resultant gas?—You might have had.

621. With reference to after-damp, that contains a large proportion of nitrogen, do you know if the lamps will burn in it?—If the after-damp is pretty strong they will not burn.

622. If it is strong enough to seriously hamper a man's movements and check his breathing will his light still burn?—No light will burn; it will die out quickly.

623. The light will last much longer than the man?—I do not know. The general evidence in the case of firedamp explosions is that men want to go to sleep, and the lamp dies out. In the case of carbonic oxide, there are many cases in which the man has been dead and his lamp has burned itself out by consuming all its oil. It rather increases its flame. I have never heard of a case where an explosion has been one of firedamp purely and simply.

624. Assuming that it was firedamp that caused the explosion in the Brunner Mine, would you still think that the carbonc oxide is the resultant gas of coal-dust?—Yes; but still the question of firedamp is purely a supposition. In one case you have evidence of the dust explosion, and in another case you have only a supposition of firedamp. In the Whitehaven Colliery explosion (1882) coal-dust could have played no part; it was one of gas and air. A large volume of explosive mixture, which was known to exist, being probably ignited by a defective safety-lamp; its effects, so far as violence was concerned, were confined to the immediate vicinity of the explosive mixture. The violence or force of the explosion was less than in any other of the five. The flame had not extended 50 yards from where the explosive mixture had been before ignition. The workmen in the field of the explosion had all been under some alarm before the explosion, and after it had moved about 100 yards one of them escaped alive. Their bodies exhibited no signs of the severe burning and blacking common after explosions in dusty pits. The part of the mine in which the explosion occurred was wet—that is to say, it was a wet pit.

625. The bodies in the Brunner Mine were intensely black, were they not?—That showed coal-dust.

626. Under ordinary circumstances they would have been working in coal-dust, would they not?—In some cases the bodies did not exhibit any signs of coal-dust.

627. That may have been due to the place they were working in?—It is stated as a fact.

628. I do not think you can put it down as a theory that because a mine is black there has been no firedamp?—No; but where you have firedamp purely and simply you do not have that amount of black such as is found with a coal-dust explosion.

629. It has been stated that the majority of these men were killed by the force of the explosion. Can you explain why the mine was not more destroyed where these men were killed?—It was on account of its splendid roof. If it had been a roof such as we have in some of our Lancashire, Cumberland, and South Wales collieries there would have been falls extending probably over hundreds of acres.

630. How is it the props did not come down?—They were tightly wedged in.

631. As a matter of fact, very few props were broken?—A few only.

632. How do you account for so few being broken?—They were wedged tight. That would be one thing in their favour. They did not offer much resistance to the force.

633. But a man does not offer much resistance?—He is not tied top and bottom like a prop; he is a more flexible subject.

634. You say that a powder shot would produce 4,000° of heat?—Yes.

635. And the air in a colliery like the Brunner would be heated about 4,000°?—This intense heat might be carried 2 or 3 yards; of course, it would continue to get weaker.

636. Would the whole area of a bord for 2 to 3 yards be heated to that extent?—I do not say the whole area, but a portion of it would in the line the shot was travelling; then the heat would diffuse.

637. For how long would that portion be heated to the extent of 4,000°?—Not a great length of time; it would take a sufficient time to generate a sufficient amount of gas which would then be immediately consumed by the flame from the shot itself.

638. Do you really believe that the amount of gas generated has produced the amount of charring?—To a great extent.

639. Do you not think that having that gas produced there would then cause it to rush along and continue to produce gas as it went?—It would produce gas from the coal-dust.

640. Supposing that you had that gas, then you must have had more flame, and it is a wonder that the roof and sides do not show a greater amount of charring?—You must bear in mind that you found evidences of flame in many places, and then the flame in many instances would be particularly severe, and it wants sufficient explosive matter to carry it on. We have evidences of that when we were travelling round the mine, where the explosion has picked up the coal-dust and has been forced on with renewed vigour.

641. Your ordinary gas would produce enough heat by expansion, would it not?—You must expand or consume it to start combustion.

642. Would not the same amount of expansion come off the drive as from the place where the blown-out shot was?—Not necessarily.

643. Well, probably?—If you take a large body of gas and drive it forward in compression it presses the explosion into the drive, and the air in front of it which has been driven at a greater speed will generate a lot of heat. In the same way mechanically the air compresses; that accumulated air will be carrying with it a certain amount of coal-dust which it picks up by coming into contact with the sides. The heat becomes so great as to distil the hydrogen gas from the coal. The explosive force is after this gas comes back from the concussion, and when it expands again it is infinitely more explosive than before.