290. Does that indicate when a man would be affected?—It would be at something over 10 per cent. before a man would feel it, but 15 per cent. before the candle would be extinguished.

291. At what percentage would the difference in the burning of the candle be first noticed?—You would notice it at 3 per cent.

292. Even according to that report the candle is not a reliable guide as to when a man should quit?—I think it is a very good guide, unless he can get an analysis of the air made.

293. Still, you admit that with even 3 per cent. it is dangerous to human life and yet the candle will still burn?—Yes.

294. Could you not suggest any other test?—No, it is the only one I know of for $CO_2$.

295. Do you consider a mine affected by carbon-dioxide gas should have a barometer?—Yes, they ought to be compelled to have a barometer.

296. In quoting the effects of saturated air from that report do you agree with those opinions? Is that your own experience?—It is my own personal experience. I have noticed it myself.

297. As to the effect of 80° wet and 86° dry?—Yes.

298. Is it not a fact that when the temperature is high it is dustier?—Yes.

299. In a dry temperature, then, is the effect not the same as the wet temperature would have?—Well, it would have a bad effect upon their lungs.

300. Is that not one of the reasons for fixing a dry temperature also?—Yes.

301. In connection with a blower, what is the maximum amount of air you could have delivered at a working-place by a blower as compared with an exhaust fan?—You will get far more from a blower, because you can work it at a higher pressure.

302. *Mr. Parry.*] Do you think that a man working in a hot place is a better judge of the effects of the temperature than a person who analysed the air would be?—The men themselves are the best judges.

303. *Mr. Reed.*] Do you think the men themselves could tell the percentage of gas?—No, the men could not tell the amount of gas present.

304. Are you positive as to the lowest percentage of carbon-dioxide that would be indicated on the flame?—No, but I think it is 3.

305. Do you think 1¼ per cent. would have a noticeable effect?—It would not be noticed very much.

306. With a given horse-power and a pipe of fixed dimensions, would a blower give as good ventilation as an exhaust fan?—The blower would be the better.

307. Under any conditions, with a given pressure?—Yes, where you have only one outlet to the surface.

ALFRED W. SAWYER sworn and examined. (No. 10.)

1. *The Chairman.*] What are you, Mr. Sawyer?—A miner.

2. How long have you been mining?—Forty years or thereabouts.

3. Where have you gained your experience?—Practically all at the Thames. I am working generally contracting and tributing, but am working my own claim at the present time.

4. Have you had any experience of taking temperatures or testing air by instruments?—None whatever.

5. What is your working rule for detecting the presence of gas?—We principally use the candle-light, and trust to our own experience in the matter of breathing.

6. Do you notice the effect on the candle first or on your heart?—On the heart.

7. Do you consider that the average miner of experience can tell by these two indications?—Well, we have done so for many years.

8. Do you think you have a reasonable and reliable workable rule in these two tests?—Yes, a workable rule so far as our experience goes.

9. Have you any other matters you wish to lay before the Commission?—Yes, in regard to sanitation, ventilation, and accidents.

10. What is your general opinion as to natural ventilation as compared with artificial, and as to the different kinds of artificial ventilation?—Natural ventilation, when you can get it, is the best; but if it is not available I prefer to use a fan. I have also used it driving a blower, but found that it did not work at all. It drove the air a certain distance from the face, and there met a wall, which was not dispersed for months. Instead of turning the water into the mine I connected up a pipe at each end and drew the water out, and, greatly to my surprise, I could then see the men working inside the tunnel. I had created an exhaust. I tried the same thing in the Dauntless, with a similar result.

11. So that you prefer the exhaust principle?—I think the exhaust is far preferable to forcing the air in.

12. Have you had any experience of ventilating deep shafts?—No, I have not worked in shafts for twenty-two years. I met with an accident in one, and have not worked in a shaft since.

13. As to accidents?—The only accident of any importance of which I have had experience, apart from knocks and bruises, happened in the Caledonian shaft. It was in a very bad state of repair, and on one occasion some of the slabs slipped out into the shaft. The result was that the cage struck the rotten slab, and they broke away. The engine-driver, not noticing what had happened, the cage fell, and I nearly got my hand cut off.

14. Then the accident was the result of rotten timber?—Yes, it had been neglected by the manager.

15. Have you seen any accidents which were caused by misfires?—No, but I have seen some narrow escapes.

16. Do you know anything about firing by electricity?—No.

17. How many shots can a man safely fire by means of a fuse?—He can reasonably attend to six holes. It greatly depends whether the holes are put in by machinery or hand-steel. You necessarily use more length of fuse, and have more time to get away.