

THIRD AND FOURTH REPORTS

FROM THE

SELECT COMMITTEE

ON

ACCIDENTS IN COAL MINES;

TOGETHER WITH THE

PROCEEDINGS OF THE COMMITTEE,

MINUTES OF EVIDENCE,

AND AN

I N D E X

TO THE FOUR REPORTS.

*Ordered, by The House of Commons, to be Printed,
1 & 26 June 1854.*

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X9(13551): 945.3.M54t
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T H I R D

R E P O R T

FROM THE

SELECT COMMITTEE

ON

ACCIDENTS IN COAL MINES ;

WITH THE

MINUTES OF EVIDENCE,

TAKEN BEFORE THEM.

Ordered, by The House of Commons, to be Printed,
1 June 1854.

Martis, 14^o die Februarii, 1854.

Ordered, THAT a Select Committee be appointed to Inquire into the Causes of the numerous ACCIDENTS IN COAL MINES, with a view of suggesting the best Means for their Prevention.

Committee nominated, of—

Mr. Hutchins.
Mr. Cayley.
Mr. Stephenson.
Mr. Ingham.
Mr. Cumming Bruce.
Mr. Hussey Vivian.
Mr. Henry Austin Bruce.
Mr. Mostyn.

Mr. Locke.
Mr. Cobbett.
Mr. Farrer.
Mr. Baird.
Mr. Fitzroy.
Colonel Pennant.
Mr. Child.

Ordered, THAT the Committee have power to send for Persons, Papers, and Records.

Ordered, THAT Five be the Quorum of the Committee.

Veneris, 7^o die Aprilis, 1854.

Ordered, THAT the Committee have power to report the Minutes of Evidence taken before them, from time to time, to The House.

Jovis, 27^o die Aprilis, 1854.

Ordered, THAT Mr. Thicknesse be added to the Committee.

Jovis, 4^o die Maii, 1854.

Ordered, THAT Colonel Pennant be discharged from further attendance on the Committee, and that Viscount Goderich be added thereto.

T H I R D R E P O R T .

THE SELECT COMMITTEE appointed to inquire into the Causes of the numerous **ACCIDENTS IN COAL MINES**, with a view of suggesting the best Means for their Prevention, and who were empowered to Report the **MINUTES OF EVIDENCE** taken before them, from time to time, to The House,—

HAVE taken further Evidence on the Matters to them referred, which they have agreed to Report to The House.

1 *June* 1854.

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MINUTES OF EVIDENCE.

Veneris, 19^o die Maii, 1854.

MEMBERS PRESENT.

Mr. Hutchins.
Mr. Child.
Viscount Goderich.
Mr. Thicknesse.

Mr. Baird.
Mr. Locke.
Mr. Cobbett.

EDWARD J. HUTCHINS, Esq., IN THE CHAIR.

Mr. John Evans, called in; and Examined.

2329. *Chairman.*] I BELIEVE you are the principal Manager of the Dowlais Iron Works?—I am.

2330. Under the trustees of the late Sir John Guest?—Yes.

2331. You have extensive collieries there?—We have.

2332. Can you state from recollection how much coal you raise annually?—About 400,000 tons.

2333. Your collieries are principally under the superintendence of Mr. Nicholas Wood?—They are.

2334. The ventilation there is more perfect, perhaps, than in almost any colliery in Wales?—I believe it is.

2335. Can you state to the Committee how many colliers you have engaged?—From 800 to 850.

2336. Have you many accidents from fire-damp?—We seldom or ever have fire-damp; never if the men are working in their proper places; but when they go over into an old working that has been abandoned, some risk is run.

2337. That is from going to places where they ought not to go?—Yes.

2338. I believe that you yourself do not pay exclusive attention to the department of working the coal, but act more as a general manager and superintendent of the works?—Yes.

2339. You cannot, therefore, give any evidence as to the particular mode of working coal in South Wales?—I cannot.

2340. Have you paid any attention to the subject of the education of the colliers?—Yes.

2341. Have there been any good schools established at the Dowlais iron works?—There have.

2342. For how many years have they been established?—I should say for 25 years.

2343. Have you found that they have improved the moral condition of the people?—A great deal.

2344. Until what age do the boys generally attend those schools?—Up to 10 or 11, and sometimes 12 years of age; where a boy is clever and apt at learning, his parents keep him at school longer than usual; we always extend privileges to boys brought up at the school, and place them in the best places.

2345. With reference to education, is 10 years of age rather too young at which to send a boy to work in the colliery?—It depends upon how long he has been at school; I should not like to see a boy sent to the works at 10 years of age, but it is the practice.

2346. At the Dowlais works, have you also infant schools?—Yes.

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2347. Are

Mr. J. Evans.

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Mr. J. Evans.

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2347. Are they very numerously attended?—On Easter Monday, I think, we had nearly 2,000 infants at a tea party.

2348. The origin of those schools is of a later date?—Yes.

2349. How long have they been founded?—I should think about 10 or 12 years.

2350. I believe that they were established through the exertions of Lady Charlotte Guest?—Yes.

2351. Have you found great benefit to result from those schools?—No doubt of it; they prepare the children to enter into the higher schools.

2352. It has the effect of removing them from the charge of the mothers, enabling them to attend to their household duties?—Yes.

2353. When they leave the infant schools, are they in a state of forwardness to commence their education at the other schools?—Very much so.

2354. Will you state to the Committee at what age they leave the infant school?—I should say from six to eight years of age.

2355. Then they go to one of the other schools?—Yes; to the boys' school or the girls' school.

2356. How many boys have you attending the regular schools?—I should say that the daily attendance in the boys' school is about 300 or 350, and in the girls' school about an equal number; in the night schools there are about 150 boys and from 120 to 130 girls who have been working all day in the colliery.

2357. I believe that the night schools are for adults also?—Yes.

2358. Is there any great attendance on the part of adults?—Very great.

2359. How many workmen have you at the Dowlais works?—Six thousand.

2360. What is the attendance out of the 6,000?—In the boys' school I should say about 150, and in the girls' school 120.

2361. They were entirely established by Lady Charlotte Guest?—Yes.

2362. Who are the teachers at the night schools?—The day teachers; and in addition to them the agents and the agents' wives, and some of the principal inhabitants of the town also assist them.

2363. How long has the system of night schools continued?—Four years.

2364. Have you reading-rooms also at Dowlais?—Yes.

2365. Have you a mechanics' institute?—No; we have the reading-room, and we have the workmen's room, where they read the periodicals and all sorts of books; in the library they have a well-selected stock of 3,000 volumes, from which they have the privilege of taking one to read in their reading-room.

2366. Do the workmen contribute towards the school?—They do.

2367. Do you find any objection on their part to contribute?—On the contrary, they consider it a very great boon conferred upon them.

2368. Are your schools better than any in the neighbourhood?—I do not know of any in the neighbourhood equal to them.

2369. Do you find that in consequence of the establishment of schools you have a better class of men?—No doubt of it.

2370. Do you find that the education of the children induces the workmen to remain at your works, and to prefer them to others in the neighbourhood?—I think so; that is shown by the length of time they stop with us. They begin with us as boys and remain to the end of their days, generally speaking.

2371. Since the formation of infant schools and night schools, have you found any material difference in the moral condition of the population?—A great deal.

2372. I presume there is still a great deal of drunkenness?—Not half so much as I have seen.

2373. Will you state what would be the course of education of a clever boy, who would remain in the school till he was 12 years of age?—He learns English history, Scripture reading, all kinds of writing, printing, mathematics and geography; in fact they turn out as clever boys as it is possible to find in an ordinary school.

2374. When a boy has received that amount of education will he go to work?—Yes; we always try to promote such boys; if we find a very efficient boy we put him into an office, or into one of the principal shops.

2375. I believe you are not allowed by law to put a boy to colliery working before he is 10 years of age?—That is so.

2376. If a Bill were passed, making it compulsory on the parents to send boys of from 10 to 14 years of age to school for 150 hours in the six months, would it meet with objection?—I think it is objectionable where the boy is 14 years of age.

2377. You think 14 too old?—I do.

2378. Do you think it possible for a boy of 10 or 11 years of age, after he has been working in a colliery for 12 hours, to go to school; would he not be too tired?—They attend very regularly now; we have as many adults from the colliery to the night schools as of any other class; it would be rather a drawback upon parents of a boy of 14 years of age to make it compulsory upon them to send him to school.

2379. The proposal is that he should receive 150 hours' education at any time in the six months?—I do not think that it would be impossible if it were done in that way.

2380. Are we right in assuming that boys of from 10 to 14 years of age work 12 hours in the colliery?—Generally speaking, they do not; some go in at about five o'clock in the morning and come out about two; others go in at seven or eight in the morning and perhaps do not come out till seven or eight in the evening.

2381. How long do the boys stop?—They are employed at driving the horses, or at the air-doors, and they stay as long as the men.

2382. The boys driving the horses are more than 12 years of age?—Yes.

2383. The boys who attend to the doors are the youngest boys?—Yes.

2384. Of from 10 to 12 years of age?—Yes.

2385. Is the labour of attending to the doors of such a nature as to fatigue the boys, and render it impossible for them to attend the evening school?—I should not say that; the labour is very trifling indeed; it is the confinement; when the younger boys come out of the pit, it would be difficult to make them go to school in the evening unless they were naturally inclined to do so.

2386. Mr. *Cobbett*.] Do you think that a boy, who works week after week, for 12 hours a day in the colliery, could profit by any education at all by going to school?—If he went to school, I should think he would.

2387. Do you think that he would not be too much fatigued to attend at the school?—I do not think that the nature of the employment of boys at that age is such as to fatigue them; the confinement is more than the fatigue.

2388. There may be no bodily fatigue, but I understood you to say, that the constant attention for 12 hours was fatiguing?—It is more confinement than fatigue.

2389. Do you think that a boy, after having given his attention to the opening and shutting of doorways for 12 hours, would derive much benefit by going to school?—If he went to school, no doubt it would be a benefit to him; what I meant to say was, that it would be difficult to get a little boy who had been working in the colliery for 12 hours to go to school.

2390. Mr. *Baird*.] And if he had received a little education before, he would be more ready to go to school than a boy of no education at all?—Certainly.

2391. Hence the advantage of infant schools?—Yes.

2392. Mr. *Thicknesse*.] Have you any play-day in your collieries?—No; they work every day but Sunday.

2393. Mr. *Cobbett*.] To what time do you work on the Saturday?—On pay Saturdays, which occur once every six or seven weeks, we leave off at two o'clock, but on all other Saturdays between four and five.

2394. *Chairman*.] On the Monday and Tuesday, at the beginning of the month, the men only make half a day; that is, they do a day's work in the two days?—Scarcely that; that used to be the general practice, but it is much improved; there is less drunkenness, and the men attend their work better.

2395. Do you think the improvement has mainly arisen from the efforts made to improve their condition, and to forward their education?—I think so; and I think the improvement will be still greater as the present boys grow up.

2396. Mr. *Baird*.] How often do you pay the workmen?—We pay every Saturday, and settle their accounts every six weeks; we advance on every Saturday what is done, within a shilling or two shillings.

2397. *Chairman*.] As the boys who attend to the doors in the collieries have a great deal of trust confided to them, any carelessness on their part might cause an accident?—No doubt.

2398. If it were possible to educate those boys, do you think that they would be less likely to neglect that trust, and to inspire greater confidence than if they were totally uneducated?—No doubt; the better informed a boy, is the greater caution will he take; at the same time the parents are perfectly aware of the

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danger of leaving doors open; and I think the boys would not do so for the sake of their parents.

2399^t Have you also established play-grounds?—Yes.

2400. Describe them?—Lady Charlotte Guest gave the boys a large field of about 10 acres of land, where they play at skittles, kite-flying, at the bowling ground, and all kinds of gymnastics; and a very good band attend the play-ground every other night to play, from half-past six till nine o'clock, or later.

2401. Do you find that attended by the colliers and the other workmen?—Yes.

2402. Has it the advantage of keeping the men from the public-houses?—No doubt of it, and if the ground were three times as large, the result would be more satisfactory; it is want of recreation of that sort which drives the men to the public-houses.

2403. How many, on an average, make use of the play-ground?—The number varies; I have seen 3,000 or 4,000 at a time, but on an average, there are constantly 300 or 400.

2404. How many of them attend the reading-room and the library?—I should think that there are about 120 regular attendants in the library, and double that number in the reading-room; the library subscribers are a very different class of men to those who attend the reading-rooms; those men work every alternate week at night or by day.

2405. From the efforts which have been already made, do you find that the younger part of the population, who have been able to take advantage of the schools and other establishments held out to them, for their moral and intellectual improvement, form a better class of men than the old workmen who had not those advantages?—In every possible point of view.

2406. Is your example followed at all in the district?—I am sorry to say that it is not; it is followed out very much in Messrs. Darby's works.

2407. If a Bill were passed to compel a workman to contribute a certain sum per week out of his earnings, for the education of a child between 10 and 14 years of age, do you think that it would meet with any opposition on the part of the workmen?—None whatever.

2408. Or supposing that a boy were not allowed to go into the colliery until he was 12 years of age, but was obliged to remain at school until that time, would you think that a better system than that to which I have before alluded?—I think 12 years of age is rather too old; if a collier or workman has five or six children, and his wages do not amount to more than 20 s. a week, he would find it difficult to maintain them up till that age; it is in consequence of the large families that so many of the boys are sent into the mines at an early age.

2409. Viscount *Goderich*.] Do you think that any inconvenience would result to the coal-owners if a law were passed prohibiting the employment of boys under 12 years of age?—No doubt; because they would have to pay higher wages; instead of paying boys' wages they would have to pay men's wages.

2410. Do you think that there would be a want of labour felt?—There would; we should be obliged to employ men in doing the work of the boys instead of getting the coals.

2411. *Chairman*.] As labour is scarce, you would feel that restriction?—I think so.

2412. Mr. *Cobbett*.] Would you not be able to find a sufficient number of boys at 12 years of age?—We should have to pay them at higher wages.

2413. At what age do the boys go to the infant school?—They are taken to the school when they are two years and 2 ½ years old, and up to five or six years of age.

2414. They go into the upper schools at five or six years of age?—They do.

2415. And stay there till they are 10?—Sometimes till they are 10, and sometimes till they are 12; if a boy shows some talent in his learning, the master does all in his power to keep him at school.

2416. Do the boys whose duty it is to open the doors, sit or stand?—There is generally a small place cut for them in the coal.

2417. What is their duty?—Merely opening and shutting the doors after the horses pass and repass.

2418. How often may that be?—It depends upon the quantity of coal brought out of that working; they may have to shut them 100 times a day.

2419. *Chairman*.]

2419. *Chairman.*] How long have you been in the employment?—Forty-two years.

2420. *Mr. Thicknesse.*] Are the boys never employed to draw the coals?—Not with us.

2421. How many boys have you in the pits?—I should say about 200 to open and shut the doors.

2422. *Chairman.*] Have you felt any inconvenience from the inspection, since the new Act passed?—I cannot say that we have, inasmuch as the inspectors have never come near us.

2423. Probably they think that your collieries are so well conducted, that they can employ their time more usefully elsewhere?—They give us very little trouble indeed.

2424. You would have no objection to see them?—Not the slightest; I would much rather see them before than after an accident.

2425. Do you think that the objection to the system of Government inspection would come from people who mismanage their collieries?—I do not think that any one would object to a rigid and proper inspection; but up to the present time, I think it has been a mere burlesque.

2426. You express that opinion because they have not visited you?—We have had two accidents, I think; in consequence of which the inspector came upon the ground, and went down into the pit; he has said nothing to us, but has done all he could to induce the coroner to bring in a verdict of manslaughter against us.

2427. Do you mean that the inspector has not recommended to you any improvement, or told you the reason why the accidents have occurred?—Never.

2428. Should you have any objection to an increase in the number of inspectors?—I should object to giving the inspectors any power to come and say, "do this, and do that, and do the other;" but if they made any suggestions which were considered of benefit, we would not object to them.

2429. You would not think it right that you should be relieved from any responsibility?—No; we would rather keep it on our own shoulders than give it to them.

Mr. John Atkinson, called in; and Examined.

2430. *Chairman.*] YOU are the Deputy Gaveler, I believe, at the Forest of Dean?—Yes.

2431. Were you examined before the Committee of 1849?—I was not.

2432. You have been extensively engaged in collieries for many years, have you not?—All my life.

2433. In your position of gaveler in the Forest of Dean, have you had an opportunity of observing how the workings of the collieries there are carried on?—Yes.

2434. Comparing the Forest of Dean with the northern districts, such as you were acquainted with before, are the collieries in the Forest of Dean, in your opinion, carried on in as scientific a manner as in the north of England?—Not quite so; the principal science in the north of England relates to ventilation, but as in the Forest of Dean, we have no carburetted hydrogen, the ventilation is not required. We do not want such a quantity of air, or such a detailed method of using it.

2435. Are the works carried on by natural ventilation?—By furnaces. Some of the smaller mines are connected with the cropping out of the coal, but the more important works are ventilated by furnaces.

2436. Have you to contend with a great quantity of black damp?—No.

2437. All you have to contend with is the carburetted hydrogen?—Where there is any at all, it is black damp; it is sometimes found in the absence of a sufficient current of air, but very rarely, and it is very easily dealt with.

2438. That is because it exists in no large quantity?—Just so.

2439. If there were a large quantity, it would be more difficult to contend with than the carburetted hydrogen?—Certainly not.

2440. Is it not more difficult to drive out?—The existence of it is not so fatal as the other.

2441. At the same time it is fatal to the health of the men where it exists in large quantities?—Yes.

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2442. With reference to the health and the safety of the men, are the collieries in the Forest of Dean carried on on a proper and workmanlike system?—In my opinion they are.

2443. Do they sufficiently attend to the capacity and size of the air-ways?—Yes; they make the size to suit the particular circumstances.

2444. Ought the airways to be of such a size as that the men may conveniently travel through them?—I should say so.

2445. Are the airways of sufficient size to enable a man to travel through them?—To creep through; at Parkend Collieries they are about two feet square, and a man could get very well through that.

2446. Mr. *Thicknesse*.] Is the coal only two feet thick?—It is three feet thick.

2447. *Chairman*.] Why should not the airway be larger?—They protect the top.

2448. Is it not rather too low, so as to induce a man to neglect his duty if he be so inclined, by reason of the difficulty and labour in travelling through the airways?—He would go into them at intervals.

2449. The man whose duty it is to superintend them would be more likely to attend to his duties if the size of the airways was such as enabled him to travel through conveniently?—No doubt of it.

2450. What sort of roof is it?—Shale at that particular colliery, with a sandstone roof in the lower seams.

2451. Is it the practice in the Forest of Dean to course the air, or to split and divide it, as they do in the North of England?—They scarcely split at all; they do occasionally, but not as a rule.

2452. The same air that enters the pit is carried entirely through it, and is used by the different sections of workmen one after the other?—Yes.

2453. If the pit be rather charged with carbonic acid gas, would it not be very unhealthy for the last men who breathed the air which had been used in five or six different departments?—We have not found it so, except in a few instances; it is indicated mostly by the appearance of the candle, which will not burn so brightly where the return air is charged with it.

2454. At the same time, you, as a north country miner, would not hesitate to recommend the system of splitting as a preferable mode to that adopted in the Forest of Dean?—Yes; but it is not so easy to carry out in the Forest of Dean, on account of the peculiar mode of working.

2455. Describe the peculiarity?—The Forest is a very limited basin; they drive what they call a deep heading along a side of the basin at water-level; along the lower side of this the air is taken, comes round the face of the head, and back again to the same place; after driving a certain distance, they drive stalls at right angles.

2456. Mr. *Thicknesse*.] You sink a pit?—Yes.

2457. And drive the level out of the pit?—Yes; from the bottom of the pit you drive your level, so that the water will drain back.

2458. *Chairman*.] What you call a deep heading is sinking a pit?—No; I call it the deepest part of the working of the level. They take the stalls up sometimes 15, sometimes 20, and sometimes 25 yards wide. The air then runs along the deep heading, and returns round the face of the stalls and away to the up-cast shaft, wherever that may be.

2459. Mr. *Thicknesse*.] What is the area of coal generally awarded to a colliery?—Sixty to seventy acres, and perhaps there are 500 or 600 acres.

2460. *Chairman*.] What is the depth of those pits?—Less than 200 yards.

2461. In sinking the pits do you meet with water and the difficulties that you have to encounter in the North of England, putting you to great expense?—Yes.

2462. Would a pit 200 yards deep in the Forest of Dean cost as much as a pit of the same depth in Durham?—I should say that it would.

2463. Do they work principally long work?—In stalls.

2464. Have they never tried the long working?—It amounts to the same thing, because they leave no pillars between.

2465. How do they work them?—One after the other; as soon as they have got 25 or 30 yards they begin it over again, and go on the same width, and go some distance, and begin another, and so follow each other.

2466. They drive up to the rise?—They turn stalls as they open them out.

2467. What is the width of the stalls?—They are of various widths.

2468. In point of fact it is a branch of the long work?—You may call it long work. Mr. J. Atkinson.

2469. Do you find that an easy system of ventilation?—It would not be an easy system if there were much gas there, because you must leave pillars between. 19 May 1854.

2470. Mr. *Thicknesse*.] What do you stow between; is there metal?—The rubbish; they are obliged to take a certain quantity away, a sort of clay or shale, and also what they have brought down for the horses.

2471. *Chairman*.] In your district do many accidents occur from the falling of the roofs and sides?—That is the chief cause of accidents in our districts.

2472. I will not ask you as to the method of preventing them, because we have had sufficient evidence to show that the only known way is to stand sufficient timbers; but I may ask you whether, in your district, the men stand their own timber, or whether, as in the North of England, it is done by deputies?—The workmen set their own timber.

2473. Is that a system that you would recommend in preference to that adopted in the North of England?—I like the system in the North of England best, because the men sometimes, for the purpose of easy working, neglect their own timber; they do not take sufficient care of themselves.

2474. You think that they risk their own lives unnecessarily?—Yes; there is always plenty of timber ready for them.

2475. You say that the men are apt to neglect the timber, with the view of getting a little more coal?—In the North of England the men will scarcely ever set the timber unless directed by the deputy.

2476. In the Forest of Dean, you consider the men are very often careless, and do not pay proper attention to it?—I think they are.

2477. Do you think that there would be less loss of life if proper deputies were appointed who should have the superintendence of setting the whole of the timber?—I think so; some of the accidents are caused by the fall of coal.

2478. That is from some faults in the fissure of coal?—And sometimes they neglect to put their short pieces underneath.

2479. Even if every precaution were taken, the men would always be liable to accidents from some irregularity in the fissures of coal, or in what they call the slips of coal?—Just so. We are much less subject to those accidents than the Welch coal pits.

2480. In the Forest of Dean, is sufficient attention paid to keeping the shafts in proper order?—I think so, but I cannot speak with certainty. When I see anything the matter, I report it. The old shafts in the Forest of Dean are not in a very perfect state, but there has been considerable improvement in the sinking of more modern shafts.

2481. Is the mode of acquiring a coal-field in the Forest of Dean similar to that of the iron-stone field?—The free miner only has the right.

2482. Before a person can gale, he must be a free miner?—Or get it from a free miner.

2483. Have you observed the condition of the machinery and the ropes in that district, because we find from the statistical information that in the particular district of the Forest of Dean, and the districts surrounding Bristol, the accidents from winding the men up shafts are more frequent than in any other part of the United Kingdom?—I do not know of any instance in the Forest of Dean; I generally look to the rope, because I am personally interested, having to go down the pit.

2484. You would report it to the inspector?—To the colliery owner.

2485. Have you ever reported such cases to the colliery owner?—I have.

2486. When you have made complaints, have you always found them attended to?—Yes; they all rectify them.

2487. Have you ever heard of such complaints having been made by the Government inspector of mines?—Not to my recollection.

2488. In all those pits are there slides?—In some.

2489. Are there a great many pits working without any slides or guides of any kind?—A great many.

2490. Are the men wound up those pits?—Yes.

2491. In pits of that kind, are the men ever wound up with full coal carts?—I am not aware of it. I can hand you a copy of the rules of the Forest of Dean, which have just been agreed upon.

Mr. J. Atkinson.

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2492. For what reason have these rules been made?—I think in order that they may be submitted to the meeting about to take place in London.

2493. These rules have not been in force up to the present time?—I think that the large colliery proprietors have rules of their own; at least the men understand that they are not to ride upon full carts, and so on.

2494. I observe, by one of these rules, that no men or boys are to go up or down in a full tub; have the men or boys been in the habit of so doing?—No.

2495. Mr. *Thicknesse*.] Is a full tub wound up when they go down?—No; in the Forest of Dean they have only one rope to the pit generally; instead of having one large shaft and two ropes, they have generally two small shafts.

2496. *Chairman*.] That would diminish the danger?—Decidedly so.

2497. Do the men go up in a basket?—Sometimes in a cart, and sometimes in chains.

2498. Have you ever known of any accident from the carts coming against the side of the pit, and tossing men out?—Not within my recollection.

2499. What sort of machinery is used in the Forest of Dean?—The modern machinery is very excellent.

2500. They are all steam-engines?—Yes.

2501. There are no water-balances?—No.

2502. Are they in the habit of using the single-link chain?—They use no chains, but ropes.

2503. Would it be safe to trust the lives of men to a single link chain?—I would not recommend it.

2504. You stated that very little fire-damp exists in that district?—None.

2505. Therefore they know nothing in that district of the use of the safety-lamp?—Nothing at all.

2506. The whole of the working is carried on with naked lights, without any difficulty?—Quite so.

2507. And there is no instance of explosion?—No.

2508. Have you watched the operation of the system of inspection since the Government inspectors have been appointed?—No, they have very seldom been there; I have been into one of the pits with one of the inspectors, Mr. Dickison.

2509. Do you find that there has been any material improvement since the appointment of the Government inspectors?—No.

2510. Are you an advocate for Government inspection?—I am sure I do not know; it is a very delicate matter to meddle with; I should not like a Government inspector to take the responsibility out of my hands, if I were the owner of the colliery. I believe that supervision has induced a little more carefulness; but it is an unfortunate thing that more accidents have happened since they were appointed than before.

2511. Are you speaking with reference to the average quantity of coal raised, or with reference to the actual number of accidents?—The actual accidents.

2512. Mr. *Thicknesse*.] Do you attribute that in any way to the inspectors?—Not at all.

2513. *Chairman*.] Your opinion would rather be, that you should not relieve the owner, or engineer, or viewer of the mine from any responsibility?—Certainly; I think that it has done good, as it has turned the attention of the viewers themselves to the improvement of their pits.

2514. If a system of inspection should be considered necessary, is the present number of inspectors sufficient?—I should think not.

2515. Have you made up your mind as to what would be a sufficient number?—No, I have considered the subject.

2516. Are the viewers in your district as superior a set of men as they are in the North of England?—I do not think they are.

2517. You would admit that they are far inferior to the principal viewers in the North of England?—Yes, they are not men of education like those in the North of England. There are exceptions to that.

2518. Generally speaking, they are not men capable of dealing with the great difficulties and dangers that exist in coal pits in the North of England?—No.

2519. Do you consider them capable of carrying on in a proper manner the system as it exists in the Forest of Dean?—Quite so.

2520. Are you acquainted with the inspectors themselves?—I know Mr. Mackworth and Mr. Dickinson.

2521. Taking into consideration the remuneration that those gentlemen receive

receive, the Government, I presume, could not have made better appointments? —I do not know; they ought to be practical men. I do not know what practice Mr. Mackworth has had, but Mr. Dickinson has had a great deal. Mr. Dunn, also, has had a great deal of practice. I am not acquainted with the other gentleman.

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2522. Your opinion is, that an inspector should combine a great deal of science with a good deal of practical knowledge?—Without absolutely practical knowledge, I cannot suppose that he is fit for an inspector at all.

2523. You mean he should, at some time or other, have been employed in conducting collieries himself?—Precisely so. A man cannot go and serve his time to be an inspector only; he ought to be a colliery viewer in order to be an inspector. That is my opinion.

2524. Mr. *Thicknesse*.] How many years' experience do you think that he ought to have had?—That would depend very much upon the intelligence of the individual.

2525. *Chairman*.] What is the minimum time that you think he ought to have served in a colliery?—He should have served between five and ten years.

2526. You give so wide a margin to allow for the difference in men's capacity? —Yes; I do not know that I am correct in that, but I have served a great many years myself, and I do not consider I have served too many to be an inspector.

2527. The inspector has a serious duty to perform?—He ought to have.

2528. And therefore you think that the inspectors ought to be practical as well as scientific men?—Just so.

2529. Have you turned your attention at all to the question of the constitution of the coroners' juries?—I have not.

2530. It has been represented, that in a great many districts the jurors summoned on inquests are likely to feel some degree of prejudice, being either small shopkeepers connected with the owners of the pits, or workmen employed about the pits; is that the case in the Forest of Dean?—I think it is; being a limited district, they must otherwise leave the neighbourhood to find jurors.

2531. Are they men likely to give an honest and conscientious verdict?—It would be much better to have others.

2532. Mr. *Cobbett*.] You think that there is a ground for complaint?—I am not aware of that, but I think it would be better to find independent persons to act as jurymen.

2533. You say that no practical mischief has occurred?—Certainly not.

2534. You think that persons taken from the immediate neighbourhood of a coal mine may possibly be biased?—It is possible, but I am not aware of any case of the kind.

2535. Have you heard of any complaints?—I have not.

2536. I mean in your own district?—I have not; of course I am speaking of the district in the Forest of Dean.

2537. The Forest of Dean is very thinly populated, is it not?—It is; they would have to go some distance, I fear, to get people entirely unconnected with the mining parties.

2538. Practically there would be some difficulty in that respect?—I think there would.

2539. Is the Forest of Dean divided into parishes?—Into two districts, East and West Dean.

2540. *Chairman*.] What is the state of the education of the colliers in your district?—I cannot express an opinion upon that subject. I know that ample provision is made, but whether the people avail themselves of it I am not in a position to say.

2541. Is that provision made by the owners of the collieries?—No.

2542. How is it made?—By means of the national schools.

2543. Do not the owners of the collieries themselves contribute towards the support of them?—Some of them do, I believe. I believe the owners of the Bilson Colliery gave 50 *l.* a year to the national school at Sinderford. That has been the case for many years, but I am not quite clear that it is done now.

2544. How are those schools supported?—By the children.

2545. I suppose there is also a Government grant?—There must be.

2546. And the difference in the salary of the schoolmaster is made up by the contributions of those who send their children to school?—I believe so.

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2547. There is no compulsory education in the Forest of Dean?—No; there are some other schools in the Forest of Dean.

2548. But none attached to the collieries?—No.

2549. Possibly the collieries are not large enough for each colliery to support a school?—I think not; there are only three which do so, Park End, Bilson, and Crump Meadow Collieries.

2550. Being well acquainted with the district in the North of England, as well as with this district, is it your opinion that the colliers and under-viewers are a better educated set of men than in the Forest of Dean?—I think that they are better educated in the North.

2551. You think the same remark applies to the men?—I think so.

2552. Do you think that in the North of England they are a superior set of men also, in their moral character?—That I cannot say. When I am speaking of the North, I am referring to 18 years ago.

2553. Are there any funds for the relief of workmen in your district?—Yes.

2554. Common benefit societies?—Yes.

2555. Are they pretty extensively established?—I think generally.

2556. Are there any funds for the relief of the widows and orphans of those who meet their deaths by accidents?—Not that I am aware of.

2557. Do the colliery proprietors come forward?—I do not think they do.

2558. If a woman becomes a widow by an accident, she is thrown upon the parish?—She is; she would receive a certain sum from the fund, but no annuity. I think that each member pays 1 s. or 1 s. 6 d., or something of that sort, to the widow.

2559. *Mr. Cobbett.*] Do you know about what number of colliers there are in the Forest of Dean?—I have no idea.

2560. *Chairman.*] Are they increasing in number?—Not much; we want railway accommodation very much.

2561. What is the population of the Forest of Dean?—Between 12,000 and 13,000.

Lunæ, 22^o die Maii, 1854.

MEMBERS PRESENT.

Mr. Hutchins.
Mr. Cobbett.
Viscount Goderich.
Mr. Thicknesse.
Mr. Locke.

Mr. H. Vivian.
Mr. Cayley.
Mr. H. A. Bruce.
Mr. Baird.

EDWARD J. HUTCHINS, Esq., IN THE CHAIR.

David Landale, Esq., called in; and Examined.

D. Landale, Esq.

2562. *Chairman.*] YOU are a Mining Engineer in Scotland?—Yes.

2563. Are you extensively engaged in the inspection of coal mines?—I am, constantly.

2564. How long have you been engaged in that particular employment?—I have been engaged in coal mining all my life, but I became a mining engineer alone about nine years ago.

2565. You have all your life been conversant with the working of mines?—I first began life as an engineer to mines; then as a colliery manager, and viewer; but my viewing business became so large, that I had to give it up, managing altogether.

2566. Do you reside in Edinburgh?—I do.

2567. Do you view collieries in all the coal districts of Scotland?—In every one of them.

2568. Will you state to the Committee how the ventilation is carried on in Scotland; whether it is carried on on the principle of artificial ventilation, or by natural ventilation?—In Scotland we have very little fire-damp; where there is fire-damp, we resort to the furnace; and in many places where there is none, natural ventilation is found to be sufficient.

2569. Are you not troubled with choke-damp?—We have a great deal of that; but it is very easily managed, if any attention at all is paid to it.

2570. Is it managed by the simple process of natural ventilation?—In large old wastes that is not so; a furnace is required.

2571. Where choke-damp exists in large quantities, it is more difficult to remove than carburetted hydrogen?—It is more difficult to dislodge.

2572. In consequence of its greater specific gravity?—Just so.

2573. Do you think that it is consistent with the health of the workmen to work a mine, under any circumstances, by means of natural ventilation alone?—In many cases it is; but I may add that it is scarcely possible for the Committee to understand how small some of our coal pits and fields are, in which natural ventilation would be quite enough; I have known instances in which it has been necessary to impede the natural ventilation, from the existence of ice in the pit making it too cold for the men.

2574. Those pits must be very shallow?—I allude to the Dysart Colliery, and Wemyss, where the seams run from nine to 18 feet thick.

2575. At what depth below the surface?—About 46 or 50 fathoms.

2576. Have you never seen the ventilation of a pit of that kind stopped from the fall of the thermometer?—I have not; in hot weather, of course, we have much less ventilation.

2577. In the hottest weather do you find the ventilation sufficient in the pits you refer to?—Yes; but not in the thinner seams.

2578. How do you account for the pits being so cold?—There is the natural heat as you get deeper, and the heat of the people and of their lamps, and the horses, and the difference of density; and the large air courses of those seams give a rapid ventilation. This necessarily applies alone to the thick seams.

2579. Does not the sufficiency of ventilation depend upon the size of the air courses?—Very much.

2580. Where you have natural ventilation, is it necessary to have the courses larger than in artificial ventilation?—The particular seams I am alluding to are so high that you cannot make a small air course.

2581. Is there any difference between the size of the upcast and the downcast?—No, they are about all alike.

2582. How do you calculate upon the certainty of always having the pit used as a downcast pit, which you at first intended?—We commonly select the engine pit, where there is a little wet and water falling; it is almost impossible to make that an upcast.

2583. It is the water falling in the pit that makes that a downcast?—Yes.

2584. And makes the difference in the temperature?—Yes. There are pits without water in them at all, where the ventilation has been known to turn; the downcast becoming the upcast, but that is very seldom; from a gale of wind blowing on a plantation, for instance, and screening the mouth of the pit, or some peculiarity of that kind.

2585. The Committee understand you to say that under certain circumstances you would permit pits to be worked without any artificial ventilation?—With the thick seams there are many circumstances under which that might be done.

2586. With what thickness of seam would you preclude that?—I have been speaking of seams of from nine to 18 feet thick; when you have to deal with the usual seams of four or five feet thick, I would suggest something more than natural ventilation.

2587. Where natural ventilation does not exist in Scotland, what is the principal mode adopted for securing artificial ventilation?—The furnace or fire lamp.

2588. Do you use the steam-jet, or any kind of machinery?—No; the steam-jet has been tried once or twice but very imperfectly.

2589. It was not found to succeed?—I would not say that it was tried at all in a proper way; it was at a very early stage of its introduction.

2590. Have you paid any attention to it?—No; I have read all that has been going on about it, and have seen the attempt to stop fires. I have had engines

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below ground, and steam-jets acting like a blast pipe, but have never tried the steam jet alone.

2591. Where did you see the steam jet tried?—At the Dalquharren, Sauchie, near Alloa, and Drumpellar mines; those are the three instances in which they have been tried in Scotland.

2592. They were on fire?—Yes.

2593. And were used to pass down a current of carbonic acid gas?—Yes.

2594. Were they successful?—Not at all; at Dalquharren and Sauchie they are burning yet. Mr. Cayley, in his last year's evidence, alludes to it.

2595. He said that they were successful in putting out the fires?—He did, but that is not the fact. It is a well-known fact that those fires are not out.

2596. Mr. *H. Vivian.*] Was the steam-jet used to force or to draw?—To force. I may add that at Alloa it is not the fault of the steam-jet that it is not out.

2597. *Chairman.*] The fire at Alloa, I believe, was four years ago?—It is a long while ago.

2598. Has it been burning ever since?—A piece of the fire has been isolated with a mine and two puddle walls, which is constantly traversed by people, who keep it up and look after it. Mr. Gurney's apparatus was applied to one of the old pits within this isolated space, and deadened it for a time, but only for a short period; it was only when the fire became hotter at the puddle wall that people in charge would believe that it was not out.

2599. It was stated by Mr. Cayley that there were about 25 acres filled with choke damp?—Yes; it is crushed and broken so, that it is impossible to retain gas; no snow lies upon it.

2600. Have you been acquainted all the time with the mine at Alloa?—I was summoned there as a witness when the puddle-wall mine was made 21 years ago, and I am engineer for a big fitting going on the colliery; and of course I make it my business to pass along and see the place, in consequence of what has been said about it.

2601. Mr. Cayley says in his evidence that there is some doubt as to the fire in one corner of the pit being out. He says, "There is some doubt as to one corner of the pit. There is no doubt we extinguished the fire in the part we got the gas into; but there was some doubt as to whether some of the residue had been got at; we had no means of ascertaining"?—There are several pits in the isolated waste; if you open one of them, you cannot put your hand in, it is so hot.

2602. You have for some time known the pit at Alloa?—Yes.

2603. Have you known it all the time the fire has been burning?—No; I was there at the finishing of the wall, and I have only been on the surface since.

2604. You have known it ever since the injecting of the carbonic acid gas?—Yes.

2605. Do you not think it possible that the fire was extinguished, and that there may have been spontaneous combustion afterwards?—No.

2606. You have no doubt that the fire is not out?—Not the least.

2607. In your opinion, the injection of carbonic acid gas by the steam-jet failed?—I think it did, because it is collapsed, and no gas could be injected.

2608. If the mine had been in a state to receive the carbonic acid gas that the steam-jet injected, and in proper quantity, it would have put out the fire?—I think it would.

2609. Mr. *H. Vivian.*] An ordinary force pump would produce the same effect?—Yes, if the pit were isolated; or if you merely shut up the mine it will go out of itself for want of oxygen. We had a dreadful fire at Wemyss, when all other means failed, the pits were shut up, and that put it out.

2610. *Chairman.*] That was put out merely by preventing a supply of oxygen reaching the pit?—Yes.

2611. Is the coal in Scotland more likely to take fire spontaneously?—There are two or three such mines; at Dysart we have had once as many as 14 fires in a year. The Wemyss fire originated from a steam-engine, not from spontaneous combustion; at Alloa also it did not arise from spontaneous combustion; nor at Dalquharren, which was also caused by a steam-engine.

2612. You have no difficulty in creating a sufficient amount of ventilation to keep your mines free from danger, and to preserve the health of the men?—None whatever, if care is taken in distributing the air; we can produce any amount

amount of current, but it is from a want of proper distribution that the evil arises.

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2613. Are the viewers you have in Scotland a class of men capable, in the general way, of contending with any difficulty that might arise?—In a great many instances they are.

2614. Are they men of as great science and experience as the viewers in the north of England?—So far as relates to ventilation, they are not; we have had no occasion to trouble ourselves with it. There are numerous small pits, where there is no doubt a great deal of carelessness.

2615. You stated that the principal thing to attend to was to guide the air well into the pit?—Yes; to split the air, along the levels, and to return it by the up-cast.

2616. Is that sufficiently attended to in Scotland?—In the larger works it is.

2617. In the smaller pits they course the air?—They do.

2618. By that system it would be almost impossible to obtain sufficient ventilation?—Where there is no fire-damp it makes a capital current.

2619. When the air travels through five or six different departments, does it not become very much charged?—A pit of perhaps 10 acres, and worked by 70 or 80 men, might be coursed.

2620. What is the largest extent of working in Scotland worked by one shaft?—It is difficult to answer that; but I know of only two levels in Scotland more than a mile long on each side of the engine pit.

2621. And with how many pits?—I speak of Alloa and Wemyss; perhaps there are half a dozen there.

2622. What is the depth of that mine?—I think 60 fathoms just now; and there is a large fitting going on with 22-inch of perhaps 90 fathoms.

2623. How many of those pits are down-cast pits?—There are only two working pits in each seam, the air entering by the engine shaft, and rising by the winding pit.

2624. The six pits are not in the same seam?—In that colliery there are two seams working.

2625. Have you formed in your own mind any idea of how many pits of eight feet or ten feet diameter would be sufficient to work any stated amount of coal in such a level as you have described?—I should say that we could take out from 60 to 80 acres of coal quite comfortably, where there were two or three seams, with two pits.

2626. With an up-cast and down-cast of 10 feet diameter?—Yes.

2627. *Mr. Thicknesse.*] There are six pits at Alloa?—There are only two going.

2628. You leave behind you the coal that is got, and the other pits are considered as done?—That has been the custom hitherto, but they are taking out the pillars now; the high prices enable them to do it. The old system was to leave such pillars as would support the roof for a given time, and then leave them.

2629. You save your wooden props by that means?—There are many pits where props are not necessary.

2630. *Chairman.*] Do you work the long wall system?—We do, a great deal; and where the seams are adapted to it, it is superior in every way, for ventilation and for safety.

2631. And as regards the economy of the mineral?—Yes; you get everything out as you go.

2632. State the character of the seams that you consider adapted to carrying on the system of long work?—From six feet down to eighteen inches; as thin as it can be worked.

2633. You would not introduce it in seams above that thickness?—It is now mooted to try a thick seam of it, taking out four feet of it at first.

2634. You would take four feet of the bottom first, and let it collapse?—That is a matter altogether for study; where I am going to try it, I think I shall take the top first.

2635. You will let the gob come down to the top?—Of a stone a foot thick, and then work away that division, and perhaps seven years afterwards go away with the gob for a roof, above the foot of stone.

2636. *Mr. Thicknesse.*] You spoke of 60 or 80 acres as being sufficient area for two pits, and said that, under some circumstances, you might allow 100

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acres?—If the coal field and pit were clean and without faults. At Wemyss we took out 125 acres.

2637. I am speaking of the ventilation only; how large an area could you ventilate by two pits?—I think 100 acres; the air is never our difficulty in Scotland.

2638. Mr. H. Vivian.] Do you mean by natural ventilation or by furnace ventilation?—I should employ the furnace there.

2639. Mr. Thicknesse.] Is your up-cast on the rise?—Generally on the rise.

2640. Chairman.] Do you think that it would be an advantage to have the up-cast pit on the rise?—I do; I have it always where I can. At point A of a plan which I have before me, No. 1 is a cross section of a road 10 feet behind the coal face; the buildings are put into 7 feet wide and 6 feet 2 inches high; the roads are from 10 to 15 yards apart, and stowed in with rubbish. No. 2 is the same road finally collapsed; it has decreased in width to 5 feet thick, and in height to 3 feet 10 inches, and that is the permanent road-way. I sent to the colliery for a working plan of one of the seams, and I received the plan to which I am now referring. No. 3 is the longitudinal section. (*The Witness here handed in a Plan, marked (A.)*)

2641. The second plan that you are about to put in is a plan of the rough ell coal, of No. 2 pit, Goran Colliery, near Glasgow?—It is; and the first is a section of a road in it.

2642. At point A. there are the two pits?—Yes; the pits are sunk to the lowest seam, and the other seams won by cross-cut stone mines.

2643. Which way do the measures rise and dip?—It is a very flat coal field.

2644. What is the distance from one seam to the other?—There are five seams within 40 fathoms of each other.

2645. By this cross-cut, and by keeping in a level course, the measures come down, and you cut every seam in the colliery?—From the Pit A. that is so, and that mine is divided by a brick division, one side taking the air in and the other taking it out; it entered here (*referring to the Plan*), along this main road up the faces, and out that way; these small blue lines on the plan represent smaller drawing roads, not cut so high; they are only used for short periods, and then stowed up.

2646. What is the size of the cross-cut?—It is about five feet six inches by seven and a half feet.

2647. Is that sufficiently large to take down a quantity of air to the whole of the working when divided into two?—Yes; there is no fire in that shaft.

2648. Is there plenty of air for the comfort of the men?—Yes; there are but 40 men working there; that drawing only represents one division of the pit; there are other five such, and this is but one split of the air, as it were.

2649. Your opinion is that you can under the circumstances you before alluded to carry out the long-wall system; it is easier for ventilation, is better for the health of the men, and more economical in every point of view?—It is so; the ventilation cannot be destroyed there, for there is nothing like a goaf; this finally collapsed place contains nothing, and I am quite astonished at what some of the witnesses have said about “claying up the gob;” it cannot hold a particle of gas.

2650. What is the thickness of the seam?—Three feet six inches.

2651. If you worked a seam of six feet, would that collapse?—Yes, it would. (*The Witness here handed in the Plan marked B.*)

2652. Mr. H. Vivian.] Supposing you had a rock top?—We should probably have fractures and gas then; a rock top does very well in Scotland.

2653. In a fiery mine in Scotland with a rock top, you would probably find gas in the roof?—Yes; not in collapsed places, for that is quite close.

2654. The chief advantage of the long-wall working is, that the goaf is left in all cases behind you, and inasmuch as you are continually working on the rise, the gas would naturally ascend and meet the air column?—We work along a level course, and towards the rise also. By the plan the level is made to go first, and then there to the rise, and we work round in that way (*referring to the Plan*).

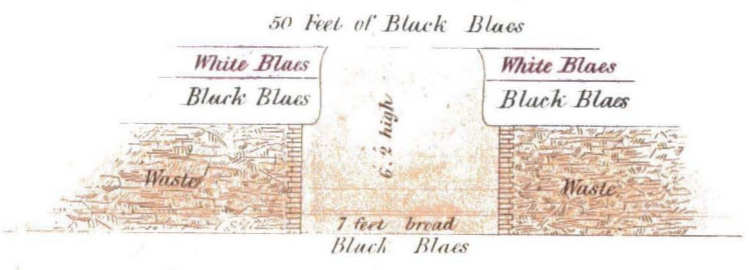
2655. The air is coursed in the pit, is it not?—Yes, a single column of air for this division.

2656. There can only be a single column of air in long-wall working?—There is another side to the pit, and other seams working.

2657. That

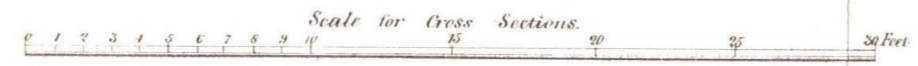
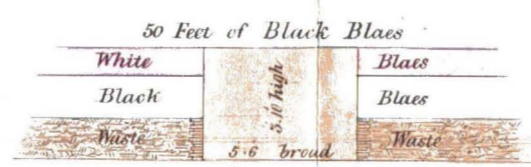
Nº 1.

Gross Section of Road 10 Feet from Coal face.



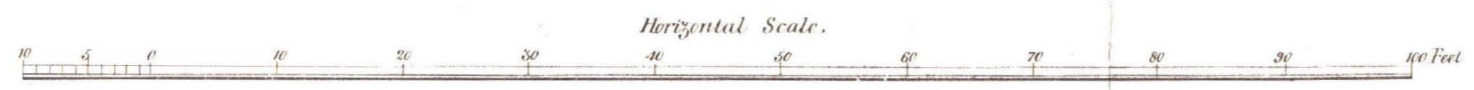
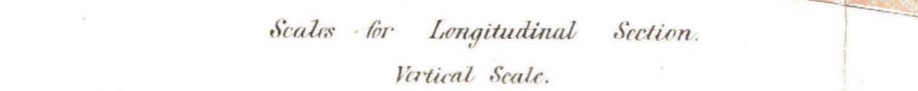
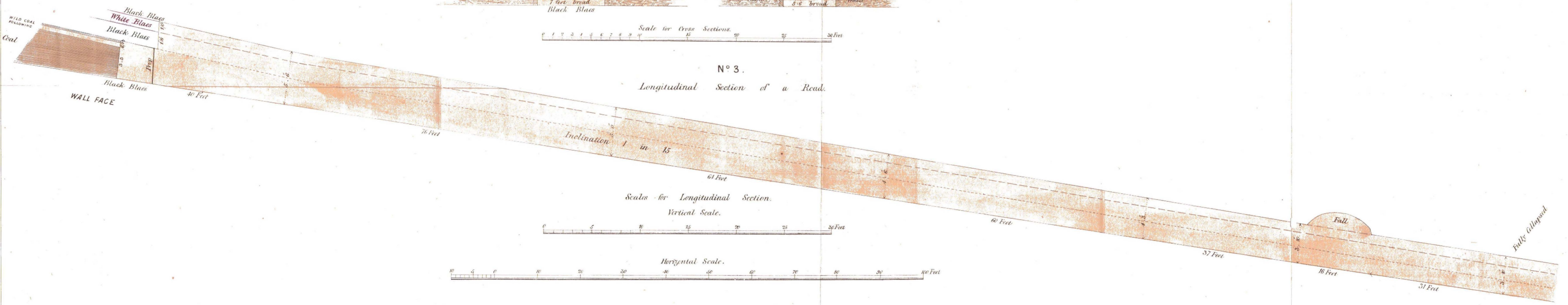
Nº 2.

Gross Section of Road 54 fathoms from face



Nº 3.

Longitudinal Section of a Road.



PLAN OF ROUGH ELL COAL (Nº 2) PIT, GOVAN COLLIERY, GLASGOW.

EXPLANATION.

The lines drawn Red on Plan exhibit the manner in which the ventilating current is caused to traverse the Workings.
The letter A on Plan indicates where the ventilating Furnace is placed.
The letters B.B.B.B. on Plan indicate where Trap Doors are placed to prevent the diversion of Air from the course.



2657. That would come under the denomination of panel working?—No; panel working would not do with us at all. D. Landale, Esq.

2658. It is dividing the colliery into sections?—Sections and divisions, but we cannot do that, as it is done in the North of England, because the cutting of the coal costs more than the value of it; the Scotch coal is so hard that we must take the natural seams, or it would take away all the profit; besides, our collieries only produce two tons per day; but a Newcastle colliery will produce five tons per day in the solid, and eight tons per day in the broken, and all our small coal from the shearings is only of one-fifth the value, and in some cases unsaleable. There is nothing to prevent our splitting the air in long-wall working; it is split here; this Plan is only one split. 22 May 1854.

2659. *Chairman.*] I think you stated that the principal thing was to split the air round the workings; in Scotland is that generally adopted, or are the mines conducted on a careless system in that respect?—The larger works are well conducted, but the smaller ones in many cases are not.

2660. Is that because they do not like to lay out the money?—Exactly so; they will not go to the expense of it.

2661. It would require more stoppings of every kind?—Yes; in many cases you will find that there is merely rubbish thrown up, and very little care taken.

2662. Are the stoppings properly attended to in Scotland?—In the larger works they are built with brick and stone, but in others with wood, and six or eight feet of rubbish behind them.

2663. In the well-ventilated pits of Scotland are they pretty nearly as well conducted as in the North of England with reference to the circumstances of the case?—The circumstances are widely different; anything like the complicated arrangements necessary in the North of England would not suit our small pits at all.

2664. You think it not necessary to go to that expense?—It is not necessary except in few isolated cases, such as Nits Hill.

2665. In the well-conducted pits you speak of everything, in your opinion, is done that ought to be done to ensure the proper ventilation of the mine, and the safety and health of the workmen?—Yes; but in the North of England they have a much better knowledge of ventilation than we have.

2666. *Mr. Thicknesse.*] When you inspect a colliery, how do you ascertain that the ventilation is sufficient?—You can see it upon your lamps, and at the air course doors. When I inspect a colliery I, of course, see whether the air is good, and if it is not in any place, I mention it.

2667. Have you any rule by which to measure it?—Only by seeing it on the lamp.

2668. *Mr. H. Vivian.*] Which is perfectly sufficient?—Perfectly sufficient; and you can test it by means of the Davy lamp.

2669. If a mine is in a dangerous position, you could detect it by the peculiar flame on the top of your candle?—Yes; but the pit is always tried with a Davy lamp in the morning; it is the duty of the fireman to go in at four or five o'clock in the morning before the men descend, to examine each working place and see that all is right.

2670. *Mr. Cobbett.*] What is the effect upon the lamp?—The flame becomes long, but a man would not wait to see that; he could smell it; it is not a thing requiring experience to detect it.

2671. *Mr. Thicknesse.*] Are you speaking of the fire-damp?—Yes; the other you see too well.

2672. *Mr. Locke.*] A man would test the presence of gas by means of the naked candle before it became dangerous?—I would not advise that.

2673. As a matter of fact, he can always tell with the naked candle that there is gas long before it becomes dangerous?—Yes.

2674. *Mr. H. Vivian.*] Is it not the practice in the north of England to manufacture candles of a peculiar description with which to test the presence of gas?—I think it is; but we have nothing of that kind; we have very little fire at all in Scotland.

2675. *Mr. Cobbett.*] Still you think it necessary to send a man down into the mine every morning?—Where there is gas.

2676. *Chairman.*] You know what quantity of air per minute ought to travel through your mine in proportion to its capacity and the number of men working in it?—Yes.

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2677. Have you any instruments for measuring that quantity?—No.

2678. What is the test?—You may fire gunpowder, or the more common way is, to detect it by the blazing of your lamp; in a good air-course, it is necessary to protect your lamp to keep it in.

2679. *Mr. Locke.*] You think that where there is a strong current passing through the air-courses, and with no gas in the mine, there must be a sufficient quantity of air for the support of the men?—Yes; in going along an ordinary air-course half the size of that pit (*referring to the Plan*), you must put your lamp under your jacket, to prevent its being blown out.

2680. You consider that a sufficient test of the quantity of air going through the mine?—Yes; it is going through faster than you can travel.

2681. *Chairman.*] Would that speed set off a Davy lamp?—Not if carried cautiously.

2682. *Mr. H. Vivian.*] Are you speaking of the intake?—Yes.

2683. The returns rarely go at that rate?—No.

2684. *Chairman.*] As you have so little fire-damp, you probably do not much use the safety lamp?—The men do not use it; if a place is to be worked with a safety lamp, there are generally two men selected for it, but we have very few such mines.

2685. Have you had considerable experience in the use of the safety lamp?—No, I have not had much to do with it.

2686. Then you are not prepared to give an opinion as to the practicability of using it?—No.

2687. If the seams you are now working in Scotland are near the surface, you will have to go deeper?—Yes, we are going very deep for the ironstone already; 100 fathoms is reckoned deep in Scotland.

2688. Do you not find a larger quantity of fire-damp as you work deeper?—The Wemyss Mine, which I worked for 14 years, was 150 fathoms deep, and we had no gas; we could bore a hole in the roof, and show the presence of it, but that was all.

2689. You do not think that as you get deeper, you will have to contend with a greater body of gas?—In some of the seams we shall.

2690. In your opinion are the present viewers men of sufficient experience and scientific knowledge to contend with the increase of gas which you are likely to meet with there?—I think so; the increase of gas will come very slowly except at Pits Hill; we have nothing like a fire.

2691. You think that the men having charge of the collieries, will improve in scientific knowledge as fast as the increase in gas?—No doubt of it.

2692. *Mr. Locke.*] What is the depth of the Nits Hill Colliery?—One hundred and thirty-seven fathoms; it is about the deepest we have.

2693. It is not the depth of the pit which increases or decreases the quantity of gas?—No; it is the nature of the seam itself.

2694. Is there any other part of Scotland where the quantity of gas given out is as large as that?—No, except perhaps Wishow and Dalziel.

2695. Do you know how that mine is ventilated?—I never was in it, but it is worked by pillars, and the air was coursed.

2696. Who is the manager of that mine?—I do not recollect his name; I have nothing to do with the mine.

2697. Do you recollect how long since it is that the accident occurred there?—I think four years ago; it is particularly referred to in Mr. Dunn's Report to the Secretary of State; 1851.

2698. *Chairman.*] Has Mr. Dunn visited that pit?—He did so after the accident.

2699. You stated that you consider the long wall the best way of working a colliery; do you think that the mine would be less liable to accidents from the fall of the roof, and sides of the pit if that system were adopted?—Yes, I think upon the whole that the long-wall system is safer for the men than the stoop-and-room work.

2700. Does that mean what is called in England pillar-and-stall working?—Pillar-and-stall; when we work stoop-and-room it is with pillars in the sides, and no buildings, and with props to support any loose pieces, and we take the natural roof; in the long-wall system we cut it down to some firm stratum, and then it collapses or bends beautifully, sometimes like leather, and resting upon those buildings, there is no longer any tendency to fall.

2701. Is

2701. Is there no risk of danger to the men?—Where the men work along the faces they put in small trees from 2½ inches to 3½ inches in diameter; a man will set four or five in a day, to keep up any loose pieces of stone that might fall, in some cases; in many places fewer are required, in some cases none.

2702. Mr. Locke.] Is he always working between these trees and the face?—Always.

2703. The bending takes place behind the trees?—Yes, and it comes down on the rubbish.

2704. And that is not dangerous to the men whilst they are working it?—No, not in the least; it is like a long triangle, the men working under the hypotenuse.

2705. Chairman.] The most efficacious way of preventing the number of accidents from the falling of the roof and sides would be as much as possible to adopt the long-wall system?—In pits, adapted for it, I think it would be safer for the men, it being clearly defined what they have to do; the master should keep up the main roads to the face by a staff of men for the purpose, the collier being alone liable for the roof of his place.

2706. In some parts of Scotland would it be necessary to work stoop-and-room, as you call it?—Yes.

2707. Where that system is adopted, are the men in the habit of standing their own props?—The more general rule is for the men to do so, and the master takes charge of it afterwards.

2708. Where the man is actually working, he stands his own props?—Yes.

2709. Do you think that a better system than the appointment of a deputy charged with the standing of all the props?—That would not do with us, because the man himself is a far better judge of the state of his roof as he loosens it, and that the deputy would have to learn.

2710. Do you consider that the men are sufficiently careful themselves?—Many of them are, but others get very careless.

2711. Do you think that if the master were to employ a certain number of deputies, as they do in the North of England, to go round and tap the roof, and see that proper supports were placed, that the men would run much less risk by falls of the roof and sides than where they stand their own props?—With a certain class of men that would be so with stoop and room. It is the duty of the overman to go round every day, and if he find a man working without the usual number of props, he would inquire into the reason; and if it was necessary that more props should be placed, it would be done.

2712. That overman is not charged with the duty of setting up the props?—No; but he ought to go round the place every day.

2713. We gather from your evidence that although some of the colliers may be at times very reckless, the men themselves should stand their own props, rather than that a deputy should be appointed?—A man should set his own props for his own faces, but not in the roads.

2714. In Scotland is great care taken to keep the winding-up shafts in proper order?—In the large collieries it is very well attended to, but in the smaller pits there is a great deal of carelessness.

2715. Do you think that the men often meet with accidents from the dropping of materials?—That is not so common a cause of accident as the cage; we have some 730 going pits in Scotland, and the accidents last year were one in 868 employed in the shaft, and there was precisely the same number of accidents from the falling of roofs and sides.

2716. That is rather a smaller proportion than in other parts, is it not?—Considering that there are 730 pits, I think it is not so much.

2717. But it is a smaller proportion than in some other parts of England?—I think so.

2718. Do accidents also happen from the want of proper cages?—I think that there have been more accidents from people falling out since we had the cages than before.

2719. Explain that?—Four or five or six of them will get upon the cage, and they feel so secure that they are often perfectly reckless; I have known them throw over each other's bonnets, and I have had to find fault with them for fighting in the cage.

2720. Are there any pits working without guides?—There are a few; perhaps less than one-fourth of the whole number of pits.

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2721. In the double or single pits does the coal go up the same pit?—With a brattice between.

2722. *Sir H. Vivian.*] Have you no regulations that more than a certain number of men shall not ride in the cage?—In all well-regulated works there is a regulation of that kind.

2723. How many do you allow?—Four.

2724. The carrying out of that regulation is entrusted, is it not, to the on-setter?—Yes.

2725. Who would lose his place if he allowed more than a given number to ascend?—There are in Scotland mines so small that there is no on-setter at all; there may be, perhaps, only 15 or 16 men in a pit, who may all assemble at the bottom of the pit at the same time, and overcrowd the cage.

2726. *Chairman.*] If the on-setter neglected his duty, the overman would know nothing about it?—There is no doubt about it; but the enginemen and banksmen would, and there would be no difficulty in regulating that part of it.

2727. Do you in Scotland use the safety cage of Mr. Fourdrinier, or of Messrs. Hall & Grant?—They are used, but not so extensively as they were, because there is a growing feeling against them.

2728. What is the prejudice?—The patentees state a great many cases in which they have saved lives, but there are many in which they have not; sometimes the tension of the ropes does not allow it to act when the accident happens far down the shaft, and away it goes; and sometimes accidents have happened from its being jammed against the side while ascending.

2729. Has it had a tendency to make the parties connected with the winding up the pit more careless?—Yes, and the men do not like them; before I came here last year I was enclosed till midnight in a pit with 70 men, where we could make no communication above-ground; and from the conversation of the men I found that they all attributed it to the safety cage; but that was not the case; it was mere opinion. With good slides and ropes I would rather use a plain cage with a roof; we are very defective in that respect, as many persist in using the cages without a sufficient cover.

2730. Do you think that it should be imperative upon them to attend to that?—I think it should.

2731. However careful the men may be, something might possibly fall from the top?—Yes.

2732. It would be no detriment to the ventilation of the pit?—No, because the bottom of the tub is as great an obstruction to the air as the top would be.

2733. It might be placed at very little expense, and would be no very great weight?—No; we have many of them; but as many pits are without them as with them.

2734. *Mr. H. Vivian.*] Is it not impossible to keep a safety cage practically in working order?—I think it is possible, but it requires constant attention; the springs, with constant tension, get out of order, or break very frequently.

2735. You have known instances in which the safety cage has actually led to accident?—At Alloa it broke the engine-shaft while ascending, and the manager immediately left it off. At Coroden Beath, three men were killed by its not holding when the rope broke.

2736. *Chairman.*] Have you separate engines for winding and for pumping?—In the east of Scotland we have. In the west, they mostly pump and wind.

2737. Do you think that details of that description should be enforced by the Government inspector?—Yes; I have drafted out such rules as generally would apply to the working of mines in Scotland.

2738. Are any persons from Scotland about to attend the meeting of coal-owners in London?—I believe a deputation from Lancashire are.

2739. *Mr. Cobbett.*] Are you aware of the meeting to-morrow?—I am; the rules applicable to the North of England would not suit us at all. We are taking no steps in what Mr. Wood is doing, except in replying to his circulars; the detailed answer to which will give a very complete view of the opinion in Scotland as regards inspectors.

2740. *Mr. Thickness.*] What do you mean by the gearing being too small?—A pit begins, we will say, about 20 fathoms deep, with sufficient gearing; but they will go on to the next seam, and perhaps to a third seam, with the first eight wheels. That could all be stopped by Act of Parliament.

2741. Do

2741. Do you think that many accidents arise from want of a cover to the tubs whilst coming up the pits?—I think a few have happened from that.

2742. Not many?—Not many.

2743. Mr. H. Vivian.] Would not the friction band prevent any accident?—There are very few accidents from overwinding.

2744. Chairman.] I think you said before, that you were not particularly well acquainted with the safety-lamp, but have you any doubt as to the safety of the regular Davy lamp, the Clanny lamp, and that description of lamp?—I think in proper hands they are safe, but not to be entrusted to boys.

2745. Under proper regulations?—Yes.

2746. In Scotland they use a lamp which is not safe, being made with a gauze wider than it ought to be?—It is a proper gauze, I believe, but it is nearly a foot high, and three inches in diameter, and with no lock upon it.

2747. If the gas were to fire in such a lamp as that, there would be almost sufficient inside to blow the lamp all to pieces?—It does not do that, but I have no doubt that it has often fired the gas.

2748. The power of explosion in the gas would force it through the wires?—I think so; it is a very absurd lamp.

2749. Have those lamps been seen by the inspectors?—Yes, I am sure they have seen them.

2750. What have they said about them?—They have never stopped the use of them.

2751. Have they never spoke to any of the owners of the mines, and represented to them the danger of using them?—I think not.

2752. Do you approve of Government inspection generally?—No; I think that with a proper set of rules, made into laws, inspection might be made useful; but, at all events, the present inspection is utterly useless.

2753. Where is the present inspection useless?—It would take one man six or seven years to go over 730 or 750 pits.

2754. The reason why you consider it useless is because there are not sufficient persons to do the work?—Yes, and we have not had proper men.

2755. I believe Mr. Lancaster was your inspector?—Yes, he was the best man we had, and a judicious man; but he should have been a Scotchman, or acquainted with the system of Scotch coal working. The salaries they receive cannot command the services of suitable men.

2756. Provided a sufficient remuneration could be given to secure the services of a proper set of inspectors, and that a sufficient number of them were employed, would you then approve of Government inspection?—Yes. I think with the addition of five more inspectors, and a head over them to make them do their work, it might answer, but that is indispensable. But we do not now know what they do, and I have frequently myself threatened them that I would write to Lord Palmerston.

2757. Mr. Thicknesse.] Do they take other employment?—They do; but the principal thing is, they come as witnesses at these trials, which you will hear more about.

2758. Chairman.] Do you know of your own knowledge that those Government inspectors take other business?—Yes, Mr. Dunn does.

2759. When did he ever take other business?—He is preparing himself to give evidence on the Bredisholm trial; he gave evidence lately upon one branch of it, and for that evidence he must have been all over the mines, which are extensive.

2760. Are those mines in his own district?—No, they are in Scotland.

2761. He being the inspector for Newcastle?—Yes.

2762. In inspecting those mines, you think that he must have been neglecting his own duties?—No doubt of it; and he was on the Carsebridge trial before that.

2763. Are you aware whether he had the consent and authority of the Government?—I am not aware, but I should think he would not be allowed to go away so long as that.

2764. How long was he away?—I could not answer that; he must have been away weeks; the trials lasted three or four days, and he must have prepared himself; but whether he went up and down to Newcastle between times, I cannot say.

2765. Are you aware of any other inspector's taking work?—Mr. Dickinson

D. Landale, Esq. was down in the Torbane Hill case; but I think Lord Palmerston summoned him home, for he went off very suddenly.

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2766. Do you know of any other case?—Mr. Williams attends; but he tells me that he was always forced by summons to come against his will; I know he does not solicit work.

2767. Are you aware whether Mr. Dunn or Mr. Dickinson were forced?—They could not be forced on a civil trial.

2768. They must have done it of their own accord?—No doubt of it.

2769. Your opinion is, that an inspector has enough to do without attending to other business?—Yes; he can only attend to one-fifth part of his work. When I tell you that I threatened to write to Lord Palmerston and to give all the viewers' names who did so, you will see that we consider it glaring enough.

2770. You say that they ought to have a head over them, and ought also to be confined strictly to their own business?—Yes, and they ought to be men of enlarged experience in the district they are to inspect.

2771. Have you formed any idea as to what salary would be sufficient for men whom you think competent to take such a situation?—I should think that double the salary they receive would not entice any proper man away from his own work; it is a disagreeable job.

2772. *Mr. H. Vivian.*] Would five times as much?—I would not say that; but I would rather have 1,000*l.* at my own work than 1,500*l.* a year as a Government inspector.

2773. *Chairman.*] Do you think a liberal salary could purchase the services of Mr. Wood?—No.

2774. They must therefore depend upon inferior men?—They want experience; a viewer, like a surgeon, is nothing without experience.

2775. If a law were passed appointing a sufficient number of inspectors, and defining their duties, and also preventing them from taking any work but their own, would that reconcile you to the system of Government inspection?—No; I think it can be as efficiently done without it, or with it in a limited way.

2776. You say that it could be done if certain regulations were laid down?—Yes, made into laws.

2777. If the rules and regulations were made into laws, how would you have them enforced?—The common law of Scotland would enforce them. You will find how well they are looked after already, without any rules at all; and if they gave information of certain acts being done, the parties would be punished.

2778. Who would punish them?—The court.

2779. The procurator fiscal would apply to the court?—Yes.

2780. Who would inform the procurator fiscal?—The men.

2781. Do you think that the men are sufficiently free agents to be likely to inform the procurator fiscal, or any officer of that kind. If it came to the knowledge of the owner of the colliery that they had given information, would they not probably be dismissed, or liable to pains and penalties of some kind?—I think not; it is very much the reverse just now. The masters have to court the men; they cannot get them.

2782. A law would provide for all time, and it might shortly happen that the men would have no power of that kind. Assuming that there was not a superabundance of labour, could a man, without the danger of losing his situation, or without suffering pains and penalties, safely go to the procurator fiscal and lodge a complaint?—It would work in this way: if the pit was not safe, or the men were ill used, the owner would not get men to work for him.

2783. If there were a very great superabundance of labour, and the men were badly off, and their wives and families in want, do you not think that they would take any employment at all, and encounter any amount of danger, rather than not work?—There is not much fear of that; but I would not do away with the limited inspection you have; one inspector with these rules could do all that.

2784. *Mr. Cobbett.*] Are you against all inspection?—No. I think the present amount of inspection could be made effective.

2785. *Chairman.*] You mean the present amount of inspection might be made to work, provided rules and regulations sufficient, if abided by, were adopted?—Yes.

2786. Give us an idea what rules you mean?—I have drawn up a few rules, but I have not consulted with any of my colleagues upon them. With such rules as those it would be the duty of every one to inform the inspector if they were

were not carried out, and he would then visit the district where his attention was required. D. Landale, Esq.

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[The Witness then handed in the following Rules:]

D R A F T.

GENERAL RULES applicable to SCOTCH COLLIERIES, IRONSTONE and LIMESTONE
PITS, by D. Landale, 22 May 1854.

Machinery.

1. All winding machinery by which men are to be raised and lowered, after the passing of this Act, shall be inspected by two competent engineers of the district, who shall report if such is of proper strength and safe construction for the speed and weight to be raised. This report to be posted up in the engine-house, and must be renewed every year, or as often as alterations are made, of either the load or the depth of the pit.

2. That when wheel gearing is used, and intended to be unshipped daily or oftener, the same shall be effected either with a fixed screw or an eccentric, worked by a lever of such weight, length, and strength, that when it hangs downwards it will effectually prevent the teeth from unshipping, under any circumstances; and when this lever is raised, or the screw, (if there be one,) unwound, the wheels to be drawn out of gear shall, as the teeth leave the engine-wheel, lock fast into three or more fixed teeth, to prevent the disengaged ropes running amain.

3. That a person shall be appointed to inspect and slowly examine, every night after the work stops, the ropes, cages, and guide-rods, and have any defects immediately remedied. The shaft also to be examined every afternoon on Saturdays, and all loose materials cleared away, and the shaft secured, before commencing work again; such inspections being regularly registered in a book kept for the purpose.

4. That a proper code of signals be arranged, printed, and hung up beside the engine-man, at the pit-head and at the pit-bottom. Men to be raised and lowered at half speed, and never more than four admitted on a cage at a time, and no minerals allowed on the opposite cage or tub while men are in the shaft. A pit-bottom man to be in all pit-bottoms to see to this rule, and the banksman to enforce it above ground.

5. That all cages by which men are to be raised or lowered shall be provided with a strong cover of wood or iron, to protect them in case of small rubbish or coal falling down the shaft; and where safety cages are used, they shall be tested daily, and their mechanism kept in perfect order, and be detached from the rope to see that they catch properly. No chains to be allowed, except four strong short ones, to connect the cage to the rope.

Shafts.

All shafts to be properly secured with timber, brickwork, or other secure material. At all soft places, such timber or brickwork to be examined weekly, and kept in a sound and secure state; and the shaft to be of such an area as to permit a free passage for the air, in no case less than 25 feet square, clear of the cages, where the shaft is used either as an up-cast or a down-cast. All shafts sunk on small fields, after the passing of this Act, where there is fire-damp, and where only one shaft is to be used, shall be divided into three by two air-tight partitions; the air entering by the dip end, and ascending by the rise compartment, both being properly walled off, and separated without the use of doors at the pit bottom. None of these compartments to be of a less area than 25 square feet, and the middle division being used exclusively for the cages. Such single pits only to be used on limited fields, and where not more than 70 men are to be employed at a time. In all larger districts, and for larger outputs, there must be two shafts, an up-cast and a down-cast, having a clear area of not less than 50 square feet.

Ventilation.

A proper supply of fresh air shall be taken into the down-cast, for the single pits, not less than feet per minute, and for the larger double pits feet; the circulation being kept up by a rarefying furnace near the bottom of the upcast, or by any other efficient means. And the current shall be carried into the working in one or more volumes along the dip parts of the mine, in air courses of such an area at all places as shall not increase the velocity of the air beyond what it is in the down-cast. From these air courses it must be carried round the working faces, giving a sufficiency of fresh air for each working place, so as to clear the pit thoroughly of gas. The stoppings in all the main air-courses to be built with two stone or brick walls, and lime with several feet of rubbish packed tightly between. The air to be carried past the drawing roads with doors, and, where there is fire-damp, these to be double and furnished with trappers. And where there is such gas in a mine, one or more firemen must be appointed to examine every working place with a Davy lamp each morning before the men are permitted to enter the mine; and in such mines as require headings and other advanced mines, to be worked with the safety lamp, the men must be made strictly to conform to such rules as are laid down for the use of the lamp, under a penalty, which it should be in the power of a magistrate to inflict summarily.

*Working of the Coal or other Mineral.***D. Landale, Esq.**

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The rules of the pit must specify distinctly what part of the mine and roads are to be propped, supported, and kept up by the master, and how much of the working place is to be kept by the collier or miner, for which purpose the master must supply him with sufficient pit wood at the pit bottom, or any other point to which he has draw his coals. The collier must then keep his place safe and secure, and attend to all orders given to him by the overseer, or his deputy. No gunpowder to be used where fire-damp abounds; and the master must provide and keep up good air courses and travelling roads, not less than 3 $\frac{1}{2}$ feet high in ironstone, and four feet in coal, and when necessary, repair all loose or dangerous places, either by taking such down or re-timbering them. The longwall system to be adopted in every seam where it is practicable, and where the extra cost of getting the coal by that means will not exceed 7 *d.* per ton. Inspector to order the adoption of this system where he thinks it safer for the men. The coalowner to have power to appeal to _____, whose decision shall be final.

Accidents.

These to be investigated as at present, with this difference, that the prosecutor (procurator fiscal), shall take the assistance of the inspector in the preliminary examinations or precognitions; and if the case should be tried by a jury, it should include three intelligent colliers, or miners, three coalmasters, and a mining engineer, all from some other district than that in which the accident happened. The judge also to have the assistance of an experienced mining engineer or inspector, in all cases when underground workers are examined as witnesses. The writer, however, is of opinion that all such cases should be tried by the judges without a jury, especially in civil actions by the relatives or others; and where damages are found due, these in no case to be paid by a lump sum, but be paid periodically in the shape of wages, at the payable, for given periods, if payable to children or for the whole of life, as the case may be; security being provided for the payment of such allowance in case of the abandonment of the works.

Rules and regulations something like the above would be enough in the Act of Parliament. The common law would then reach all gross offenders, who neglected the imperative rules; but every colliery or mine, to be compelled to have a full detailed set of rules printed, containing besides the general rules that may be agreed on in the Act, all suitable rules or bye-laws for the specialities of each work, revised by the inspector. These to be hung up in the pay-office at all pitheads, and also be printed in a small book, to be given to each man on entering the service, so that he may exactly know not only his own duties, but that of every other man and officer about the works (as in railways). These rules to be enforced with suitable penalties and punishments, to be inflicted either by the magistrate or the manager.

2787. On what principles are those rules based; supposing the rules were not complied with, they would not give the inspector any power?—No, he would have no power.

2788. His business would be to inform the procurator fiscal?—Yes; but the very fact of his going would correct the evil.

2789. Supposing he did not?—He must go or send to the procurator fiscal.

2790. He could not go before an accident occurred?—Yes, if any of the rules were absolutely violated, or not complied with.

2791. Then you would put it in the power of the procurator fiscal to punish if the rules were not actually put into practice?—Yes, or to stop the pit.

2792. Mr. *Thicknesse.*] Do you think that those rules would apply to England and Scotland, or only to Scotland?—Only to Scotland.

2793. *Chairman.*] The first rule that you suggest provides that competent engineers shall inspect everything connected with the pit?—That is machinery only; I mean an engine-maker, the same as there is in steam-boats, to make these reports.

2794. Who should pay for the men?—The mine owner of course; it is like a license every year.

2795. The inspection should be by the owner at his own expense, before he was allowed to work?—Yes; he should have a certificate.

2796. And you think an inspection of once a year of such a character, would be sufficient?—It might be coupled with something more in detail, about broken teeth, &c.

2797. The second rule applies to engines for pumping and winding?—Yes.

2798. Do you think it safe to use an engine-pump?—Perfectly safe for small pits; it is liable to be abused, however, because they creep down to lower seams where the gearing is not strong enough.

2799. By the third rule do you refer to the Government inspectors?—No, to their own servants; the things referred to in the third rule are such as should be done by the workmen at the colliery.

2800. Do you think that he should employ an independent engineer to do that, and to have a certificate?—No; the certificate is only for the machinery.

2801. What do you mean by loose materials?—The action of the cage is so silent, and loose pieces of coal hang here and there in the course of the work on the cross beams, &c.

2802. The fourth rule applies to a code of signals?—Yes.

2803. The fifth rule applies to cages, and you have already stated that you think that it should be imperative that strong covers of wood should be fixed on to the top of the winding-up cage?—Yes; and I go on further to say, in that rule, that if safety cages are to be adopted, they should be examined every day.

2804. After the pit is done with in Scotland is it the custom to wall it up properly?—Yes, with loose stone and lime wall, five feet high; that is enforced in the leases.

2805. In the fifth rule you speak of an area of not less than 50 square feet?—That would be for new pits.

2806. You could only work a field of limited size with that?—Without gas you could get 50,000 cubic feet; the Wemyss pit that I spoke of before was less than that, but we had two large engines under-ground.

2807. You say in one of the rules that no gunpowder is to be used where there is fire-damp; do you mean where there is any fire-damp, or where there is sufficient to make it proper to use the Davy lamp?—Where there is sufficient fire-damp to ignite with gunpowder.

2808. If it was so fiery a pit that it would be imperative upon the parties to use the safety-lamp, you would not fire gunpowder?—I would not use any gunpowder at all, then.

2809. Mr. H. Vivian.] I understand from that rule, that where gas was present in such abundance as to cause the atmosphere to be in an explosive state, you would prohibit the use of gunpowder. But assuming the atmosphere not to be in an explosive state, would you still prohibit the use of it?—No; if a Davy lamp was not needed in the place at all, I would blast.

2810. Assuming that the place were perfectly free from gas, and that you still, as a matter of protection, used a Davy lamp, will you still prohibit the use of gunpowder?—No. I think that where a Davy lamp was used there should be no blasting.

2811. But assuming the Davy lamp not to be necessary, but merely used as an additional protection to ensure safety, would you then prohibit the use of gunpowder?—I cannot conceive that to be the case; we have no instance of a collier getting coal with a Davy lamp, except in headings in Scotland.

2812. You have no practical experience of such a case?—No.

2813. Chairman.] you think that the rules you have just handed in, with the present amount of inspection would be sufficient?—Yes.

2814. If the inspector found the rules not obeyed, you suggest that he should acquaint the procurator fiscal, who should institute proceedings against the owner of the colliery?—Yes; but we should seldom come to that.

2815. You think that whenever the inspector found the rules not carried out, a remonstrance from him would be sufficient?—I am satisfied that it would. I merely said to a leasee one day when I wanted to go down a shaft: "I do not think that machine is quite safe," and the next time I went there it was all remedied; new shaft, new gang and rope rolls, and I had no power at all, being the landlord's engineer.

2816. Do you consider the law in Scotland as to assessing damages for carelessness a proper and perfect system?—No, far from it.

2817. Detail to the Committee what the system is; take the case of an accident having taken place, and a trial instituted in Scotland similar to a coroner's jury in England?—When an accident takes place, the coal manager is obliged to report to the Lord Advocate, who makes an investigation; if it has been purely accidental, nothing more is heard of it; but if it has arisen from carelessness, the parties are tried for manslaughter; and even if they escape punishment criminally, then by our law they are still subject to a civil action from even the most distant relative. A certain class of attorneys get them up for speculation;

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they get the discontented workmen, and those who have been discharged, to act as witnesses, and to say that something was wrong; they try to procure the attendance of engineers, but they do not often succeed; they go into court with a talented counsel, and perplex a jury who know nothing about it, until they get perfectly bewildered. Perhaps they set up the widow and children in the court; the widow is almost always present in her weeds; parties are examined to say that the pit was all wrong, and the jury are led to believe that some evil has been done, and in nine cases out of ten the coalmaster is made to pay large sums, from 300*l.* to 500*l.* In the last case I know of, the damages awarded were 40*l.*, and the costs amounted to 345*l.*, and the man who got the 40*l.* was the party who should have been punished.

2818. Mr. Cobbett.] What is your objection to the action at law?—The objection is, that we have no set of rules; the colliers and their witnesses say that it was all wrong, when perhaps it was perfectly right, and a jury can never be made to understand a mining case. I will give you an instance in which neither judge nor jury comprehended anything about the case; another case was, after going on for five days, and a great deal said about “long wall” and “lime wall,” but the judge, in his charge to the jury, described the “long wall” as the “long lime wall” amidst the laughter of all the mining people present. Another judge, whose notions of mining seemed to be derived from railway tunnels, put the question to the witness, with reference to a coal mine “Was it not cut in an arched form;” he put that stupid question five or six times to as many witnesses, receiving the same answer, “No.” Every one conversant with the subject knows that there are not two seams in Scotland that could stand five minutes with an arch so cut.

2819. You say that the first representation is made to the Lord Advocate that an accident has happened?—Yes.

2820. He writes to the procurator fiscal?—He hands it over to the Crown agent.

2821. What does the Crown agent do?—Instructs the fiscals of the district to go and investigate it.

2822. What do they do?—They go to the spot and examine the place, and examine witnesses, and after they have made that examination they judge whether the matter shall be prosecuted criminally or not, and we are often puzzled with their judgment. I have had two or three cases sent from the Crown Office after the inspector, Mr. Lancaster, has pronounced them to be purely accidental; they were sent from the Crown Office for my opinion, which was the same as Mr. Lancaster's, and the papers were returned again for specific details as to how they were accidental.

2823. You say that after it has been proved to the satisfaction of the fiscal, that it was purely accidental, still it has been carried further?—The Crown stops then, and the relatives get up a case for money.

2824. Although proved to be an accident?—Then there is no further proceeding by the Crown.

2825. All are accidents?—If it has been from neglect there is no prosecution, but if the accident shall have arisen from neglect, then the parties go to trial.

2826. Give me an instance of what would be considered neglect?—The worst explosion we have had, in which 13 people were killed, was where the collier-owner and his son were tried for manslaughter, and they only escaped by a majority of one on the jury; their pit was not properly furnished with stoppings, and furnace for fire-damp.

2827. Was that trial at the instance of the procurator fiscal?—Entirely.

2828. Without any jury sitting with him to say whether they should be tried or not?—There was no jury in the preliminary part of the proceeding.

2829. The procurator fiscal, after examining the parties, some witnesses, and also the spot where the accident happened, decides whether there shall be a criminal proceeding or not?—Yes, after laying it before the Crown agent.

2830. What objection have you to that?—I have no objection to that, but I object to juries trying anything connected with mining matters; they can never be made to understand them.

2831. When the procurator fiscal sends a case to be tried, would you not have that tried by a jury?—Not unless there was some infusion into the jury of people knowing something about mining, such as I have put it in the draft rules, under the head of accidents; it is impossible otherwise to make them understand it.

2832. You

2832. You say that judges and jurors mistake matters connected with mining so much, that a trial by jury cannot well be just in such cases?—Exactly; it is the wrong ordeal.

2833. Do you say the same with regard to a civil action for damage?—Yes; it should be tried by judges, or, as I have already said, by an improved jury.

2834. Without the intervention of a jury?—Without the intervention of a jury; it is not the case for a common jury.

2835. *Chairman.*] Do you know what the law in England is?—Only by reading it.

2836. You would not wish the same law introduced into Scotland?—No; I think that that is as unjust the other way.

2837. In what respect?—For instance, if I understand it, there is no case at all, unless they find the body; that is one material objection; and then comes our objection, that a jury is not the proper ordeal for it. The last instance I heard of in Scotland was that of the Newton coalpit; it was opened out skilfully with two splits of air and a furnace, and was pronounced by Mr. Lancaster to be perfect, and he gave evidence to that effect; the two heading mines had a little fire-damp in them, which were bratticed off with timber; an old man was slightly burnt in one of those on striking a blower, and left his place, according to rule, but his boy induced him to return, and he was burnt again; the case was taken before a jury, who gave him 40*l.* damages, and the expenses were 345*l.*

2838. *Mr. Locke.*] Who went before the jury?—He brought an action against the owner. In that case the counsel and the judge contended that the whole air of the pit should be put through an opening two feet and a half, the ordinary air-courses being 12 feet wide, because, "from its narrowness, it would go all the faster;" and one witness was very roughly treated for saying that a door to force the air in would have laid the ventilation of that side of the mine dead, which we all knew it would have done. Mr. Forster, the eminent viewer, was present, besides almost all the English mining people of note, who were waiting for another trial. He said that if the case had been his, he would, the moment the surgeons pronounced the man out of danger, have put him into gaol and prosecuted him for setting fire to the pit, it was so gross a case. There both judge and counsel took upon themselves to say, that a door should be made to force the whole current through a place two and a half feet wide, and all the height of the seam. It is impossible to conceive anything more absurd than that, and yet damages were given.

2839. Is your object, in referring to that particular case, to show, that judge and jury were called upon to adjudicate upon matters that they did not understand?—Yes; and the judge on that occasion called upon me, from the open court, to explain how the ignition took place, and did not ask a single question about the forcing the whole air through the narrow space already spoken of.

2840. *Mr. Cayley.*] You have given evidence with regard to the Sanchil Pit?—Yes.

2841. And of the experiment made by Mr. Gurney?—I saw it in action on the second occasion.

2842. What was that?—Last summer, I think.

2843. When was the first experiment?—The year before, I believe.

2844. It was stated by Mr. Gurney that the fire had been extinguished?—Yes.

2845. Do you know, as a fact, that it was not extinguished?—I believe it was not; at all events it was very soon burning again; it would be very easy to obtain evidence from the district that it never was out.

2846. *Chairman.*] I think you stated that you did not attribute its not being put out to any failure in the steam-jet?—No.

2847. You stated that the workings were very likely crushed in such a way that it was impossible for the gas to have entered the pit?—Just so.

2848. *Mr. Cayley.*] The evidence was that part of the fire was put out?—They damped the fire by sending down the gas, but did not put the fire out. When the agent was sent for, he would not believe that it was as hot as ever. The parties concerned believed that it was out; but I believe there can be no doubt that that was not the case. At Dalquharren it is burning vigorously, for I am engineer to the next estate, and we fear that it will come across to us.

2849. You do not deny that if carbonic acid gas were generated it would destroy it?—Not at all.

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2850. *Chairman.*] Will you give us some details about the colliery schools?—At most of the larger works the education is well managed; and some little places are neglected.

2851. Do the workmen themselves, at the large collieries, contribute towards the schools?—It is made imperative upon every man who enters the service to pay so much per week, about 1*d.* for the unmarried men, 1½*d.* or 2*d.* for the married men.

2852. That is done by contract?—It is one of the rules of the works; and then the coalowner provides a school-house, a dwelling-house, garden, and coals, and sometimes money. I believe the Messrs. Baird and others are even more liberal. A boy is not allowed to go down into the pits until he is 10 years old, and can read and write; but that is rather neglected in the small works.

2853. Do you find any difference in the condition of the men upon the large and small works; are they a better class of people where the education is attended to?—Yes; but they are a very moveable race, and it is difficult to define the improvement.

2854. Would it be advisable, in your opinion, to pass a law compelling the colliers to send their children to school?—I think it would be no hardship upon them, because it is done already in practice; there would be nothing wrong in saying “You shall not work till you are 12 years old, and you must read and write, and know something of arithmetic before you are allowed to work.”

2855. At present they are allowed to work at 10 years of age?—Yes.

2856. It is suggested that a law should be passed compelling parents to give their children; if between the ages of 10 and 14, 150 hours instruction in the course of six months, the children prosecuting their employment at the same time, as is done in the factories?—I see no objection to that.

2857. Do you think that a boy of that age is capable of doing that?—He would not acquire much knowledge after a hard day's work.

2858. You would rather approve of extending the age at which to begin work to 12 years?—Yes; but have evening schools also for those inclined for it.

2859. Mr. Tremenherne proposes that a boy of from 10 to 14 years of age should continue in his employment, and that, at any time that might be found most convenient, he should receive the benefit of 150 hours' education every six months; do you think that that would be practicable?—I think it would be perfectly impracticable.

2860. Mr. Cayley.] You think that he could not work part of a day, and the rest of the day go to school?—No.

2861. Could he work only some days in the week?—No master would take him upon those terms.

2862. *Chairman.*] You think that it would be better to make it imperative not to take a boy into the works until he is 12 years of age?—Yes.

2863. And that up to 12 years of age he should receive a compulsory education?—Yes; it is not neglected now, except here and there; we get a great many Irish over, and they must, I think, be forced to it.

2864. Would the men themselves raise any objection to compulsory education?—No; the better disposed of them are anxious for it.

2865. Are they anxious that the law should prohibit the employment of boys before they are 12 years of age?—I think that a majority of them would agree to 12 years.

2866. And to a compulsory system of education?—That is my impression.

2867. Mr. Cobbett.] In Scotland what is the number of hours during which they work?—From 8 to 10 hours, and in some pits 12; but that is not the rule.

2868. *Chairman.*] When you speak of compulsory education, you probably mean that a boy, before he is employed, should undergo a course of examination, and that if he did not come up to a certain test, he should not be eligible for employment?—He should go back and receive further instruction; even now, at some of the pits, there is a committee of the colliers who, acting with the manager, look after that, and all matters relating to the school.

2869. Mr. Cayley.] Has there not been a considerable increase in the working of collieries in Scotland within the last few years?—Of ironstone there has.

2870. If you applied the test you propose, would there not be a considerable scarcity of hands?—None; we have had a more severe trial upon us in the emigration. Many of the Irish who come over were put into the pit, and their duty

duty was to take the coal from the collier to the pit bottom ; but since the wages have become so high, 5*s.* and 5*s.* 6*d.* per day, they have been taken off, and put to hew coal, and horses substituted.

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2871. *Chairman.*] Are those men capable of working the coal and standing their own timbers?—Yes, after a while ; the long-wall system does not require much experience in working coal ; it is the easiest and quickest. The long-wall system, I must say, destroys the usefulness of colliers ; they are not near so good pickmen, and at other handy jobs ; it is merely undermining and filling the coal.

2872. I believe the long-wall system is peculiarly applicable to the working of ironstone?—It would be double the expense the other way.

2873. Are the claystones worked upon the long-wall system?—They are not always so. On the property of Lord Douglas, and another landowner only that I know of, they work on the panel system, and come back and take out the pillars ; but we have very little claystone working.

2874. When a man leaves his employment, under the rules we have referred to, he is debarred of the benefit of any relief?—Yes ; but it is only the custom at a few works ; it is not fair.

2875. Why is it not?—If a man contributes to a fund he should not be deprived of it because he leaves.

2876. The proprietors do not contribute towards it?—No ; they have the management of it only.

2877. In point of fact, the Alloa rules are simply for the benefit of friendly societies?—Yes.

2878. The other rules include a system of education?—I think so.

Samuel Dobson, Esq., called in ; and Examined.

2879. *Chairman.*] YOU are a Mining Engineer, I believe?—Yes.

S. Dobson, Esq.

2880. You manage the property of Mr. Clive?—Yes, and of several other landed proprietors, in regard to their minerals ; I am also the principal manager of the Duffryn Collieries.

2881. Were you examined before the Committee of the House of Lords?—I was examined in 1849.

2882. I believe you have for a very considerable period had large collieries under your superintendence?—I have.

2883. Have you been all your life engaged in collieries?—I have ; since I was 16 years of age.

2884. Did you serve your apprenticeship in the North of England?—I did.

2885. You are therefore perfectly well acquainted with the best system of managing collieries?—I believe I am.

2886. You stated before the Committee of 1849 that you had paid very considerable attention to the causes of accidents, and the means of preventing them, and you then stated that the commonest cause of accidents was neglect ; have you had any reason to modify that opinion in any way?—I think not. I think that especially in the district of South Wales very many of the accidents that occur arise from neglect in some way or other.

2887. Is that with reference to sending sufficient air down into the pits, or is it in the distribution of the air?—In the distribution of it ; there is not so much difficulty in getting the air down into the pits, but having got it down, it is not generally conducted so well as it might be ; I think this proceeds from want of knowledge of the principles which govern the distribution of air ; a great many accidents also arise from falls of coal and stone.

2888. In South Wales are the pits conducted on the principle of natural or artificial ventilation?—In both ways ; in many of them artificial ventilation has now been adopted.

2889. Do you think it proper, under any circumstances, to allow coalpits to be carried on by the process of natural ventilation alone?—I do not.

2890. You think that the Legislature ought to step in and say that no colliery should be conducted upon a system of natural ventilation alone?—I think it would be no hardship upon the coalowner if the Legislature took such a step.

2891. Will you state what are the means of producing artificial ventilation most in use in Wales?—The furnace is most generally used ; but of late years the steam-jet, and also Struve's machine, have been brought into use.

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2892. Have you yourself had any experience with regard to all those three systems?—I have.

2893. To which do you give the preference?—That depends very much upon the mine to which you apply the ventilation; with a deep shaft, if I could use the shaft solely for ventilation, I should prefer the furnace, but I think it depends upon where you want to apply your motive power. I am using the steam-jet for opening some very fiery mines; I allude to the Pennar Colliery, in the parish of Berdare, but it is not my intention to continue the use of the steam-jet there.

2894. After you have once opened the mines, you mean to use the furnace?—Yes.

2895. What is your object in using the steam-jet in the first instance?—Because it is not safe to use the furnace; the discharge of gas is so great, that it would not be safe to take an unprotected flame of any description into the pit.

2896. Not even by a furnace with a dumb drift?—You cannot put a furnace with a dumb drift into a pit until the workings have progressed some distance from the shaft.

2897. You use the steam-jet by boilers on the top, taking the steam down?—Yes.

2898. Do you use gunpowder there?—We do not.

2899. That is strictly prohibited, is it?—It is, except in the level headings, which are supplied with air direct from the shaft.

2900. Is there more fire in that mine than any other that you have had to contend with?—I think there is more in that pit than I have ever seen in South Wales.

2901. The reason that you mean to adopt the furnace is, that a great deal of gas will have filtered out of the coal, and that you will then be able to introduce a dumb drift, when there will be no danger in using a furnace?—It is not because the gas will have filtered out of the coal, because, as we progress with the opening of the pit, owing to the number of fresh surfaces that will be exposed, the discharge of gas in the aggregate will be much greater than it is now; but we shall be able to put the furnace in properly, and to have a dumb drift to work with it.

2902. Do you find that the steam-jet answers the purpose for which you used it?—It does at the present moment.

2903. What amount of ventilation do you produce by it?—In one pit we have 15,000 cubic feet per minute, and in the other the steam-jet was only applied last week, and I have not had an opportunity of ascertaining personally the result.

2904. Have you heard that it is sufficient?—Yes.

2905. You stated that you were also acquainted with the working of Struve's machine?—Yes.

2906. Have you that in work also?—Yes.

2907. Extensively?—I think we have applied it more extensively than it is applied anywhere else; I believe the Middle Duffryn machine is the largest appliance of mechanical power in the world for producing ventilation.

2908. State the amount of air you are able to introduce into the pit?—From 60,000 to 70,000 cubic feet per minute.

2909. Do you find any difficulty in keeping the machine in order?—We did at first, but I think it was owing altogether to a defect of construction.

2910. You mean that the materials used were not strong enough?—Yes.

2911. Have you rectified that?—Yes, I have, so far as I have been able to do so; I was obliged to stop the machine, and to completely rebuild some parts of it.

2912. I suppose there is no limit to the power of ventilation to be obtained by Struve's machine, inasmuch as you may increase the number of the cylinders?—The machine I have in use I could work up to 100,000 cubic feet per minute very easily, provided we had airways adequate to the passage of that quantity.

2913. Do you think it possible to put the machine into such a working condition as that it might be depended upon in all cases as perfectly as the furnace or the steam-jet?—I should always give the furnace the preference, provided I could get the requisite power with it.

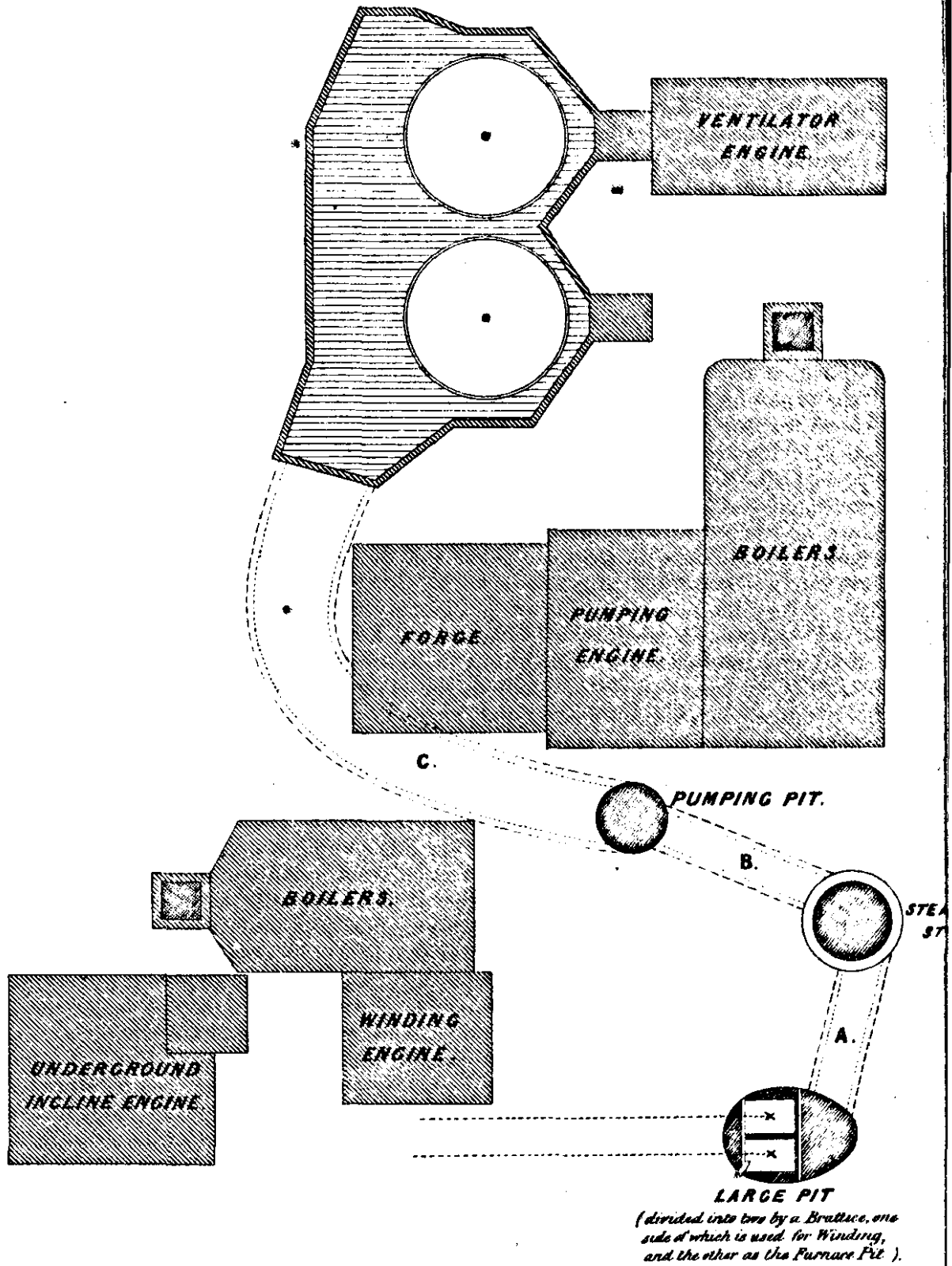
2914. For what reason?—I think that machinery is always more liable to get out of order than the furnace; the furnace is the steadiest motive power we can have.

2915. Does

PLAN
[To face page]

MIDDLE DUFFRYN COLLIERY.

Plan showing the Surface Arrangements for
VENTILATION,
1854.



SCALE. 20 Feet to an Inch.

Samuel Sabers

2915. Does the same objection apply in your mind to the steam-jet?—Yes; and moreover we cannot get the power with the steam-jet, except at such an enormous expense, as compared with either the furnace or Struve's machine, that I would never think of applying it, except under peculiar circumstances.

2916. In your opinion, therefore, there is no difficulty in getting abundant power by economical means, to ventilate a colliery, but your objection is rather that the machinery is liable to get out of order, and you would prefer depending upon the furnace as more safe mode of securing the ventilation of the pit?—Yes; when I could obtain the necessary power with the furnace.

2917. Instead of any particular system being laid down as a law, you would probably think it better to require that a sufficient amount of ventilation should be produced in the pit, leaving the coalowner to find out which was most advantageous and suitable in the circumstances under which his mine was placed?—I think there cannot be a question about that. I have given an instance in which I am using the steam-jet with considerable advantage, without at all intending to continue its use. Where I am using Struve's machine I could not well have used anything else. Perhaps it may be convenient to the Committee to know the reason why we adopted that machine.

2918. *Chairman.*] If you please?—I have a sketch here of the arrangement of the works (*referring to a Plan of the Middle Duffryn Colliery, marked C.*) The large pit is divided by a brattice of three-inch planks, and one side of it was used as a furnace pit, the furnace being placed at the bottom of it; the other side was used for winding, and was also used as the down-cast; there was a pumping pit, but that was not used at all. I am speaking of the arrangement at the time of the explosion. (*The Witness here handed in the Plan of the Middle Duffryn Colliery, marked C.*)

2919. How many persons were killed by that explosion?—Sixty-five; it was supposed that the accident occurred from the gas having been lighted at the furnace, and on that account it was thought prudent that the pit should in future be worked with a dumb drift. I may be allowed to state, that I had nothing at all to do with the management of the colliery at the time of the accident, but was consulted afterwards as to the best mode of setting it to work again. As a temporary means of getting over the difficulty, as to ventilation, the up-cast was divided by a brick brattice for about 10 yards up from the bottom, and the furnace with a split of fresh air worked into one side of it, and the return air passed into the shaft on the other side of it; but we found that that arrangement did not answer our purpose. In addition to the furnace, a steam-jet on the surface, working into a stock placed here (*referring to the Plan*), which was connected with the up-cast shaft by the drift marked A., was in operation. The furnace and steam-jet together, working with the dumb drift, gave us about 35,000 cubic feet per minute; without the steam-jet, which was assisted by the exhaust pipe from the winding engine, we got 32,000 cubic feet per minute. Seven thousand cubic feet of that quantity was in both cases necessary for working the furnace; so that it was not available for the ventilation of the mines, leaving in one case 28,000 cubic feet, and in the other 25,000 cubic feet for that purpose. We found that that would not give us the quantity of air required, and not being able to put a furnace into the pumping pit, owing to its being too small, to admit of its being walled, nor into the large shaft, because it was not walled, and to have walled it would have involved the stoppage of the colliery for a considerable time; and in a walled shaft of such a size it would have been almost impossible to get the necessary temperature for producing the requisite water gauge. We had to think about some other means of getting the necessary ventilation, which we considered must amount to from 60,000 to 70,000 cubic feet per minute; I recommended the proprietor of the colliery to try Struve's machine, which he did.

2920. Do you produce more than 60,000 cubic feet per minute by that machine?—We work it now at about 60,000.

2921. The application of the steam-jet must have been very difficult, because I understand that you produce 32,000 cubic feet with the steam-jet alone?—No, with the furnace alone.

2922. Without any aid from the boiler fires below?—We had none below.

2923. When you first took the management of this pit you found the ventilation very deficient?—It was about 25,000 cubic per minute.

2924. Was that deficiency of ventilation the cause of the accident?—No, I think

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think it was from a sudden irruption of gas from workings very near the furnace, occasioned by a fall of the roof, about seven yards above the upper four-foot seam, the one in which the explosion took place; there is another; and my notion of the matter is, that owing to the removal of the lower seam, and the pressure of the gas exuding from the upper one, the ground below the latter got set off from it, and so a space was formed in which the gas accumulated, and at last attained to such a pressure as, coupled perhaps with a natural tendency in the ground to fall, broke it down altogether, and thus escaped suddenly in such a quantity as to cause the explosion. We put up Struve's machine, which consists of two cylinders each of 20 feet in diameter, worked by a steam-engine with a cylinder 18 inches in diameter and three-feet stroke.

2925. Then the machine has produced much more air than any machine in use in Belgium?—It has; we put up the machine to obtain the greater quantity of air required, and found that it answered the purpose.

2926. Since that machine has been in operation, you have met with no accident, and have not suffered from any want of ventilation?—No.

2927. What is the depth of the working?—The level course is now, I think, about a mile from the shaft.

2928. Mr. *Thicknesse.*] Is the pumping pit used?—We use it for ventilation, the air now comes up the pumping shaft, and also up the back part of the winding shaft.

2929. *Chairman.*] Your reason for using the machine was that you could not use the furnace with the steam-jet below?—We could not get the quantity of air we required with the furnace as we had it applied, or could apply it with the existing arrangements.

2930. You have no doubt in your own mind, that this machine is perfectly sufficient for the purpose for which it is required?—None, and I should have no hesitation in applying it again under similar circumstances; perhaps making some alterations in the construction of the machine.

2931. The objection you have to any machine is that it is liable to get out of order?—I think it is not so certain as the furnace in its action.

2932. In the collieries which you superintend, do you suffer much from fire damp?—Very much, I think they are the most fiery mines in South Wales.

2933. In South Wales, attention generally speaking is not sufficiently paid to ventilation?—I do not think it is generally, but an immense improvement has taken place in that respect within the last few years.

2934. To what do you attribute that?—To the great extension of mining operations, and to the fact that coal owners are becoming more alive to their interests, and are beginning to see that it is of importance to themselves in an economical point of view.

2935. Does the improvement consist principally in the introduction of a larger quantity of air into the pit, or to the distribution of it?—There is an improvement taking place in the general system of working mines; they are becoming better ventilated, and better conducted in every respect.

2936. Is it not the rule in South Wales, to course the air, and the exception to split it?—I think it is.

2937. Are you aware of any large collieries which have sufficient splits of air?—Yes, there are some very well-managed collieries in South Wales.

2938. Which are those?—I think I may mention Mr. Vivian's collieries, the Plymouth collieries, and I could name others.

2939. The collieries in the neighbourhood of Merthyr Tydvil and Aberdare, are worked upon the principle of coursing the air?—Some of them.

2940. Do you consider that a defective system?—I think so, especially when applied to the system of working coal practised in South Wales.

2941. You consider it more difficult, properly and perfectly to spread the ventilation over the mine, and not so safe for the health of the men?—It cannot be so good for the health of the men, and is not so safe.

2942. Is there a much greater amount of friction?—Yes, and the current itself gets much charged with gas and other impurities.

2943. In South Wales, is the size and capacity of the airways much attended to?—More attention is now being paid to the size of the airways than there used to be.

2944. Until of late years, that was very much neglected, was it not?—Very much.

2945. The

2945. The airways now are always driven, I suppose, of the proper size?—
Not always.

2946. Is sufficient attention paid to keeping them in good order when they are made?—I do not think that is so in all cases.

2947. Do you think it possible that a colliery can be sufficiently ventilated where attention is not paid to that?—Certainly not.

2948. Is it necessary to have the airways of such a size that a man can with convenience travel through them?—Yes, they ought to be walked through two or three times a week, and in fiery mines once every day.

2949. If they are not made of sufficient size to enable the man to walk through them without great labour, would it not be rather a premium to the man to neglect his work?—The chances are, that he would not go through them at all; or at all events as seldom as possible.

2950. Do you think that public attention in South Wales is directed to all kinds of improvement in collieries?—I think so. I think that the coalowners in South Wales are quite alive to the necessity of improving their mines; and as the coal fields are becoming more extensively opened out, I have no doubt that as good a system will be introduced there as anywhere else. It requires time.

2951. As a general rule, are the viewers themselves men as capable as those in the North of England?—Certainly not; I know of no district where there is such a deficiency of that class of men as in South Wales; it is almost impossible to get overmen or under-viewers in whom you can place much confidence, in very dangerous mines; I have several overmen who can neither read nor write, but they are the best I can get.

2952. Men from the North of England probably would not come?—Yes; I have some from the North of England, but it is not desirable to introduce them there; they cannot speak the Welsh language, and have been accustomed to a state of things so different to what exists with us, that it is a long time before they become reconciled to our system, and to the habits of the workpeople; and moreover, not being able to talk to the workmen in their own language, they never can command their sympathies as a Welshman can; I prefer Welsh agents for Welsh workmen.

2953. Is that deficiency much felt?—Yes.

2954. Many of the best viewers are brought from the North of England?—Yes; I think that is the case, although there are some very good men who have been brought up in the district of South Wales.

2955. Do you think that that class of men is improving?—Yes.

2956. Your observations are more especially directed to overmen?—Yes, subordinates; the system is different in South Wales to what it is in the North of England; we scarcely have such a class of men as viewers in South Wales; I believe that Mr. Struve and myself are the only persons practising as viewers in South Wales; that is to say, the only persons having the charge of several collieries, and having subordinate agents residing at the collieries.

2957. I believe that in South Wales the system is to appoint to each mine a man who has particular charge of it?—For the most part, in South Wales, the owner of the mine manages his own works, leaving generally an under-ground agent to look after the underground arrangements.

2958. It is sometimes said that a man who is his own lawyer is food for the lawyers; does the same hold good with a man who manages his own colliery?—I think it is not a good system.

2959. Is the science of mining very much behind in South Wales?—Very much; it is like all other new districts, it will require time to establish a better system.

2960. I suppose that every day the collieries, going more to the deep, become more fiery and more difficult to manage?—Yes.

2961. Do you think that the intelligence of the viewers is keeping pace with the difficulties they will have to encounter?—They are improving in intelligence, but the deep collieries are often supplied with managers from other districts.

2962. Do you use the safety-lamp?—Yes; I have about 400 of them in use daily.

2963. I presume that, in some of the collieries, you do not allow the use of naked lights at all?—That is so.

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2964. Have you any particular regulations with regard to those?—We are obliged to lay down very stringent regulations.

2965. You never allow the men to unlock the lamps?—They are instructed not to do so.

2966. You do not use the safety-lamp as a means of avoiding good ventilation, but rather to insure an extra degree of safety?—Yes; after the last explosion, at Middle Duffryn, we thought it was not safe to work the colliery without safety-lamps, and we use them as an additional precaution.

2967. Since that you have had no accident whatever?—No.

2968. You do not allow gunpowder to be fired?—We do in Middle Duffryn.

2969. Do you think that a sort of regulation that ought to be enforced where the safety-lamp is used?—I would not go so far as that; I think blasting may be pursued with safety, under proper regulations.

2970. If used it should only be by men employed for that purpose?—Yes.

2971. As regards the system of inspection, have you paid any attention to that?—Yes.

2972. Are you favourable to that system?—I think it has done good, and differently constituted would do good.

2973. Do you consider the present system of inspection sufficient?—No.

2974. You would adopt a code of regulations, which it should be their duty to enforce?—I think that might be done. The present system of inspection has done good, I think, but it may be very oppressive upon the coalowner; it would not be nearly so much so if there were a code of rules for the guidance of the inspector, his duty being simply to see that those rules were attended to. At the present moment he can make suggestions, which are, in fact, orders, from which the coalowner has no appeal.

2975. Is it your intention to attend the meeting of coalowners in London?—Yes.

2976. You are preparing, I suppose, a code of rules applicable to that district?—No; the South Wales coalowners do not contemplate the framing of a code of rules; that being left for the general meeting in London, at which they will be represented.

Mercurii, 24^o die Maii, 1854.

MEMBERS PRESENT.

Mr. Hutchins.
Viscount Goderich.
Mr. Thicknesse.
Mr. Child.

Mr. H. A. Bruce.
Mr. Cayley.
Mr. Locke.
Mr. Cobbett.

EDWARD J. HUTCHINS, Esq., IN THE CHAIR.

Thomas Wynne, Esq., called in; and Examined.

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2977. *Chairman.*] I BELIEVE you are a Government Inspector of Coal Mines?—Yes.

2978. For what district?—The district of Staffordshire, Worcestershire, and Shropshire.

2979. You reside at Longton?—I do.

2980. Is that pretty nearly in the centre of your district?—It is as well situated as any place can be for the mining district.

2981. I believe you have never before given evidence before a Committee of the House?—I have not.

2982. How long have you been appointed Government inspector of coal mines?—Two years and a half.

2983. Have

2983. Have you been the whole time in the district in which you are now placed?—I was four months in the Lancashire district.

2984. The Committee wish you to confine your evidence particularly to the defects in the district under your charge; before you became Government inspector, were you much acquainted with the working of mines?—I had been connected with collieries 14 years, first as the managing partner in a large colliery for seven years, and afterwards the agent for several coal proprietors.

2985. In what district?—The North Staffordshire district.

2986. Are you much acquainted with the system of working mines in the North of England?—I have been in many mines in the north, and, in fact, in every district except the Yorkshire district.

2987. I suppose we may conclude that the coal district of Durham and Northumberland is managed in a much more scientific way than any other part of England?—It is.

2988. Comparing the North of England with the district over which you have charge, is that district worked in a much less scientific and workmanlike manner?—The difference is as great as it can be as regards South Staffordshire.

2989. Will you state what the difference is?—The North Staffordshire district is now advancing much more than any other district under my charge.

2990. You mean towards improvement?—Yes. The South Staffordshire district is as bad as it can be; the winding apparatus is bad, the system of working the thick coal is rude in the extreme, and no attention whatever is paid to the ventilation.

2991. Will you state to the Committee in what particular respects the improvement is going on in North Staffordshire, and to what cause you attribute that improvement?—To the introduction of parties from other districts. Mr. John Lancaster is introducing immense improvements on Lord Granville's estate. Mr. Hedley is also introducing great improvements on Mr. Stannier's property. Mr. Cope has made great alterations, and the system generally is better.

2992. In what do the improvements consist?—In a better system of ventilation, the introduction of furnaces at the bottom of the shafts, better engines, and better pit-frames; the introduction of guides, improvements in the air-ways; indeed the whole system of ventilation has been changed.

2993. Up to the time of those improvements being made, what was the system of ventilation?—Natural ventilation was the rule; whenever artificial means were used it was merely by hanging a lamp in the pit with a little fire in it.

2994. What is the system pursued in South Staffordshire?—There is no system at all; the pits are turned over as soon as they are sunk, to the butties.

2995. What do you mean by a "butty"?—He is a contractor for working the coals at so much per ton. Then the viewer, as he would be termed in the North, or the ground bailiff, visits the colliery once a week or once a fortnight, by himself or his deputy, measures the dead work, and enters it in the book. The management is entirely in the hands of the butties.

2996. What other districts do you inspect besides North and South Staffordshire?—Worcestershire and Shropshire.

2997. The answers you have given apply to the whole of your districts?—Except North Staffordshire, which is improving.

2998. In South Staffordshire and Worcestershire the system of ventilation is entirely natural, or nearly so?—Nearly so. There are a few exceptions.

2999. Is that, in your opinion, a system which ought to be tolerated?—It ought not; some artificial means of ventilation should be adopted in all collieries.

3000. Do you think that it would be oppressive upon the coalowner to enact that no colliery should be carried on without artificial means of ventilation?—Quite the contrary; I consider it would be decidedly to his advantage.

3001. In what respect?—The men would do far more work in a day than they can now with their scanty supply of air.

3002. You think that the natural system of ventilation affects the health of the men, and their physical energies also, and that therefore they are not able to do so full a day's work as if they had proper ventilation?—That is my opinion; I have watched men at work, and have counted the number of strokes they could make with a pick before they altered the position of the light; and I have seen that in some instances they never exceeded six strokes.

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3003. Have you compared that with the number of strokes by a man who has been working under a good system of ventilation?—I have. He ought not to have any trouble with his light.

3004. You mean that the man could not make more than six strokes without altering the position of his light?—The candle would have gone out if he had not.

3005. You think that, with a proper system of ventilation in the pit, a man would do a great deal more work, and that that would be beneficial to the coal-owner, as he would derive more profit from the labour of the man?—He would do so.

3006. You say that in the district of North Staffordshire considerable improvements are taking place. Is education, also, more attended to there than in South Staffordshire?—It is; we have not so decidedly a mining population there; the manufactories are mixed up with the collieries.

3007. Have you, in your official capacity, complained to the owners of mines in South Staffordshire of the defective state of their arrangements?—I have been compelled to do so on almost every visit I have paid.

3008. What attention has been paid to your complaints?—It has resulted chiefly in words; I have had smooth words, but very little has been done.

3009. In the district you are alluding to more particularly, South Staffordshire and Worcestershire, is there a great quantity of carburetted hydrogen?—There is not.

3010. Is there carbonic acid gas?—To a great extent.

3011. That is more difficult, from its specific gravity, to remove from a mine than carburetted hydrogen?—It requires artificial ventilation equally with mines where there is danger of explosion, because it takes a greater power to remove the heavier gases.

3012. Carbonic acid gas is poisonous in its nature?—It is.

3013. Of course a man could not breathe pure carbonic acid gas?—No; and the effects of it are clearly seen in the faces of the mining population.

3014. Have you noticed the condition of the mining population in these districts where there is an improper system of ventilation?—My opinion is, that they are suffering much from want of pure air.

3015. Does it shorten their lives?—I have no doubt of it.

3016. Have you made any statistical observations as to the average period of men's lives?—I have not.

3017. You judge more by the appearance of the people?—Yes, and by complaints that I receive constantly from the men.

3018. Do you find that the men often complain to you, in your official capacity, of the want of ventilation?—They do not so often as I could wish; they seem afraid of the butties; that they should lose their places if they complained.

3019. I suppose that if a man complained to you, you would consider that communication confidential?—I should.

3020. You would ascertain whether the cause of complaint was a correct one, but you would take care not to divulge his name?—Just so; but I do not think that the men dare venture upon the giving of information.

3021. Do you think that the men have not, at present, sufficient confidence in the inspector not divulging the names of his informants?—My opinion is, that the men are not often enough brought into contact with us in the absence of the master; and as very few of them can write, they do not like to employ others to write for them. I have had, perhaps, ten complaints in the course of the year, but have been sorry to see that they were generally by some third party in their names.

3022. Are there no delegates of the men, as there are in the districts of Northumberland and Lancashire?—There are not any.

3023. With regard to the state of the air-ways, are they driven originally of a proper size, or are they too small?—Sadly too small; to work a large mine, I have very often found that the air in the main air-courses is confined to an area of nine feet.

3024. In your opinion is that not only an error in the system, but an error also of economy on the part of the coalowner?—Undoubtedly it is.

3025. Do you think that he could drive a larger air-way almost, if not quite as cheaply as one of a smaller size?—Quite so; by cutting two seams of the thick coal instead of one.

3026. On what principle is it that the coal-masters in these districts drive the air-ways

air-ways so small?—The only answer I can get is, that they must not have too much air, or else it would set fire to the goaf.

3027. Is there a large quantity of iron pyrites in the coal?—There is.

3028. It arises from a fear of bringing oxygen into the goaf, and setting fire to that?—That is the only defence they set up.

3029. Do you think it perfectly easy to wall off the goaf so completely that there would be no danger whatever of spontaneous combustion?—There ought not to be two opinions upon that.

3030. Mr. *Locke*.] Are they afraid of spontaneous combustion?—Yes; but my opinion is, that that need not stand in the way of good ventilation.

3031. *Chairman*.] Have you complained to the masters of the want of capacity in the airways?—I have.

3032. And that has been the answer?—It has.

3033. Have you endeavoured to point out to them that it would be easy to drive the air-ways a proper size without running that danger?—I have done so; but, unfortunately, there is scarcely a large coal proprietor who takes any interest in mining operations; their time is so devoted to the manufacture of iron.

3034. Does the same defect exist in the air-ways in North Staffordshire?—To some extent; but in a few years I think there will scarcely be a colliery proprietor in North Staffordshire who will not understand his own interests in making large air-courses.

3035. When the air-courses are made of so small a size are they properly maintained, or are they allowed to fall?—There is not proper care taken of them.

3036. Have you ever travelled through those air-courses yourself?—I have.

3037. Have you found them partly shut up?—In many instances I have passed through air-ways where I could scarcely creep over the coals that had fallen down.

3038. You are now alluding to the main air-ways?—Yes.

3039. What would be the condition of the mine itself under those circumstances?—It would be very unhealthy to work in, and very dangerous if any gas came off; there would not be sufficient air to dilute it or carry it away.

3040. Your answer, I suppose, will apply to North Staffordshire as well?—Only in a few cases; generally speaking, the system adopted there is very different from that carried out in South Staffordshire.

3041. In South Staffordshire are deputies appointed, whose duty it is to take care that the air-courses are kept in good order?—There are men who are called doggies employed by the butties to look after the workings of the mine.

3042. Do those men travel regularly through the air-ways?—I am afraid not; I have seen clear indications of coals having fallen in the main air-courses that must have been there for some weeks.

3043. Do you not think that the size of the air-ways would, in some measure, prevent their going more frequently through them?—My opinion is, that they pay more attention to sending the quantity of coals out of the pit than they do to the air-ways, or anything else.

3044. Then the Committee are to understand that in that district they pay very little, if any, attention to the safety or health of the men?—Very little indeed.

3045. What is the height of those air-ways?—About 3 feet 6 inches high, and perhaps, 3 feet wide.

3046. What is the thickness of the coal?—From 8 to 10 yards.

3047. You are referring to South Staffordshire?—I am.

3048. In North Staffordshire what is the thickness of the coal?—From 2 feet 6 inches to 10 feet.

3049. Are the air-ways in North Staffordshire driven of sufficient height?—I have not to complain of any new workings in that respect.

3050. You think that there is a gradual and visible improvement going on in the collieries of North Staffordshire?—There is.

3051. Do you consider that that has commenced since the appointment of Government inspectors?—It has to a great extent.

3052. But there is no improvement in South Staffordshire?—Very little indeed.

3053. In South Staffordshire, do they work upon the pillar and stall system, or upon the long wall system?—Upon the pillar and stall system, except in three instances; Mr. Gibbons, Mr. Forster, and the British Iron Company work upon the long wall system, as introduced by Mr. George Jones.

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3054. That is a novel system in that district?—It is, except in thin seams, where all is long work.

3055. I suppose you have seen it in operation?—I have.

3056. In your opinion is it an improvement on the old pillar and stall system?—It is a decided improvement.

3057. Both as respects the ventilation, and as respects the getting a greater quantity of coal?—My opinion is that they would get nearly double the quantity of coal by working it upon the long-wall system than they would by the old system.

3058. Is there any greater difficulty in ventilating collieries worked upon the long-wall system?—Much less.

3059. Explain that?—The stall work requires to be all open at the same time, and a greater power of air to sweep through all the stalls, because they are of great height and width; where they adopt the system of long-work, the air is always sweeping past the face of the work; where the men are working, the air is always passing. I will explain that by means of a section of the coal in two different localities in South Staffordshire. (*The Witness here handed in a plan of two sections of the thick coal in South Staffordshire, marked A.*)

3060. By that plan, it appears that there is about the same quantity of coal and the same ground, the difference being that the shale is in different parts of the coal?—That is the difference.

3061. The difference in the stratification would make very little difference in the system of working?—Just so.

3062. You have stated that three colliery proprietors have adopted the system of long working; describe the mode in which they work?—They work the upper half first (*referring to the plan*), commencing with the heath coal and brazels, and then they underbuild the white coal, and then work the white coal, and support the spires and roofs until that is worked away; and then they let down the spires and roofs, and draw them forward and load them.

3063. Then they get half the coal out of the ground?—Yes; and I am informed that they get nearly as much out of that half of the seam as, in the adjoining colliery, under the same proprietors and under a different system, they get out of the whole of the seam.

3064. Have they proceeded to take away the bottom part?—I have not seen any workings where that has been done; but I have known mines where they have worked under a gob roof, and the long-wall system acts exceedingly well.

3065. Does not the gob fall?—Not always; there is generally something, as appears by this plan, to protect it; for instance, shale between the veins of coal.

3066. They leave the shale, which would be between the brazels and the fine coal?—Yes.

3067. Mr. Locke.] What is the thickness of the band between?—About three feet.

3068. They make use of that as a roof for the lower workings?—They do.

3069. Chairman.] Is that practicable?—No doubt of it; I have seen it worked in South Staffordshire.

3070. It would have precisely the same effect as if you take away the lower part first, because the piece of shale between the heath coal and the brazels and fine coal would press down?—It would, and would never stand long; it would fall close behind them. The most dangerous part in long work, is where the roof stands a long time, and then comes down and crushes up to the face of the coal.

3071. Mr. Locke.] Does it often do that?—It does where there is a strong roof.

3072. Does it give notice?—It does; but it is generally in the first fall, and that tells against the introduction of the system, for they open a space perhaps as large as this Committee-room, about 25 feet square, before the roof will give way; and then when it does come down, it is generally with a severe crush; after that there is little or no danger.

3073. Will you have the goodness to describe the black parts in the plan?—It is the shale that comes from between the coal.

3074. They are not pillars of coal?—They are built up.























3075. They are artificial pillars?—Yes.

3076. To keep up the upper seams of coal while they are working the under seams?—Yes; they ease the top of them to let the roof down.

3077. They take down part of those pillars to allow the roof to come in gradually?—They do.

3078. Chairman.]

**PLAN OF
TWO SECTIONS OF THE THICK COAL OF SOUTH STAFFORDSHIRE.**

		<i>Coal.</i>	<i>Part?</i>			<i>Coal</i>	<i>Part?</i>
		<i>F^t In</i>	<i>F^t In</i>			<i>F^t In</i>	<i>F^t In</i>
<i>Roofs.</i>		1.3	. 3				
<i>Spires.</i>		2.9					
<i>White Coal.</i>		3.8					
			2.9				
<i>Heath Coal.</i>		3.0					
<i>Brazels.</i>		2.0					
			4.3				
<i>Fine Coal.</i>		2.3					
<i>Veins.</i>		1.0	1.0				
			1.0				
<i>Stone Coal.</i>		3.9					
<i>Patchels.</i>		1.10	. 4				
			. 5				
<i>Sawyer.</i>		2.0					
<i>Slipper.</i>		3.0					
<i>Benches.</i>		1.6					
		<u>27.10</u>	<u>10.0</u>				
<i>Spires & Roofs.</i>						4.3	
<i>White Coal.</i>						2.6	2.0
							3.0
<i>Heath Coal.</i>						3.0	
<i>Brazels.</i>						1.4	
							3.0
<i>Veins & Fine Coal.</i>						2.6	
							2.0
<i>Stone Coal.</i>						3.0	. 9
<i>Patchels.</i>						2.0	. 8
<i>Sawyer.</i>						1.6	
<i>Slipper.</i>						2.10	
<i>Benches.</i>						1.8	
						<u>24.7</u>	<u>11.5</u>

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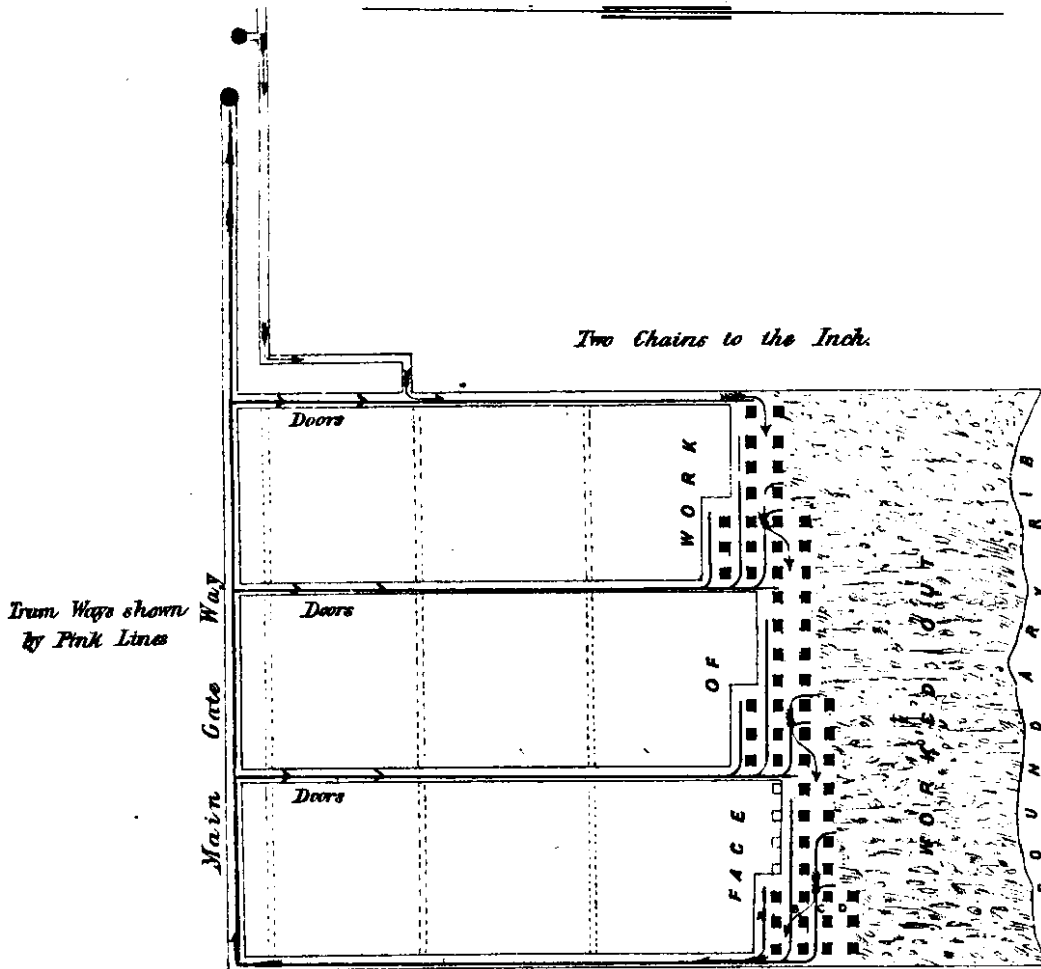
Thomas Wynne
Inspector of Coal Mines
1853

[To face page 36.]

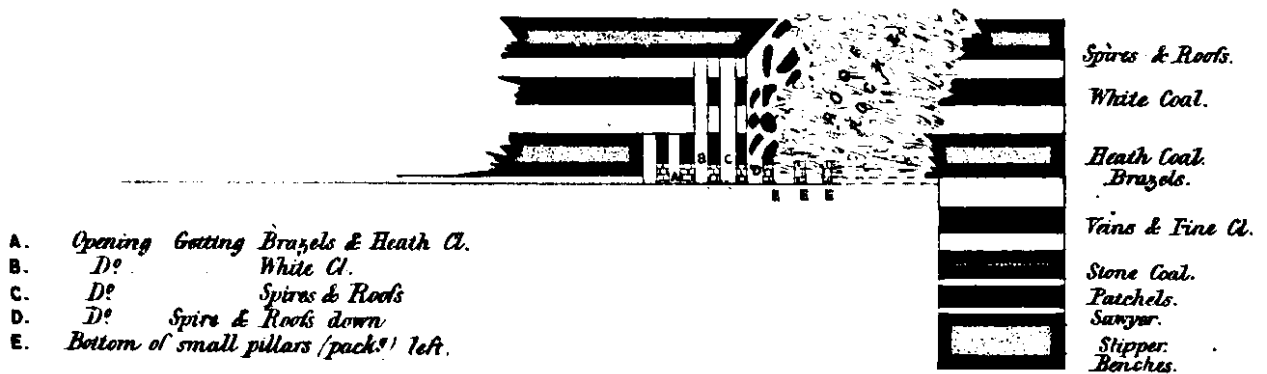
SELECT COMMITTEE ON ACCIDENTS IN COAL MINES.

No 277. Ordered, by The House of Commons, to be Printed, J:ms 1854.
Honor Hansard Printer

PLAN OF
Long Wall Working in 10 Y^d Coal.



SECTION.



Horizontal Scale, 20 Feet to the Inch.

Thomas Wynne
Inspector of Coal Mines

3078. *Chairman.*] Has it that effect?—It has.

3079. Is there not a deficiency of coal in the Staffordshire district; is it not working out rather fast?—There is a great deficiency of coal compared with the consumption; the consumption was much greater than the supply in the last 12 months.

3080. I mean as regards the actual quantity of coal in the strata; is it not working out rather fast in South Staffordshire?—It is.

3081. Is not this plan the most economical as to husbanding the resources of that district?—It is.

3082. Does it involve the coal-owner himself in any great expense?—There is a great difference in that district between the lessor and the coal-worker.

3083. Is it more economical to work long work?—It is.

3084. When you speak of the worker, you do not mean the butty?—No, the lessee.

3085. What is the reason that the system is not more generally adopted?—One great reason is, that the agent of the largest proprietor in the district has entirely set his face against long work.

3086. Who is that?—Mr. Smith, Lord Ward's agent.

3087. Have you ever had any conversation with him on the subject?—Knowing that that was his opinion, I wrote to ask him whether he had changed that opinion or not, stating that if I received no answer I should presume he had not, and that it was my intention to state the circumstance to the Committee; I did not receive any reply, but I have since seen him.

3088. Did he state to you his reasons for objecting to the system of long work?—We did not go into the matter.

3089. Do you know his objections?—One was, that it made more small coal, but my opinion does not agree with his.

3090. *Mr. Locke.*] Did he say anything with reference to the additional cost of working the coal?—He did not; nor did he seem inclined to go into the matter.

3091. I understand you to be of opinion that the coal is got cheaper by the long wall system than by the pillars and stall system?—I feel quite confident on that point.

3092. You think that it does not increase the quantity of small coal?—No; I think it will make more large coal in proportion to the small.

3093. It is your opinion that there is no disadvantage whatever in working the long wall system, as compared with the pillar and stall system?—I cannot see any.

3094. In the cases you have alluded to, they have obtained as much coal in one half of the measures as they have hitherto done by working all the measures?—Yes, or nearly so.

3095. That would be a saving, of course, of the lower portion of the coal, and would prolong the period of the duration of coal in South Staffordshire?—It would; it would take more money to recover the coal, because it would require two distinct levels, one for the upper and one for the lower working.

3096. You think that in order to win the lower coal it would become more costly, in consequence of the upper coal having been worked away?—Yes.

3097. In consequence of having the roof to sustain?—Yes; it would have to be supported in some places with timber, but not generally.

3098. You think that it would be difficult to support the roof?—I do; that is the only difficulty I see.

3099. According to your opinion, if they obtain as much coal out of the working of the upper mines, and at as cheap a rate, whether they work the lower mines or not, it is, at all events, as good as the system at present adopted?—It is.

3100. Notwithstanding the inconveniences, there would be an immense advantage to the proprietor in working the two mines upon the long wall system, having the lower coal to work hereafter, over the present system?—There would be a very decided advantage.

3101. *Chairman.*] Beyond those advantages you stated, I think, that it would be much easier to ventilate a colliery, and would be much safer as regards the lives and health of the men?—It would be very much better in both respects.

3102. *Mr. Locke.*] What is the space represented upon this plan between the hurrying roads?—The roads are about 50 yards apart.

3103. Do they work the whole coal away in that 50 yards?—Entirely.

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3104. Have you generally more than one hurrying road?—Yes; they generally use three or more.

3105. As shown upon this plan?—Yes.

3106. In point of fact, the general system is to work from a face of 150 yards at once?—Yes.

3107. *Chairman.*] You stated just now that you thought it would also effect a very great improvement in the system of ventilation; is not the system of pillar and stall working, in such an immense seam of coal as is generally found in South Staffordshire, likely to be the cause of serious accidents to the men from the falling in of the roofs?—I do not see how the number of deaths from the falling of roofs can be diminished so long as the present system is continued.

3108. If the long wall system of taking away the coal at the lifts were adopted, do you not think that the number of deaths from the falling of the roofs would be considerably diminished?—In my opinion, one-third of the lives would be saved.

3109. Why?—Because it is utterly impossible sufficiently to prop the roof; for instance, it is no uncommon thing to find the roof coal cut down 20 feet higher when it is impossible to support the strata above.

3110. Although you could not suggest anything to save the lives of the men if the present system were carried on, do you believe that if the long wall system were adopted, there would be a vast decrease in the loss of life?—Certainly.

3111. Have there been many accidents in that district?—A vast number.

3112. From what cause?—The greatest number has been from the falling of the roofs; taking the last half-year as a specimen, I find that out of 118 deaths, 57 of them were occasioned by falls of roof.

3113. An accident occurred recently; I believe in North Staffordshire?—That was from explosion.

3114. How many lives were lost?—Four.

3115. What was the cause of that?—The cause of it was want of discipline in the mine; allowing a boy to go into the pit who was not at work there; he went into a place where there was gas, and no doubt fired it.

3116. To whose negligence was that attributable?—To the negligence of the butties.

3117. The contractors?—Yes, the men were in the habit of going to work on Saturday morning at three o'clock, and it appears that the butties did not go there till between four and five.

3118. Was it their duty to have inspected the pit before the men went to work?—It was; and the jury hesitated some time whether they should not return a verdict of manslaughter against the butties.

3119. Is there not a viewer or head man appointed over those butties?—There is one for the whole colliery, but not to go down into the pit every morning; that is left to the contractors or butties.

3120. How many butties are there in the colliery?—Five in the pit, but not in this part of the workings; there were two in this part of the workings, and neither of them had been in that morning.

3121. It would be the duty of the head viewer to see that the butties kept the different departments over which they have control in a proper state?—One of the butties admitted before the coroner and the jury that it was his duty.

3122. Is it not the duty of the inspector?—I suppose you mean the fireman, but the butty attends to that.

3123. Is there no inspector over the butties?—There is only one bailiff to manage above-ground and below-ground.

3124. Is it not the duty of that bailiff to see that the colliery is properly conducted by the butties?—It is, but it is impossible for him to do it; he cannot be at all the pits to see that the butties go down, because there are 20 or 30 pits.

3125. The principal part of your objection applies to the system of employing butties?—It is very objectionable where no one is appointed to attend to the timbering, the ventilation, and the general management of the pit; this ought not to be left entirely in their hands, being interested parties.

3126. Because they have no interest in the security of the pit?—All they think of is sending up a large quantity of coals at the cheapest rate.

3127. Of what class of men are the butties generally?—They are men who have saved sufficient money to purchase the tools and horses.

3128. Not men of education?—Not generally.

3129. Nor

3129. Nor of any scientific mining knowledge?—None whatever.

3130. Of a grade very little removed above the common workman?—They are workmen.

3131. In the districts of South Staffordshire and Worcestershire the management and entire control of the collieries is, in fact, left to men no better than workmen?—It devolves, I may say, almost entirely upon the butties, who are but little removed from the situation of working men, as regards mining knowledge.

3132. You spoke of the long work, as applied to the thick seams of coal, and expressed your opinion that it is a much more economical and safe system, as regards the health and lives of the men: is it as easy to adopt it in the thinner seams of coal?—It is.

3133. Is it more so?—It is more so.

3134. Not only as regards the thick seams, but in every seam of coal, your opinion is, that the workings could be better ventilated, and the safety of the men, as regards ventilation and the falling of roofs, better attended to by a system of long work than by any other system?—Yes; but there is a difficulty in some districts to get the men to work together; you cannot in long work allow each man his separate place to work in. By a modification, this may be to some extent dealt with.

3135. That difficulty arises from carrying out a new system in a particular district?—Yes.

3136. That difficulty being overcome, your opinion is such as you have stated?—Yes.

3137. You stated that in your district there was very little fire-damp, and therefore, I suppose, you do not find it necessary to use the safety lamp?—Not generally; merely for exploring.

3138. Are the safety lamps used for exploring?—They are, but not to the extent they ought to be; if we had efficient managers they would be much more extensively used.

3139. Have you an account of the number of men burnt by explosions?—Fourteen were burnt in the half-year ending December last.

3140. Out of how many accidents?—One hundred and eighteen deaths.

3141. What were the circumstances under which those accidents occurred?—Generally speaking, they have been small explosions in levels or air-heads, where they have been driving forward.

3142. Before they got the air to them?—Yes.

3143. Did those explosions arise from carelessness?—Yes; in almost every instance.

3144. From driving too far before the air?—Yes, and going in with a naked light, instead of ascertaining with a safety lamp whether any gas had accumulated during the night.

3145. I suppose it would not be possible to carry on a colliery without driving in the way you describe?—No.

3146. The only thing is to take sufficient care that the air is brought in as far as possible with the men, and that the additional precaution is taken of using a safety lamp?—And that the place is examined before the men go to work.

3147. By whom ought the place to be examined?—There ought to be an underground viewer, to take the management; and a fireman for that particular duty; it should not be left entirely to the butties.

3148. You yourself have perfect confidence in the efficacy of the safety lamp?—I have.

3149. You have no doubt, in your own mind, that it is a safe and proper instrument?—I am quite of that opinion; I have no hesitation in using it anywhere.

3150. Not in a very extreme current?—No; when exploring, I feel myself quite safe with the safety lamp in my hand, as it enables me to withdraw when sure indications of danger are given. Extreme currents which are rarely met with may be unsafe.

3151. When collieries are very fiery, would you make it imperative on the owner to use the safety lamp?—I would.

3152. Not as an inducement to him to pay less attention to ventilation, but as an additional security after the ventilation has been made as perfect as possible?—That is exactly the light in which I look at it.

3153. The first improvement, in your opinion, for the health and safety of the men,

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men, is to make the ventilation as perfect as possible?—That is the first consideration.

3154. Where a mine is liable to outbursts of gas, you would recommend the use of the lamp?—I would.

3155. Where there is a regular supply of gas, would it not be perfectly possible to ventilate the colliery sufficiently, so as to render it unnecessary to use the safety lamp?—I am not of that opinion.

3156. How would you draw the line?—I do not see that we could draw any line, but must leave it in the hands of competent managers of mines.

3157. Would you leave it in the hands of an inspector?—I would not.

3158. You would leave it under the control of the manager of the mine?—I would.

3159. Supposing the manager of the mine were not a competent man, how would you deal with it then?—I am viewing the matter in this light, that a person who has a dangerous mine would probably not employ any one but a competent man.

3160. Do you find that invariably the case?—It is becoming more so.

3161. Do you think that the attention of coal-masters has been more particularly directed to the necessity of employing competent men to superintend the works?—Very much more so.

3162. To what do you attribute that fact?—I attribute it to the effect of public opinion upon coal proprietors generally, and the advantage arising from it.

3163. Do you think that, generally, public attention has been directed to it?—Very much indeed.

3164. More particularly in the coal districts themselves?—Just so.

3165. In your opinion, is the attention of the men also called to it?—The men are far more alive to the danger they run than they were a few years ago.

3166. At present, I believe, there is a considerable scarcity of labour in the coal districts?—There is.

3167. That being the case, do you find that the men give a preference to a well-ventilated colliery over one improperly ventilated?—They do.

3168. It is much easier to get a supply of labour there?—I know instances of the men working for 3*d.* per day less. At Ince Hall it is more than that; 8*d.* per ton is being paid since the last explosion. Part of this is owing to gunpowder having been dispensed with; but more than one-half of it is clearly assignable to the fears of the men.

3169. What is the general average of their wages?—Five shillings in my district.

3170. They would rather work in a well-ventilated colliery for 4*s.* 9*d.* per day, than for 5*s.* in one not properly ventilated?—Yes.

3171. Are the owners of mines aware of that fact?—They are.

3172. Is that one of the facts which has directed their attention to the ventilation of their collieries?—Yes; and I never hesitate to point it out to the colliery proprietors.

3173. When you point it out do they admit the fact?—They do.

3174. Do they promise to pay greater attention to ventilation?—Yes; generally speaking, there is a disposition in coal proprietors to have better managers than heretofore.

3175. As there can be only, at present, a certain number of competent men, what do you consider the best means of improving the competency of coal viewers, so as to provide a supply of men thoroughly competent to conduct the coal works, upon whose competency the lives of the men should be made to depend?—I think that every school in a mining district ought to be able, from their funds, to send one boy or more to the School of Mines in London every year as a prize, instead of giving him a money prize.

3176. I suppose that in a great many of your districts there are no schools?—There are schools, and great improvement has taken place in them within the last few years; more attention is paid to the education of the people in South Staffordshire than in many other districts that I know of.

3177. Is that the case also in North Staffordshire?—Yes.

3178. Is considerable attention paid to the prize system?—Yes; there are some men who pay great attention to that subject. I would name the Messrs. Bagnalls; no men in England pay more attention to the education of the boys than they do.

3179. Do

3179. Do the workmen themselves contribute towards the schools?—Generally they are supported by the proprietors themselves.

3180. Entirely?—Not entirely, but to a great extent.

3181. There is no compulsory payment by the men?—There is not.

3182. Are the men willing to take advantage of the facilities that are offered them of sending their boys to school?—They seem very much disposed to do so.

3183. Do they themselves pay anything per week towards the education of the children?—The children pay a small sum.

3184. Possibly sufficient only to find books and pencils, and so on?—I should say not more than sufficient for that.

3185. Is it becoming more general in South Staffordshire?—It is; there is a very excellent school at the works of the British Iron Company at Congreaves.

3186. Have the schools been established for any length of time?—Some lately, and some for several years.

3187. Did you know the district before the establishment of the schools?—I did.

3188. From what you have observed, both before and since the establishment of schools, do you consider that there has been a visible improvement in the character of the population?—There is a visible improvement.

3189. Does the improvement extend to the older men, who have not been able to take advantage of the system of education?—It does not.

3190. You consider that the rising generation are more intelligent, more attentive and sober than their parents?—They are; but they have no opportunity of acquiring mining knowledge.

3191. Is it necessary that a workman should acquire some scientific mining knowledge?—I am quite of that opinion.

3192. Have you made up your mind as to the extent to which it should go?—It would be impossible to lay down a rule; it must be according to the man's taste.

3193. You think that if, with the present schools, the most talented of the boys were offered a premium, in the shape of promotion to the School of Mines, or to some higher establishment, it would produce a beneficial effect upon the population, and would raise up in the district a number of young men capable of grappling with the difficulties in that district, of carrying out a system of mining on a much improved plan?—Yes; I think that the young men would become viewers ready to hand; that the coalowners would not experience the same difficulty of finding practical viewers as exists at the present time.

3194. Were you one of the inspectors originally appointed under the Act?—I was not.

3195. You were appointed two or three years since?—Yes; I was one of the two inspectors appointed when there was a division of the districts.

3196. How many collieries have you under your superintendence in your district?—Four hundred.

3197. Yours is not one of the largest districts?—There is the greatest loss of life in my district.

3198. Principally from accidents in the falling of roofs?—Also from accidents in the shafts, and bad winding gear.

3199. Is any improvement taking place in the winding gear of shafts?—Very little in South Staffordshire.

3200. And the shafts themselves there are very much neglected, are they not?—Very much indeed.

3201. Are they so much neglected that pieces of the strata often fall off the pit on to the heads of the men?—It is no uncommon thing for men to be killed by the falling of bricks or stones in the shaft.

3202. Mr. *Thicknesse*.] Might not the majority of those accidents be prevented by proper care?—Nearly all.

3203. *Chairman*.] Are the pits, when abandoned in South Staffordshire, generally left without any walls round them?—Since I have been appointed inspector, I have caused 200 pits to be fenced; and I believe that there are now about 400 in a dangerous condition.

3204. Those are pits which have been abandoned?—Yes.

3205. Are there not accidents from men falling down those pits?—Very frequently indeed; many men are never found.

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3206. I suppose the tops of the pits get covered by weeds and grass growing upon them?—Yes; and of a foggy night it is very dangerous to get off the road.

3207. Should it not be made imperative upon the owners of pits to wall them up safely after they have been abandoned?—It is the opinion of myself and the inspectors generally; and in a suggestion that we have made to the Home Office, we propose that they should be fined 20*s.* per day for every day they remain open.

3208. That recommendation would apply also, to a certain extent, to pits at work?—It would; at all events, I would have them fenced at night.

3209. You would have two sides of those walled up?—Yes; in one case I know two men fell down the same shaft in three months.

3210. Are the pits generally provided with slides?—Scarcely any of them.

3211. Is there one pit, or are there generally two pits, for winding-up and lowering?—Two.

3212. Those are worked without any slides or guides?—They are.

3213. And the coals, I suppose, are brought up in baskets?—In what are called “skips;” hoops are placed here and there on a lump of coal, the hoops being about six inches to a foot apart.

3214. Are the men wound up those pits?—They are.

3215. Is it not a frequent cause of accident that those things strike against the pit, and throw the men out?—Very frequent.

3216. Have you any account of the number of accidents from that cause?—The number of deaths from falling down shafts, or from falling substances in shafts, is 21 out of 118; that is nearly 20 per cent.

3217. In Northumberland, where the pits are much deeper, and the speed at which the men are wound up the pits is infinitely greater, there is nothing like that proportion of those accidents?—Nothing like it.

3218. That you attribute entirely to the greater care taken of the machinery, and to the much better system adopted generally?—I attribute it to that, and that alone.

3219. Do you think it safe that pits should be worked without guides?—I am of opinion that guides should be adopted in all cases where men are let down or wound up.

3220. Do you think that men should be let down or wound up without a cover on the top?—It would be advisable to have one.

3221. You do not think that that would be necessary if the shafts were sufficient to prevent the falling of materials?—No; but it could be done without any material expense.

3222. Is it not possible that a piece of coal might fall from the top of the pit?—That would be very rare where the fitting up of the shaft is what it ought to be.

3223. Where do the accidents you have just referred to generally occur?—Chiefly in South Staffordshire.

3224. In North Staffordshire those things are better attended to?—Very much better.

3225. Have you remonstrated with the owners of those pits?—I have.

3226. What answer have you received?—The answer I generally get is, that they cannot alter their system; that it has done very well, and will do still.

3227. You have no power to enforce any alteration?—I have not, nor should I wish to have any. I should prefer having introduced into the Act whatever is thought advisable, and make it imperative on the proprietors to carry it out. I may state that we have made a few suggestions to the Home Office, a copy of which I hold in my hand.

3228. Were those suggestions embodied in a report?—They were.

3229. Was that report agreed to by the whole of the Government inspectors?—I believe it was. I believe they all assent to those rules.

3230. But there are other inspectors who wish to suggest further rules?—Yes; and who differed rather as to the propriety of our reporting to the Home Office previous to the termination of the sitting of this Committee.

3231. By whom were the rules drawn up?—The matter was fully discussed by all the six inspectors, but the report was drawn up by four. Mr. Morton and Mr. Dunn preferred, as they were about to be examined, giving their opinions in their own way.

3232. The difference is not that they disagree with those rules, but they think that

that it would have been better not to send them in to the Home Office until they had first been discussed by the meeting of coalowners?—I believe they preferred reserving their opinions, or to report individually.

3233. Has a copy of these rules been given to the deputation of coalowners sitting in London?—Yes. We applied to Lord Palmerston for permission to do so, and his Lordship stated that he saw no objection to it, and we did so.

3234. Have you had any communication with the proprietors of coal mines and the delegates of the men upon those rules?—I have; and the matter is still under consideration.

3235. You do not know at present whether they approve of them or not?—I do not, but I think they ought to do so.

[*The Witness here handed in the following Report :*]

REPORT of Government Inspectors of Mines, delivered to the Deputation of Coalowners, at the Craven Hotel, London, 23 May 1854.

London, 4 May 1854.

WE, the undersigned inspectors of coal mines, having attended a general meeting of coalowners and viewers of Great Britain, and delegates from the colliers of four counties in the north of England, and taken their proposals for an amendment of the Act for the inspection of coal mines into consideration, and having brought together our own experience of the working of the said Act, are prepared to recommend the following suggestions :

1. That it is expedient that the Act for the inspection of coal mines, 13 & 14 Vict. c.100, be extended.

2. That as ironstone mines are connected with the working and ventilation of coal mines, and subject to the same kind of accidents, explosions of fire-damp, &c., they should be included in any future Act.

3. That the second section of the above-named Act relating to the powers and duties of the inspectors, from the 10th line of the second page, after the words, "coal mine or colliery," should be altered as follows : "or notify the same to him in writing, in order to his being heard upon the matter giving rise to such finding as aforesaid; and if such manager or principal viewer or agent shall not satisfy such inspector in writing within the space of seven days, then such inspector shall serve notice in writing of the particular grounds on which he shall be of opinion that the said coal or ironstone mine is dangerous or defective on the owner or agent of such mine, and shall also report the same to one of Her Majesty's Principal Secretaries of State.

With respect to the serving of the notices, that the notices should be sent in duplicate, one of which shall be returned, properly signed, to the inspector.

4. That section three of the above-named Act, respecting the making and keeping of plans, should be enforced by a penalty of one pound per day after the expiration of six months subsequent to the passing of the proposed Act.

5. That every shaft which is out of use, or used only as an air-pit, should be securely fenced, under a penalty of one pound per day after the expiration of the six months subsequent to the passing of the proposed Act.

6. That as the present Act relates only to accidents to persons employed in or about coal mines, and many fatal accidents occur to other persons from unprotected shafts and other causes, the proposed Act should be extended to all accidents happening to any person in or about coal or ironstone mines.

7. That every working and pumping-shaft be fenced on two sides when at work, and on all sides when not at work.

8. That every working or pumping-pit should be securely cased or lined with bricks, stonemasonry, iron or timber, unless the natural strata be equally secure.

9. That every winding-shaft used for lowering or raising persons should be provided with guides or conductors, and that no person shall ascend or descend the shaft without being protected by a bonnet or cover.

10. That single link chains, except the short coupling chain at the end of the rope, should not be used for the lowering or raising of persons.

11. That every winding-shaft should be provided with some proper mechanical means of signalling from underground to the surface.

12. That a proper shaft indicator, with a bell to show the position of the load in the shaft, should be set up at every engine used for raising or lowering persons.

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13. That every steam boiler should be provided with a proper steam-gauge, water-gauge, and two safety valves.

14. That an adequate artificial means of ventilation should be provided and constantly employed at every coal and ironstone mine.

15. That there shall be a sufficient current of pure air through the workings to dilute and render innocuous all noxious and deleterious gases.

16. That every coal and ironstone mine should have printed rules properly made known to the workpeople, in reference to all questions affecting the safety of life and limb, under a penalty of one pound per day after the expiration of six months subsequent to the passing of the proposed Act.

17. That with the view of bringing the collieries and ironstone mines more immediately under notice, the owner or agent of each colliery or ironstone mine shall, during the month of December in each year, transmit to the inspector of the district a written report stating the name of the colliery or ironstone mine, the township, parish and county where situate; also, the name and address of the owner and responsible manager; the number of engines, pits, drifts or adits usually at work, and the number of persons employed in and about the works, specifying those employed underground and at the surface.

18. That the constable or police of the township, on the occurrence of any fatal or serious accident, in or about any coal or ironstone mine, should forthwith give notice thereof, by letter, to the inspector of mines for the district in which the accident has occurred.

19. That in addition to Section 6 of the present Act, the coroner should send to the inspector of mines for the district previous notice of every inquest, and that he should allow sufficient time to elapse to permit of the attendance of the inspector at any final or adjourned inquest.

20. That no owner, agent of, or at any coal or ironstone mine, when an accident occurs, or any person in their employ, or any relative of the deceased, should be eligible to sit on a coroner's jury.

21. That coroners' juries be empowered to deal with cases of neglect, which do not appear to deserve a verdict of manslaughter, by inflicting a short imprisonment or limited pecuniary fine.

That all pecuniary penalties arising out of such verdicts should be given or apportioned by the coroner and jury, or a majority of them, amongst the relatives of the deceased or surviving sufferers, without limiting the application of Lord Campbell's Act.

22. That in all requirements of a future Act, it is indispensably necessary to enforce the same by adequate penalty.

Note.—It has been suggested to us by legal gentlemen that Section 8 in the present Act, as to the enforcement and recovery of penalties, is defective, and that penalties could not be recovered under it.

23. That as many magistrates refuse to convict under the 4 Geo. 4, c. 34, commonly called the "Masters and Servants' Act," section 3, a clause should be inserted in the proposed Act as to the punishment of persons employed in or about mines, in cases of misconduct.

24. That in case of difference of opinion between the owner or manager and the inspector, an arbitration shall be held, the inspector being one arbitrator, and the owner, manager, or some person appointed by them, to be the other, and, if necessary, an umpire to be appointed by them, or on their failing to agree, the umpire to be appointed by the Secretary of State at the request of one of the arbitrators, the decision of the umpire to be final. If the arbitrator or umpire agrees with the inspector as to the dangerous character of the mine, system of working, machinery, ropes, rules, regulations of the coal or ironstone mine, or if he agrees with the inspector as to the propriety of suggested improvements or alterations, the inspector may forthwith order the same to be carried out; and if the owner should refuse or neglect to arbitrate within the space of 14 days, or if he disobey the joint award of the inspector and umpire, the penalty of not less than 10 l. shall be imposed for every day that every such owner continues to work or use the mine, machinery, &c.

(signed) *Joseph Dickinson,*
Herbert Mackworth (except Clause 24),
Thomas Wynne,
Robert Williams,
Inspectors of Coal Mines.

3236. I understand that a general wish has been expressed on the part of the workmen that a special coroner shall be appointed?—Yes.

3237. Have you taken that subject into consideration?—I have, and I do not think that it will work well at all.

3238. Will you state your objection?—I am perfectly satisfied with the present coroners; they show every disposition to inquire very fully into the cause of every

every accident, and offer me every facility in doing so; they never hesitate to adjourn if I ask for an adjournment personally, or by letter when I cannot reach the inquest.

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3239. Considerable objection also has been raised to the constitution of the juries. It has been represented by a good many witnesses that parties are summoned who are in some way or other interested in the mines, or are connected with the proprietor or with the manager, or some other person; and that that is a serious objection, as you cannot secure an unbiassed verdict: is that your opinion?—It is my opinion; there is not that discernment exercised in summoning the juries that I think ought to be.

3240. How could you alter that in a district which is principally composed of the mining population?—It is a very difficult subject, for in many districts there are scarcely any but parties connected with the mines; in South Wales or in the North almost all the parties in the neighbourhood are in some way connected with the collieries or the iron works.

3241. How would you remedy such a state of things?—Unless you extend the area from which to summon the juries, I do not see how you can; I seldom experience any difficulty in my district in having a jury prepared to do their duty.

3242. Do you think that Rule 20 of the suggestions you have just handed in would meet the case: "That no owner, agent of, or at any coal or iron-stone mine, where an accident occurs, or any person in their employ, or any relative of the deceased, shall be eligible to sit on a coroner's jury"?—I do not feel inclined to recommend any further than that.

3243. That would meet a great deal of the difficulty?—It would; there would still remain a large class of men, shopkeepers, and parties of that kind, perfectly competent to serve.

3244. Mr. H. A. Bruce.] Without special knowledge, how could you get a witness properly examined?—I find the shopkeepers, generally, a very intelligent class of jurymen, who generally act quite as well as those connected with the collieries, because they have no prejudices.

3245. They may exercise intelligent opinions, but is there not a great deal of special knowledge required in a body of men who have to examine into accidents in coal mines; may it not often be the duty of a jurymen to suggest questions which have not been put to a witness?—I make a point of attending more coroners' inquests than perhaps any other inspector, as I have more difficult men to deal with, and I believe that my attendance is often of service in the inquiry, with the view of meeting the objection which you state.

3246. You think that you are able to bring out all the necessary evidence, and that the juries of shopkeepers are sufficiently intelligent to understand the evidence, however scientific it may be?—I have found, generally, one or two men on the jury who understand the subject, and who express their opinions to the others, who are a good deal guided by them, and if they are not connected with the parties they speak without prejudice.

3247. Mr. Locke.] You think that some persons conversant with mining operations are often on the jury?—Yes.

3248. You do not think it desirable that all persons possessed of that knowledge should be excluded?—No; but only that they should not have any bias either in favour of the proprietors of the mine, or in favour of the deceased.

3249. A question of bias is rather difficult to settle; are you of opinion that neither the coal owner, the agent, nor any person engaged in any mine, should be placed upon a jury for the trial of cases of this kind?—I mean only that the parties interested in the result of the verdict should be excluded.

3250. Do you mean the limitation to refer only to the colliery at which the accident has occurred?—Yes.

3251. But that any owner, agent, or workman in any other colliery might be upon the jury?—Yes, and I think it is desirable, but perhaps not in all cases.

3252. Chairman.] It has been represented more than once during the course of this inquiry, that the inspectors are in the habit of taking private business; is that the case?—I have, to a very trifling extent.

3253. Has it been with the knowledge of the Secretary of State?—It has.

3254. He is aware that you have done so?—Yes; when the inquiry was made, I stated that I had acted as umpire in a few cases.

3255. In criminal or civil cases?—In civil cases.

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3256. You say that you have 400 collieries under your own superintendence?—I have.

3257. The majority of the Government inspectors have nearly as extensive duties to perform as yourself?—They have.

3258. Do you not consider that is more than you can attend to, to do justice to the whole of the collieries?—It is.

3259. In order that the system of inspection should be efficient, have you formed any opinion as to what addition should be made to the number of inspectors?—My opinion is, that if you embody our suggestions, with perhaps a few others that may be made, into an Act of Parliament, that any great addition to the number of inspectors is not desirable, because the parties themselves would know what they had to do, and it would be more our duty to see to the carrying out of those regulations; as it is now, a considerable portion of our time is occupied in making suggestions, and in inducing people to adopt them.

3260. You think that if a specific set of rules were agreed upon, your work would become more easy, and that it would be unnecessary to appoint many additional inspectors?—I think so; I think that a great number is not desirable.

3261. Is your opinion founded upon the assumption that you should have the power of enforcing those rules?—Such rules as may be embodied in the Act of Parliament.

3262. Having such a number of collieries under your superintendence, does it not follow as a consequence, that if you are called away to attend to other business, some part of your official duties must be neglected?—I am not called away much; for instance, I inspected 140 collieries, and attended 96 inquests, in the course of last year; and therefore I had not much time to spare to attend to other business.

3263. You have heard of a wish being expressed that sub-inspectors should be appointed?—I have.

3264. Do you approve of that?—I do not approve of it at all; I should consider that I should be worse off with them than without them.

3265. Do you consider that such men as those suggested could not be expected to give satisfaction to the coalowners and to the workmen as well?—I think that the appointment of such officers would raise a prejudice against inspection altogether, on account of the manner in which they would interfere with the coal proprietors and with the managers, which is not desirable under any circumstances.

3266. You consider that the object of inspection is by no means unnecessarily to interfere with the coalowner, or to relieve him or the manager from responsibility?—That is my opinion; the good to be done is by the moral effect of the inspector being expected, or sometimes coming, and no man liking to be found fault with.

3267. Mr. *Child*.] You consider that the inspector possesses a moral influence?—I think so; I have found great improvements in many places, and have been told by the parties that they expected me, and wished to have the pits in as good order as possible.

3268. *Chairman*.] Have you had any serious opposition or contention with the owners of collieries in your districts?—Only in one or two cases, in which I felt myself entirely powerless to protect life.

3269. State what those circumstances were?—One was a case near Stourbridge, where the manager introduced a steam-engine into the mine where there was only one shaft, and a tunnel by the side of the shaft two feet square, so that the four feet area was all the upcast there was to carry away the air from the mine, the spent-steam and the smoke, and the products of combustion from working the engine. During the night a man went and put some coals on; the flame came out of the front of the furnace, set fire to some wood-work, and then effectually stopped the down-cast shaft. There were eight lives lost; and at the inquest the manager told me that he should continue working as before.

3270. Did you represent that to the Secretary of State?—I did.

3271. Do you consider that, in the present state of the law, there is no means of punishing him?—If he chooses to go on upon the same system, I have no means of preventing it.

3272. Mr. *Locke*.] What was the cause of the flame coming out in front?—There was not room for it to pass up the small aperture.

3273. Was there no artificial stoppage?—There was a damper.

3274. Supposing

3274. Supposing that had not been closed?—The pipe that carried the smoke away from the boiler was only a 12-inch pipe.

3275. Was the damper in that pipe?—It was; but even that I should not consider safe, as the men would throw large quantities of coal in to keep themselves warm, and the fire-door would be open.

3276. If the damper had not been closed the accident would not have happened?—It might not have happened; but I should not pass it without suggesting an alteration. I consider that there ought to be no steam-engine in any pit without an up-cast and a down-cast shaft.

3277. It did not arise from any deficiency in the size of the up-cast?—No.

3278. Although you think it desirable that that drift should be larger?—Yes.

3279. *Chairman.*] Are those the only two instances you have had of a colliery-owner contending with you, and refusing to carry out your suggestions?—I attended officially in the affair at Bent Grange, near Oldham, where the manager set both myself and Mr. Dickinson at defiance.

3280. The Secretary of State, I believe, when applied to, found that he had no power to punish him?—That was the case.

3281. Were the law officers of the Crown consulted?—They were.

3282. And was their answer that, in their opinion, there was not sufficient grounds set forth in the evidence to warrant a criminal prosecution in the case?—I believe that was the answer.

3283. Did you attend the inquest at the Arley Mine?—I did.

3284. Did you go down the pit?—I did.

3285. Have you read the evidence given before this Committee by Mr. Elliot and Mr. Darlington?—I have.

3286. Do you agree with that evidence?—On many points I entirely disagree with Mr. Darlington.

3287. *Mr. Cayley.*] Is the Arley Mine part of the Ince Hall Works?—It is.

3288. How long after the explosion did you visit the mine?—The accident occurred on the Saturday, and I visited it on the Tuesday following.

3289. *Mr. Thicknesse.*] In your opinion, what was the cause of that accident?—It was from foul return air.

3290. Do you consider the general ventilation of that colliery insufficient for the number of men working there?—I think it is sufficient, if properly applied.

3291. There being 400 men working in that colliery, and the ventilation being 77,000 cubic feet per minute, does not that give less than 200 cubic feet per minute per man?—Yes; but I think that amply sufficient in a mine like that.

3292. You do not agree with Mr. Blackwell, that 500 cubic feet per minute per man is requisite?—No, that is going to extremes; I should like that or more, but I do not consider a manager to blame if he has less than that quantity.

3293. Do you consider that the cause of the accident was from the men working in the return air?—From their working in the return air-courses; I consider that when there are two or three splits of air, and when again those splits are brought together to return to the shaft, it is highly dangerous to place any men to work there.

3294. Do you consider that the explosion took place at the furnace?—No; I think it was in Pilkington's drift.

3295. Was the immediate cause of the accident the falling of the roof?—It was not, in my opinion; I think that the fall of the roof was consequent on the explosion, and not the cause of it.

3296. You consider that the cause of the accident was from a shot fired in Pilkington's drift?—I do; and that the place was foul at the time.

3297. *Mr. Locke.*] Was the shot fired?—The fusee was fired, but the shot did not go off.

3298. *Mr. Thicknesse.*] Do you not think it necessary to sink another pit in that colliery?—I think another shaft desirable.

3299. If the ventilation is sufficient why should that be necessary?—The difficulty is in having the air brought down to the present shaft, instead of having one on the rise workings, so that as the gas is given off it would pass away, and relieve the ventilation to a great extent.

3300. You think that the upcast pit ought to be more in the crop of the mine?—Yes; as it is now, the rise workings are 70 yards perpendicular above the bottom of the shaft.

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3301. *Mr. Locke.*] All that must be brought down by artificial means?—Yes, and in this case it was brought through the place where the men were working; 30,000 cubic feet of the foul air were brought past Pilkington's working-place.

3302. *Chairman.*] What are the material points in which you and Mr. Dickinson differ with Mr. Elliot and Mr. Darlington?—We differed as to the cause of the explosion, in the first place.

3303. *Mr. Darlington* maintained that the explosion took place from the fall of the roof?—Yes.

3304. Is that your opinion also?—Not that it took place on account of the fall of the roof, but that the explosion produced the falling of the roof.

3305. *Mr. Elliot* maintained that the explosion took place at the furnace, caused by the dumb-drift being out of use?—That is not my opinion, and Mr. Elliot was undecided on that point.

3306. Ought the dumb-drift to be in use?—By all means.

3307. *Mr. Thicknesse.*] How could the fall of the roof occasion the explosion?—By the force of the blast and concussion of the air.

3308. Does not the blower continue for some little time?—Generally it does; but it was considered that the roof swagged down, and formed an aperture which filled with gas; and when the roof came down the gas was carried along with the air, and came upon the shot.

3309. The gas being lighter than atmospheric air, why should it come down?—Gas is sometimes pent up in the strata above; the pressure of the gas causes the roof to swag, and when it falls the gas is suddenly released.

3310. Would not gas be found there afterwards?—Possibly not.

3311. *Mr. Locke.*] The effect of the falling of the roof would be to bring down a quantity of gas either immediately under it, or in the strata in contact with the floor of the mine and against any candle or shot that might be there?—It would; but we had the evidence of a man who had done all the metal work, as it is called, in the pit, for two years, and he stated that nothing of the kind had ever occurred during his time; there had been nothing like a sudden release of gas from either roof or floor.

3312. Is not that rather a presumption against the conclusion that gas had been evolved by the fall of the roof?—I think so; I do not think there was any evidence of gas coming off from the roof from any one witness; it was altogether a supposition.

3313. *Mr. Thicknesse.*] Is it not unusual that gas should come off the roof without its continuing to do so for some time?—It is generally detected, but not necessarily so; there is mostly some trace left.

3314. In this case, I believe the roof was examined with a naked candle?—It was carefully examined with safety-lamps, and there was no indication of any fissure or discharge of fire-damp.

3315. *Chairman.*] You came to a different conclusion, and on other grounds than the grounds stated by the Honourable Member?—I do; Mr. Dickinson and myself made an extra visit to the colliery on purpose to examine the roof, finding it was about to be made an excuse for the explosion.

3316. *Mr. Locke.*] Nothing but the safety-lamp was employed at that spot?—No.

3317. Was the shot under the direction of the proper man when it was let off?—It was; Brown, the fireman, was found within a few yards of the spot.

3318. Do you believe that the state of the atmosphere at that time in the mine was highly explosive?—I do. The return-air must have been heavily charged, otherwise the flame would not probably have followed it so far back into the workings.

3319. You think that whether there was a fall in the roof or not, or whatever might have been the circumstances, the firing of the shot would be sure to blow up the mine?—At that time and at that spot.

3320. Is the fact that the shot was fired, and did not go off, a presumption in favour of that conclusion?—It is.

3321. You would say that the fault was in attempting to fire a shot in a state of the atmosphere that was highly explosive?—The chief fault was in placing men to work in the return air-course.

3322. But as I understand, it was not the fault of the man working in the air-course, but in firing the shot?—Yes.

3323. The primary cause was, the discharge of the fuse in an explosive atmosphere, which blew up the mine?—Yes.

3324. If it had been the duty of a man to direct the shots, and he had known his business well, and had not fired the shot, by the use of the safety-lamp probably the accident would not have occurred?—I do not think that it would have occurred but for the shot.

3325. When the state of the air had been ascertained by the use of the safety-lamp, there would have been no accident in that mine if the man who fired the shot had known better what he was about?—I think so.

3326. Are there not men specially appointed in mines for the purpose of preventing shots being fired at improper times?—There are in that mine.

3327. And the man who was killed was a person of that particular description?—Yes; he bore an excellent character.

3328. Notwithstanding that, you come to the conclusion that that man, of great experience and good character, had committed the error of blowing up the mine?—I do; it was at the end of his day's work; it was the last shot he had to fire, and I think that he probably did not take that care that he otherwise would have done.

3329. *Chairman.*] You do not mean to say that it is impossible or improbable that the accident should have occurred at the furnace?—I do not think it probable.

3330. How far from the furnace was the man working in the return air-course?—One hundred yards or more; before the air got to the furnace it would meet the other 40,000 cubic feet of air on the south side, and must travel with that to the furnace, and some portion of the north air would go up the dumb drift.

3331. You think that the 40,000 cubic feet were sufficient to dilute the column that was passing, and prevent its firing at the furnace?—I do; but as the distance from the point of junction to the furnace was short, there is a possibility of the two currents not mixing.

3332. *Mr. Thicknesse.*] Had not one or two drifts been standing idle near Pilkington's place?—We had great difficulty in ascertaining that fact; but we did ascertain it, and produced the man who was said to have been at work, and who, we were told, had been killed. The company's agents stated that the man had been at work and had fired two shots that day, and that he was found burnt to death. The man had not been down the pit that day.

3333. Had there not been a complaint a day or two before, from a collier, that that place was full of fire-damp?—There had, three days before.

3334. Was he discharged for making that complaint?—He was.

3335. *Mr. Cayley.*] How near was that to the spot where the accident happened?—I could point it out on the plan.

3336. Was it within 100 yards?—Within about 100 yards.

3337. *Mr. Locke.*] Have you and Mr. Dickinson generally concurred as to the cause of that accident?—We have.

3338. Do you both agree that it arose from the shot?—We do.

3339. Can you state any reason why that shot did not explode?—We suppose that the explosion put the fuse out; it was burnt just within the aperture.

3340. Is it a common practice for a shot, in that particular mode of working, to miss fire?—It is the case sometimes, but not often.

3341. Is it a common practice?—It is not a common practice; it was stated that two or three in a week, where about 300 men were at work, did not go off.

3342. Then the fact of the fuse having been found partly consumed only is a strong indication that the mine fired at the shot?—It is.

3343. It is your impression, as well as Mr. Dickinson's, that the fuse was blown out by the force of the blast?—Yes; I have since tried a piece of fuse, to ascertain whether it would produce flame enough to ignite gas, and found that it did so.

3344. What depth was the hole for the fuse, between the light and where the powder was placed, in the shot in question?—That we did not examine; they vary so much, according to the man's working; some men prefer drilling deep, and some not.

3345. You do not know what was the exact state of the fuse when it was found?—I found the piece that the powder had burnt out of, and the portion of it that was burnt.

3346. I wish to know how much of the powder was burnt?—It was not more than an inch in.

3347. Was the powder in a straw or tube?—It was a patent safety fuse.

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3348. The powder was only consumed for one inch in depth?—Yes.
3349. Did you ascertain whether there was any defect in it?—There was defect in the fuse itself.
3350. Or in the powder?—None, so far as we could see.
3351. Mr. *Thicknesse*.] I made the inquiry just now, whether the man who complained of the fire-damp had not been discharged?—I believe that was the case.
3352. I believe it was stated that the place had been examined, and no fire-damp found?—A written report was put in and sworn to, detailing the circumstances.
3353. Was there not a great mistake in that report as to dates?—Yes; it turned out that the gas had been discovered only three days before the explosion, and the daily report for that day said nothing about it, but the circumstance was fully detailed in another report professedly written a week before the occurrence.
3354. The report presented three days before the explosion did not contain any allusion to the fact of the man having been dismissed?—It did not.
3355. Mr. *Cayley*.] What materials have you before you, to enable you to form a judgment as to the state of purity or otherwise of the atmosphere, before the accident occurred?—The seat of the explosion, and the weight of it also, was in those drifts where Pilkington worked, and gradually spread out from them.
3356. Mr. *Thicknesse*.] Did not the drift of the explosion go towards the furnace?—It did.
3357. Proving that the explosion took place at Pilkington's place, and not at the furnace?—Yes; the cause of the explosion I contended then, and I contend now, was the breach of their very good rules, in placing men to work in the return air.
3358. Mr. *Cayley*.] That objection would apply at all times?—No.
3359. That it is dangerous to work in the return air?—It does not apply in all cases, because, I contend, that when the air is done with it never ought to be used again.
3360. Your answer appears rather to be an argument against the principle of working, under those circumstances, than an answer to my question, as to what particular materials you had before you to show that on that particular day the air in that course was more foul than at other times?—Because in that place the seat of the explosion was evident; the coal was charred, the brattices were burnt, a portion of the woodwork was burnt, and from that place the fire seemed to radiate in different directions; clearly proving that the weight of the explosion was in that place.
3361. If the accident had occurred from the falling in of the roof, would not the same evidence exist?—It would; the gas would have come past the bottom of that drift.
3362. *Chairman*.] Is not the discipline very good in that pit?—It is, but not the management.
3363. Mr. *Cayley*.] When you say that Brown, the fireman, was a man of good character, did you mean to say that he was a man who had a competent knowledge of his business?—All the evidence went to prove that.
3364. *Chairman*.] Mr. Darlington states, in answer to question 446, that they have carried out every recommendation made by the inspectors, except one; and that he had the greatest confidence in the safety of the mine, founded upon personal inspection; have they carried out every recommendation except one?—I was not at the examination into the previous explosion, and therefore I could not answer that question; but most assuredly he does not carry out his own rules.
3365. In what respect?—There is a most excellent rule, that no man shall be allowed to work in the return air; there is another, that all crossings shall be in the solid, but there is not such a one in the pit.
3366. How are they made?—Carried across by artificial means.
3367. If the stoppings had been made in the solid, do you consider that the loss of life from after-damp would not have been so great?—I think very likely it would not; I could not speak positively on that point, but the air would be much sooner returned into its proper course.
3368. Both the accidents took place on the north side of the mine?—They did.
3369. That is the side of the mine on which the pillars are not allowed to be worked away?—Yes.
3370. You stated, I believe, that they ought to adopt the Lancashire system?—Yes.

3371. Mr.

3371. Mr. Darlington says that it is not possible to take the pillars away, in consequence of the coal being under the town of Wigan; is that your opinion?— I think it is much more desirable to work back than to work forward.

3372. Bearing in mind that a good deal of this colliery is exhausted, and that it is under the town of Wigan, could they, practically, and with a view to economy, adopt the Lancashire system on that side now?—The whole of the mine on the north side is just finishing, according to Mr. Darlington's statement.

3373. That would apply also to sinking a pit; as the mine is almost finishing, would it be proper, at the present moment, to compel the owner, if he could be so compelled, to sink another pit?—I consider that it is positively dangerous to continue these rise workings.

3374. You say the workings are nearly finished?—As regards the lower level, where the accident happened.

3375. Have they not gone to the extent of their boundaries?—Mr. Darlington states so, and I cannot contradict him.

3376. Mr. *Thicknesse*.] Is there not still a large quantity of coals to be got out of the workings?—There is.

3377. *Chairman*.] Bearing that in mind, are the workings that still remain to be finished sufficient to justify the outlay of sinking a pit under the town of Wigan?—I do not think it safe to work still further up without sinking another shaft to the rise.

3378. You think that it should be left to the option of the coalowner to sink the shaft or to abandon the working?—Or not to push his workings any higher up.

3379. Mr. *Thicknesse*.] Do you not think that a larger supply of atmospheric air might be introduced into the present pits?—It is advisable to have more, but I do not think that it would remedy the evil. There is another point, in which I notice that my evidence at the inquest has been misrepresented, and that is with respect to building the gas off; my suggestion was, not to build the gas off, but to wall the openings, and leave a clear air-course to the up-cast shaft, so that the goaf behind should communicate with a dumb drift in the up-cast shaft.

3380. Mr. *Locke*.] I understand that your object in suggesting walls was, not to build off the gas, but to make a uniform side to the air-course, so that the air might pass more freely along?—That was my object, to keep the air passing along the face of the waste, and to keep a clear communication between the waste and the up-cast shaft.

3381. You consider it necessary to make that explanation, in consequence of what Mr. Darlington said about your suggestion at the inquest, as to walling off the gas in the waste?—I do.

Mathias Dunn, Esq., called in; and Examined.

3382. *Chairman*.] I BELIEVE you are Government Inspector of Mines for Durham, Northumberland and Cumberland?—I am.

3383. I suppose you have perused the different Reports published by this Committee?—I have read most of them.

3384. The Committee has had so much evidence before it upon the different modes of ventilation, and, in point of fact, upon all the subjects connected with this inquiry, that it will not be necessary to trouble you much in detail; but I may ask you whether you have any observations to make upon the evidence which has been already given, either with regard to the ventilation or the size of the air-ways?—I should like to make a few general observations upon the subject referred to to-day, viz., the accident at the Ince Hall Works.

3385. I will ask you, first, on the general subject, whether you have seen the evidence given before this Committee with regard to ventilation?—Yes.

3386. Have you any particular observation to make on that evidence generally?—I am not aware that I have.

3387. Your opinion very much coincides, we understand, with the general opinion of the witnesses examined, that the principal mode of avoiding accidents is to improve the ventilation of the mines?—Yes; I have published a small pamphlet embracing all the various causes of accidents.

3388. You have published very extensively, I believe, on the working and ventilation of coal mines?—Yes.

3389. And you have all your life paid attention to those subjects?—Yes.

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3390. Is it your opinion that the basis of any improvements to be made is an improvement in the ventilation?—Yes.

3391. And that those improvements should be effected in any manner that the coalowner finds expedient, provided he take care to supply proper ventilation to the mine?—Yes; I do not think that any general rule can be laid down as to the manner in which it ought to be done.

3392. We have had before us the evidence of a great many of the principal viewers of your district, which you have probably read?—I have.

3393. They all describe the improvement that is gradually going on in that district, which is said already to be in advance of every other; do you concur in that view?—Entirely so.

3394. Are the mines in that district conducted in a more scientific manner than in any other?—Decidedly so.

3395. Are great improvements being made there?—Very great; upon that subject I should wish to hand in a paper, showing the diminution in the number of fatal accidents.

[The Witness here handed in the following Document:]

SYNOPSIS of DEATHS from ACCIDENT in the Counties of Durham, Northumberland, and Cumberland, since the Commencement of the Mine Inspection Act.

	Months.	In Shafts.	Explosions.	Choke-damp.	Falls of Coal and Stone.	Sundries.	TOTAL.
From 21 November 1850, to and with 30 June 1851.	8	13	8	1	21	29	72
From 21 November 1850, to and with 31 December 1851.	6	5	49	-	15	19	86
From 21 November 1850, to and with 30 June 1852.	6	17	33	1	19	27	97
From 21 November 1850, to and with 31 December 1852.	6	11	5	-	26	16	58
From 21 November 1850, to and with 30 June 1853.	6	12	7	-	28	32	79
From 21 November 1850, to and with 31 December 1853.	6	17	12	1	30	12	72
Aggregate - -	-	75	114	3	139	135	466
Average - -	-	13	19	$\frac{1}{2}$	23	23	77 $\frac{1}{2}$

The above Table shows, that during the first three half-years the deaths from explosion amounted to one in three of the aggregate, whilst during the latter three half-years, the proportion has diminished to one in nine.

3396. By that it appears that the total number of deaths, from 21 November 1850 to 30 June 1851, was 72, and that for the half-year ending the 31st December 1853, there were also 72?—Yes.

3397. During that time, had there been a great increase in the produce of coal?—Yes, there has been a gradual increase in the produce of coal.

3398. Have you made any calculation of what has been the diminution in the number of deaths, with reference to the increase in the produce?—I could not state that.

3399. With regard to explosions, there seems to have been a very considerable decrease within the last three half-years?—Yes.

3400. To what do you attribute that decrease?—To the moral effect of the Act of Parliament; to the anxiety of each person to steer clear of blame, in case of accident.

3401. Do you think that since the inspectors have been appointed, the coal-owners and viewers have been more alive to the necessity of improving the ventilation?—Yes.

3402. Is it your opinion that the great controversy amongst the coalviewers, for a good many years past, with reference to the steam-jet, and other modes of ventilation, may have had a considerable effect in directing the attention of the coal proprietors to improving the ventilation of their mines?—I dare say it has; but I attribute the improvement mainly to the working of the Act, and the scrutiny that takes place upon accidents happening.

3403. Has not the anxiety of the advocates of each particular system to show the advantages of that system, also caused a great improvement in the ventilation?—No doubt it has; it has drawn public attention more narrowly to it.

3404. Mr. Cayley.] Has not popular sympathy for the sufferers by the terrific accidents which have happened, also had its effect upon the minds of the viewers?—Of course it has.

3405. Chairman.] Have you always been attached to the same district as you now superintend?—Yes, and for the first year I had Scotland also under my care.

3406. Have you had occasion constantly to remonstrate with the owners and viewers of mines, upon the defective systems of ventilation?—I have had several controversies with the viewers, and also at the inquests: they often in various instances brought other viewers to give a sort of check evidence against the inspector.

3407. You have often represented to the viewers the defects in the systems which they have been carrying out?—I have always given written suggestions, of which I keep a copy; I keep an account also of all my visits.

3408. You write to the coalowner, telling him of faults, and suggesting improvements?—I always do so in writing, and keep a copy of the suggestion.

3409. When you do so, do you find that the coalowner gives to it the attention which he ought to?—With very few exceptions they do; they feel an increased responsibility placed upon them by the receipt of those instructions, as was explained by Mr. Wood, particularly if anything should be disclosed at the inquest respecting them.

3410. You consider that the principal benefit of inspection?—It is.

3411. So far from relieving the coalowner from responsibility, it places upon him a higher responsibility, if the suggestions are not attended to?—Yes, and that is what I call the moral working of the Act; a suggestion made by the inspector, and not attended to by the coalowner, would come to the knowledge of the coroner and the jury.

3412. You would not recommend the passing of an Act to work in a different manner?—No; the present Act is found very effectual in my district.

3413. You do not think that it would be an improvement to enact a law relieving the coalowner from responsibility?—No.

3414. Have you ever made suggestions that have not been attended to?—I have.

3415. Without detailing the particular cases, state what they were?—There was one case in which a complaint was laid before the authorities at the Home Office, before I was appointed. I attended to that and made some suggestions, supporting the complaint of the men; the safety-lamp was used, but was accompanied by blasting the coal with gunpowder. I suggested that that should be discontinued until a greater quantity of air could be introduced into the colliery; and I explained how that might be obtained. Other viewers were brought to controvert my opinion, but the suggestions I had made were attended to, regarding the introducing more air into the colliery.

3416. After those suggestions had been made, did any fatal result follow?—No.

3417. Mr. H. A. Bruce.] Then your suggestions were, to a certain extent, attended to?—They were.

3418. The danger, therefore, from the firing was lessened?—Considerably.

3419. Chairman.] Is it your opinion that in a colliery which is very fiery, and where the safety-lamp is used, that gunpowder ought not to be resorted to?—That is my opinion; the question was put to me by Lord Palmerston, after the Ince Hall explosion, as to the use of gunpowder in a colliery where safety-lamps were considered necessary; and my answer to him was, that in all the eastern district, the use of gunpowder in a colliery that was under the obligation of using the safety-lamp was inconsistent.

3420. When you say, "under the obligation of using the safety-lamp," you do

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not mean to say that there should be a compulsory use of the safety-lamp in all cases, but merely in a pit which is as well ventilated as possible, but which is liable to sudden irruptions of gas?—If the safety-lamp is used in any pit, it is generally because the air is not in a safe condition to entrust the lives of the workmen with a naked light, and where the pit is liable to sudden discharges of gas.

3421. If the air is not in a safe condition for the use of the naked light, would it not be better, instead of compelling the owner to use the safety-lamp, to insist upon his increasing the amount of ventilation?—That cannot always be done; although it may obtain an undeniable ventilation along the face of the work, some mines are liable to throw out sudden discharges of gas, which are not safe with naked lights.

3422. I am speaking of mines in which there is no sudden irruption of gas, but a constant supply of gas?—Then I would have good ventilation.

3423. You would compel the use of the safety-lamp in mines liable to sudden irruptions of gas?—Yes.

3424. There might be so large an irruption of gas, that no ventilation would meet the danger?—For the moment, it would not; where a mine is worked under the apprehension that it is necessary to use the safety-lamp, I say they ought not to blast with gunpowder; that remark applies, with one or two exceptions, to the whole of my district.

3425. *Mr. H. A. Bruce.*] You think that, even with precautions as to the choice of men, gunpowder ought not to be fired?—No; that is a precaution, of course, but not an adequate one.

3426. *Chairman.*] If any law were passed, enacting that where safety-lamps were used there should be no blasting with gunpowder, might it not induce people to work too much with the naked light, not depending sufficiently on the safety-lamp?—It might have that effect, perhaps.

3427. *Mr. Cayley.*] Do you find, practically, that the men always keep their lamps locked?—In some collieries, not in my district, the lamps have no locks; in my district the lamps are all locked.

3428. Is it not a fact that they have not light enough without taking off the top?—They cannot do so in my district except by violence to the lamp; there have been very few instances of that in my district.

3429. *Chairman.*] Have you been conducting mines for a great many years?—All my life.

3430. Have you ever known an accident occur from the explosion of a safety-lamp?—Never; some people have lamps which are not safety-lamps.

3431. Are there a great many lamps in use in different parts of the kingdom which are not made upon the principle of Sir Humphry Davy's patent?—Yes; and in many of the southern districts the men have the entire custody of them.

3432. Are many lamps made which are called safety-lamps, in which the gauze is of a larger size, and does not contain so many apertures to the square inch as Sir Humphry Davy's lamp?—I am aware that that is the case.

3433. Is it very possible that a lamp of that kind might explode?—Yes.

3434. But a lamp made with the small mesh mentioned by Sir H. Davy, you have never known explode?—No. It is worth mentioning, perhaps, that whilst at Hebburn Colliery I received from Sir H. Davy the first lamps that ever came to the North, and so little dread was there of anything happening, that I have known the men working with them red-hot; I never knew of an accident happening to any of them even then.

3435. That is a system which you would not now recommend?—Not at all.

3436. You would not recommend the use of the safety-lamp, except with strict regulations?—Of course; if the lamps are left to the men, without being overlooked in any way, they get rusty, and are no longer to be trusted.

3437. The Committee understand you to say that the principal thing to be attended to is the improvement in the ventilation?—Yes.

3438. And that care should be taken to have sufficient ventilation, leaving it to the coalowner to supply that ventilation in such a manner as he may think best?—Yes; general ventilation; that is, air passing up one pit and down another is one thing, but the failure generally is in the distribution of it through the workings.

3439. That is to say, you are of opinion that the old system of coursing it from one working to another should be done away with, and that the air should be scientifically split, in order that each district of men may have a supply of fresh fresh

fresh air?—Yes; and to have as few doors in the pit as possible; the more numerous the doors the greater the chance of explosion.

3440. Should the stoppings also be solid?—Yes.

3441. Are you acquainted with Mr. Wood's pit, in which he has but one door, and where every stopping is a solid stopping?—Yes.

3442. If the door could be so constructed, that on explosion a trap-door might fall down, would not there be a considerable decrease in the loss of life by after-damp?—That has long been suggested, but it is not considered practicable.

3443. Why?—It is difficult to suggest any door that would stand the test of explosion so near the shaft and so suddenly.

3444. Could you not fasten a door to the roof to fall down under those circumstances?—Two or three were put in some time ago, but they were not found of any use.

3445. Do you not think that science might suggest something of the sort?—It would be very easy perhaps to make the experiment.

3446. Mr. Cayley.] Do you think that ventilation is very much improved within the last 10 years, since inspection began?—Yes. It has been improving for the last 20 or 30 years, but most materially since inspection.

3447. Mr. Thicknesse.] Do you think that the position of the up-cast is of any consequence in the ventilation of the mine?—I do not think that the position of it is of consequence, but the size and arrangement of it is.

3448. Mr. Cayley.] Are the air-ways, generally speaking, large enough?—In my district the air-courses are, with very few exceptions, undeniable.

3449. And the shafts sufficient?—There are some single shafts with brattices; two very deep collieries have a single shaft subdivided by brattices.

3450. Do you consider the shafts, on the whole, ample in your district?—Generally speaking, I think they are; of course it becomes more difficult to ventilate works when they become very extensive.

3451. Might it not be facilitated by means of extra shafts?—Of course; the smaller the area you have to ventilate the more perfect is the ventilation.

3452. Chairman.] In the north of England the difficulty and the enormous outlay of sinking a shaft would raise an impediment to the sinking of shafts?—They could not have many sunk where the coal lies deep.

3453. Can you give us an idea of the expense?—It is not the bare sinking of the shaft, but the tubbing off of the water and putting up of the shaft; a modern coal-pit is a complete manufactory at the top also.

3454. In your opinion the attention of the coalowners is directed not only to the ventilation, but to every improvement for the saving of human life?—Yes; there is a great improvement on all hands with that view.

3455. That extends to the shafts and to the machinery, and to everything of that kind?—Yes; the small number of accidents in shafts in my district, considering the immense number of people employed, is remarkable, as will be seen by the statement I have already put in.

3456. That you attribute to the excellence of the machinery, and to the attention paid to the condition of the shafts themselves?—Yes; there is one circumstance I may mention, that all the engines in my district are got up upon the first motion, moving with extraordinary rapidity; in the other districts they are upon the second or third motion, so that the ropes travel proportionably slow.

3457. You would not recommend men being wound up the shafts at the same speed with the coals?—No, we never do that.

3458. What is the difference in speed?—It is very much at the discretion of the persons having charge of the mine.

3459. What is the greatest speed at which you would recommend men being wound up?—I can hardly mention that; the man at the engine has a serious charge and they generally select steady men; the speed of the engine is so considerable, that they cannot leave the handles for a moment; in other districts accidents happen because the man often leaves the handles, to go down and fire his boiler.

3460. Is a lad of 18 years of age too young to have charge of the engine?—I do not think so; in many pits the engines are very light; but the large engines are worked by men.

3461. Are boys of that age generally steady enough?—Yes, I think so.

3462. Do you think it necessary that they should undergo any kind of exami-

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nation before having the charge of an engine?—Steadiness is the grand point; they would not employ an unsteady drinking man.

3463. Do you find the working colliers more alive to the necessity of improvement in ventilation and other matters?—They are, generally speaking; but I have received very few applications from the colliers to examine pits.

3464. Do you not receive applications from the delegates?—I have had some, but not many.

3465. When you receive such applications, do you pay immediate attention to them?—I do; and I always encourage them to call me in, because I have no particular object in going to examine a colliery, unless I suspect that there is anything wrong.

3466. Do you consider such communications confidential?—Entirely so.

3467. Do you know of any ill effects having resulted to a collier for having reported to you anything that was wrong?—I have heard some of them say that they were afraid, and so on; I scarcely know of an instance within my own knowledge of a man being discharged for it.

3468. *Mr. Cayley.*] But from your general impression, is it your opinion that the colliers feel themselves free to communicate with you?—I have heard them say that they were afraid, but I could not, of my own knowledge, mention any punishment that any of them have suffered.

3469. Do you think that that impression may account for their communicating more freely with you?—No; I would rather attribute it to their not being sensible of danger; instead of their being alive to danger, it is very much the reverse.

3470. *Chairman.*] If any consequences resulted to the men, it would not be from your having communicated with the owner?—No.

3471. And therefore the man himself must have revealed it?—I do not know as a fact that there have been any such cases; there are some coalowners, perhaps, who would act in the manner suggested, but I think very few.

3472. When you say that the collier is not alive to danger, does that arise, in your opinion, from his entire confidence in the person having the management of the colliery, or from a want of knowledge of the danger?—I think that it does not arise from a want of knowledge, but from his constant dependence upon those who are taking care of him.

3473. Do you think that the colliers have great confidence in the particular viewers of your district?—Yes; when I was first appointed I contemplated that I should have constant applications to go and see pits, but I think that in three years I have not had more than 10 such applications; I have published that in order to induce them to communicate with me.

3474. In your capacity of Government inspector, you do not think it necessary to visit collieries unless you have reason to suspect that there is something wrong?—I visit them generally, but in case of complaint I go especially.

3475. How many collieries have you under your own superintendence?—Large and small, I have about 200.

3476. What is the area of your district?—The counties of Durham, Northumberland, and Cumberland.

3477. Those 200 collieries would probably raise a larger amount of coal per annum than any other district?—I should say a great deal more.

3478. Had you also Scotland under your superintendence?—Not after 1851.

3479. Scotland has now a separate inspector?—Yes.

3480. *Mr. Cayley.*] If you had to visit all those collieries, how long would it take you to go round?—The word "visit," I think, is very much misunderstood. If I had to go and examine all Hetton Colliery, I should have a week of the hardest work I ever had in my life.

3481. If you had to inspect 65 of the collieries, how long would it take you?—Twenty people could not do it in detail. If I were to make a detailed inspection at Hetton Colliery next week, and came back at the end of four months and began to talk about the arrangements of the colliery, they would say it was quite different; that it was not as I saw it four months ago, and that much of the system had been changed.

3482. What is the value that you particularly attach to the office of inspector?—Going round to collieries, examining the plans, making himself generally conversant with the whole arrangements, and attending to complaints, and at inquests; the keeping of records and the serving of suggestions.

3483. Who gives you the plans?—The coalowner is obliged to produce the plans.

3484. How

3484. How do you know whether they are accurate or not?—I should not ascertain the accuracy of the plan by going down into the workings.

3485. How can you ascertain that it is correct?—Only by going and surveying the workings myself. A colliery plan extends over miles.

3486. I presume you occasionally visit some of the pits?—Yes.

3487. What induces you to do so?—I do so if anything occurs to me as particularly novel or particularly hazardous, or if I am called upon by any complaint.

3488. On the part of the men?—Yes; in the event of an inquest, I go and examine the colliery myself, so as to prepare myself both to examine others, and to give evidence before the coroner.

3489. *Chairman.*] It has been represented to the Committee that yourself and some of the other inspectors are in the habit of attending to private business?—I have attended to some private business.

3490. Has that been with the knowledge and consent of the Secretary of State?—Yes; I consulted Lord Palmerston before I went to Scotland.

3491. He was aware of your going to the Carse Bridge trial?—Yes.

3492. Was he aware of your going down on the Breadisholm trial?—No; I did not write about that.

3493. One of the witnesses stated that he thought you must have been away on that trial for some weeks?—That is not correct; it was nearly a week.

3494. Do you think that you can consistently perform your duty to the public whilst you are attending to private business?—I think, perhaps, that, as a rule, I could not attend to private business without absenting myself; but one plea I would make is, that the payment as an inspector is so very deficient.

3495. I presume that when you took upon yourself the duties of the office, you knew what the amount of remuneration was?—I believe not; I believe that when I took the appointment no salary was fixed. To satisfy the Act, I gave up, after a correspondence with Sir George Grey, many check-viewings, although I showed that they would not militate against the principle of inspection, because the collieries were such as I need only visit once in six months.

3496. *Mr. Cayley.*] What is your salary?—£. 400 a year.

3497. What is the salary of an average viewer of a mine?—Of an ordinary viewer it is 400 l. or 500 l.; but then he has, in addition, a house, servants, coals, horses, and cows; the inspector has to find all those.

3498. *Chairman.*] Those ordinary viewers are not the first-class viewers of the country?—No; over and above what I have mentioned, he is at liberty to exercise his profession generally.

3499. He would receive the salary you have mentioned from one particular colliery, with liberty to take other work?—Yes.

3500. Does the Act put a limitation on the amount of the salary, or is it in the discretion of the Secretary of State?—The salary is very limited, and we have memorialised two Secretaries of State, for there is no salary fixed by the Act.

3501. You must have been aware, when you took the situation, that that would be the amount of the salary?—I was not aware of it at the time. And we received no positive answer to our last memorial, because your report was not yet made, deciding as to the number of inspectors, and their duties and so on.

3502. Our report will not decide the number of inspectors; we shall only send a report to The House of Commons for their consideration and that of the Secretary of State?—We confidently trust that you will recommend that the inspectors be properly paid.

3503. *Mr. Cayley.*] You think that the inspectors should be of a class of men equal with the viewers?—I do; I think that the low salary degrades the office of inspector, because I am brought into contact with viewers of a single colliery who are receiving far more remuneration than I do for all the responsibility placed upon me.

3504. *Chairman.*] You think that the Government cannot get such a class of men as ought to be placed in so responsible a situation, unless they are also allowed to take private business?—I am sure they cannot; I am sure that you would not get a respectable viewer in the north of England to take the situation, if the amount of salary is to remain as it is.

3505. You think it would be better to give the inspector a larger amount of remuneration, and forbid his taking any private business?—I think so; I find that I have come into conflict with some gentlemen who have been giving evidence in the same case, and who were upon the opposite side.

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3506. The evidence we have before us from the inspectors themselves, and from other parties, is, that every inspector has more to perform than he can do justice to; do you admit that to be the case?—I do not admit that exactly to be the case. I do not think that my district would be benefitted by the introduction of another inspector into it, because I consider that the advantage of the Act is more from the moral working of it than the actual inspection of the mines.

3507. Do you concede that you have as much as you can well attend to without taking any extra work?—That may be fairly admitted, and the only plea I put in for private practice is that we are so badly paid.

3508. You say that the Secretary of State is aware that you have been taking private business?—Yes; the question was put to us all a short time ago.

3509. Mr. Wynne stated just now that you concurred generally in a set of rules put in by him, and which had been agreed to by four of the inspectors; is that so?—Yes; but I am prepared to put in rules of my own.

3510. In what respect do they differ from those put in by Mr. Wynne?—They do not differ very materially, but I have not compared them minutely.

3511. If there is no very material difference, would it not be better to embody them all into one set of rules, you stating now to the Committee any point to which you wish to direct their attention?—I think you may consider them almost the same. I wish to call your attention to the provision in the Act with respect to coroners. At present, the coroner is bound only to give two days' notice; but it is possible for him to keep within the letter of the Act, and yet to hold the inquest without the presence of the inspector. For instance, a letter may be sent from the coroner, through the Home Office, to the inspector, which, from his being absent from home, may only reach him after the inquest is over. Some of my colleagues do not agree with me; but I propose that, as it is inconvenient to the coroner to make two journies, one to bury the body, and another to meet the inspector, the constable of the district should view the body and give his consent, or that of the coroner, to its being buried, and that the coroner should not hold the inquest for a week; I wish the Committee to consider that, because it does not interfere with the law relating to coroners, but has reference only to an amended notice under the Act.

3512. Mr. *Thicknesse.*] Reverting to the question of salary, are not the inspectors allowed 12*s.* per day for expenses?—Yes.

3513. Does not that amount to a considerable sum?—It depends upon the expenses.

3514. *Chairman.*] Would it be more than you would expend if you were called away from home?—I should think not.

3515. Mr. *Thicknesse.*] It would not double the salary?—No; witnesses in all cases are allowed a guinea per day.

3516. *Chairman.*] The 12*s.* per day is to pay your tavern bills?—Yes.

3517. Mr. *Cayley.*] Does it defray your locomotion?—No; we have travelling expenses as well.

3518. *Chairman.*] Is there any other point in the rules to which you wish to draw our attention?—Not particularly. We agree in suggesting that the coroner and jury should be enabled to give an intermediate verdict. At present they can only give a verdict of manslaughter, or of accidental death; it often happens that they find cause to complain of neglect; but if they add that to their verdict the coroner tells them that it will amount to a verdict of manslaughter. We have considered whether it would not be of service if the coroner and jury were allowed to levy a fine upon the owner or agent, or principally upon the owner.

3519. Is there any other rule in which you differ from your colleagues?—I think there is scarcely anything material, but we have not compared minutely.

3520. Do you know whether, in the rules that Mr. Morton has drawn up, there is anything materially different from those that have been put in?—I am not aware that there is anything novel in his rules.

3521. Then the Committee may take it that the rules that have been sent to us by the Home Secretary are those in which you all concur as necessary to be enforced?—I think so, generally.

Lunæ, 29^o die Maii, 1854.

MEMBERS PRESENT.

Mr. Hutchins.	Mr. Locke.
Mr. Thicknesse.	Mr. H. Vivian.
Mr. Cobbett.	Mr. H. A. Bruce.

EDWARD J. HUTCHINS, Esq., IN THE CHAIR.

Nicholas Wood, Esq., called in; and further Examined.

3522. *Chairman.*] IN consequence of the desire expressed by the Committee on Accidents in Coal Mines, at the end of last Session, that a meeting of the coalowners of England should take place, and that the deputies of the men and the Government inspectors should attend, a meeting was, I believe, called in London?—Yes.

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3523. On what day was the meeting held?—The first meeting was held in London on 25th April, and by adjournments on the 27th, 28th, and 29th April; and the document I now put in gives an account of the proceedings, and of the resolutions come to at that meeting.

[*The Witness handed in the subjoined Report:*]

MEETING of Deputations of Coalowners and Mining Engineers, from different parts of the Kingdom, held at Morley's Hotel, 25th April 1854, on the subject of Accidents in Coal Mines.

NICHOLAS WOOD, Esq., in the Chair.

PRESENT:

Northumberland and Durham.—Mr. Wood, Mr. Elliot, Mr. Robson, Mr. Potter, Mr. Barkus.

Yorkshire.—Mr. Biram, Mr. Charlesworth, Mr. Day, Mr. Leather.

Leicestershire.—Mr. Woodhouse, Mr. Stenson.

Derbyshire.—Mr. Binns.

Nottinghamshire.—Mr. Bean.

Warwickshire.—Mr. Dumolo.

Lancashire.—Mr. Lancaster, Mr. Knowles, Mr. Booth, Mr. Mercer.

North Wales.—Mr. Eyton, Mr. Low.

North Staffordshire.—Mr. Lancaster.

South Wales.—Mr. Richardson.

Proposed by Mr. Biram, seconded by Mr. Low.

That it is the opinion of this meeting that it would contribute greatly towards the safety of the mines and of the lives of the workmen, if a code of rules, bearing on the subject of the prevention of accidents, were provided by the owners at each colliery, applicable to the particular state and circumstances of such mines, to be observed by the persons entrusted with the management thereof, and by the workmen employed therein.

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Proposed by *Mr. Potter*, seconded by *Mr. Charlesworth*.

That in the opinion of this meeting, any legislative measure giving power to the Government inspectors of mines to interfere with the system or details of working the mine would be highly inexpedient and dangerous, as lessening the responsibility of the owners of managers in the management of such mines.

Proposed by *Mr. Woodhouse*, seconded by *Mr. Lancaster*.

That in the opinion of this meeting, in the event of an additional number of Government inspectors being thought necessary, the object of the prevention of accidents would be best promoted by a division of the districts, and the appointment of persons of sound practical knowledge and experience, of not less than 10 years' standing as managers of collieries; and that the appointment of irresponsible sub or assistant inspectors of a lower grade than the responsible managers of mines would, in the unanimous and decided opinion of this meeting, most unquestionably be attended with very injurious effects in the discipline of the mine, and consequently tend to increase, rather than diminish, the number of accidents; and to insure that independence which their onerous duties require, the meeting is of opinion that the Government inspectors should not practise as mining engineers.

Resolved,—That this meeting be adjourned to Thursday the 27th April, at 10 o'clock, to meet the Government inspectors and the deputations of the workmen.

27th April 1854.

At Adjourned Meeting held this day at the Craven Hotel,

NICHOLAS WOOD, Esq., in the Chair.

PRESENT:

Northumberland and Durham.—*Mr. Elliot*, *Mr. Robson*, *Mr. Potter*, *Mr. Barkus*, *Mr. T. J. Taylor*.

Yorkshire.—*Mr. Biram*, *Mr. Charlesworth*, *Mr. Day*, *Mr. Briggs*, *Mr. Pope*, *Mr. Goodison*.

Leicestershire.—*Mr. Stenson*.

Derbyshire.—*Mr. Binns*.

Nottinghamshire.—*Mr. Bean*.

Warwickshire.—*Mr. Dumolo*.

Lancashire.—*Mr. Lancaster*, *Mr. Knowles*, *Mr. Booth*, *Mr. Mercer*, *Mr. Peace*, *Mr. Gilroy*, *Mr. Jones*.

North Wales.—*Mr. Eyton*, *Mr. Low*.

North Staffordshire.—*Mr. Lancaster*, *Mr. Hedley*.

South Wales.—*Mr. Richardson*, *Mr. Dobson*, *Mr. Powell, jun.*

East Somersetshire.—*Mr. Hollway*, *Mr. G. C. Greenwell*.

Dean Forest.—*Mr. Atkinson*, *Mr. Goold*, *Mr. Trotter*.

Scotland.—*Mr. Paton*, *Mr. Bennett*.

Bristol District.—*Mr. White*.

Gloucestershire.—*Mr. Cossham*.

The Government inspectors of mines attended the meeting, viz. :—*Mr. Dunn*, *Mr. Dickenson*, *Mr. Williams*, *Mr. Morton*, *Mr. Mackworth*, *Mr. Wynue*.

A deputation of the workmen also attended, consisting of—

Durham and Northumberland.—*Mr. Martin Jude*, *Mr. Edmund Gray*.

Lancashire and Cheshire.—*Mr. David Swallow*, *Mr. Allen Tetlow*.

Mr. Wood explained cause of meeting; stated that it had been deemed advisable to confer with the mine inspectors, and also with the workmen; and that the meeting would be glad to hear any suggestions the inspectors might have to make.

Mr. Dunn, inspector of the Northumberland and Durham district, stated that inspectors have not had a conference together. For his own part, he approved of the rules as printed at Newcastle and now upon the table [see rules for Northumberland and Durham], and thinks they would operate beneficially. Thinks the rules in question excellently "adapted as a provision against accidents."

Mr. Wood asks inspectors what legislative enactments, or whether any, they would advise to be adopted.

Mr. Morton thinks the inspectors ought to hear what are the opinions and views of the meeting, and then to confer amongst themselves.

Mr. Dunn,

Mr. *Dunn*, as an inspector, attended to learn the views of the meeting, and stated that inspectors have not agreed upon a course to be recommended to Government.

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Mr. *Dickenson* thinks a committee of persons might be appointed to condense the labours and information of the meeting.

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Mr. *Wynne* suggests that as some change appears to be contemplated, it would be best for the meeting to discuss and settle the nature of that change in the first instance, and to have a conference afterwards with the inspectors (if deemed desirable) on the subject.

Mr. *Wood* reiterates his former observations.

Mr. *Dickenson* suggests that delegates from workmen be called in, and their opinions asked.

Mr. *Machworth*.—Inspectors wish to be acquainted with views of parties from different districts.

Deputation from workmen was called in, consisting of—

Durham and Northumberland.—Martin Jude, Edmund Gray.

Lancashire and Cheshire.—David Swallow, Allen Tetlow.

Mr. *Wood* explains object of meeting to deputation.

Mr. *Jude*.—Workmen's deputation are not prepared to go into details; have not had time to do so; came to procure information, so as to learn whether the views adopted by the conference acquiesced with their own, as expressed in their petition. He added, that the views of the miners were contained in—

The petition from *Durham and Northumberland*.

The petition (not yet presented) from *Lancashire and Cheshire*.

The petition (not yet presented) from *Scotland* (contains a clause for abridging the hours of labour).

The petition (not yet presented) from *Yorkshire*.

The meeting then proceeded to discuss with the deputation of workmen the various points in the petition referred to.

Abridging Hours of Labour.

Mr. *Swallow*, referring to the petition from *Scotland*, observes, that in *Lancashire and Cheshire* no intention is entertained of abridging the hours of labour.

Privilege of appointing Person at Coroner's Inquest.

Wish to have some person of their own to attend at the coroner's inquest as a right, not to be there by sufferance.

Explains the foregoing to mean, that some representative of the relatives of deceased party should have a right of speaking and of examining and cross-examining witnesses.

Mr. *Jude* says, that the "Times" copy of the petition of the miners of *Durham and Northumberland* is correct.

Sub-Inspectors.

Mr. *Swallow* says, that the workmen wish to have sub-inspectors; to be practical men, not exactly men working with the pick, but of the class of under-viewers, overmen, and other officers, or it might be of the most intelligent workmen.

The sub-inspectors' powers would be very limited; would only report to the head-inspector of the district, but would have no power to make "any alteration."

Board of Control.

Admits that inspection hitherto has been "without objection;" but thinks that a "practical Board" should be appointed to judge of the qualification of inspectors, such men as are round the table; one might be a scientific man, say, Sir H. de la Beche.

This body to constitute a board of control, to judge between colliery managers and inspectors, and to decide what is to be done in cases of difference.

Puts the case of the employment of gunpowder, or otherwise, as an example in which difference of opinion might arise, to be decided by a board of control.

Board of Control to appoint Inspectors.

The foregoing board would appoint inspectors and sub-inspectors, besides acting as a court of appeal.

Thinks that a standard quantity of air should be fixed upon.

Supposing too little air to be in circulation, board of control to determine this point.

What they wish is, to have a sufficient quantity of air, leaving the means and method of supplying it to the owners or managers of the colliery; but the board of control is to be ultimate judge of quantity.

Anticipate that not much difficulty will be experienced in working the board of control; cases brought before them would in all probability be few in number.

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Examination of Viewers.

Viewers to be examined by the board as to their qualifications, and to have certificates of competency before they are allowed to practise.

Thinks that some managers are ignorant, but admits that there has been a great improvement of late years in this respect.

This is a general feeling amongst the workmen.

Constitution of Board of Control.

Thinks board of control should consist of five persons, three to be a quorum.

More Shafts.

Mr. *Jude* suggests that a subject of complaint is the want of more shafts, but that if there is sufficient air, admits this is the main point.

Principle of Ascending Air.

Mr. *Swallow* mentions ascending air as the practice in Belgium, where the air is not forced to the dip.

Air becomes Loaded.

Mentions Ince Hall as a case in which a large quantity of air was insufficient to prevent explosion.

Boys carrying Lamps.

Boys should not carry lamps when atmosphere is dangerous.

Objects to hewer having his lamp to take out in the dark, to get lighted at a distant station.

Number of Inspectors.

Mr. *Swallow* thinks that one head inspector, and five sub-inspectors, should be sufficient for Lancashire and Cheshire.

Duties of Inspectors.

Thinks that sub-inspectors would examine into every part of the pit; inspector would examine sub-inspectors afterwards, and the work would be better done.

Thinks that there is not sufficient care now.

Desires to have responsibility put upon owners of mine not taken from them; that inspectors should not interfere with mode of working, nor with working details.

Thinks that there should be two codes of rules, one for safety, and the other for working; would be much better liked by the men if separated.

Approves of rules for each colliery; that it be made imperative for owners of collieries having fire-damp to have rules.

Adds "all" collieries.

Manager of colliery to draw rules; is not prepared to allow power to the inspector to alter rules.

Board of control to settle differences.

Ropes bad,—

Wood deficient,—

Colliery dangerous generally,—

Inspectors in these cases to have power to stop pit; adds afterwards, that owner is to have an appeal.

Say that there is no penalty on the owners or managers for not fulfilling the rules.

(In this case it is suggested that the negligence of the owners is punishable by the existing law.)

Board of Control.

Does not go into the subject of the location of this board.

The Secretary of State is to appoint the board of control.

Twelve Years' Clause for Boys.

It is wished to have them educated, not to keep them out of the mine.

This is optional now.

Shafts to the Rise.

Mr. *Machworth* explained the nature of working coals in Belgium, and on the Continent generally, and more especially with regard to the ascensional mode of ventilation by shafts to the rise.

Shafts,

Shafts, Up-casts and Down-casts close together are Dangerous.

Mr. *Swallow*.—It is dangerous to have to have up-cast and down-cast pits close together, on account of the after-damp after explosion. Thinks the Belgian principle good; but the main point is to have a sufficient quantity of air.

Thinks, however, that by adopting the Belgian system lives would be saved.

Mr. *Mackworth* admits that the system, as regards shafts, is not applicable to pits laid out; has not, however, known any instance of explosion when air was carried upwards.

Doors.

Mr. *Swallow* objects to doors, as being unsafe; parties may neglect them, and they have leakage. To do away with them as far as possible.

Stoppings.

Mr. *Jude* suggests that there are to be double stoppings stowed between them; thinks that one stopping only would be blown out; thinks a stopping stowed on both sides is not so good as double stopping with stowing between.

Education.

Education.—Wish every man on colliery to contribute 2*d.* a week to educate children. To have a library also.

Coroners' Juries.

Mr. *Morton* asks how juries are to be appointed.

Mr. *Jude* has no specific plan, but thinks that it may be done; at present some of the jury consist of dependents of the coalowners; thinks that the jurymen should be summoned from the whole county.

Mr. *Morton* observes that coroners have this power.

Mr. *Swallow* objects to their having the option to exercise this power.

Coroners.

Thinks coroner should be a practical man, otherwise he cannot direct the jury properly. Thinks any of the first mining engineers in Durham and Northumberland might be coroner.

What is to be done pending dispute between Manager and Inspector.

In the event of a difference between the manager and the inspector, the colliery is not to be stopped, but an appeal made to the Board of Control.

Case for Appeal put.

If 30,000 cubic feet of air be found in a pit, and the inspector says, "You want 20,000 more," he is not to define the mode of proceeding to obtain this addition, but the question is to be referred to the Board of Appeal.

Duties of Inspectors.

Inspectors are not to have any power of management.

Certificate of Competency.

Whenever a man is entrusted with the management of a colliery, he should have a certificate of competency. The same to apply to the viewer, and the under-viewer, not to the overman.

Deputation withdrew.

Mr. *Morton* proposed that a sub-committee of six of the meeting be appointed to confer with inspectors. The inspectors, he added, have not had time to deliberate.

Mr. *Peace* proposed that the discussion should be in full meeting.

Inspectors state that they wish to have views of coalowners laid before them.

Meeting are of opinion that they ought to discuss all the matters arising for consideration in full conference.

Mr. *Peace* strongly objects to the line of proceeding proposed by inspectors.

Various observations are made of the same purport.

Mr. *Richardson* offers to the meeting a statement of heads of discussion.

Inspectors withdrew, to afford opportunity for consideration.

In the inspectors' absence, various gentlemen speak in favour of a discussion between the

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inspectors and the entire meeting, in preference to the appointment of a sub-committee, and the following resolution was passed unanimously; the same being proposed by Mr. George Elliott, and seconded by Mr. George Greenwell:

Resolved,—That this meeting does not feel warranted in appointing a sub-committee of six; to meet the mining inspectors, as proposed by them, and is prepared to go on with the discussion of the pitmen's petitions, the observations made thereon by the deputation of workmen, and the several points adduced before the Committee of the House of Commons, the inspectors being invited to attend, and take a part in the discussion on those as well as any other propositions which they may think proper to bring forward.

Read,—The foregoing resolution to the inspectors, when Mr. Morton stated that the inspectors were not authorised "to go into the subject with the meeting."

Mr. *Dunn* did not concur in this statement, so far as he is personally concerned, having received the authority of Lord Palmerston to attend the meeting, and submitted that his colleagues ought to do the same.

The meeting then adjourned until to-morrow, at half-past 10 o'clock, at the same place.

At an Adjourned Meeting of the Deputations from the Mining Interests of the Kingdom, held at the Craven Hotel, on Friday, 28th April 1854.

NICHOLAS WOOD, Esq., in the Chair.

PRESENT:

Northumberland and Durham.—Mr. Elliot, Mr. Robson, Mr. Potter, Mr. T. J. Taylor, Mr. Barkus.

Yorkshire.—Mr. Biram, Mr. Charlesworth, Mr. Day, Mr. Briggs, Mr. Goodison, Mr. Pope.

Leicestershire.—Mr. Stenson, Mr. Woodhouse.

Derbyshire.—Mr. Binns.

Nottinghamshire.—Mr. Bean.

Warwickshire.—Mr. Dumolo.

Lancashire.—Mr. Peace, Mr. Knowles, Mr. Booth, Mr. Mercer, Mr. Jones, Mr. Lancaster, Mr. Gilroy.

North Wales.—Mr. Eyton, Mr. Low.

North Staffordshire.—Mr. Lancaster, Mr. Hedley.

South Wales.—Mr. Richardson, Mr. Dobson.

East Somersetshire.—Mr. White, Mr. Bennet.

Dean Forest.—Mr. Goold, Mr. Trotter.

Gloucestershire.—Mr. Cossbam.

Scotland.—Mr. Paton.

Mr. *Wood* explained to the meeting that it appeared desirable to abstain from the recommendation of a final course of proceeding until it is in possession of all the information which can be procured, as well from the proceedings of the Parliamentary Committee now sitting as from the inspectors. Put it to the meeting whether to go on with the points in the pitmen's petition, and with the other matters before them.

The meeting is of opinion that the discussion should go on.

Proceeded accordingly to read pitmen's petitions.

'1, 2, 3, 4. *Points of the Petition complaining of the bad state of Ventilation.*

It is the opinion of this meeting, "That the extreme cases mentioned in the petitions are exceptional ones, and are to be remedied by the rules for proper ventilation adopted by this meeting."

5, 6. *Points relating to Air Channels, length of Air Courses, Stoppings and Doors.*

Resolved,—That these points are met by providing a sufficient quantity of air. Stoppings are to be made sufficiently strong. Doors to be discontinued so far as practicable, and crossings substituted.

7. *Point as to Inspector and Sub-Inspectors.*

Resolved—That the meeting confirm the resolution come to on this subject on the 25th and 27th instant.

8. *As to Board of Control.*

Resolved,—That the investing of inspectors of coal mines with additional powers, which would necessarily render them responsible, to a corresponding extent, for the safety of the coal mines within their respective jurisdictions, would also render necessary the appointment of one or more boards of control or courts of appeal (to be composed of practical mining engineers), to which colliery proprietors might have recourse in case of oppressive direction of the inspectors, and which board should have the power to confirm, reverse, or modify such direction.

9. *As to Education.*

Resolved,—That the meeting is favourable to the education of the mining population, and expect that the details of Mr. Tremenhære's Bill will contribute to that desirable object. The meeting is also favourable to the project of a fund for educational and benevolent purposes.

10. *As to Safety Lamps.*

Resolved.—That this meeting recommend the adoption of proper rules for the care of safety-lamps in those collieries where it may be necessary to use the same.

11. *As to Coroners' Juries.*

Resolved,—That the coalowners are solicitous to have, in all cases, an impartial jury. The law of inquests is of course beyond their control.

Read.—Recommendations made by Messrs. Mackworth and Dickenson in their evidence before the Accident Committee.

Resolved,—That this meeting be adjourned till to-morrow morning at half-past 10 o'clock.

ADJOURNED MEETING of Deputations of Coalowners and Mining Engineers, from different parts of the Kingdom, held at the Craven Hotel, April 29th, 1854, on the subject of Accidents in Coal Mines.

NICHOLAS WOOD, Esq., in the Chair.

PRESENT :

Northumberland and Durham.—Mr. Wood, Mr. Elliott, Mr. Robson, Mr. Barkus, Mr. Potter, Mr. T. John Taylor.

Yorkshire.—Mr. Charlesworth, Mr. Day, Mr. Goodwin, Mr. Briggs.

Leicestershire.—Mr. Woodhouse, Mr. Stevenson.

Derbyshire.—Mr. Binns.

Nottinghamshire.—Mr. Bean.

Warwickshire.—Mr. Dumolo.

Lancashire.—Mr. Knowles, Mr. Mercer, Mr. Booth, Mr. Jones.

North Wales.—

North Staffordshire.—Mr. Hedley.

South Wales.—Mr. Dobson, Mr. Nixon, Mr. Richardson.

Bristol.—Mr. Bennett.

Dean Forest.—Mr. Goold.

Scotland.—

Somersetshire.—Mr. White. *

Gloucestershire.—Mr. Copham.

Mining Inspectors Present :

Northumberland, Durham, and Cumberland District.—Mr. Dunn.

Lancashire, Cheshire, and North Wales.—Mr. Dickinson.

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Scotland.—Mr. Williams.

Yorkshire, Derbyshire, Notts, Leicester, Warwick.—Mr. Morton.

South of England and Wales.—Mr. Mackworth.

Staffordshire, Shropshire, and Worcestershire.—Mr. Wynn.

Deputation from the Miners :

Northumberland and Durham.—Mr. Martin Jude, Mr. Edmund Gray.

Lancashire and Cheshire.—Mr. David Swallow, Mr. Allen Tetlow.

READ over proceedings of three former days, and commented upon the same.

Mr. Tremenheere attended, and addressed the meeting on the subject of the education of miners.

Thinks the principle of the Print Works Act might be advantageously introduced.

Intends having a bill brought into Parliament, of which the following are the principal heads :

Boys from ten to fourteen to attend schools for at least 150 hours in every six months.

Owners of colliery are required to demand certificate book that boy has attended school; certificates to be produced every six months, until the boy is fourteen years of age.

Parents or boy to pay at the rate of 1*s.* for 30 hours' instruction.

Mr. *Swallow* objects to boys under 12 being sent down pits.

(Explained to him that this is already disposed of by Act of Parliament.)

Thinks six hours a week is not sufficient.

Boys would forget their education, and cannot learn at night schools, being exhausted by work.

Expense, 1*s.* for 30 hours, an objection; proposes compulsory payment of 2*d.* per week from all colliers above 18, for educational purposes.

Mr. *Tremenheere* thinks that boys would go voluntarily more than the prescribed number of hours.

Youngest boys are not exhausted by labour, and would go when pit is not at work.

Five shillings a half-year cannot be deemed a hardship.

Chairman, addressing workmen's deputation, states, that they will be furnished with copies of proceedings, and that, to give time for further consideration, meeting will be adjourned.

Mr. *Swallow* observes, that though the meeting may not agree to sub-inspectors, they ought to agree to inspectors of different grades, with large and small salaries, as an incentive to industry.

States that delegates are grateful for information received; admits their own views to be modified by the discussion, and will inform workmen of this circumstance.

Suggests that delegates from workmen may confer with owners and managers in their own districts, with a view to local regulations.

Mr. *Tetlow* says that the workmen's delegates are grateful to the meeting for the kind reception they have met with, and the free manner in which the discussions have been conducted.

Mr. *Jude* has further suggestions to make, which will be forwarded through Mr. Doubleday, of the Coal Trade Office, Newcastle.

Thinks that inspectors' ranks and salaries may be left to the proposed board of control.

Is glad to find that differences of views are likely to be amicably settled.

Chairman thanks delegates for their attendance, and states that deputations will be glad to take into consideration any further observations or suggestions they may have to make.

Mr. *Gray* thanks the deputations, and will do his best to remove the impression, that the owners and viewers of collieries, and the workmen, are hostile parties.

Workmen's deputation withdrew.

Chairman, addressing inspectors, is glad to see them again. Hopes to make as satisfactory arrangements with the inspectors as it appears probable may be made with the workmen. Will hand over proceedings of meeting, and expects similar frankness in return from the inspectors.

A good deal of discussion then took place with the inspectors, on the various points arising for the consideration of the meeting, the inspectors requesting that, as they had not had time to form conclusive opinions, their suggestions might not at present be published.

To this the meeting, under the circumstances, agreed, and adjourned till 23d May.

3524. That meeting was attended by the Government inspectors, and by the delegates of the men?—Yes; the statement shows what districts were represented, and gives the names of the Government inspectors present, and of the delegates of the workmen, with an account of the proceedings, taken shortly, of the several

several

several meetings; they were considered preliminary proceedings, and at the conclusion of the meeting, it was thought advisable that a report of the proceedings should be sent round to the different colliery districts in the kingdom, in order that the different parties might express their opinion upon them, and send representatives to a meeting to be held in London, on 23d May. A circular was also issued by me, as chairman of the meeting, containing some points which it was intended should be the subject of discussion at the meeting on 23d May.

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[*The Witness handed in the following Circular :*]

Sir,

Craven Hotel, Strand, London, 2 May 1854.

I beg to forward, for your consideration, the proceedings of the united deputations from the coal mining interests of the kingdom, held in London, on the subject of the prevention of accidents in coal mines, and to suggest that the resolutions come to by you thereon be addressed to me at this hotel, so as to reach me two days previously to the adjourned general meeting of 23d May, with a view to their being so arranged as to facilitate the proceedings of the meeting.

I also beg to transmit a classification of the points or subjects of consideration adopted at the several meetings, your observation upon which *seriatim*, and their return in the same shape, will tend greatly to facilitate the like desirable object.

I am, &c.
(signed) *Nichs. Wood*, Chairman.

POINTS FOR CONSIDERATION.

1. As to rules at each colliery.
2. Additional inspectors; whether deemed requisite; and, if so, what number, and of what description.
3. Sub or assistant inspectors; whether considered advisable; and, if so, what number and of what description.
4. Powers of inspectors; whether existing powers under Inspection Act be deemed sufficient; if otherwise, in what respect to be altered or enlarged.
5. Board of control or court of appeal; whether any be advisable; and, if so, of what character, by whom appointed, and whether local or central.
6. Coroners' inquests; as to constitution of juries; whether to give juries the power of awarding damages, or of giving intermediate verdicts.
7. Ventilation; whether the rules to be adopted at each colliery for sufficient ventilation will ensure the requisite supply of air, without specifying particulars as to number or situation of shafts, length of air channels, &c.
8. Education of miners; please to state your views on this subject.
9. Benevolent funds; state your views on this subject also.

3525. The circulars, I understand, were sent to all the coalowners in the kingdom?—They were, and answers have been received from the districts of Northumberland and Durham; from the Barnsley district in Yorkshire, the Leeds and Bradford district in Yorkshire, the Huddersfield and Halifax district in Yorkshire; from the Manchester district in Lancashire, and from the Forest of Dean; from the Midland district, comprising Nottingham, Derby, Leicester, and Warwick; from the Bristol district; from the North Staffordshire district; from Fife, Kinross, Clackmannan, Perth, and Stirling in Scotland; and from North Wales and Cheshire, South Wales, and also from Ayrshire and Lanarkshire in Scotland. There was no representative or answer from South Staffordshire; we had answers also from several individuals in the different districts. We met in London on 23d, 24th, and 25th May ult., and certain resolutions were come to, a copy of which, including the names of those who attended, I produce for the information of the Committee.

[*The Witness handed in the following Report :*]

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ADJOURNED MEETING of Deputations of Coalowners and Mining Engineers from different parts of the Kingdom, held at the Craven Hotel, 28d May 1854, on the subject of Accidents in Coal Mines.

NICHOLAS WOOD, Esq., in the Chair.

PRESENT :

Northumberland and Durham.—Mr. Wood, Mr. Burrell, Mr. Forster, Mr. Robson, Mr. Elliot, Mr. Potter, Mr. Hall, Mr. Boyd.

Yorkshire.—Mr. Charlesworth, Mr. Biram, Mr. Day, Mr. Briggs, Mr. Pope, Mr. Goodison, Mr. Baxendale, Mr. Haigh.

Lancashire.—Mr. Peace, Mr. Mercer, Mr. Booth, Mr. Jones, Mr. J. Lancaster.

Leicestershire.—Mr. Stenson, Mr. Woodhouse.

Derbyshire.—Mr. Binns.

Nottinghamshire.—Mr. Bean.

Warwickshire.—Mr. Dumolo.

North Wales.—Mr. Low, Mr. Clayton.

North Staffordshire.—Mr. Hedley.

South Wales.—Mr. Dobson, Mr. Powell, Jun., Mr. Nixon, Mr. Struvé.

East Somersetshire.—Mr. Greenwell, Mr. Hollway.

Dean Forest.—Mr. Goold, Mr. Trotter, Mr. Atkinson, Mr. Thomas.

Scotland.—Mr. Murray, Mr. McKenzie, Mr. Landale, Mr. Hunter, Mr. W. Lancaster.

Bristol.—Mr. Bennett, Mr. White, Mr. Austin.

Gloucestershire.—Mr. Cossham.

Shropshire.—Mr. Horton.

Mining Inspectors :

Mr. Dunn, Mr. Dickinson, Mr. Wynne, Mr. Mackworth, Mr. Williams.

Delegates from the Workmen :

Lancashire and Cheshire.—Mr. David Swallow, Mr. Allen Tetlow.

Northumberland and Durham.—Mr. Martin Jude, Mr. Edmund Gray.

Scotland.—Mr. Thomas Phillips.

REPLIES to the points for consideration (*see* Appendix, No. 1), sent to the various mining districts, were read and fully discussed, together with the reports of the Government inspectors (Appendix, No. 2), Mr. Dunn's report (Appendix, No. 3), and Mr. Dunn's letter (Appendix, No. 4), and the following resolutions come to thereon :

Resolved, No. 1.—That it is the opinion of this meeting that it would contribute greatly towards the safety of the mines, and of the lives of the workmen, if a code of rules, bearing on the subject of the prevention of accidents, were provided by the owners at each colliery applicable to the particular state and circumstances of such mines, to be observed by the persons entrusted with the management thereof, and by the workmen employed therein.

Resolved, No. 2.—That, in the opinion of this meeting, an additional number of inspectors is not necessary; but, in the event of an additional number of Government inspectors being thought necessary, the object of the prevention of accidents would be best promoted by a division of the districts, and the appointment of persons of sound practical knowledge and experience, of not less than 10 years' standing as practical managers of collieries; and that the appointment of irresponsible sub or assistant inspectors of a lower grade than the responsible practical managers of mines would, in the unanimous and decided opinion of this meeting, most unquestionably be attended with very injurious effects in the discipline of the mine, and consequently tend to increase rather than diminish the number of accidents; and to insure that independence which their onerous duties require, this meeting is of opinion that the Government inspectors should not practise as mining engineers.

Resolved, No. 3.—That, in the opinion of this meeting, any legislative measure giving power to the Government inspectors of mines to interfere with the system or details of working the mine would be highly inexpedient and dangerous, as lessening the responsibility of the owners or managers in the management of such mines.

Resolved,

Resolved, No. 4.—That the investing of inspectors of coal mines with additional powers, which would necessarily render them responsible to a corresponding extent for the safety of the coal mines within their respective jurisdictions, would also render necessary the appointment of one or more boards of control or courts of appeal (to be composed of practical mining engineers), to which colliery proprietors might have recourse in case of oppressive direction of the inspectors, and which board should have the power to confirm, reverse, or modify such direction.

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Resolved, No. 5.—That with reference to coroners' inquests, this meeting is of opinion, in all cases the jury should be composed of persons of a strictly impartial and independent character; but they do not feel themselves justified in expressing any opinion as to the mode of conducting the proceedings of the inquest, except that if it should be deemed advisable by the coroner that the masters shall be represented at any inquest, that the relations of the deceased should be similarly represented.

No. 6.—Moved by Mr. *Biram*, Seconded by Mr. *Elliott*.

That adequate artificial means of ventilation be provided at all collieries, and that there shall be at all times a sufficient current of pure air through the workings to dilute and render innocuous all noxious and deleterious gases; and that the number or situation of shafts, length of air channels, &c., be left to the discretion of the responsible manager of the mine.

Amendment, Moved by Mr. *McKenzie*, Seconded by Mr. *Murray*.

That some effectual means of ventilation should be provided in every coal mine, so as to insure at all times a sufficient current of pure air through the workings to dilute and render innocuous all noxious and deleterious gases.

For the Resolution -	-	-	-	-	-	24
„ Amendment -	-	-	-	-	-	15

Resolved, No. 7.—That it is the opinion of this meeting, that a large number of accidents in collieries arise from the ignorance and recklessness of the miners themselves, and that increased education would greatly tend to decrease the number of accidents arising from such causes; and that it is especially desirable, for the moral and domestic welfare of this class of the people, that the daughters of colliers, as well as the sons, should have a better early moral training than they have at present, and they therefore recommend that the proprietors of each colliery should provide the requisite school accommodation for that purpose, either independently or in connexion with some other scholastic institution; and that, in the opinion of this meeting, the owners of such colliery should, in connexion with the workmen, make such arrangements in a financial point of view as will accomplish this desirable object.

Resolved, No. 8.—That this meeting approves of benevolent funds connected with all collieries, but considers that the arrangements connected with such funds should be left to the respective coalowners and their workmen.

RESULT of Discussion on Inspector's Report. Appendix No. 2.

Proposition 1. Approved to the extent hereinafter mentioned.

2. That as ironstone mines are not represented at this meeting, and the interest being a very important one, the meeting is of opinion that it is not competent to consider the question as to the propriety of including them in any proposed Act.

3. That no alteration of the present Act on this subject is considered necessary.

4. That Clause 3 of the Inspection Act be altered as follows: In case plans are not provided or kept as prescribed by the Act, the inspector shall be empowered, after giving six months' notice in writing to the owner or manager of the colliery, to cause such plan to be made, and kept up from time to time at the expense of such coalowner.

5. That every shaft or pit which is out of use, or used only as an air shaft, shall be kept securely fenced by the owner of such shaft or pit, under a penalty of 1*l.* per day for neglect, after a written notice shall have been served by an inspector on the owner of such colliery in respect of such shaft or pit; such penalty in any one case not to exceed 50*l.*

6. That the power in the present Act relating to this object is sufficient.

7. That every working and pumping shaft or pit shall be properly fenced when not at work, and that the mode of carrying it into effect be arranged in the rules to be made applicable to each colliery.

8. That every working or pumping shaft or pit to be sunk or deepened after the passing of the Act shall be securely cased or lined with bricks, stone masonry, iron, or timber, unless the natural strata be considered safe; and that in all existing pits the safety be provided by the rules of each colliery.

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- 9, 10, 11, 12, 13. To be considered in framing the rules, to be made applicable to each colliery.
- 14, 15. Discussed in resolution and amendment No. 6.
16. Discussed in resolution No. 1.
17. No alteration considered necessary.
18. After the words (in Mine Inspection Act) Lord Advocate, insert "and to the inspector of the district."
19. Subject of this clause not considered within the province of this meeting.
20. Considered in resolution No. 5.
- 21, 22. Not within the province of this meeting.
23. That a clause should be inserted in the proposed Act as to the punishment of persons employed in or about mines in cases of misconduct, or in breaches of the rules of the colliery in which they are employed.
24. Considered in resolution No. 4.

DISCUSSION ON MR. DUNN'S REPORT.

- Propositions 1, 2, 3, 4, 5. Decided upon in preceding resolutions.
- 6, 7. Not within the province of this meeting.
8. Previously discussed.
9. We think great benefit would accrue from the half-yearly reports of the inspectors being published for circulation.
10. That it behoves both the public and the proprietors of collieries to secure the services of inspectors of experience and talent, and that the services of such gentlemen cannot be secured without the payment of adequate salaries; and that the present salaries are, in the opinion of this meeting, insufficient, and ought to be increased; more especially if their entire service is confined to the duties of their office as Government inspectors of mines.
11. Decided upon in No. 2 resolution.
12. Not within the province of this meeting.
13. Does not require discussion.
14. Disposed of in resolution No. 6.
15. Disposed of in proposition No. 2 on inspector's report.
16. Considered not desirable.
17. Comprised in proposed rules.
18. Not within the province of this meeting.
- 19, 20. Previously discussed.

SUPPLEMENT TO MR. DUNN'S REPORT.

1. Considered in proposition No. 17. (Inspector's report.)
2. Considered in proposition No. 4. (Inspector's report.)
3. Considered in proposition No. 5. (Inspector's report.)
- 4, 5. Included in the rules.
6. Disposed of in No. 22. (Inspector's report.)

Resolved, No. 9.—That the chairman be requested to lay before the Committee on Accidents on Mines the proceedings of this meeting, and make such explanations thereof as he may deem necessary.

Resolved, No. 10.—That as soon as the Bill proposed to be brought before Parliament is printed, the chairman be requested to call a general meeting of deputations from the respective colliery interests, to be held in London for the consideration thereof.

Resolved, No. 11.—That this meeting is of opinion it would be of essential service in the future management of mines, and consequently have a tendency towards the prevention of accidents, if a central mining school, or college, of a practical nature, was established in some convenient and suitable colliery district, with branches therefrom, and connected therewith, for

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for the education of mining engineers, and other officers or subordinate persons, to be entrusted with the management and conducting of the mines of this country; and that the Committee now sitting on Accidents in Mines, be solicited to take this subject into their serious consideration, with a view of recommending the Government to afford such aid as they may deem advisable and requisite to establish and support so necessary and laudable a measure.

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Resolved, No. 12.—That the following gentlemen be appointed a committee for the purpose of drawing up a report of the proceedings for transmission to the coalowners of the different districts, with power to add to their number :

Mr. Wood.	Mr. Cossham.
Mr. Woodhouse.	Mr. Biram.
Mr. Peace.	Mr. Day.
Mr. Forster.	Mr. W. Lancaster.
Mr. Elliott.	Mr. Dobson.

Resolved, No. 13.—That the thanks of this meeting be given to the chairman for his efficient services in the chair.

Resolved, No. 14.—That the thanks of this meeting be presented to Mr. T. J. Taylor and Mr. J. W. Day, for the great trouble and pains they have taken in carrying out the objects of this meeting.

(signed) Nicholas Wood, Chairman.

APPENDIX, No. 1.

POINTS for Consideration sent to the various Mining Districts of the Kingdom, on the 2d May 1854.

1. As to rules at each colliery.
2. Additional inspectors: whether deemed requisite; and, if so, what number and of what description. Sub or assistant inspectors: whether considered advisable; and, if so, what number and of what description.
3. Powers of inspectors: whether existing powers under Inspection Act be deemed sufficient; if otherwise, in what respect to be altered or enlarged.
4. Board of control, or court of appeal: whether any be advisable; and, if so, of what character, by whom appointed, and whether local or central.
5. Coroners' inquests: as to constitution of juries: whether to give juries the power of awarding damages, or of giving intermediate verdicts.
6. Ventilation: whether the rules to be adopted at each colliery for sufficient ventilation will ensure the requisite supply of air, without specifying particulars as to number or situation of shafts, length of air channels, &c.
7. Education of miners: please to state your views on this subject.
8. Benevolent funds: state your views on this subject also.

APPENDIX, No. 2.

REPORT of Government Inspectors of Mines delivered to the Deputation of Coalowners at the Craven Hotel, London, 23d May 1854.

London, 4 May 1854.

WE, the undersigned inspectors of coal mines, having attended a general meeting of coal-owners and viewers of Great Britain, and delegates from the colliers of four counties in the north of England, and taken their proposals for an amendment of the Act for the Inspection of Coal Mines into consideration, and having brought together our own experience of the working of the said Act, are prepared to recommend the following suggestions:

1. That it is expedient that the Act for the Inspection of Coal Mines, 13 & 14 Vict. c. 100, be extended.
2. That as ironstone mines are connected with the working and ventilation of coal mines, and subject to the same kind of accidents, explosions of fire-damp, &c., they should be included in any future Act.
3. That the second section of the above-named Act relating to the powers and duties of the inspectors, from the 10th line of the second page, after the words, "coal mine or colliery" should be altered as follows: "or notify the same to him in writing in order to his being heard upon the matter giving rise to such finding as aforesaid, or if such

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manager or principal viewer or agent shall not satisfy such inspector in writing within the space of seven days, then such inspector shall serve notice in writing of the particular grounds on which he shall be of opinion that the said coal or ironstone mine is dangerous or defective on the owner or agent of such mine, and shall also report the same to one of Her Majesty's principal Secretaries of State."

With respect to the serving of the notices, that the notices should be sent in duplicate, one of which shall be returned, properly signed, to the inspector.

4. That section 3 of the above-named Act, respecting the making and keeping of plans, should be enforced by a penalty of 1 £ per day after the expiration of six months, subsequent to the passing of the proposed Act.

5. That every shaft which is out of use, or used only as an air pit, should be securely fenced under a penalty of 1 £ per day, after the expiration of the six months subsequent to the passing of the proposed Act.

6. That as the present Act relates only to accidents to persons employed in or about coal mines, and many fatal accidents occur to other persons from unprotected shafts and other causes, the proposed Act should be extended to all accidents happening to any person in or about coal or ironstone mines.

7. That every working and pumping shaft be fenced on two sides when at work, and on all sides when not at work.

8. That every working or pumping pit should be securely cased or lined with bricks, stone, masonry, iron, or timber, unless the natural strata be equally secure.

9. That every winding shaft used for lowering or raising persons should be provided with guides or conductors; and that no person shall ascend or descend the shaft, without being protected by a bonnet or cover.

10. That single link chains, except the short coupling chain at the end of the rope, should not be used for the lowering or raising of persons.

11. That every winding shaft should be provided with some proper mechanical means of signalling from underground to the surface.

12. That a proper shaft indicator, with a bell to show the position of the load in the shaft, should be set up at every engine used for raising or lowering persons.

13. That every steam boiler should be provided with a proper steam-gauge, water-gauge, and two safety-valves.

14. That an adequate artificial means of ventilation should be provided and constantly employed at every coal and ironstone mine.

15. That there shall be a sufficient current of pure air through the workings to dilute and render innocuous all noxious and deleterious gases.

16. That every coal and ironstone mine should have printed rules, properly made known to the workpeople, in reference to all questions affecting the safety of life and limb, under a penalty of 1 £ per day, after the expiration of six months subsequent to the passing of the proposed Act.

17. That with the view of bringing the collieries and ironstone mines more immediately under notice, the owner or agent of each colliery or ironstone mine shall, during the month of December in each year, transmit to the inspector of the district a written report, stating the name of the colliery or ironstone mine, the township, parish, and county where situate; also the name and address of the owner and responsible manager, the number of engines, pit drifts, or adits usually at work, and the number of persons employed in and about the works, specifying those employed underground and at the surface.

18. That the constable or police of the township, on the occurrence of any fatal or serious accident in or about any coal or ironstone mine, should forthwith give notice thereof by letter to the inspector of mines for the district in which the accident had occurred.

19. That in addition to section 6 of the present Act, the coroner should send to the inspector of mines for the district previous notice of every inquest, and that he should allow sufficient time to elapse to permit of the attendance of the inspector at any final or adjourned inquest.

20. That no owner, agent of or at any coal or ironstone mine, or any person in their employ, or any relative of the deceased, should be eligible to sit on a coroner's jury.

21. That coroners' juries be empowered to deal with cases of neglect, which do not appear to deserve a verdict of manslaughter, by inflicting a short imprisonment or limited pecuniary fine.

That all pecuniary penalties arising out of such verdicts should be given or appropriated by the coroner and jury, or by a majority of them, amongst the relatives of the deceased, or surviving sufferers, without limiting the application of Lord Campbell's Act.

22. That

22. That in all requirements of a future Act, it is indispensably necessary to enforce the same by adequate penalty.

Note.—It has been suggested to us by legal gentlemen that section 8 in the present Act, as to the enforcement and recovery of penalties, is defective, and that penalties could not be recovered under it.

23. That, as many magistrates refuse to convict under the 4 Geo. 4, c. 34, commonly called the Masters and Servants Act, section 3, a clause should be inserted in the proposed Act, as to the punishment of persons employed in or about mines, in cases of misconduct.

24. That in case of difference of opinion between the owner or manager and the inspector, an arbitration shall be held, the inspector being one arbitrator, and the owner, manager, or some person appointed by them, to be the other; and, if necessary, an umpire to be appointed by them, or, on their failing to agree, the umpire to be appointed by the Secretary of State at the request of one of the arbitrators, the decision of the umpire to be final. If the arbitrator or umpire agrees with the inspector as to the dangerous character of the mine, system of working machinery, ropes, rules, regulations of the coal or ironstone mines, or if he agrees with the inspector as to the propriety of suggested improvements or alterations, the inspector may forthwith order the same to be carried out; and if the owner should refuse or neglect to arbitrate within the space of 14 days, or if he disobey the joint award of the inspector and umpire, the penalty of not less than 10 l. shall be imposed for every day that every such owner continues to work or use the mine, machinery, &c., &c.

(signed) *Joseph Dickinson,*
Herbert Mackworth (except Clause 24),
Thomas Wynne,
Robert Williams,
Inspectors of Coal Mines.

APPENDIX, No. 3.

REPORT of Mr. *Dunn*, Government Inspector of Mines for *Northumberland, Durham, and Cumberland.*

London, 28 April 1854.

As the inspectors do not agree respecting the details which ought to be comprehended by an amended Act, I have thought proper to submit my individual views to the consideration of the meeting, in the following short remarks :

1. I am of opinion that detailed inspection cannot be compassed by any amount of increased inspectors; but I think great improvement of the working would be effected by the more frequent attendance at inquests, which would be the case if the constable of the district was empowered to view the body, and give a certificate for burial, whilst the coroner must give notice to the inspector of the holding of the inquest, which shall not take place within less than a week after the notice; the persons employed in the colliery to be ineligible as jurymen.

2. I submit, whether the power of levying any fine upon the proprietary at the said inquest might not be well, where negligence or inattention is shown; such fine to go to the family of the deceased, with power of appeal before magistrates by either party respecting such fine.

3. I think every colliery ought to possess some artificial means of ventilation, by way of securing uniformity.

4. Each district ought to possess a set of printed rules, such as drawn up for the north, such rules to be approved of by the inspector.

5. Inspectors to have the same power as at present, except in the case of certain parts of a colliery with machinery being so dangerous as to induce him to call for its suspension, at the same time giving power of arbitration to the manager of the colliery, either one or three arbitrators elected in the usual manner.

6. Inspector to be authorised to employ a reporter in serious cases, as the publication of correct versions of the evidence adduced would have a beneficial effect.

7. Inspectors to be appointed as heretofore.

8. Some additional inspectors might be beneficial, especially in those districts where coroners' juries and the state of practical science are most to be complained of, and where additional inspection would go to check and improve, with proper aids in amended legislation. I think very little benefit would accrue to the district of the north, where, generally speaking, colliery arrangements are as well carried out as they can be desired, and where the progressive improvement is shown by the remarkable diminution of explosions.

9. I think great benefit would accrue from the half-year's reports of the inspectors being published,

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published, and that such reports should be in the Home Office within a month of each half-year's termination.

10. To give due weight to the office of inspector, I think the salaries ought to be increased up to the standing of respectable viewers, due regard being taken as to their want of house, &c. If such is not provided for, the proper class of men will not be found to adhere to the point permanently, and that I think of the utmost consequence, as a long period must elapse before a stranger can become intimately acquainted with the district.

11. I think the future arrangements ought not to debar inspectors from appearing as witnesses on colliery cases, as their experience is often most important to the ends of justice; with this exception, if the salaries were made ample, it might be well to ensure their whole time.

12. The inspectors to meet together once in six months to confer, and to offer any useful suggestion to the Secretary of State.

13. I decline, in the present instance, attaching penalties, for I think the amendments of the Act must first be agreed upon, after which it is easy to attach penalties; and where penalties are to be inflicted I think they ought to be directed chiefly against the owner of the property, rather than against butties, contractors, or agents.

14. It is impossible to lay down any data as to the amount of ventilation or how it is to be effected, the only question being as to its efficiency.

15. I think ironstone mines should be included in the Act.

16. It is a question whether it would not be desirable for an improved Act to be made available for obtaining statistics of persons employed, the quantities of mineral raised, &c., as possessed by foreign governments.

17. The advantage of guides or conductors being so self-evident, a qualified power of enforcing them might possibly be provided for, as also the use of single-link chains.

18. I submit whether a public office, in each district, with an occasional attendance and clerk, would not be a proper appendage.

19. I am against the appointment of any supreme board, other than the Secretary of State, as it is impossible that any such board can so immediately apply itself to any case so as to ease the inspector of his responsibilities; for no such board could be effectual without they were practical men, nor would there be any employment which would repay the additional expense to the country, if they did not, when required to, enter the mines.

20. In lieu of such board, and in order to be a proper check upon the powers of the inspector, I would recommend a power of appeal in all undefined cases, which power of appeal would amply provide against the abuse of any additional powers which may be conferred by the Act.

And, in conclusion, I state that in my district the working of the present Act has been most beneficial, and its operation has been (with very few exceptions) very cheerfully advanced and facilitated, and I place much more value upon the amendments contemplated than in increased numbers of inspectors.

APPENDIX, No. 4.

Dear Sir,

Newcastle, 19 May 1854.

HEREWITH I beg to enclose you a few additional remarks, to be appended to my former statements.

1. Each colliery and its owners to be registered, with the number of persons employed above and below ground, with the number of pits and adits producing coal.

2. Every colliery to possess a plan of the workings within six months of the passing of the amended Act.

3. All old pits to be fenced round and defended against the public, as well as the workmen.

4. Signals to be applied. (Query?)

5. Every boiler to have two safety valves, with steam and water gauge.

6. Clause 8 in the Act, said to be ineffective, to be made clear and amended, so as to obtain convictions.

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I remain, &c.
(signed) *Matthias Dunn.*

3526. After receiving the answers, the depositions met in London at the time appointed?—They did.

3527. Were they met there also by the delegates of the men, and by the Government

Government inspectors?—By five of the Government inspectors, Mr Morton not being present. We discussed the answers received from the different districts. The inspectors handed in a report, which they stated had been forwarded by four of them to Lord Palmerston. Mr. Dunn furnished us with several suggestions of his own, and we discussed the whole of those together, with some observations that Mr. Morton had made at the previous meetings, but which he did not wish published, on the ground that he had not sufficiently considered them.

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3528. Is there any substantial difference between Mr. Morton or Mr. Dunn, and the other four inspectors?—There is no material difference; the resolutions we came to were founded upon the discussion of the points sent to the different districts for consideration.

3529. Mr. Locke.] Upon receiving the answers to the points sent, you met in London, and came to the resolutions which you have handed in?—Yes; we had a discussion upon the points, and also upon the answers; we went then into a discussion upon the inspector's report, and upon Mr. Dunn's report, and came to certain resolutions upon them. We had considered the petition of the workmen at the meeting in April, and had drawn up certain resolutions thereon. I believe that the resolutions that I have laid before you, embrace all the points of consideration suggested by the coalowners, all the suggestions made by the inspectors, and the statements in the petitions of the workmen. Probably, with the permission of the Committee, it would be as well to hand in a copy of the rules of some of the districts, seeing that in each district different rules are required.

[The Witness handed in six sets of Rules, as follows, applicable to the respective Districts:]

NORTHUMBERLAND AND DURHAM.

RULES and REGULATIONS for the SAFETY of COAL MINES, and of the WORKMEN Employed therein.

Responsible Charge of the Mine.

IN the absence of the viewer and under-viewer, the responsible charge of the mine is with the overman and back-overman in their respective shifts. The overman is not to leave the mine without communicating with the back-overman, and both officers are to make daily reports of the state of the mine, the overman to the viewer or under-viewer, and the back-overman to the overman or under-viewer. The overman will also confer with the back-overman and deputies every night. The back-overman will receive the reports of the back-deputies at the overman's cabin each day when the pit is done, and he will see all the workmen and boys safely out of the mine, it being his special duty to remain until they have quitted it: he is also, before leaving, to ascertain that all lights are extinguished. In the absence of the overman and back-overman, the deputies are responsible for carrying out the orders of their superiors, and the duties prescribed to them by the regulations of the colliery.

Working Places.

No workman or boy shall enter any working place until it has been examined by the overman, back-overman, or deputy, whose duty it is to make such examination before work is commenced, and to ascertain that the place is properly ventilated, free from fire-damp or stithe, and in a safe condition, by sufficient props and timbering; and until such examination shall be made and leave given, no workman or boy shall go beyond the flat or other station appointed by the overman. If a place be found insecure from the causes above-mentioned, or any of them, on its examination, such place shall not be set to work until it is secured or made safe and free from foulness, as the case may be; and if, in the course of being worked, the place prove insecure from any of the causes mentioned, the overman or deputy shall stop such place, and remove the workman; and should the unsafe state of the place be owing to the issue of fire-damp, a danger signal is to be placed at the entrance to it, any person passing beyond which with a candle or other naked light is to be sent out of the mine, and not allowed to have employment until his misdemeanour shall be inquired into and punished.

No workman or boy is allowed (unless duly authorised so to do) to go into any part of the mine, excepting that in which he is placed by the overman, deputy, or other officer.

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Waste.

The waste is to be properly examined by the master wasteman or other wasteman, who shall report its condition to the under-viewer in a book kept for that purpose. The intake and return currents are to be examined by the master wasteman every morning. The quantities of air passing into each district are to be noted by him, and if any deficiency be experienced, he is not to leave the mine until the cause of such deficiency is ascertained and remedied. He is to see that the waste is properly ventilated. He is to keep the air courses in a proper state, and to make them of sufficient area for good ventilation: if any part of the waste be foul, he is to inform the viewer, under-viewer, or overman of the same. Safety lamps are to be used exclusively in the waste, the master wasteman or other authorised person examining and locking the lamps of the men employed under him. The overmen and the deputies are to travel the air courses with the master or other wasteman occasionally, in order to make themselves thoroughly acquainted with the same.

Goaves.

The edges of all the goaves in the broken workings are to be carefully examined by the overmen or deputies every day with the safety-lamp; and during the day the condition of the edges of the goaves and the working juds are to be frequently examined by the deputies, and should inflammable gas be at any time observed, the working of the jud to be immediately stopped, until the gas has been cleared away. Where danger is apprehended no juds are to be drawn until after the pit is done, and no naked lights are to be allowed in the district during such drawing.

Waggon Ways and Tram Ways.

All waggonways and tramways are to be kept in a safe and working state throughout the colliery by the persons in charge of them, to whom it is a special instruction to secure them properly, and to make safe, by removal or otherwise, any over-hanging stone or "side wafers." No workman is allowed to ride inbye or outbye, upon the sets, nor upon any incline bank or engine plane, except by permission.

Timbering and Props.

A stock of props and timber to be provided for the security of the working places, roads, and all other portions of the mine. The overman to see that a sufficient quantity of it is sent down the pit, and into the places where needed. It is the duty of the deputies (acting under the orders of the overmen) to have the props and timber conveyed into the workings, and to set the same for the safety of the workmen. The supply is to be renewed as often as found necessary; and if, in the absence of a deputy, any place requires additional timber, the hewer not to continue his work, but to leave his place and to find the deputy, for the purpose of having the requisite timber set.

The deputies are responsible for putting, on all occasions, a sufficient quantity of timber into every working place in the best possible manner, so as to afford the greatest safety to the workmen employed.

Machinery.

The pit ropes and chains, with the several bolts, shackles, springs, and cages, are to be examined by the banksman every day as they pass slowly (for this purpose) from the engine; if found faulty in any respect, he is immediately to report the same to the engineer; and if any defect be found in either rope, or the apparatus connected therewith, the banksmen and onsetters are to prevent the use of that rope by the workmen until the requisite repair or renewal shall be made. The engine and machinery are to be examined by the brakesman once in 24 hours; and the ropes, rope-rolls, hinges, tackles, chain links, and signal bell, twice in 24 hours. The cages are in no case to be moved in the shaft without a direct order from the banksman, waiter-on, or onsetter. The brakesman is to acquaint himself with the signals, and if he suspect any error as to a signal he is to stop the engine, or keep it at rest until a properly understood signal be given. The handles are not on any account to be left by the brakesman while the engine is in motion, and no other person is to be taught the duty of brakesman, or allowed to touch the handles of the engine, without authority from the engineer. The fireman is to be under the control of the brakesman. An apprentice is not to be left in charge of the engine, or allowed to move it, except in the brakesman's presence, until he shall have obtained a certificate of competency from the engineer. If any part of the machinery or winding apparatus be at any time found imperfect or unsafe, the brakesman is immediately to give notice thereof to the engineer, or some other person in authority, with a view to the same being at once repaired. The cages made use of to have covers of sheet-iron, or such other protection as may ensure the safety of persons ascending and descending the shafts. The steam-boilers are to be cleaned as often as the engineer may deem necessary. The safety valves (two in number) are to be particularly attended to by each brakesman during his shift, and are not to be meddled with by any other person whatever, without the authority of the engineer. The boiler feed is to be so regulated as to maintain a regular supply of water to the boilers. The winding engine is at all times to be kept in good and safe working order. Should any default or derangement of the engine,

or

or any part of the attached apparatus, occur, the same to be immediately reported by the brakeman to the engineer. On all occasions the workmen are to be let down and drawn up with the greatest care. The machinery upon the colliery, with its appendages, above ground and below, is under the special charge of the engineer, who, or some person appointed by him, is to examine, at least once a day, the pit ropes, guides, and cages, and the chains belonging thereto, the renewing and repairs of which at all times are under his directions, both in the joiners' and blacksmiths' department; he is to inspect and direct also, at all times, the repairs of the engine and coal shafts, for which purpose the best materials are to be used. In the event of any deficiency or failure of any parts of the machinery, ropes, guides, or any parts of the shaft or pit apparatus, or any machinery or apparatus underground, or any other article or thing pertaining to his department, occurring at any time, or being reported to him by the heads of the various departments, or any of them, he will immediately report the same to the proper authority, with a view of adopting, at the earliest opportunity, such means as will, to the best of his judgment, remedy the said deficiency, and restore the apparatus to strong and efficient working order.

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Shafts.

No person is allowed to descend the pit without permission from the proper authority. It is the duty of the banksman, or, in his absence, the brakeman, to see this rule attended to; and also that no workman or other person goes down in a state of intoxication. The number of persons allowed to descend or ascend at one time will be prescribed by the banksman and onsetter, under orders from their superiors. When men are to ride the agreed signal is to be given. Riding on full tubs is not allowed, and no person is to ride on the cage top. Workmen are not permitted to take their gear with them in the cage, all gear being sent down in a tub appointed for the purpose. While men are riding, a banksman to remain next the signal rope to signal the brakeman in the event of an accident.

The engines to be worked at decreased speed when workmen ascend or descend; and a banksman or other person is to attend at the pit every morning at calling course, and also at changing time, to see the men and boys safely into the cage when about to descend the pit. The banksmen and onsetters are to have a clear understanding as to signals. The onsetter to work the signals himself, and not allow any other person to do so, and to see the workmen safely into the cage. When a shaft is being repaired, the banksmen, onsetters, and persons employed in the shaft, are to have a clear and distinct understanding as to signals, in order that accidents may be avoided. Banksmen and onsetters are to "change" at the pit, to insure proper attention when cages are being moved in the shaft. Banksmen and onsetters are to remain in attendance after the pit is done, and until all the men and boys are out of the pit.

Ventilation.

The main and district air currents to be examined by the overman or deputy every morning before work is commenced, and also every evening after it is finished; also on the Sunday mornings, and every other morning that the pits may not be at work, to ascertain that the ventilation is going on properly, and that the pits are in a safe state. If any defect be found, a remedy to be forthwith applied. Obstructions or falls in the different air courses are to be removed should any such exist; and the intakes and returns are to be kept in a proper state, and of a sufficient sectional area for the full and effectual ventilation of the mine.

Stoppings.

The principal or permanent stoppings are to be of brick or stone, built with lime, well plastered, and made quite tight, and supported by stowing. The stoppings and air crossings in the waste to be examined and kept in repair by the wastemen. The permanent stoppings in the working districts, as well as the board-end, and other temporary stoppings, are to be examined by the overmen or deputies daily, and are to be kept in perfect order and repair. It is the duty of the deputies (acting in all cases under the orders of the under-viewer and overmen) to put in temporary stoppings, and to ascertain that stone and brick stoppings are properly built, plastered, and stowed. Regulating stoppings are to be locked, and are not to be interfered with except by the master wasteman, or such other person as is duly authorised to take charge of them.

Brattice.

Brattice placed for the purpose of ventilation is to be examined by the overmen or deputies every morning, and kept tight and in good order. Working places to be bratticed where necessary.

All brattice to be set, put up, and kept in repair by the deputies.

Doors.

The main and other ventilating doors are to be examined daily by the overmen or deputies, and are to be kept in a thorough state of repair. The main separation doors to be double. No main door is to be left without a trapper, either man or boy. No door is to be propped or fastened back whilst on its hinges, and all doors for ventilation are to be so hung that they will not stand open of themselves. Doors, giving access to the waste, and separating the

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the fresh and return air currents, are to be fitted with proper locks, which must be kept locked, and only opened by persons properly authorised. Deputies to set all doors necessary for the ventilation of the mine, and to keep the same in good repair, having, when requisite, the assistance of the joiners, blacksmiths, and masous.

Furnaces.

The ventilating furnace to be kept clean by each furnaceman in his shift, and supplied with a sufficient quantity of coals. The furnacemen to change at the furnace, so that no slackening of the fire may be occasioned by absence. The furnace-drift is to be cleaned out when requisite, under the inspection of the master wasteman. The master wasteman is also to travel occasionally the air ways at each side of the furnace. An anemometer or other indicator to be placed near the furnace, to show the velocity of the air current, as a guide to the furnacemen.

Fire Damp.

Places in which fire-damp is detected are not to be set to work until they are made perfectly safe and free from the same. In the event of any unexpected discharge of fire-damp, or if the officer in charge apprehend any such discharge (especially in situations where faults, backs, or water are met with), he must order all naked lights to be extinguished, withdraw the workmen and boys, and apply to, or send for, the overman. Any hewer or other workman meeting with a blower or sudden discharge of gas, or observing the presence of gas in his lamp, is immediately to draw down the wick, leave his place, and report to the deputy what has occurred. Workmen are strictly prohibited from continuing at work in a place where indications of the presence of fire-damp are observed as above, and should the flame continue in the interior of the lamp after drawing down the wick, the lamp must be cautiously moved into pure air, and no attempt made to extinguish the flame by any other means.

Safety Lamps in Fire-damp Mines.

Safety-lamps are to be used whilst examining all workings, also in old or suspended workings, in back pillars, in drawing timber (whether in the old or broken), in stow boards, and in the waste. Where the pillar working or broken is in operation, or in such districts of the whole mine as the viewer may direct, or as the viewer or overman may, from time to time, judge necessary, stations will be fixed upon, with proper notice boards, on the inbye side of which no candles, lanterns, or tobacco-pipes are to be taken. From these stations no person is to take a safety-lamp into the pillar working, broken, or waste, without its having been first examined and securely locked by the overman, deputy, or other responsible officer. The overman and deputies to have full power to direct the workmen how to use their safety-lamps during the time of working; and it is particularly enjoined that every workman strictly attend to such directions. None but the overman, or person authorised so to do, to be allowed to carry a safety-lamp key.

Should any accident happen to a lamp whilst in use, by which the gauze is injured, or oil is spilled upon the gauze, or it be in any other way rendered unsafe, the light to be immediately extinguished by drawing the wick down within the tube with the pricker; such lamps to be immediately taken out to the station where the lamps are examined, and not to be again used until after having been properly examined by the overman, or some other responsible person. Every person to whom a safety-lamp is entrusted shall take the gauze home and clean the same every time it is used, and if it require repairing he shall take it to the workshops.

Every person using a safety-lamp shall frequently notice it, and should he detect, by the usual indications, the appearance or presence of fire-damp, he is to pull down the wick with the pricker, as before mentioned, and then to retreat to the lamp station, and give information of the same to the nearest responsible person.

Every hewer or other person to whom a safety-lamp is entrusted, is hereby strictly prohibited from interfering in any way whatever with the lamps whilst in use on the inbye side of the stations, beyond the necessary trimming of the wick with the pricker. And in no case shall the safety-lamp be suspended upon the row of props next the goaf, or old work, nor in any situation which is not at least two feet from the stroke or swing of the pick or other gear.

Should any hewer, putter, or other person whatever, in charge of a safety-lamp, in any case lose his light, he is to take it himself to the station where the lamps are examined, to be relighted, examined, and locked by the overman, or some other responsible person, before being again used.

The person who keeps his safety-lamps in the best order for a period of three months will be entitled to a premium of 5 s., and for the second best 2 s. 6 d.

No putter, pony driver, helper-up, or other person is, under any pretext whatever, to carry a lamp during his work, except in cases where the parties have leave to do so from the viewer. Lamps will be hung up where required, to afford sufficient light for the performance of the work.

Any person found smoking tobacco, or having in his possession a pipe, in any part of the said colliery where safety-lamps are used, will be liable to be fined or taken before a magistrate, at the option of the owners or viewer of the said colliery. No lucifer matches,

or

or other self-igniting apparatus, under any pretext whatever, to be taken down the pit by workmen or boys.

It is expressly directed that any workman or other person witnessing any improper treatment of the safety-lamps by any one, shall give immediate information to the overman then in charge of the pit, so that a recurrence of such conduct may be prevented, by the offending party being brought to justice.

In the event of any of the instructions or rules herein set forth not being attended to, it is particularly requested that whosoever may know of such neglect will instantly make complaint, so that immediate measures may be taken for applying a remedy, and inflicting such penalties upon the parties so neglecting as may be deemed necessary, or as the magistrate may order. And any person informing against offending party or parties will, in every case, be handsomely rewarded.

General Instructions.

Any person observing any door standing open that ought to be shut, or stoppings injured, or any other thing whereby the ventilation of the mine, or its safety in other respects, may be affected, is immediately to inform the overman, deputy, or other person in charge of the pit, so that there may be as little delay as possible in applying a remedy.

No person acting in a place of trust to depute any one to do his work without the sanction of the viewer.

No swearing or fighting is allowed in the mine.

No ale or intoxicating drink is allowed, on any pretext, to be taken down into the mine.

Where a barometer or thermometer (or both instruments) is kept underground, it is the duty of the overman to observe and adjust the same immediately after descending the pit in the morning, noting the observation in a journal to be kept for that purpose. If the mercury has fallen during the night, particular care must be directed towards those parts of the mine which contain gas, more especially the goaves and goaf edges; and should any extra quantity of gas be observed, either in these or in other situations, the precautionary and remedial measures provided under the heads of fire damp and safety lamp must be properly attended to.

The back overmen will observe and adjust the barometer (or barometer and thermometer, as the case may be), as his last duty before leaving the pit, and will enter his observation in the journal beforementioned.

Penalties.

It is particularly enjoined upon the overmen, deputies, and all other officers, to acquaint themselves thoroughly with the foregoing rules and regulations, and to observe and enforce the same in and throughout their various departments. Workmen and boys are also required to inform themselves of the rules, for which purpose each workman is furnished with a printed copy, which is to be taken care of, as the loss of it will be considered a delinquency, if it be missing when inquired for.

Officers and heads of departments who fail in the due and right observance of the rules, or in enforcing the same, for the safety of the mine and workmen, subject themselves to degradation from their respective ranks. Workmen and boys who neglect the rules, or refuse obedience to the orders of the officers, are to be sent out of the mine, with a view to the investigation of the case, and the punishment of the offender for his misdemeanour, either by fine (not exceeding 10s.), or by legal proceedings before a magistrate, as the viewer may determine.

DISTRICT OF DERBYSHIRE, LEICESTERSHIRE, NOTTINGHAMSHIRE, AND WARWICKSHIRE.

“NON-FIERY” MINES, or MINES where SAFETY-LAMPS are only used occasionally, and for Exploring Purposes.

A COPY of the following rules and regulations, or so much as concerns the respective parties, shall be furnished to every miner or other person, when engaged to work, whether under or above ground. These rules must be taken care of, as the loss of them will be considered a delinquency if they be missing when inquired for.

RULES AND REGULATIONS.

Underviewer and Deputies.

THAT the underviewer and deputies shall see that proper stoppings, doors, gates, and caution boards, be immediately put where required, and that all roads and everything connected therewith, stables, &c., be kept clean and in good order, and shall be responsible for

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the general condition of the mine, and that they shall give a daily report as to the state of the mine, to be registered at the general office.

That they also see that these rules and regulations be strictly attended to by the workmen and every other person under their charge; or report to the viewer any breach of the same, in order that proper steps may be taken to ensure order and discipline throughout the works, with a view to the safety of the lives of the workmen and to the protection of the property of the owners of the colliery.

Underground Workmen.

1. That the underviewer or his deputy shall have the control of the workmen employed under ground, and, in cases where it is customary, on the pit bank.

2. That during the time of drawing coals, every workman or other person descending a pit, shall do so by the directions of the "banksman," or "puller-off," and in ascending the pit by the directions of the "onsetter." And that no person be allowed to give a signal, or ring the bell during such time, except the "onsetter" or other person duly appointed.

3. That no boy under ten years of age be allowed to enter the pits. Any parent or person evading this rule, or falsely representing his age, is liable to a fine by Act of Parliament.

4. That no persons whatever, except workmen at the colliery, be allowed to descend the shafts or remain upon the bank, without permission from the viewer or manager.

5. That no man or boy be allowed to go into any other part of the mine than where he works, under any pretext whatever, except by order from the underviewer or his deputy, or under the circumstances described in Rule 10.

6. That no person shall leave a lighted candle or other light in any part of the mine when leaving his work, or leave powder in a dangerous manner, or use it carelessly, or when forbidden to use it.

7. That when headings, drifts, or bolt-holes be proceeded with night and day, no person shall be allowed to leave his work until released by the person or persons comprising the next shift, or without permission from the viewer, unless prevented by illness or some other sufficient cause. All "headers" to throw coal, slack, clod, or rubbish six feet from the face.

8. That all doors in the mine be so fixed as to close of themselves, but every person passing through must close them, and particularly notice that they be properly fastened.

9. That all air-courses, bratticings, and headings be sufficiently large and near the face, according to the directions of the underviewer or his deputy.

10. That no person shall injure any air-course, brattice, door, stopping, fire the coals or wood; or put coals, slack, rubbish, or any other obstruction in any air-course; or do any other act whereby the lives of the workmen, or the safety and security of the mine, would be endangered.

11. That every person discovering any derangement of the ventilation, or injury to doors, stoppings, or brattices; finding any accumulation of choke-damp, or water; or coal, or wood on fire, shall immediately inform the underviewer or deputy of the same.

12. That every person finding any danger in the roof of main-roads or gate-roads, shall immediately give notice to the underviewer or deputy, in order that the same may be secured.

13. That during holing, "sprags" must be set according to the instructions of the underviewer or deputy.

14. That no workman be allowed to ride upon any underground road, without orders from the viewer or underviewer.

IN "FIERY" MINES, or MINES where it is customary to use SAFETY-LAMPS, frequently in the Working Parts of the Mine, the following RULES must be enforced, in addition to the preceding.

15. That the underviewer, deputy, or wasteman shall inspect the state of the workings and headings with a safety-lamp every shift, in order to ascertain that they be in a fit and proper state previous to any person commencing work, and that one of them shall go through the workings every morning, except Sunday, at two o'clock, for this purpose; and in case of any gas being found, or danger apprehended in any part of the mine, no person to be allowed to commence work there until the same be removed.

16. That no workmen be allowed to go down the pits in a morning until the wasteman has rung the bell for them to do so.

17. That in addition to examining the working parts of the pit, the wasteman shall examine with a safety-lamp every waste, old working, dam, fall in the roof, and air-course, every

every day, and report their state to the underviewer or his deputy; and should any such place be found "fiery," he shall caution the workmen against approaching it.

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18. That every old working, waste, or abandoned road, containing or likely to contain fire-damp, shall have a wicket-gate or some other protection put up against it by the wasteman, who shall keep the same locked, and upon no account allow any person to enter without a safety-lamp; and until a gate can be put up, a board with the word "fire" upon it, shall be fastened at the entrance of such old working, waste or abandoned road.

19. That any workman taking a naked candle, lucifer-matches, a lighted tobacco-pipe, or any other combustible matter, into any portion of the mine where safety-lamps are ordered to be used, shall be liable to instant dismissal.

20. That no person be allowed to "blast" coal, except by the express order of the underviewer, and in no case whatever where it is unsafe to use candles.

21. That any person using a safety-lamp who shall be found unlocking or opening it, lighting his tobacco-pipe at the wire gauze, blowing out the flame, removing the shield, or using the lamp in an improper manner, or in any way damaging the same, shall be liable to instant dismissal.

22. That every safety-lamp which shall have become in an unfit or unsafe state for use, by having oil spilled upon the gauze, or become crushed, or in any way injured, shall be immediately put out carefully, removed from the workings, and taken to the lamp-keeper, or other person in charge of the lamps. No lamp upon any account to be blown out at any time, but the flame to be extinguished by drawing down the wick.

23. That every person using a safety-lamp must deliver it with his own hand into the care of the lamp-keeper or other person appointed, when he has ceased using it.

Furnace Men.

24. That the men in charge of the furnaces shall pay particular attention to the barometers which are placed near them; that they at all times keep clean brisk fires, and use extra care and exertion when the barometers fall to "fire-heavy."

25. That the coals used for firing be not larger than a man's fist; that no accumulation of ashes or cinders be permitted upon the bars, and that all cinders be put into a proper place, and not removed until quite cold.

26. That the furnace-keeper must upon no account leave his post, until he has been actually relieved by the man, who is to take his place: as the furnace must not be left under any circumstances whatever.

THE following RULES are applicable to both "FIERY" and "NON-FIERY" COLLIERIES.

Instructions to the Enginewright.

27. That the engines, boilers, drums, ropes, chains, cages, and all other machinery used for the purpose of raising men and coals from the mine, must be inspected daily; the flat ropes must have particular attention paid to them, and be examined with great care.

28. That the pumps and pumping apparatus be kept in an efficient working state, and the water regularly pumped, and that all water-curbs be examined and cleaned out at least once a month.

29. That all flat ropes be carefully attached to the drum by clamps; and, when the cage is down, in no case must there be less than two whole rounds of rope upon the drum.

30. That any breakage or derangement of the machinery be immediately reported to the viewer and underviewer.

Instructions to Enginemen and Stokers.

31. That every engineman in charge of an engine shall attend to it constantly during his shift, and upon no account permit any person, except such as may be appointed by the viewer, to touch any part of the machinery or to remain in the engine-house; he shall also "hand" his engine with great care and caution when any person is ascending or descending the shaft, and run the ropes once up and down before men and boys descend in the morning, in order to see that the ropes be all right.

32. That the engineman keep his engine clean, and in efficient working order, and all the shafts and bearings well oiled; and in case of any failure or derangement of the machinery, he must report the same to the enginewright or any agent at the general offices.

33. That when the pits have ceased drawing at dinner-time, night, or on any other occasion, the rope must not be permitted to remain in the "upcast" shaft, and unless there be an "offtake" the cage must be raised above the level of the pit top, so as not to impede the ventilation.

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34. That there must be a bell or other signal, in every above ground engine-house connected with the pit bottom, and the signals as directed by the viewer, to be given by the "onsetter," or other person duly appointed, and carefully observed by the engineman.

35. That there must also be a bell or other signal in every under ground engine-house connected with all the "pass-bys," or sidings on incline planes, and the signals as directed by the "viewer," must be given by the "train boy," or some other person duly authorised by the under-viewer or his deputy.

The engineman must at all times use very great caution and pay every attention to these signals, and to any deviation from the regular course of his engine; and in case anything appears to be wrong, he must immediately stop it, and not proceed until the proper signal be given.

36. That the engineman or stoker shall attend, without fail, at the break, whenever men or boys are riding in the shaft or down incline planes.

37. That the pulley wheels and rollers above ground shall be regularly oiled by the engineman or stoker at least once a day.

38. That the boilers shall be laid off and cleaned from time to time, as the viewer or enginewright may direct.

39. That the stoker shall fire with regularity, in order that an uniform supply of steam be raised, the fires to be kept clear, and the bars free from cinders; he shall attend very particularly to all the safety-valves, that they may work freely, and to the feed-pumps, that a constant and regular supply of water be kept up in the boilers; he shall also assist the engineman to clean his engine, and shall see and take care that the ropes run freely and properly upon the rope rolls, and shall immediately caution the engineman if any derangement takes place.

Instructions to Banksmen and Onsetters.

40. That the head banksman shall have the control of the men employed on the pit bank, subject to the underviewer or other person placed over him.

41. That the banksman or puller-off shall also be responsible for the state of the pit top, and shall see that the frames are kept free from coal or dirt, and that they are cleaned at least twice every day, great care being observed that no persons ride in the shaft unless the frames be quite clean.

42. That the "onsetters" shall have the control of the pit bottom, subject to the underviewer, and be answerable for any injury to persons or machinery, or otherwise, arising from their neglect; attention must be paid that no coals be sent up the shaft, projecting beyond the cage.

43. That at least one "puller-off" or banksman, and one "onsetter," must be at their respective posts during the whole time "turnsmen" and boys are descending or ascending the shafts at morning and night.

44. That the "puller-off" or banksman and "onsetters" shall not allow more than eight persons to ride at once upon any occasion; no person to be allowed to ride with coals, slack, dirt, or if there be two cages in the shaft, not against a loaded cage, unless the shaft be divided; and no person to be allowed to get upon or off the cage at the pit top, unless it be standing upon the props.

45. That when the water is all drawn out of the sump, which will be done from time to time, the scaffold must be replaced immediately, and upon no account must the sump remain uncovered whilst the pit is at work.

46. That the banksman, or other person appointed, see the slides or conductors be kept well greased or watered, and examined carefully every day; also that any worn or defective parts be reported to the underviewer, or his deputy, or the enginewright, in order that the same may be replaced.

47. That the head-banksman, or other person appointed, shall examine all corves in use, daily, particularly the axles, &c., and shall require them to be oiled or greased; and such as are discovered to be out of repair must be set aside, and their condition reported to the underviewer or enginewright.

General Regulations.

48. That no men or boys be employed underground or discharged, except by the knowledge and consent of the manager or underviewer; and no person to refuse working at any other occupation than that for which he engaged himself, if required to do so either by the manager, underviewer, or deputy.

49. That no ale or intoxicating liquor be allowed to be consumed upon the colliery, whether under or above ground, except with the sanction of the viewer or underviewer, in cases of necessity.

50. That

50. That no miner, labourer, or workman whatsoever, be permitted on or about the colliery in a state of intoxication.

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51. That no person shall strike or ill-use another, create any disturbance in the mine or upon the bank, swear, or use abusive language, or interfere with an agent or foreman in the discharge of his duties, or ill-treat a horse, pony, or ass.

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52. That any workman negligently or wilfully disobeying these rules and regulations, or any other order of the underviewer, deputy, or foreman of the department in which he is employed, be liable to a fine of not exceeding 1 *l.* nor less than 1 *s.*, to be deducted from his wages, or instant dismissal from the colliery, or prosecuted as the law directs, at the option of the owner, viewer, or manager.

53. That all fines made payable by these rules and regulations be assessed and imposed by the viewer or manager, who will also give all orders of dismissal for breach or neglect of duty.

54. That in every case of an offence or neglect of duty for which the offender or defaulter may be prosecuted at law, or summarily convicted before a justice or justices of the peace, the fine imposed or power of dismissal given by the foregoing rules and regulations for the same offence or neglect of duty, shall not exempt the offender or defaulter from liability to such prosecution and conviction.

N.B.—The system of fines is established for the sole purpose of insuring the safety and comfort of the workmen, and the protection of the colliery.

FOREST OF DEAN.

RULES applicable to the Forest of *Dean* Coal and Iron Mining District.

1. THAT no person be allowed to go down either of the pits without an order from the firm, or their agents (except workmen at their proper fixed times). It is the duty of the engineman to see that this rule is attended to; and also that no workman or any other person, is, under any circumstances, to be allowed to go down in a state of intoxication.

2. No person to be allowed to ascend the pit without a proper signal being first given to the banksman, the kind of signal required, to be arranged by order of the manager or bailiff.

3. Should any part of the workings be found unsafe, either for want of propping, or bad ventilation, notice to be given at once of such fact either to the bailiff or underman, and the men working in such unsafe part are at once to stop, and not go on again until such part of the workings has been examined and pronounced safe.

4. It is particularly directed that no person employed in any way, or at any kind of work, should run any personal risk of loss of life or injury; but in case any danger should be seen arising from any cause, it shall be at once pointed out, either to the manager or bailiff of the works, who are hereby directed to have such danger removed without delay.

5. The engineman, banksman, and bailiff to see that the workpeople or others are not allowed to stand about the top of the shaft more than is necessary, and that no men or boys are to go up or down on a full tub. The banksman or hitcher shall be fined for any irregularity in the riding up or down of the men.

6. The bailiff or underman to examine all the air-courses, and see that they are in proper order for the ventilation of the mine. Also to see that all the water-courses are kept properly open for the effectual draining of the mine.

7. The ropes and chains used in drawing at each pit to be examined by the engineman and banksman; and in case of any defect being detected, immediate notice of the same to be communicated to the bailiff; and the engineman is not to allow any person to ascend or descend the shaft until such defect is rectified.

8. No person to be allowed to ride on the side of the bucket or cart, either in ascending or descending the pit.

9. All persons violating either of these rules, will be fined not less than three-pence, and not exceeding five shillings. The amount of such fines to be awarded by the firm or their agents; and the proceeds to be applied to the sick fund established for the benefit of the persons employed on these works.

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BRISTOL DISTRICT.

29 May 1854.

RULES and REGULATIONS to be observed by the Workmen, and all others concerned, at *Wethered, Cosham, & Bendall's Fucklechurch and Shortwood Collieries.*

1. THAT no person be allowed to go down either of the pits without an order from the firm, or their agents (except workmen at their proper fixed times). It is the duty of the banksman to see that this rule is attended to, and also that no workman, or any other person, is, under any circumstances, to be allowed to go down in a state of intoxication.
2. No person to be allowed to ascend the pit without a proper signal being first given to the banksman; the kind of signal required to be arranged by order of the bailiff.
3. Should any part of the workings be found unsafe, either for want of propping or bad ventilation, notice to be given at once of such fact either to the bailiff or underman, and the men working in such unsafe part are at once to stop, and not go on again until such part of the workings has been examined and pronounced safe.
4. It is particularly directed that no person employed in any way, or at any kind of work, should run any personal risk of loss of life or injury; but in case any danger should be seen arising from any cause, it shall be at once pointed out, either to the bailiff or clerk of the works, who are hereby directed to have such danger removed without delay.
5. The underman to examine the roof and props daily, and be answerable for their safety.
6. No person to be allowed to go into any part of the mine, except where his work requires him, unless so directed by the bailiff or underman.
7. The stalls to be kept filled up to within 10 feet of the face of the working.
8. The bailiff, or his underman, to be in attendance at the regular times for putting the men up or down, and to be responsible for order on such occasions, and not to allow more than the proper number to ascend or descend at a time; notice of the restricted number to be given at each pit to the engineman, banksman, and underman, by the bailiff. It is his duty also to see that the workpeople or others are not allowed to stand about the top of the shaft, or in the coalhouses underground, more than is necessary, and that no men or boys are to go up or down on a full tub. The banksman or hitcher shall be fined for any irregularity in the riding up or down of the men.
9. The banksman to be also held responsible for keeping order when the men are ascending or descending, and seeing that no more than the proper number ride at a time.
10. The bailiff or underman to pass through and examine all the air-courses at least once every week, and see that they are in proper order for the ventilation of the mine. Also to see that all the water-courses are kept properly open for the effectual draining of the mine.
11. The bailiff to see that no main air-way shall contain less than eight square feet in any part, all falls in which are to be immediately cleared out.
12. Any workman receiving any injury, to be taken home with all possible despatch.
13. No air-door to be left open; the stoppings to be kept perfectly tight, and a current of air carried along the working face.
14. The day's work in each pit to consist of not more than 10 hours, and to commence from drawing the first coal.
15. The ropes and chains used in drawing at each pit to be examined every morning, by both the underman and the banksman; and in case of any defect being detected, immediate notice of the same to be communicated to the bailiff; and the engineer is not to allow any person to ascend or descend the shaft until such defect is rectified.
16. Swearing is strictly prohibited in the mines, or about the works; and any one striking, or ill-treating another, or being the cause of any disturbance, to be fined.
17. No boys under 10 years of age to be allowed to work in the mine, and any parent or guardian falsely representing the age, is liable to be fined by the Act of Parliament.
18. No intoxicating drink to be taken down the pits or brought on the works, without the special sanction of the firm or their agents.
19. Every workman is held responsible for the tools or any other things used by him, the property of the company, until the same be delivered up to the person in charge from whom he received them.
20. The hewers to use their utmost endeavours to work the coal as large as possible, and keep it free from stone, shale, or foul coal; and any tub containing more than six pounds of stone, &c., when brought to land, will not be paid for.

21. The underman to examine the state of the mine every day, to ascertain that the ventilation is properly progressing, water-courses are properly open, and to report all other matters connected with the safety and efficient working of the mines. In case any defects are observed, the underman to report the same to the bailiff, when immediate steps are to be taken to rectify the same.

22. The engineer to inspect the engines, machinery, and boilers under his charge daily, and report to the bailiff or clerk of the works, or head engineer, in case of any defect, which is at once to be repaired. The engineer to attend to his own engine constantly, and not to allow any other person to work, or in any way interfere with the same, without orders from the company or their agents. The engineer to pay particular attention to the boilers, and to see that they are kept properly cleaned out, and regularly supplied with water.

23. The day's work for all the above-ground men to be 12 hours, namely, from six o'clock, A. M., to six o'clock, P. M., with the exception of Saturday, when the time for leaving off work is to be four o'clock. Half-an-hour to be allowed for breakfast, and one hour for dinner.

24. The carters, either under or above ground, to attend their own horses, and properly feed, groom, and water them night and morning; to be ready for their work not later than 7 o'clock, A. M., and not to leave off before 5 o'clock, P. M.

25. The truck system, in any shape, is strictly forbidden. It is expressly ordered that no agent or overlooker connected with the works be allowed to supply any workman, directly or indirectly, with goods or articles of trade of any description (except candles used on the works, which will be found for the convenience of the men, and for which a usual and fair price is to be charged).

26. No person to be allowed to ride on the side of the bucket, either in ascending or descending the pit.

27. No workman to be discharged without one week's notice being given (except in cases of misconduct), and no person employed on these works to leave without giving one week's previous notice to the clerk of the works.

28. Any workman absenting himself from his usual place without previous notice, or a satisfactory reason, and causing thereby delay or inconvenience, will be fined.

29. A sick fund is established in connexion with these works, to the benefit of which all the persons employed will be entitled as far as the funds will permit.

Those earning 15 s. per week, and above, to contribute 3 d. each weekly; those above 10 s. to pay 2 d. per week; those earning less than 10 s. to pay 1 d. per week. Such fund to be placed in the hands of a treasurer, to be chosen annually by the workmen themselves.

The pay from such sick fund not to exceed 7 s. per week, and not to be less than 2 s. per week.

The amount of such pay, and the time of its continuance, to be under the direction of a committee of five persons, to be chosen annually by the workmen employed on the works.

30. All persons violating either of these rules will be fined not less than 3 d., and not exceeding 5 s. The amount of such fines to be awarded by the firm or their agents; and the proceeds to be applied to the sick fund established for the benefit of the persons employed on these works.

WHITWOOD AND NEWTON COLLIERIES.

RULES and REGULATIONS to be observed and complied with by the Miners and Pitmen employed at the *Whitwood* and *Newton* Collieries.

1. That every morning the engineman and banksman examine and ascertain that all the driving wheels, pullies, ropes, &c., &c., are in good and proper working order, before the engine is put in motion.

2. That no person be allowed to descend the pit, until the bottom steward, or some other person appointed by him for that purpose, shall have been down and examined the works, and reported them all safe.

3. That safety-lamps be used in all or any part of the pits, when ordered by the bottom steward, and that he shall have power to discharge any man neglecting or refusing to obey his orders in that respect.

4. That the furnaces be kept burning freely day and night.

5. That not more than two men be allowed to ascend or descend, at one time, any shaft where single cages are used, or more than four men, any shaft where double cages are used.

6. That any bottom steward, "or person appointed by him," fireman, engineman, or banksman neglecting these rules be discharged forthwith.

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7. That if any miner or workman shall occupy a house or other premises, belonging to his employers, the rent of such house or premises shall be deducted "weekly" from the amount of his wages, and that he be considered a weekly tenant.

8. That a set of tools, consisting of six picks, one bottom pick, one hammer, two wedges, one buffet, and one riddle (if the coals are riddled at the bottom), shall be furnished to every miner, for which he is to be responsible, and return at any time he may be requested to do so; and in the event of any man leaving his employment, the amount of wages due to him shall be detained until the whole of his tools shall have been returned; and that all new shafts shall be charged twopence each, and deducted from his wages weekly.

9. That no boy under 10 years of age, or any females, be allowed to work in the pits.

10. That if, in the opinion of the banksman, any workman send to bank a scoop of coal not properly dressed, or not sufficiently filled, payment for the getting and hurrying of such scoop shall be forfeited.

11. That all men and boys employed in these pits are engaged for not less than a fortnight, and are to give and receive not less than a fortnight's notice, in writing, before leaving their employment, except in case of neglect of work, gross misconduct, or for the breach of any of these rules and regulations, when they may be discharged forthwith.

WEST RIDING COLLIERY.

RULES and REGULATIONS to be observed and complied with by the Miners and Pitmen employed at the *West Riding Colliery*.

No. 1. THAT every morning the engineman and banksman examine and ascertain that all the driving wheels, pullies and ropes, &c., &c., be in good and proper working order, before the engine is put in motion.

No. 2. That no person be allowed to descend the pits until the bottom steward, or some other person appointed by him for that purpose, have been down and examined the works, and reported them all safe.

No. 3. That safety-lamps be used in all or any part of the pits, when ordered by the bottom steward; and that the bottom steward shall have power to discharge any man neglecting or refusing to obey his orders.

No. 4. That the furnaces be kept burning freely day and night.

No. 5. That any bottom steward, "or person appointed by him," fireman, engineman, or banksman neglecting these rules be discharged forthwith.

No. 6. That if any miner or workman shall occupy a house or other premises belonging to his employers, the rent of such house or premises shall be deducted "weekly" from the amount of his wages, and that he is considered a weekly tenant.

No. 7. That a set of tools, consisting of six picks, one bottom pick, three hammers, three wedges, and one buffet, will be furnished to every miner, for which he is to be responsible, and return at any time he may be requested to do so. In the event of any man leaving his employers, the amount of his wages due to him shall be detained until the whole of his tools shall have been returned, and that all new shafts shall be charged 1d. each, and deducted from his wages weekly.

No. 8. That no boy under 10 years of age, nor any females, be allowed to work in the pits.

No. 9. That all men and boys employed in these pits are engaged for not less than a fortnight, and are to give and receive not less than a fortnight's notice, in writing, of leaving their employers, except in case of neglect of work, gross misconduct, or for the breach of any of these rules and regulations, when they may be discharged forthwith.

Prices of Collier's Tools at the West Riding Colliery.

	s.	d.
1 Shovel - - - - -	2	6
1 Hammer - - - - -	2	-
1 Tomahawk - - - - -	1	6
Picks, each - - - - -	1	6
Wedges, each - - - - -	-	3
Pick Shafts, each - - - - -	-	1

Witness.] The coalowners, inspectors, and workmen are unanimous in this, that every colliery should have a set of rules.

350. Mr.

3530. Mr. *Locke*.] You mean for the government of the workmen in conducting the colliery?—For the safety of the workmen. The rules we propose here, are simply with reference to the prevention of accidents; there are other rules with reference to the working of the colliery; those two sets of rules have heretofore been blended in one set, but we now suggest that the rules for the prevention of accidents should be kept entirely distinct from the rules as to the working of the colliery. Disputes often arise between the employers and the workmen about the working of the colliery, and therefore we think that the rules should be confined exclusively to the question of the safety of the mine. Then we proposed that the rules should be made applicable to the particular state and circumstances of each colliery, as in the same district there are scarcely two collieries alike in all the circumstances. We think that the different rules should be settled by the district generally in the first instance, and then to be varied according to the circumstances of each colliery, and that those rules should be framed by the coalowners themselves.

3531. Have you considered whether any set of general rules could be made applicable to every district and every colliery?—We have; we do not think that the districts are so much alike, as to justify us in agreeing upon any set of rules to be made generally applicable to every district or to all collieries; some of the rules or regulations might be embodied in an Act of Parliament, and made imperative upon all colliery owners.

3532. Have you, in the report, stated what those rules are?—We discussed them at the meeting *seriatim*.

3533. By resolution No. 1, the Committee understand that you leave it to the option of the coalowner to form such a set of rules as he may think applicable to the state of his colliery?—We do; we think the inspectors should enter into the discussion of the formation of those rules along with the coalowner, but that the inspectors should not have the power of enforcing any rules, except with the consent of the coalowner.

3534. How would you, by such a resolution as that, make it imperative on any coalowner to establish any rules whatever?—I think that if it were made imperative in the Act, that every colliery should be provided with a set of rules, it would of course be incumbent upon the coalowners to make such rules, and the Act might impose penalties for non-performance.

3535. If the rules were found totally ineffective and of no use whatever, as regards the safety of the men, how could the coalowner, under such a resolution as this, be compelled to make such rules as might be applicable to the district, paying due regard to the safety of the men?—If the coalowner should refuse to frame proper rules, and the inspector suggested additional rules, which he considered necessary, the responsibility upon the coalowner of not adopting those rules (if they were applicable and necessary), would be such as to induce him, in my opinion, to adopt any rules which he could, consistently with the state and circumstances of the colliery, carry out; if any accident should happen to the colliery in the face of such suggestions from the inspector, which were neither inserted in the rules nor carried into effect, it would be a very serious matter for the coalowner.

3536. Mr. *H. Vivian*.] I understand your opinion to be, that certain rules might be framed, applicable to every colliery, and which should be made compulsory by law?—Yes.

3537. And that other rules should be left to the judgment of each particular colliery proprietor?—Yes; but then I think the responsibility which would attach to the coalowner in not having a proper set of rules, would be sufficient to induce him to adopt the requisite rules. We have in the different districts all the various grades of management. You cannot by legislation enforce a proper system of management, you must leave it to the force of example, and to time, and not make it a subject of legislation; a more efficient state of management must be arrived at before the desired object can be attained.

3538. *Chairman*.] Has your experience proved that one district will follow the example of another?—I find districts which I visited some years ago very much improved in their system of working and ventilation. I have always found it impracticable to enforce upon districts which have not progressed in this respect, improvements, except at a very slow and practicable rate; and though I am quite satisfied that the mode of working, the system of management, and of ventilation, is very far inferior to that of some of the collieries in the north of

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England, (where the necessity has existed for so many years,) yet still I find extreme difficulty in enforcing upon those collieries a more efficient system of working and ventilation, except by time and experience; and therefore I am afraid that any hasty legislation, making it compulsory upon them to adopt improvements more rapidly than can be brought about by the course of events, might be attended by very injurious effects.

3539. *Mr. Thicknesse.*] Would there be any objection to the workmen having a voice in the framing of the rules?—I think not; I think the coalowners generally would be glad to hear any suggestions from the workmen, with reference to the rules regarding safety.

3540. *Mr. Vivian.*] I gather from your evidence that your opinion is, that certain rules may be framed with reference to the safety of the men, which would be applicable to all districts, and that such rules may be made compulsory and embodied in an Act of Parliament; while certain other rules also designed for the safety of the men must be left to the judgment of each colliery proprietor, to be framed in conjunction with the inspectors and the workmen of the district in which the colliery is situate?—Yes.

3541. *Chairman.*] The second rule applies to the appointment of Government inspectors; have you any observations to make upon that?—The answers from all the districts were, that an additional number of inspectors was not necessary, but we considered that this was probably more in the discretion of the Government than resting with the coalowners; we therefore put the resolution in the alternative, that in the first place an additional number of inspectors was not necessary, but that in the event of an additional number of inspectors being thought necessary by the Government, the prevention of accidents would be best promoted by a division of the districts, and the appointment of persons of sound practical knowledge and experience, of not less than 10 years' standing as practical managers of collieries.

3542. *Mr. Thicknesse.*] What do you mean by practical management?—We mean that the persons to be appointed should be mining engineers or viewers of collieries.

3543. Do you mean managers practically acquainted with underground workings?—Yes; who have had the management of underground workings; we put that in contradistinction to sub-inspectors and general agents.

3544. *Mr. Locke.*] I understand that to be in accordance also with the wishes of the delegates of the workmen, who were in favour of the appointment of sub-inspectors who should be persons well conversant with colliery matters?—We discussed that at great length at the meeting in April, the inspectors and delegates being present; and the resolution come to at that time was almost precisely the same as that we have been referring to, except that we did not then give any expression of opinion as to whether an additional number of inspectors was necessary or not.

3545. Was that resolution approved of by the delegates of the working miners?—I think Mr. Swallow agreed to it.

3546. *Chairman.*] The Committee understand that the delegates of the men wished to have an increase in the number of inspectors, but gave up the point of sub-inspectors, provided the inspectors were practical men?—I think they gave up the question of sub-inspectors on those conditions; certainly Mr. Swallow did, because he informed me, as chairman of the meeting on the 23d of May, that resolutions had been passed at meetings held at Hollingwood, Glodwick, Oldham and Duckinford, Bardsley, Denton, Blue Bell and Messhouse, Hurst Cross, and Mount Pleasant, to this effect, that the meeting was perfectly satisfied with the explanations given at the masters' meeting in London; and that I understand to refer to the question of inspectors, on condition that they should be composed of practical men of not less than 10 years' standing.

3547. At the same time, was it not fully understood that the delegates of the men considered an additional number of inspectors necessary?—They have since stated that they are not satisfied with the number of inspectors.

3548. *Mr. Thicknesse.*] Are the workmen in Northumberland and Durham in favour of the appointment of sub-inspectors?—They continue to be of that opinion.

3549. Are the workmen in Scotland also of that opinion?—It has been so stated by Mr. Phillips, the delegate from Scotland.

3550. *Mr. Locke.*] How do you know that the men in Northumberland and Durham,

Durham, adhere to their former opinion?—It was stated by Mr. Martin Jude, at the meeting of the 23d of May.

3551. *Chairman.*] The men think, that if they do not succeed in obtaining the appointment of sub-inspectors, the number of inspectors should be increased, and that those to be appointed should be persons of sound practical knowledge and experience, of not less than 10 years' standing?—It was so stated by the delegates who attended the meeting of the 23d of May.

3552. *Mr. Locke.*] By whom?—By Mr. Swallow and Mr. Martin Jude. I understood it, however, to be still the opinion of the working men in Northumberland, Durham, and Scotland that sub-inspectors should be appointed. There was a very long discussion, and several speeches were made upon it; and I certainly understood that the men of Northumberland and Durham, and I now find also of Scotland, were still in favour of the appointment of sub-inspectors, but that, supposing they could not succeed in that, then they were in favour of the appointment of men of sound practical understanding, mining engineers of 10 years' standing.

3553. *Mr. H. Vivian.*] You have stated that the inspectors ought to be selected from the class of persons acting as managers of collieries; as in the North of England, you have two managers to each colliery, the viewer having the general management, and the resident under-viewer having the special and detailed management, from which class of men would you select the inspector?—If the under-viewer has had experience of 10 years in the management of collieries, I should not object to him, because we consider that such a man, of 10 years' standing, would be an efficient person.

3554. You would not go below that in the point of rank?—Not below that; we think that it would interfere with the discipline of the men, and would have a tendency to produce confusion in the management, and would consequently not diminish the number of accidents.

3555. Do you consider that in all cases head viewers would be qualified to act as inspectors?—If they had had 10 years' practical experience in mines. We think it dangerous that young men who have not had practical experience should be appointed inspectors, because they may be sent into districts where the management of mines are deficient, and where they are very likely to make suggestions which it is impracticable to carry out. We think, therefore, that they should be men of mature and sound practical understanding, who can judge, not only what is necessary, but of the practicability of carrying the suggestions into effect. We find suggestions made which are impracticable to be carried out in some collieries, such collieries not being in such a state of efficiency of management or advancement in mining efficiency to adopt such suggestions.

3556. The latter part of the resolution suggests that Government inspectors should not practise as mining engineers. What salary do you consider sufficient to ensure the entire services of such men?—We came to a resolution upon one of Mr. Dunn's questions, that the salaries of the inspectors are not sufficient, more especially if their entire services are to be devoted to the duty of inspection. We have not, as a body, formed any opinion as to the amount of salary they ought to receive.

3557. *Mr. Thicknesse.*] Is it your opinion that all the inspectors should receive the same salary and be men of the same grade?—I think it desirable that a difference should be made; that there should be a graduated scale for the purpose of inciting emulation in the discharge of their duties, so that as they possessed a more extended experience they should receive a higher salary, when they became, of course, more efficient in the duties of their office.

3558. *Mr. H. Vivian.*] From your own knowledge of the remuneration which men of that description obtain, what salary do you think the Government ought to give?—I think varying from 600 *l.* to 800 *l.* a year.

3559. *Chairman.*] Supposing that the Government were to decide upon appointing a good many more inspectors, and upon increasing their salaries in the proportion you suggest, it would of course entail a heavy expense upon the Government. Was it discussed at the meeting whether the coalowners would be prepared to pay any part of such expense?—We think it would be a very bad principle for the Legislature to establish, that the coalowners should pay for the Government inspectors.

3560. The third resolution refers to the removing of responsibility from the
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owners and managers of the mines?—We thought that increasing the responsibility of the owners, and not lessening it, would tend to diminish the number of accidents; and we strongly object to give to the Government inspectors of mines any power to interfere with the system or the details of working the mine. We have some doubts about the powers of the present Act in that respect, and the inspectors themselves differ upon that point, some of them thinking that the Act gives them that power; and we think it desirable that we should come to a clear understanding upon the subject, and that the Act should state specifically that the inspector should have no power to interfere with the system or the details of working the mines.

3561. Referring to the evidence given before this Committee by the inspectors themselves, it would seem to be their opinion, generally, also;—There is a difference of opinion amongst them, and they have acted accordingly.

3562. *Mr. Thicknesse.*] If a coal pit is in a highly dangerous state, in the opinion of the inspector, and the coal proprietor refuses to make any alteration, what course would you adopt?—The inspector would under the Act report to the Secretary of State, but he has no power at present to do more than that.

3563. You consider that an interference that ought not be allowed?—That is not the sort of interference which I refer to; that is an interference with reference to the safety of the mine, and not with the working of it.

3564. *Chairman.*] If a mine should be reported, and the owner warned once or twice, and an accident occurs through his own negligence, there is no power at present to punish the owner in any way?—I think the penalty in the Act and that of the general law would punish him.

3565. The present Act was found insufficient in the case of the Bent Grange accident?—I am not aware of the nature of that case. I think it is incumbent upon the owner of the mine to put it into a safe state; and that question was discussed, whether the inspector should have power to stop a mine, in case of its being dangerous. It was proposed that if such a power were given to the inspector, there should be an appeal from him, and that such appeal should be made to mining engineers of practical knowledge.

3566. *Mr. Thicknesse.*] Did the meeting you have referred to come to any resolution on that subject?—It did not; it was considered a dangerous power to confer, but we stated that if it should be thought advisable to give them such powers, a court of appeal should be constituted.

3567. *Mr. H. Vivian.*] That you do not recommend?—We have not expressed any opinion about it one way or the other; there is a difference of opinion on the subject.

3568. *Mr. Thicknesse.*] Might not a case arise where the inspector should say that the mine was decidedly unsafe, and the owner of the colliery that it was perfectly safe?—Such cases have arisen, and no doubt would arise.

3569. How would you provide against that contingency?—I think the rules of each colliery should meet that case.

3570. *Mr. Locke.*] Do you mean that the rules which you think should be compulsory on the owner would embrace a case of that kind?—I think so; I think it is incumbent upon the coalowner to have rules to embrace all such cases; and the rules which I have put in from Northumberland and Durham do embrace those cases.

3571. You have not pointed out any mode by which the Government would be enabled to enforce the rules upon unwilling coalowners?—No; I think it is a question of very serious consideration. If obligatory to have rules, the responsibility of coalowners would be sufficient to enforce them.

3572. Unless the rules were made compulsory, the difficulty put by the Honourable Member would not be met?—Without some power or inducement to enforce the rules, they would not be operative; but the rules are to be carried out by the underground staff of superintendents, so as to render the mines safe; and if they do not perform those duties, certain penalties attach.

3573. You have given in a set of rules applicable to Northumberland and Durham, and you say that these rules are not made applicable to all other places?—I have not gone into the question of the rules of other places; but I should say, wherever a mine is unsafe, that rules should be made to apply to such mine to render it safe, although in another district.

3574. *Mr. H. Vivian.*] That is one of the general rules which you say might be incorporated into an Act of Parliament?—I think such a rule might be embodied

embodied in an Act of Parliament, so as to make it imperative on each coal-owner that he should have a set of rules to provide for the safety of the workmen at all times.

3575. Mr. *Locke*.] What objection do you see to that?—I see no objection; I think that in framing the clause, making it imperative upon the owners to provide rules, the clause might be so drawn as to make it incumbent on the owner to provide the requisite rules regarding safety.

3576. Mr. *H. Vivian*.] I understand the opinion of the meeting, as embodied in the Resolution No. 3, and Resolution No. 4, is a simple alternative?—Yes.

3577. Which they do not recommend?—We do not very well know what powers may be given to the inspectors, and we say, if those powers are such as will enable them to stop the mine, or to do anything to the prejudice of the coalowner, and there is reasonable doubt on the part of the coalowner as to the practicability of carrying out the suggestion, that then there should be a court of appeal from the inspector.

3578. But you do not recommend such an arrangement?—We say it is not necessary that the inspectors should have power to interfere with the working of the mines; we think that their powers should only be made to apply to all circumstances relating to the safety of the mines.

3579. *Chairman*.] Supposing, for instance, in a fiery colliery a man were found driving without air for 30 yards, and the inspector went in and considered that dangerous practice, and directed that he should not work more than 20 yards before the air?—I think the inspector should have no power to say whether the coalowner should drive 20 or 30 yards, but to see that the men had a sufficient quantity of air; and this either is, or should be, provided for in the rules of the colliery.

3580. Mr. *Thicknesse*.] Is it your opinion that the inspector should give notice that the ventilation was insufficient?—Certainly; I think that all the inspectors should do so; to see whether the man has or has not a sufficient quantity of air, leaving it to the owner to say whether the boards should be driven 20, or 30, or any other number of yards, but making it imperative upon the coalowner that it is equally safe for the workman to drive 30 yards or 20 yards.

3581. *Chairman*.] If a coalowner were to consider his system safe, or rather refused to carry out the suggestion of the inspector, upon a statement that his ventilation was not in a safe state, and an accident occurred, what power would the Legislature have to interfere and to punish him?—The common law of the land.

3582. It was found in the case of the Bent Grange accident that the common law of the land could not punish the owners for the very great dereliction of duty of which they had been guilty, involving the lives of 20 men, not only after they had been repeatedly warned, but after they had promised to carry out the suggestions of the inspector, and had failed to do so?—I think that the same law which applies to other parties in the case of death resulting from carelessness ought to be enforced with reference to coalowners; if the law is not sufficient, let it be made so; but do not single out the coalowner as being responsible to a different law from other parties.

3583. You think it would be better to alter the law of the land generally?—I think so; I think it is not right to single out the coalowner, and to place upon him a responsibility which does not exist with reference to the public generally.

3584. Have you any remark to make with reference to the 5th resolution?—A variety of suggestions are made, both with reference to the coroner himself, and also with reference to the jury. We thought that the coalowners should not interfere in any way with the appointment of the jury, and that all we could do was to declare our willingness that the jury should be of a strictly impartial and independent character. It was represented that in several cases it had not been so; in these cases we considered it must have been the fault of the coroner, seeing that he had it in his power to make it strictly impartial. A wish was then expressed by the workmen that the relatives of the deceased should, by law, be represented at the inquest, to which the coalowners made no objection, on condition that they should be similarly represented. At the same time I must be allowed to state that it was not by any means a unanimous conclusion, that it was desirable that such attendances should be allowed at the coroner's inquest; some gentlemen being of opinion it would create feelings of asperity between the coalowners and the workmen, and that the coroner

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having it at present in his power to call in practical persons to assist him, might also, if he thought proper, allow the coalowner and the relatives of the deceased to be represented at the inquest.

3585. The 6th resolution provides for adequate artificial means of ventilation, to which it appears there was an amendment, that effectual means of ventilation should be provided?—It was mentioned at the meeting that your Committee had raised the question, if it would not be advisable that artificial means should in all cases be made imperative; some of the Scotch representatives stated that the question of what was, or what was not, artificial ventilation had been raised in some of the Scotch courts, and had led to a difference of opinion, and in some cases to litigation. It was asked whether the prolongation of a pit in the shape of a chimney was an artificial mode of ventilation, that being the plan adopted in several mines in Scotland. At the same time, I was instructed to state, what I believed was the unanimous feeling of the meeting, that in moving the amendment it was not intended to lessen in any degree the safety of the mine, or to suggest a less effective mode of ventilation; it was thought that the words “effectual means” met all the cases better than the words “artificial means.”

3586. *Mr. Locke.*] With the exception of the difference between the word “artificial” and the word “effectual,” the two resolutions seem to be precisely the same?—Precisely the same.

3587. Excepting as regards the difference in those two words, the feeling of the meeting was unanimous?—Yes; we considered that making it imperative upon the coalowner to use such a mode of ventilation as should produce at all times a sufficient current of pure air was the best expression; the effect to be produced being the sufficient current of air; the mode of producing ventilation by means of simply raising the shaft would not at all times probably meet the case. I think there should be in all mines such a mode of ventilation as will insure, in summer and in winter, and at all times, without reference to the state of the atmosphere, a sufficient current of pure air.

3588. *Chairman.*] Which cannot be attained by natural means?—Which cannot be attained by natural means. The meeting was of opinion that the means should be such as to produce a sufficient quantity of air, but they differed as to the mode of accomplishing it. In Scotland they raise a chimney over the shaft, which in some months of the year is amply sufficient; and they say, if that is the case, what more can be expected of them?

3589. The majority of the meeting considered that the simple raising of the shaft was not sufficient?—Twenty-four of those present at the meeting said, “You must always have a furnace or steam-jet, or some other artificial mode of ventilation;” the others said, “We find that by raising the shaft (admitting such mode as well as artificial means) we produce, in some cases, a sufficient quantity of air, and therefore we say the word ‘effectual’ is sufficient for legislative purposes.”

3590. The 7th resolution states that increased education would greatly tend to decrease the number of accidents arising from the ignorance and recklessness of the miners themselves?—That was the opinion of the meeting; it was the opinion of the meeting that it is very desirable that the miners should be educated, considering that the more they were educated, the more likely they were to contribute towards the prevention of accidents. In this resolution it is recommended that the daughters of colliers should be educated as well as the sons; some gentlemen being very strongly of opinion that the comfort and order consequent upon a better education of the wives and daughters of colliers, by improving their social habits, would render them more likely to obey orders, and promote discipline in the mine. It seemed to be the general opinion that some scholastic education should be enforced. It was stated that in some of the districts the collieries were too small to pay for separate schools, and that they had placed themselves in connexion with other schools in the district; and therefore the meeting came to the resolution that it was incumbent upon the owners either to provide a school, or to see that the boys and girls were accommodated in some other institution. The question was then discussed, whether any general enactment should be passed to enforce education; and during the proceedings of the first day, Mr. Tremenheere was present, who stated that such a Bill was in preparation; we thought therefore it was not desirable

desirable to take any further cognizance of it, except to express our opinion in favour of such a measure. N. Wood, Esq.

3591. Mr. Tremeneere says that he has had a meeting with the delegates of the workmen, and that he understands they are willing to contribute each 2*d.* per week?—Such a measure would, I think, meet the approbation of the coalowners, but it could not be done voluntarily. I made the experiment at a colliery some years ago, but the bachelors ceased to pay after a certain time.

3592. Could it not be done by contract with the workmen?—Yes; but it would be very onerous unless made general. 29 May 1854

3593. The 8th resolution approves of benevolent funds, but thinks that the arrangement of them should be left to the discretion of the coalowners and colliers?—The meeting was favourable to such a fund.

3594. Mr. *H. Vivian.*] Mr. Tremeneere's scheme is, that between the ages of 10 and 14 each boy should be compelled to attend school 150 hours every six months, being at the rate of one hour per day; do you consider it desirable to compel a boy, who has been working underground for several hours, to go to school?—I think it quite practicable to carry it out. The coalowners in the North have discussed this with Mr. Tremeneere, and I believe that the general opinion there is, that arrangements might be made to carry out such a system without prejudice to the interests of the coalowners.

3595. Would you not rather make it illegal to employ boys underground before the age of 12 years?—I think not; the great evil with reference to the education of the boys is, that ceasing to go to school at the age of 10, they lose everything they have learned, and become almost as ignorant as if they had not been to school. The great point is to continue the education up to, say 14, which would, I think, be very beneficial in an educational point of view. I think that arrangements might be made to give them that education without interfering much with their work.

3596. You do not consider that a boy, fully educated up to 12 years of age, would be better educated than a boy whose education ceases at 10, and who has 150 hours of schooling every six months?—I think that carrying it on to the age of 14, is better than leaving it off at 12 altogether. I think the age of 12 rather too late a period for boys going to work.

3597. Mr. *Thicknesse.*] Might it not be desirable to prohibit a boy under 12 years of age going down into a coal-pit, unless he could read and write?—The other arrangement has been considered, and is thought the best for the interest of all parties. The difficulty we find is in preventing boys going down into the pits at an early age, as the parents are always pressing them to go to work.

3598. Would it not be an inducement to the parents to see that their children were educated?—I think that in many cases their circumstances are such that they are not able to do so.

3599. *Chairman.*] You would let them go down at an earlier age, but would require that they should be able to read and write before they went down?—Yes, and to continue their education to 14. I am not satisfied it would be to the interest of the miners generally that they should be kept out of the pit till they are 12 years of age, although a different statement is made in the petition of the workmen to the House of Commons. I am sorry to differ with them in that opinion.

3600. Mr. *Cobbett.*] How many hours in the day do you contemplate a boy being down in the mine?—Twelve hours.

3601. If he worked 12 hours every day, do you think he would derive much advantage from an hour at school?—In the North of England the practice is to work 11 days in the fortnight, and therefore they might occupy one day at least in the fortnight at school.

3602. *Chairman.*] Resolution No. 11 expresses a desire, on the part of the meeting, for the establishment of a central mining school or college; what observations have you to make upon that?—The meeting was decidedly of opinion that the most effectual mode of preventing accidents was to endeavour to raise the capacity of the subordinate persons engaged in conducting the mines of this country to a higher standard than at present. It is known that the management of many mines in the country are entrusted to managers of inferior education, and there is no doubt that those districts are becoming, in consequence of deeper workings, more dangerous; the meeting was therefore of

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opinion that if any system of mining tuition were established, it would be attended with very beneficial results. In Newcastle, an institution of mining engineers has lately been established, and it is proposed that in connexion with that institution a mining school or college, of a purely practical nature, should be established, where young men intended to act as mining engineers, or in the lower grades of the management of mines, should receive an education suitable for their occupations; that district schools should be established in connexion with such an institution, where the education should be adapted to mining instruction; and that such a school [or college being in a district where mining operations are carried to a high state of perfection the pupils would have an opportunity of observing the mode of conducting mines in that district. Of course it would be difficult to establish schools of that kind without funds; and although the coalowners have expressed themselves very favourable to such a measure, still we think that being a national question, it is a very proper subject for Government to encourage.

3603. Have you any observations to make with reference to the resolutions upon the report of the Government inspectors?—The first proposition is with reference to what should be put into the Act of Parliament; the next is about iron-stone mines; but as the iron-masters were not represented at the meeting, we could come to no resolution upon that subject. With reference to the third suggestion, the meeting was decidedly of opinion that there should be a personal interview between the inspector and the coalowner upon the subject of any complaint, and that after such personal interview, the inspector might report to the Government if the coalowner did not satisfy him as to such complaint.

3604. The fourth suggestion applies to plans, as to which you propose to give the coalowner six months?—Yes; we thought that six months should be given to him to provide plans.

3605. You do not enforce that with any penalty?—We empower the inspector to order plans to be made at the expense of the coalowner.

3606. By the fifth suggestion you provide that every shaft which is out of use, or used only as an air-pit, should be securely fenced, and that you enforce, by a penalty of 1 *l.* per day, after a written notice; would there be any objection to a similar course of proceeding with reference to the plans?—It was thought better that the inspector should have the power of ordering the plans to be made.

3607. But supposing a man could not pay for the plans, the expense would fall upon the inspector?—The meeting was decidedly of opinion that it was advisable that plans should be made, but there was a difference of opinion as to the particular mode of enforcing it upon the coalowner; it was thought that there should be a difference between existing collieries and pits hereafter to be sunk as to the system of enforcing the production of plans.

3608. Will you explain the sixth suggestion?—It was proposed not to extend the Act to the protection of people trespassing; it is at present confined to persons working in the mine who have a right to be on the premises, but the shafts being situated upon private property, it was considered that the coalowners should not be made responsible for accidents happening to people not connected with the colliery, because such persons had no business to be there.

3609. The seventh suggestion is, "That every working and pumping shaft be fenced on two sides when at work, and on all sides when not at work"?—We propose that this should be put into the rules instead of being embodied in the Act of Parliament, because there is such a variety of circumstances in the different mines; in some of the districts it might be done in a particular way which would be impracticable in others, and we therefore considered that the mode of doing it should be provided for in the rules.

3610. The eighth suggestion is with reference to the lining of the shaft with bricks, stone masonry, iron or timber?—The only part we disagree with is that which requires the shaft to be so lined, "unless the natural strata be equally secure," which means equally secure with iron, which is impossible.

3611. *Mr. Thicknesse.*] The inspectors contemplate all pits, do they not?—Yes; it is quite impracticable to line all the existing pits with bricks and stone masonry. We have no objection that they should be made safe, but we object to the mode suggested of making them equally safe with iron, &c.

3612. *Chairman.*]

3612. *Chairman.*] The same observation would apply to the tenth, eleventh, twelfth, and thirteenth suggestions?—Yes, that they should be provided in the rules.

3613. *Mr. Locke.*] Do you see any reason why every steam-boiler should not be provided with a safety-valve?—No; we do not object to its being done, but we consider that it would be more properly provided for by the rules of the colliery.

3614. Do you not consider this a very desirable rule in the North of England?—Generally.

3615. Why should you object to its being included in the Act of Parliament?—Because it could not in the Act of Parliament be provided for so much in detail, as in the rules of the colliery.

3616. There would be no great detail in a stipulation in the Act, that every steam-boiler should be provided with a safety-valve?—There should be two valves; but there are a great many other things connected with a steam-engine which it is necessary to provide for; and it is better that the rules should take cognizance of every part of the machine, than that one part should be made the subject of an Act of Parliament, and the other the subject of rules; we thought it much more convenient that the requisite safety generally should be provided for by the rules.

3617. If we had perfect confidence in other districts adopting the same rules as prevail in the North of England, there might not be much difficulty; but with reference to those districts which would raise an objection to the framing of such rules, how would you advise this Committee to proceed?—I see no objection to the Act declaring that all boilers should have two safety-valves, and that they should be provided with proper steam-gauges and rules generally.

3618. Are there a great many points in the rules you handed in for Northumberland and Durham which might equally be embodied in any general Act?—Some of them might; but it would require very great care and discrimination.

3619. *Mr. Cobbett.*] I understand you to say that there are certain rules applicable to all mines which you would enforce by Act of Parliament, enumerating them?—Yes; I think that every rule which is applicable to all the mines of the country might be made the subject of legislative enactment; but it would require very great care not to include in the Act any rule or provision that was not universally applicable.

3620. Have you, in your own mind, sketched out those rules which you consider applicable to all mines, and which might safely be put into an Act of Parliament?—I am not at present prepared to specify them. I think that it is a very difficult question; and, seeing the difficulty, we thought it desirable that they should be embodied in the rules which it should be made imperative upon every colliery to establish. I have no doubt that, if such a system were adopted, all the collieries would, in a short time, have all requisite rules.

3621. Those, I understand, are rules that you would not make imperative by Act of Parliament?—Such are not general in their application.

3622. Can you give the Committee any notion of those rules that you consider generally applicable?—I could do so at a future sitting of the Committee, but not at this moment.

The *Chairman* stated, that he had received from H. S. Tremenheere, Esq., the subjoined letter, which was directed to be inserted upon the Minutes as an addition to his evidence.

Sir,

105, Pall Mall, 27 May 1854.

It will be in your recollection that, in the course of my evidence before the Committee of which you are Chairman, I had occasion to state, that the provisions of the measure which I had ventured to propose, for obliging all boys working in collieries or ironstone mines, between the ages of 10 and 14, to attend school for 150 hours every six months, had received the general assent of the committee of coalowners and agents recently assembled in London, and also of the delegates of the working men from the principal coal districts in England and Scotland, to whom the principles and details of the proposed measure were explained by me at a meeting of the above-named committee of those delegates and of the underground inspectors of mines.

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The delegates, after receiving my explanation of certain difficulties and objections that occurred to them, expressed their intention of returning to their respective constituents, and taking their opinions upon the proposed measure.

They sought an interview with me again yesterday, after an interval of about three weeks, and stated to me the following conclusions, which are so satisfactory that I think myself justified in communicating them to you, and through you, if you should think proper, to the Committee.

There were present, Mr. David Swallow and Mr. Allen Tetlow, delegates from Lancashire and Cheshire; Mr. Martin Jude and Mr. Edmund Gray, delegates from Durham and Northumberland, and Mr. Thomas Philip, delegate from Scotland.

They stated to me as follows :—"After communication with the men in our respective districts, we find they are unanimous on this point, namely, that they are all willing that a certain sum, say not exceeding 2 *d.* per week, should be stopped out of their wages for school purposes, provided that the men are fairly represented on the committee which manages the particular school to which their contributions are applied."

Mr. Martin Jude stated, "that the colliers of Northumberland and Durham would prefer a system by which the boys working underground between the ages of 10 and 14 should only work half of each day, and go to school the other half, according to the system of relays in operation under the Factory Act."

Mr. Thomas Philip, from Scotland, stated that this is also the opinion of the colliers of Scotland.

Mr. Allen Tetlow expressed the opinion of the colliers of Lancashire and Cheshire to be, "that they have no objection to the provision requiring boys between 10 and 14 to go to school for 150 hours every six months, but they desired that it should be so arranged as to oblige them to extend the time regularly over that period, by going to school three days a week for two hours each day, or as many more hours as they please, but only two hours to count towards the 150. They think that so much ought to be compulsory, because so many parents, from false indulgence, are indifferent to the education of their children."

Mr. Edmund Gray, from Durham, although "thinking it highly desirable that such a plan of distributing the schooling equally over the whole time should be general, is nevertheless aware that in many instances where boys live at some distance from the pits, and from other circumstances, they would not be able to attend school with the regularity above mentioned, but might at other times, by regulations as to hours of work between the men and their masters, or by a partial system of relays, as would be practicable in Northumberland and Durham."

I stated that I felt confident that these resolutions and sentiments of theirs would be taken to be a convincing and most gratifying proof of the progress of intelligence among the most enlightened of the working population in those districts, and of the growth of that mutual confidence between the men and their masters which was so desirable for all parties. I was persuaded that the desire expressed by the colliers of Northumberland and Durham and of Scotland for so large an amount of compulsory attendance at school, for their sons between the ages of 10 and 14, would have an excellent effect as an example, although the circumstances of other large mining districts would not permit of such a measure being applied to them by law. The measure proposed was the only one applicable to the latter districts; but there would be nothing to prevent arrangements being made in the former, between the employers and their men, for a system of relays, wherever practicable, by which the boys between the ages mentioned would be enabled to give a greater amount of time to education than was included in the proposed measure. They agreed with me that an important point had been gained by ascertaining and recording these facts and opinions; and that nothing now remained but to trust to the wisdom of the Legislature to decide upon the plan which, upon the whole, would be most suitable to the circumstances and the wants of the entire mining population referred to.

E. J. Hutchins, Esq., M. P.

I have, &c.
(signed) *H. Seymour Tremenheere.*

P. S.—Although Wales was not represented in the committees above referred to, I believe, as I stated in my report to the Secretary of State for 1852 (p. 37), that the proposed measure would be carried into effect with the concurrence of nearly all persons of leading influence as employers of mining labour in Wales, as well as in the above-named districts of England and Scotland, as well as in Yorkshire and the Midland Counties. I believe that some reluctance towards it has been expressed in the small district of Somersetshire.

Martis, 30^o die Maii, 1854.

MEMBERS PRESENT.

Mr. Hutchins.
Mr. Cobbett.
Mr. Ingham.
Mr. Thicknesse.
Mr. Farrer.

Mr. Locke.
Mr. Cayley.
Mr. H. Vivian.
Viscount Goderich.

EDWARD J. HUTCHINS, Esq., IN THE CHAIR.

Nicholas Wood, Esq., called in; and further Examined.

3623. *Chairman.*] AT the last meeting of the Committee, you were requested to consider what rules you thought might be so generally applicable as to be embodied in an Act of Parliament; have you taken that matter into consideration?—I have.

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3624. State your views upon that point?—The first resolution of the coal-owners states, that rules for the prevention of accidents should be framed at each colliery. I think that it might be made imperative upon every coalowner to provide a set of rules, applicable to the particular state and circumstances of his colliery.

3625. Who should decide what are proper rules; would you leave that to the decision of the coalowner?—I think that that must be left to the responsibility of the coalowners.

3626. *Mr. Locke.*] I understood you to say yesterday, that the coalowner would not object to receive assistance, in that respect, from the Government inspectors, and also from proper delegates of the workmen?—I think suggestions might be made by the inspectors and by the men of the colliery; not by delegates of any union or society. The men belonging to the colliery should be at liberty to suggest rules, and those should be taken into serious consideration by the coalowner, who should decide whether they ought to be adopted or not, leaving to him the entire responsibility.

3627. *Chairman.*] If a coalowner so far neglected his duty as to frame no rules applicable to his colliery and his district, how would you deal with him?—I think that the suggestion of any rules by the inspector, and a refusal on the part of the coalowner to adopt them would be a serious responsibility, seeing that the law generally would take cognisance of his not framing a proper set of rules, in the case of an accident happening. Anything that would relieve the coalowner of the responsibility would tend rather to increase than to diminish the number of accidents.

3628. Have you formed any opinion upon the second resolution of the coal-owners?—We merely there state what description of persons should be employed, leaving it to the Government to decide whether there should be any additional number of inspectors or not. In the third resolution we state that it would be injurious that any legislative enactment should interfere with the working of the collieries.

3629. You propose to leave the degree of interference the same as under the present Act?—It should be made more clear, because the present Act has been construed, by some of the inspectors, as giving them power to interfere with the working of a colliery. In the case of the Ince Hall accident, Mr. Dickinson made a statement that the mode pursued there was dangerous, and that it should be altered.

3630. His making a statement that it was most dangerous, and recommending that it should be altered, was not alleging that he had vested in him the power of altering it?—No, he only expressed an opinion, but he considered he had the power of interfering.

3631. I do not understand that the case you have referred to proves that the present Act gives the inspectors any power whatever; you say that the inspector

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said that the plan of working was not a proper one, and recommended that it should be altered; I presume you do not wish, by any Act of Parliament, to prevent his making a suggestion or a recommendation?—I think it ought to be clear that an inspector should not interfere with the mode of working; anything of that kind must tend to weaken the responsibility of the coalowner.

3632. When you say “interfere,” you would not, I presume, say that he should not recommend them to cease a mode of working which he considered dangerous, and from which mode of working a serious accident had happened?—I think it would be incumbent upon the coalowner, in pursuing any particular mode of working, to keep the mine always sufficiently safe. You will observe that the mode of working pursued at the Ince Hall works is that which is adopted generally in the North of England; it was not that the mode of working was of itself dangerous, but simply that it was considered so by Mr. Dickinson when applied in that district.

3633. It was stated that they could not remove the pillars, because the mine was under the town of Wigan?—We have many such cases in the North of England.

3634. *Mr. Locke.*] You say that there is an ambiguity in the construction of the present Act?—Yes.

3635. You wish that cleared up?—Yes.

3636. You think that the inspectors should have no right of interfering with the mode of working, but that suggestions might be made by them, which suggestions would be favourably entertained?—Yes, if practicable and judicious.

3637. But you decidedly object to a right of interference?—I do; I think that it would weaken the responsibility upon the coalowner, and so tend to increase rather than to diminish the number of accidents.

3638. *Mr. Thicknesse.*] Do you not think that where the inspector is made acquainted with a system of working which he considers dangerous, as in the case of the Arley mine, he ought to point that out to the owner of the colliery?—I see no objection to his pointing it out, but in the case referred to it was a question of judgment; the colliery proprietors brought in the most experienced mining engineers they could find, who said that the inspector was wrong.

3639. Do you not think that the inspector is bound to act upon his own opinion rather than upon the opinion of men from the North, who may be prejudiced?—That may be, but he may be wrong; and if so, it produces confusion without any practical effect.

3640. If the inspector is not to interfere in that way, of what use is he?—To see that the mine is safe, throwing upon the coalowner the responsibility of making it safe if it is not so. If the inspector interferes with the mode of making the mine safe, then he interferes with the mode of working or managing the mine, and takes upon himself and relieves the manager from responsibility. That is not the principle of the Act; the principle of the Act is, that he shall not interfere in any way with the mode of working.

3641. *Mr. Locke.*] As I understand you, the great majority of the practical engineers, in the case you refer to, gave an opinion adverse to that of the inspector?—The mining engineers who were called in did so.

3642. I understand it to be your opinion that the opinions of those persons should be acted upon in preference to that of the Government inspector?—Yes; the manager acting under such advice, and not the inspector, being the responsible person.

3643. If in such a case as that the opinion of the Government inspector is to be taken and acted upon, you probably consider that Government should take the responsibility of the Act also?—Either the Government or the Government inspector; certainly it should relieve the coalowner of the responsibility.

3644. You consider that undesirable?—I do; in this particular case, the managers of the mine fortified themselves with the opinions of other persons or talent and experience; and the manager, acting on their opinions and advice, assumes the responsibility.

3645. *Mr. Cobbett.*] I understand you to say that Mr. Dickinson’s interference was an interference by command; that is, that he commanded that the colliery, which had been previously worked in one way, should from that time be worked in another way; is that so?—No; he did not put it, as I understood, in the shape of a command, because the Act only gives him power to report to the Secretary of State, and to deliver in a statement to the manager of the

the mine. I think that such interfering with the mode of working, was still beyond the legitimate object of the Legislature under the Act; that his duty was simply to say whether that mine was or was not safe, and not to enter upon any condemnation of the mode of working. It is incumbent upon the manager of the mine not to adopt any system which, as a system, would necessarily render the mine unsafe.

3646. If an inspector were of opinion that the mode of working a particular mine was unsafe, would you not suffer him to suggest that to the coalowner and to the Government?—I have no objection to his suggesting it, but I think that he should not have the power of enforcing his judgment, which may be erroneous, against the judgment of the responsible managers of the mine.

3647. What did Mr. Dickinson do, more than I have stated in my question?—I do not blame Mr. Dickinson, if it did not go beyond a suggestion.

3648. *Chairman.*] The Committee understand you to say that if the present Act is not sufficiently clear, that the inspector has no power to interfere with the working of the mine, any future enactment should be more specific?—I think it desirable. The fourth resolution is with reference to investing the inspector with additional powers; if it be thought proper to do that, I think it should be embodied in the Act of Parliament, and specifically defined.

3649. *Mr. Locke.*] Would you embody in the Act the opinions of the majority, with reference to the sixth resolution?—Any such clause as that must be very carefully drawn. There are two modes suggested, “artificial” and “effectual;” probably it would meet the case if it were stated that there should be “some artificial or other effectual means;” because, if means other than artificial are sufficient and effectual, there is no reason why they should not be adopted. I see no objection to embodying in the Act a clause to the effect, that the mode adopted should be such as would produce a sufficient current of air for the purpose of ventilating each mine.

3650. To carry out the object of the sixth resolution?—Yes; but you would require what is impracticable, if you made it imperative that there should be at all times, and in all parts of the pit, a specific current of air; that would be impracticable, and might lead to endless litigation.

3651. *Chairman.*] As regards the 7th resolution of the coalowners upon education, the Committee understand the meeting of 23d May agreed to Mr. Tremenheere’s scheme of compulsory education?—The coalowners are favourable to the principle.

3652. Is there any other rule that you would include in the Act of Parliament?—We wish to make a recommendation, as is mentioned in the 11th resolution, as to educating managers of mines. We think that it would tend to produce more permanent utility than anything else in preventing accidents.

3653. What clauses of the inspectors’ report should, in your opinion, be embodied in the Act?—I have stated that, under certain conditions, it may be desirable to extend the Inspection Act as regards the first proposition, but that the subject of the second should not be interfered with. By the third, it is proposed that there should be a notice in writing; and we think that there should be a personal interview between the coalowner and the inspector.

3654. You do not approve of that suggestion of the inspectors?—No.

3655. *Mr. Thicknesse.*] Do you not think that a personal interview and a written notice also might be desirable?—A written notice in the first instance might be given, but it should be imperative that there should be a personal interview.

3656. As you approve of the fifth suggestion of the inspectors about the shafts, should that be in the Act of Parliament?—As defined in our fifth resolution entered into upon the discussion of the inspectors’ report.

3657. What do you say as to the sixth suggestion?—I think the Committee yesterday expressed their opinion, that it was not desirable to include such a power in the Act. Acting upon the principle that nothing should be embodied in the Act except what is generally applicable, and can be worked out practically in every colliery, I think that the seventh proposition of the inspectors might be embodied in the Act; but that the mode of doing it should be defined in the rules.

3658. *Mr. Locke.*] It is proposed that a working shaft should be fenced on two sides?—We considered that two sides could not be generally adopted; we proposed to substitute the words, “properly fenced.”

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3659. *Chairman.*] What do you think of the eighth suggestion of the inspectors?—The difficulty there is, as to the safety of the natural strata; the inspectors require that it should be equally secure with a pit lined with iron. It has been suggested that the provision should be reversed; that the natural strata should be adopted where it is considered safe, but that where it is not safe it should be lined with bricks, stone masonry, iron, or timber. I consulted a gentleman accustomed to construe Acts of Parliament, and he considers that, as proposed, it would mean that all shafts should be lined, and that the natural strata would be the exception; and upon that point the inspectors, I believe, ultimately agreed with us.

3660. *Mr. Ingham.*] Who is to determine whether a particular pit is safe or not?—The responsibility is upon the coalowners.

3661. *Mr. H. Vivian.*] Some strata is safe at first, but after some years becomes unsafe?—Then it must be lined.

3662. *Mr. Cobbett.*] When should a pit be lined?—In most collieries a person goes down every day to examine it, and if he finds it is not safe he orders it to be made safe, or to be lined. We consider that such a regulation, not being universal, should not be embodied in the Act, but in the rules applicable to each colliery. We discussed the 14th and 15th suggestions of the inspectors on the subject of ventilation. The 16th I have already referred to. We do not consider it necessary that the returns alluded to in No. 17 should be made; it would be a matter between the coalowner and the inspector in what manner the information was to be obtained.

3663. The 18th provides for a notice to the inspector?—We admit that such an alteration would be advisable, so that the inspector might receive notice of every fatal accident, and that it should be embodied in the Act. The 19th proposition we consider not within our province; it refers to an Act of the Legislature generally.

3664. You have considered the 20th suggestion in your fifth resolution?—That is with reference to the coroners' juries, which we wish should be impartial.

3665. Would you embody that in an Act of Parliament?—If the Legislature think proper so to alter the law as to coroners' inquests; but we think that the same law should apply to coalowners as to the public generally.

3666. That would apply also to No. 21; do you agree to the 22d resolution?—I cannot give an opinion as to whether the eighth section of the present Act is or is not sufficient to enforce the penalties; if it is not so, I presume it should be made so. With reference to the imposition of penalties generally, we say that the intended Act ought to be specific as to what is required to be done under that Act; and that any penalties imposed by that Act should be of a specific nature, and clearly defined in the Act, and should be made recoverable, of course, under such Act. But we think it not desirable that the Act should give any power whatever to impose penalties in any other manner, or to any greater extent, than is specifically named in the Act; and that it would not be desirable to give power to any arbitrators, court of appeal, or board of control, to enforce rules or conditions which would involve the payment of a fine.

3667. *Mr. Ingham.*] You would not wish the question of penalties to be left to the discretion of any arbitrator, or justice, or third party to be called in?—No.

3668. But a specific penalty imposed in the Act?—Exactly. If the justices have power to impose penalties generally under any public Act, we do not object; but we say that there should be no specific power given to them to impose penalties on the coalowners which are not imposed upon the public generally.

3669. Whenever an Act of Parliament directs anything to be done there are two ways of enforcing it: either by attaching a specific penalty to the non-performance, to be recovered before a magistrate, or it is considered a misdemeanour at common law, and a person contravening a peremptory enactment in any statute, is liable to fine and imprisonment, if convicted before a jury?—These we do not object to; but we say that the penalties should be definite and specific.

3670. *Mr. H. Vivian.*] That would not apply to the public generally?—Certainly. In the arbitration proposed between the inspector and the coalowner, it is suggested, I believe, that the arbitrator should have power by the Act

Act to say that the coalowner shall do so and so; and, failing to do so, he should be fined. We say this is not a constitutional mode of dealing with the question. In the first place, I am told that you could not by law enforce such an arbitration, or recover any fine consequent thereon; and therefore it is not desirable to contemplate such a power.

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3671. *Chairman.*] Clause 23 would apply to every person employed in the mine?—Clearly.

3672. Clause 24 is the arbitration clause?—That is the clause I object to, as giving to the arbitrators the legislative power of imposing penalties.

3673. You do not object to the arbitration, but say that if, after the arbitration, the coalowner neglected to comply with the conditions imposed upon him, he should be liable to penalties in the usual way?—I object to arbitration altogether, because it would be unconstitutional, and no penalty could be recovered under it. It would remove also a responsibility from the coalowner, which I think it very desirable to maintain.

3674. Have you any observation to make upon any other point?—We think that the ninth suggestion of Mr. Dunn's, as to half-yearly reports, might be recommended by the Committee; his opinion is this: "I think great benefit would accrue from the half-year's reports of the inspectors being published, and that such reports should be in the Home Office within a month of each half-year's termination." The reports of the inspectors of schools and of factories are published, and we think the reports of the inspectors should be published.

3675. The Committee understand you to say that the rules you have mentioned may be embodied in an Act of Parliament, special care being taken as to the wording of them, so as to make them clear and express, and that penalties should be levied in the usual mode?—Yes, such as I have named.

3676. You object to arbitration altogether?—We do. We think that any rule which is universal, and which can be generally carried out, may be embodied in the Act; but that any rules or regulations that are partial, and not applicable to the whole, should form part of a system of rules; and that the provisions of the Act should be definite and final, not entrusting indefinite powers to others.

3677. *Mr. H. Vivian.*] It was understood yesterday that you should consider the rules and regulations in use in Northumberland and Durham for the safety of coal mines and the workmen employed therein, in order to determine whether any points contained in those rules and regulations might be re-embodied in the Act?—I have gone through them, but I think that none of them could be embodied in the Act, except those I have already mentioned.

Joseph Dickinson, Esq., called in; and Examined.

3678. *Chairman.*] YOU are one of the Government inspectors?—I am.

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3679. You have heard Mr. Wood's account of the meeting in London of the coalowners and mining engineers, and have heard also his views as to embodying part of the rules in the Act of Parliament, leaving the others to be included in a set of rules to be framed at the discretion of the coalowners; do you wish to make any observations to the Committee on those rules?—The inspectors generally, I believe, would have no objection to Mr. Wood's views being carried out, if we could believe that the colliery owners would introduce the points referred to in their rules; but knowing the great difficulties that we should meet with in certain districts, in prevailing upon the coalowners to agree to these very salutary rules, the four inspectors who have reported, and Mr. Dunn also, are unanimously of opinion that these matters should be distinctly prescribed and laid down by Act of Parliament.

3680. You allude probably more particularly to the district of South Staffordshire?—I believe that in the districts generally, except, perhaps, in the North of England, there would be great difficulty in getting the coalowners to introduce these matters into their rules, unless compelled to do so by Act of Parliament.

3681. Mr. Wood has given us an epitome of the rules which, in his opinion, should be introduced into the Act of Parliament; what are the additional rules which you think should be included?—We think that suggestions 7 as to fencing working pits, 8 as to lining pits, and 9 as to guides and covers, should be included.

3682. You are alluding now to your own report?—Yes, to the joint report

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3659. *Chairman.*] What do you think of the eighth suggestion of the inspectors?—The difficulty there is, as to the safety of the natural strata; the inspectors require that it should be equally secure with a pit lined with iron. It has been suggested that the provision should be reversed; that the natural strata should be adopted where it is considered safe, but that where it is not safe it should be lined with bricks, stone masonry, iron, or timber. I consulted a gentleman accustomed to construe Acts of Parliament, and he considers that, as proposed, it would mean that all shafts should be lined, and that the natural strata would be the exception; and upon that point the inspectors, I believe, ultimately agreed with us.

3660. *Mr. Ingham.*] Who is to determine whether a particular pit is safe or not?—The responsibility is upon the coalowners.

3661. *Mr. H. Vivian.*] Some strata is safe at first, but after some years becomes unsafe?—Then it must be lined.

3662. *Mr. Cobbett.*] When should a pit be lined?—In most collieries a person goes down every day to examine it, and if he finds it is not safe he orders it to be made safe, or to be lined. We consider that such a regulation, not being universal, should not be embodied in the Act, but in the rules applicable to each colliery. We discussed the 14th and 15th suggestions of the inspectors on the subject of ventilation. The 16th I have already referred to. We do not consider it necessary that the returns alluded to in No. 17 should be made; it would be a matter between the coalowner and the inspector in what manner the information was to be obtained.

3663. The 18th provides for a notice to the inspector?—We admit that such an alteration would be advisable, so that the inspector might receive notice of every fatal accident, and that it should be embodied in the Act. The 19th proposition we consider not within our province; it refers to an Act of the Legislature generally.

3664. You have considered the 20th suggestion in your fifth resolution?—That is with reference to the coroners' juries, which we wish should be impartial.

3665. Would you embody that in an Act of Parliament?—If the Legislature think proper so to alter the law as to coroners' inquests; but we think that the same law should apply to coalowners as to the public generally.

3666. That would apply also to No. 21; do you agree to the 22d resolution?—I cannot give an opinion as to whether the eighth section of the present Act is or is not sufficient to enforce the penalties; if it is not so, I presume it should be made so. With reference to the imposition of penalties generally, we say that the intended Act ought to be specific as to what is required to be done under that Act; and that any penalties imposed by that Act should be of a specific nature, and clearly defined in the Act, and should be made recoverable, of course, under such Act. But we think it not desirable that the Act should give any power whatever to impose penalties in any other manner, or to any greater extent, than is specifically named in the Act; and that it would not be desirable to give power to any arbitrators, court of appeal, or board of control, to enforce rules or conditions which would involve the payment of a fine.

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3681. Mr. Wood has given us an epitome of the rules which, in his opinion, should be introduced into the Act of Parliament; what are the additional rules which you think should be included?—We think that suggestions 7 as to fencing working pits, 8 as to lining pits, and 9 as to guides and covers, should be included.

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of myself and other inspectors. With regard to No. 7, we might meet Mr. Wood's objection by stating that working pits should be fenced as far as practicable; in nearly every case, a pit may be fenced on two sides. We think that No. 8, with reference to the casing of the pits, should be imperative.

3683. Mr. Wood agrees to allow that to be introduced into the Act, with a modification of the words?—Yes.

3684. What do you say to Nos. 9, 10, 11, 12, and 13?—We think that they ought to be prescribed by Act of Parliament. The colliery proprietors admit them to be salutary, but the resolution they have come to is very carefully worded; for they do not say that they will introduce them into their rules, but simply that they shall be considered in framing the rules.

3685. Are they applicable to all districts?—I think they are.

3686. Is that the general opinion of the inspectors?—It is the opinion of five out of six of the inspectors; Mr. Morton has not reported his opinion. With regard to No. 9, as guides are so much objected to in South Staffordshire, that district, or any pit, might be exempted, provided they paid a penalty whenever an accident happened through the want of such a salutary precaution.

3687. Are the South Staffordshire pits very crooked?—Many of them are straight. I forgot to mention that, with regard to suggestion No. 3, we agree with the coalowners in considering a personal interview extremely desirable and necessary between the coalowner and the inspector; but it frequently happens that, having spent a day with the coalowner, inspecting his pit, and going over the plans, &c., and considering the matter of importance, we find it desirable to put down upon paper what we have to say to him; he dissents from it, but before we can serve him with a formal notice it is necessary that we should go and see him again; we might, in that case, have 100 miles to travel, in order to state exactly that of which we had informed him in our letter; and we are anxious to avoid such a waste of time and money. The coalowners propose to alter the terms of our suggestion, No. 5, as to fencing old pits, by the introduction of six months' notice to be given as to "such" pit; so that even a general notice sent by the inspector, on the passing of the new Act, would not meet that case; it is quite impossible for the inspector ever to find out all the old pits; it is the manager's place to have them fenced, and if he does not do so he ought to be subject to a penalty.

3688. Mr. *Ingham*.] You mean that a proprietor must take notice of his own shafts?—Yes; the passing of the Act of Parliament to that effect ought to be sufficient notice to him.

3689. *Chairman*.] Have you any remark to make upon the 6th suggestion, as to including persons not employed in and about coal mines?—At the present time old pits, close to which a footpath may run, may be left unfenced, and a person might tumble into them without being a trespasser; and we propose to extend the Act to cases of that kind, and provision should be made for fencing pits where the colliery is not at work.

3690. Mr. *Cobbett*.] Do many accidents happen from that cause?—Yes, many every year; every death which occurs that way is not known; skeletons are now and then found in old pits.

3691. *Chairman*.] What is the next rule that you have any remark to make upon?—The resolution of the coalowners coincides with the 14th and 15th suggestions made by ourselves, on the subject of ventilation; we think it highly desirable that there should be some ventilating power.

3692. You say it should be artificial?—We think there should be artificial power; it might be a hardship in some cases, but the general benefit resulting from it would be so great that we think it might be made compulsory.

3693. What have you to say to No. 17?—We think it desirable that there should be a registration of mines; unless a very large number of inspectors are appointed, it is almost impossible to keep ourselves conversant with the numerous collieries in the district; and it is often important to know who is the responsible manager of the colliery. The statistics which such a registration would afford would give very valuable information to the country at large. In the 18th suggestion we propose that the police should report to us when any fatal or serious accident takes place.

3694. Mr. *Cobbett*.] Why should not the person who reports to the coroner report also to you?—That is the same thing.

3695. *Chairman*.] Who reports to you now?—At present the coalowner reports

reports to the Secretary of State, and the Secretary of State informs us. Such information would be extremely valuable, as the inspector might by that means hear of trifling accidents in a mine, such as slight explosions, as will enable him to offer suggestions, which would have the effect of preventing the occurrence of a fatal accident.

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3696. Mr. *Locke*.] Do you propose that the coalowner should also give you notice of the accident?—We did not propose that; but the coalowners themselves suggest that they should send us a copy of the letter to the Secretary of State, which I think would be satisfactory; but the notice of the police is a check upon cases where the coalowners neglect to send any report to the Secretary of State.

3697. Do you propose that the coalowner should report to the police a non-fatal accident?—It would come under the cognisance of the police.

3698. How?—The police being in the neighbourhood would hear of an accident which is known to everybody round about.

3699. Do you think an accident of that kind would be so well known that the constable, of the parish would hear of it?—He does hear of the greater part of them.

3700. Would you be satisfied to hear of it from such an uncertain channel?—It would be some addition to the information given under the Act by the coalowner to the Secretary of State.

3701. Mr. *Cobbett*.] Does the fifth clause of the Act make it imperative on coalowners to send notice of the accidents which are not fatal?—Only of each death arising from fatal accidents

3702. If a non-fatal accident were to happen, would it not ensure your purpose equally well if the coalowner sent you notice of that?—Quite as well, except in this case, where the coalowner omits to furnish any report to the Secretary of State.

3703. Mr. *Ingham*.] You think that the coalowner should report to you every accident whether fatal or not?—All serious accidents.

3704. Mr. *Locke*.] Do you not think that a better mode of obtaining the information than through the policeman?—I think so.

3705. Mr. *H. Vivian*.] Do you not think it objectionable to offer to the policeman an inducement to be constantly prying into the concerns of the colliery?—The police are public servants, and all we should expect them to do is to state that such a man had been burnt in such a colliery on such a day; that is all the information that he would be required to furnish, and that would probably be known to every person in the neighbourhood.

3706. Would you confine it to burning?—I would not confine the information to an accident by burning, but that is the worst class of accident.

3707. How would you define what is serious?—Serious accidents in a colliery, such as burns and broken limbs, are so numerous, that no person would think of reporting the case of a crushed hand, or a slight accident of that kind.

3708. Does it not appear to you exceedingly difficult to draw the line as to what is a serious accident and what is not?—I think there would be no difficulty in carrying out the intention of the Act in that respect. By the 19th suggestion we simply propose that the coroner should inform us in time to admit of our attendance at the inquest; it would be the same thing if the police or constable who summons the witnesses gave us the information; but we thought it should be left in the hands of the coroner, to give us notice as he considers best. The 21st suggestion as to intermediate verdicts is a most important point; at present a colliery owner may contrive to neglect the most obvious requirements which may have been pointed out to him by the inspector, and when the accident happens the law of the land does not touch him, except in Scotland; so that unless there is some mode of punishing such a neglect of duty I really begin to despair of inducing coalowners to take the steady strides in the improvement of their mining operations which ought to be expected. I could quote cases of gross mismanagement, in which suggestions made to the coalowners have not been carried out, and accidents having resulted in which the coalowner has escaped without any punishment.

3709. *Chairman*.] If certain additional rules were enforced by penalty under an Act of Parliament, would not that rather do away with this rule?—It would in some respects; but with regard to the explosions of fire-damp, the supply of pitwood for propping, securing the main roads, and such-like, we find

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the subject so complicated that it is almost impossible to prescribe by Act of Parliament what ought to be made compulsory; so much depends upon constant watchfulness, that you cannot prescribe by an Act what shall be done in order to meet such cases. The only way is to punish in case of neglect. Upon the 22d suggestion I may remark, it is of course of no use inserting clauses unless they can be enforced by penalties.

3710. No. 23 has been agreed to; do you insist upon the arbitration clause, No. 24, or is the penalty sufficient?—I think that if there were an intermediate verdict, or some way of punishing cases of neglect, the arbitration clause would be unnecessary.

3711. If there were an intermediate verdict, and a penalty, as suggested by Mr. Wood, it would be unnecessary?—Yes; more particularly as the coalowners seem to think that it would relieve them of some of the responsibility which properly attaches to them.

3712. And which the inspectors have no wish to do?—Certainly not; unless there be an intermediate verdict, the arbitration clause would be indispensably necessary.

3713. What do you mean by an intermediate verdict?—That the coroner should have the power of punishing, by a short imprisonment, or by a limited pecuniary fine, in cases where the degree of negligence may be classed between that of accidental death and manslaughter. Referring to the resolutions of the coalowners as to the qualifications and the number of inspectors, we have no suggestion on that point; generally, we quite agree with what the coalowners say, and I believe that nearly all the inspectors do conform to the suggested qualifications.

3714. You are not in favour of sub-inspectors?—I think I am stating the opinion of all the inspectors, in saying that sub-inspection would not work well. With regard to the third resolution of the coalowners, I am quite of opinion that the present Act does give us the power of interfering with the mode of working, and I consider it highly desirable that we should have that power, as it is so mixed up with the safety of the persons working in the mines, that without such a power, accidents might sometimes take place through ignorance on the part of the colliery manager.

3715. Will you be kind enough to explain to the Committee what power of interference you think the inspectors have under the present Act?—Under the head of "powers and duties of inspectors," we have power to interfere in any matter or thing which relates to the safety of persons employed in and about the collieries.

3716. Mr. Cobbett.] How far do you think that those words give you power to direct that there shall be any alteration in the mode of working the mine?—I think that if we consider the system of working a particular mine is such as to be dangerous in itself, or to make the system of ventilation very intricate, so as to endanger the lives of the men, we have then the power of interfering. The accident at Ince Hall has been alluded to; and as witnesses examined before this Committee have expressed their opinion upon it, perhaps I may be allowed to express mine, as I was the inspector concerned in the matter.

3717. How was the Ince Hall Colliery worked before the accident?—At the time of the first accident, the Ince Hall Colliery was worked upon a plan something similar to the Newcastle system, but yet not with the regularity of the Newcastle system.

3718. Is the system called by any other name?—It is the pillar and stall, somewhat resembling the Newcastle system. At Newcastle, however, the seams lie nearly flat, whilst at the Ince Hall Colliery, the seams are at an angle of one in six, or one in seven; and the consequence of that is, that the air from the top of the workings, in the higher part of the mine, has to be brought down about 70 yards perpendicular before it reaches the bottom of the pit by which it ascends, so that the power necessarily applied to force the air through the workings is very great, and the pressure upon the doors between the two pits is great in proportion, and the water gauge in those pits is about two inches, which shows the enormous power required. On the occurrence of the first great accident, in March 1853, I suggested that that was not a proper system of working, and that it ought to be altered; I made many other suggestions with regard to the discipline of the mine, which was very lax, and those suggestions were attended to, but the system of working was not altered. The system con-

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tinued till February 1854, when there was a second great accident; and I then stated that, although the discipline had been brought into as perfect a state as possible, the management with respect to the system of working the mine was still bad. I stated that, considering the great dip of the mine, and the height to which the workings were carried above the bottom of the pits, and the great number and intricate nature of the workings, accidents were almost unavoidable. With the permission of the Committee, I will read part of a letter which I wrote to the proprietors of the Ince Hall Colliery, on the 17th May 1854:—

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“It appears of importance in a fiery mine, dipping at the rate of 1 in 6 or 1 in 7, like the mine in question, that the workings should not extend beyond a certain distance to the rise of the shafts. The rise workings have now reached 500 yards from the shaft levels, or about 70 perpendicular yards above the bottom of the shafts. It is questionable whether this limit be safe; but I am quite satisfied it ought not to be exceeded; and it is highly desirable that an air-pit be sunk to relieve it. The point in the Mesnes property, spoken of for an air-pit, is about 1,100 yards to the rise of the present shaft levels, a distance which should not be attempted uphill, and which is such as to point to the necessity and desirableness of an intermediate pit.

“As the present system of working entails greatly increased risk of explosions, it seems highly important that it should be altered to the most approved system of working in similar seams. Having men getting coal at so many points along the numerous long levels, necessitates openings from the main roads at points where the pressure of air is great, and where, if leakage takes place, the inner workings may be almost entirely deprived of ventilation. Driving the levels to the boundary, and working the coal backwards from the extremity, seems the safest method; but if your determination be, as I understand it is, to work the coal forwards as at present, it would add much to the safe working, if the working places were confined to near the face of the levels, and not scattered from the pits to the face of the levels as at present. Keeping the workings in a compact form would enable you to secure the air to the face of the workings by permanent stoppings, without the intervention of the numerous air-doors and crossings.”

3719. That is a letter which you sent to the owners of the mine?—Yes; and they have acknowledged the receipt of it, and stated that it should be considered.

3720. Is that anything more than a letter of advice to them as to the mode in which they should hereafter work the mine?—Nothing more; but should they disregard it, it will then become a matter for my consideration whether I should give them a formal notice on the point or not, and report the matter to the Secretary of State. I may state, with reference to the great experience called in by the owners which has been alluded to, that although they were highly distinguished men in their own district, none of them knew much about the district in question; although they are experienced in the working of flat mines, they are not so experienced in mines of this steep nature. I consider that for one mine visited by either of them, lying at this angle, I have seen 20. The two local viewers both preferred a different system to the one adopted.

3721. Do you consider that you are justified under that Act in interfering, except in the manner you have already stated?—No. I am acting in conformity with the Act; but should they disregard this letter, and persevere in their present intentions, it may become my duty to put them under notice, and report the same to the Secretary of State.

3722. *Chairman.*] Having so sent the letter to the Secretary of State, what power has he of altering the mode of working?—None whatever, I believe.

3723. Then how do you make out that under the present Act you have any power to command a different mode of working the mine?—I have no such power under the present Act; I have the right to suggest, and report, but nothing further.

3724. Do you think that you ought to have such power?—I think that we ought not to have the power of doing more; it would tend to interfere with the responsibility of the coalowner. With reference to the recommendation as to the mining schools, institutions of that kind, no doubt, are very useful, and are likely to disseminate a great deal of valuable information; but there is already in existence the institution of Practical Geology in Jermyn-street, and it would be a first step towards the establishment of a mining school if one or two practical men were attached to that establishment to explain the use of all

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the different safety-lamps, to show how they differ, the advantages of each, and to explain the mining tools as used in different parts of the kingdom; models of mines, mining machinery, ventilation, and such like; also the various qualities of building stones, of which there is a large collection, and all of which have been carefully analysed, but which, in the form as exhibited, convey no more instruction than is to be got from looking at any piece of stone. Some local institutions, as at Newcastle, Truro, and other places, are very good, but there also the information is all shut up.

3725. At present, persons are left to walk about by themselves?—Yes; and as to the information they derive, they may as well be in a lumber room.

3726. Is there not also a mining institute in Newcastle?—Yes, and that is an institute of mining engineers which has been established nearly two years, and which has communicated to the world a great deal of very valuable information.

Mr. David Swallow, called in, and Examined.

Mr. D. Swallow.

3727. *Chairman.*] HAVING heard the evidence of the inspectors, and of Mr. Wood on the part of the coalowners, perhaps you, on the part of the delegates of the men, will be good enough to make any remarks upon it which occur to you?—We have great objection to several of the resolutions of the coalowners. The rules suggested in the first resolution are very necessary and desirable, but they are so vague that the responsibility upon the owners is very light; the suggestions made are not sufficiently definite and binding. The masters may adopt rules which do not embrace any one point necessary for the safety of the workmen, and therefore we are anxious that all the important points should be named in the Act; we do not mean the exact words, but that the masters should be compelled to have a rule on all those important points.

3728. *Mr. Ingham.*] Is it your opinion, that although the statute might not particularise in detail the several rules to be inserted in a code, yet that it ought to be pointed out in the Act that the rules shall, in some of the articles, provide for certain essential points?—Yes; for instance, The responsible Charge of the Mine. Working-places. The Intake and Return Air. Goaves; Gobs, or Old Workings. Waggon-ways and Tram-ways. Timbering and Props. Machinery. Ascending and Descending Shafts. Ventilation. Stoppings. Brattices and Doors. Furnaces. Fire-damp. Also, as to Safety-lamps and Fire-damp Mines; and that penalties should be specified. We say that the rules should embrace those points, and that they should be made as convenient as possible to the particular locality in which they are required. We have suggested a few points which we think might be made compulsory in detail, and which might be embodied in the Act; as for instance, the third proposition of the inspectors, that there should be a notice in writing.

3729. *Chairman.*] You approve of the resolution of the inspectors in that particular?—Yes; we also approve of the fourth resolution being embodied in the Act; and consider it very desirable, we would include also the fifth and sixth. In the place of the seventh proposition of the inspectors, we would substitute a portion of the masters' resolution, and that is, "that every working or pumping shaft or pit be properly fenced when not at work."

3730. You do not want it fenced on two sides?—It is a matter of impossibility in some cases. We consider that the amendment of the masters on the eighth resolution of the inspectors would be preferable to that resolution, and that it ought to be embodied in the Act also. (See Appendix No. 2, Resolution No. 8.) We suggest that the ninth resolution of the inspectors should be embodied in the Act, with this addition, "in every winding shaft where steam-engines are used."

3731. Would not a water-balance go nearly as fast?—Yes; I would insert that also. I would make this resolution applicable only to new pits, or to pits sunk deeper, because it would be very difficult to apply it to the present shafts. We think that the 10th, 11th, 12th and 13th provisions also of the inspectors should be embodied in the Act of Parliament.

3732. Is it your opinion that the ventilation should be artificial, or that it should be effectual?—Artificial. I beg to express my opinion, with all deference to the opinions of eminent men to the contrary, that I do not consider that building a chimney on the top of a pit ought to be looked upon as artificial; if

q furnace

a furnace is to be considered mechanical, that term ought to be adopted, and I do not know but that mechanical means would be more appropriate than artificial.

Mr. D. Sullivan.

30 May 1854.

3733. You approve of the 14th resolution of the inspectors?—Yes.

3734. Mr. Ingham.] You say that the mere prolongation of a shaft should not be considered artificial means?—It ought not; my opinion is, that that method at certain seasons of the year would fail to produce a regular current of air through the pits, and that the current would be uncertain, and that some kind of means ought to be adopted which would produce at all seasons of the year a sufficient current. The 15th, 16th, and 17th resolutions of the inspectors should be embodied in the Act, with the exception of ironstone mines. We think that the 18th, 19th, 20th, 21st, and 22d should also be embodied in the Act. We think that the 23d should take effect on all colliery officers, and that you should specify that in the Act, or in your report; because we find that, in the masters' rules, it is proposed that the men should be taken before the magistrates or sent to gaol, but that for the disobedience of an underlooker, which might be of far greater importance, it is only a degradation of office, and that there is no criminal punishment attached to it. We do not think it right that there should be one law for the workmen and another for the manager or underlooker, but that they should be placed on an equal footing; that if one is subject to criminal proceedings, all should be liable to them alike.

3735. The 24th suggestion of the inspector is with reference to arbitration?—We are anxious that you should recommend a board of control and appeal, but failing that, we would accept the arbitration as an alternative.

3736. Do you consider the arbitration clause necessary with the penalty laid down by the masters in their suggestions?—I am not aware that they have proposed any penalty at all.

3737. Mr. Wood stated that he would have no objection to the rules embodied in the Act being enforced by penalty in the usual way?—I think there ought to be arbitration in all cases; that is, if the owner demands it, and therefore the penalty would be suspended, if the owner demand an arbitration.

3738. If the rules were broken, or if the decision of the arbitration was not carried out, you would impose penalties upon them, to be enforced in the usual way?—Yes.

3739. Have you any other remark to make?—We are anxious that the inspectors should have power to enforce the rules, and to see that they are properly carried out.

3740. Mr. Thicknesse.] What power do you propose to give them?—To demand copies of rules at all collieries, as well as the plans, and that they should have the power of inquiring into those rules, as it has been proved in several instances that good rules have been printed and circulated, but that they have been utterly disregarded by the head managers, by those under them, and by the workmen; they have been nothing more than a dead letter.

3741. Mr. Cayley.] Do you say that they have been formally promulgated, but that the workmen have not been aware of the terms of the regulations?—They have been supplied with a copy. For instance, where there has been a rule which prohibited smoking in a pit, the fireman has gone down into the men's working places and taken out his pipe and lighted it, and then the workmen followed his example.

3742. What inference do you draw from that?—We wish that rules which are made should be carried out with all sincerity, and with the view of promoting the safety of the men.

3743. Mr. Ingham.] You wish that it should not be left to the master or to some subordinate officers, but that the inspectors should have the right of interfering, and punishing for a breach of the rules?—Yes.

3744. Mr. Thicknesse.] Do you consider an additional number of inspectors desirable?—Very.

3745. How many men would you wish appointed?—To speak in detail, I think that five inspectors, in addition to Mr. Dickinson, would be required for the district of Lancashire and Cheshire: for instance, one is necessary for St. Helens, Haydock, Billinge, and Whiston; and then there should be one for Wigan and neighbourhood; one for Bolton; one for Manchester and Oldham districts; one for Ashton and Cheshire; and one for Rochdale and all the north-east side of Lancashire.

Mr. D. Swallow.

30 May 1854.

3746. *Chairman.*] Can you tell us how many collieries an inspector should have under his charge?—The collieries vary so much in size, and in the number of people employed in them, that we can hardly say that; but I am perfectly satisfied that for the inspectors to have that moral influence which it is intended they should have, they must be nearer to the place, so that the masters or managers should not know but that the inspectors may be dropping upon them any morning at five or six o'clock. As the inspector lives at Manchester, they know that he must come by the train, and that he cannot be at the pit's mouth in the morning, and therefore their visits are not so efficient as they would be if they resided on the spot.

3747. *Mr. Cayley.*] What do you consider to be the duties of an inspector?—Not to remain on the top of the mines, but to go down, and examine every part of the workings, as far as they possibly can.

3748. As some of the mines extend over several miles, how could the inspector by his personal presence detect the threatening danger?—If he could not go through all the workings in one day, he could go through one part one day, and through the other parts on different days.

3749. *Mr. Thicknesse.*] In the case of colliery accidents, have you ever attempted to recover damages under Lord Campbell's Act?—We have. I remember some very gross cases, one of which I will mention: at a certain colliery, where it was necessary to pump out the water every day, the master reduced the man's wages from 21 s. to 18 s. per week. The man said, "Then I shall not work on Sunday." The water was allowed to accumulate in the lodge level, as we call it, and the pumping engine was a long way from the pit where the men had to descend; there was no fireman in the colliery, but each man had a lamp, or not, just as he pleased. On the Monday morning the men descended to their work, not observing that the air was stopped, or that there was any difference in the state of the mine, and an explosion took place at one of the men's candles, caused entirely and solely by the water being allowed to accumulate in the air-road. We considered that a very gross case of neglect on the part of the master. We were advised by our attorney to seek damages under Lord Campbell's Act, but we thought it necessary first to take counsel's opinion upon the subject. We took the opinion of Mr. Atherton, and his opinion was that there was very great doubt as to our obtaining damages at all, and that he would not recommend the parties going to the expense; there is so much technicality about what was the moving cause to the death; and, in this instance, the unconscious movers to the death, from their ignorance, were the men themselves.

3750. *Mr. Cayley.*] Who were the parties intending to prosecute the claim?—The widow, in this case.

3751. Was there any difficulty in the way of expense, or any obstacle of that kind, to prevent her taking advantage of Lord Campbell's Act?—She could not have done it unless funds had been supplied to her; we had to pay 16 s. or 17. to enable her to administer.

3752. If an accident of that sort occurred, attended with loss of life, and there was a disposition on the part of any of the workmen to take advantage of Lord Campbell's Act, would a subscription generally from the workmen be necessary, in order to enable them to appeal to justice under that Act?—The opinion of the attorney was that we could not take that case to the Liverpool assizes, with anything like a good effect, under 30 l.

3753. Do you think that if 30 l. were required in order to enable one of the working class to take advantage of Lord Campbell's Act, such an expense would operate generally speaking as an obstruction in the way of their obtaining justice?—Yes.

3754. Have you any suggestion to make as to giving them any greater facilities for obtaining justice under that Act?—Yes; under the Factory Act the inspectors have power to institute proceedings on behalf of injured parties, not only where life has been lost, but in cases of bodily injury, and we think it desirable in these cases that the inspectors, with the sanction of the Secretary of State, should have power to institute proceedings on behalf of widows and relatives of persons or individuals injured in coal mines.

3755. You think that the burden should not fall on the working people?—Just so.

3756. *Mr. Thicknesse.*] What do you think of Mr. Tremenhoe's plan?—We disagree

disagree with him as regards the fees to be paid; he suggests one shilling per 30 hours, or 10 shillings in the half year, which would be a serious amount, and more than we consider necessary. As a substitute for that, we propose it should be made lawful for the masters to detain out of the wages of every person above 18 years of age, not more than 2 *d.* per week, which should be applied to the purpose of education, and that the whole of the pitman's family should have the privilege of being educated for that sum.

Mr. D. Swallow.

30 May 1854.

3757. How many hours of education per week do you think they should receive?—We think that they should go to school not less than two hours per day, and three days in each week. Mr. Tremenheere's plan is, that if they have 150 hours in the half year, that would be sufficient; but we fear that the Act would, in many instances, be evaded by the children going to school for 150 hours at the end of the six months, by which but little benefit would be derived.

3758. How do you propose that they should find time to attend school six hours per week, and to work in the pit at the same time?—There is great difficulty in that, and my own opinion is, that it would be better to keep to the old clause, and not to allow boys to go into the pits until they are 12 years of age. As the masters have a great objection to that, we laid it before the men, some of whom, not looking at their own interests as they ought to do, have consented to meet the views of the masters by withdrawing that clause; but, after all, there is great difficulty in compelling a boy to go to school six hours per week after he has been working hard in a coal-pit.

3759. Do you approve of any educational test?—Yes; I think that no boy, even at 10 years of age, should be allowed to go into a pit without being able to read and write; if that were made compulsory it would induce the parents to provide sufficient education for their children.

3760. *Chairman.*] Are you giving now the opinion of the workmen generally?—No, it is my own opinion only.

3761. Mr. *Thicknesse.*] How do you propose that the 2 *d.* per week contributed by the workman should be devoted to colliery education?—I believe the Council on Education would be willing to make grants for the building of schools, and for the supply of materials to those schools; and if a number of masters found that the building of a school would cost 600 *l.* they might subscribe 300 *l.*, and the Council on Education 300 *l.*

3762. How do you propose to secure the appropriation of the 2 *d.* per week to educational purposes?—I would make it compulsory upon the coalowners to find the means of education; I would suggest that the inspectors should look to that.

3763. Who should examine the accounts, to see that the funds were properly applied?—The men themselves.

3764. Mr. *Cayley.*] Have you seen a petition, very numerously signed by the workmen in the pits of Northumberland and Durham, which was presented the other day to the House of Commons?—I have seen a copy of that petition.

3765. Do you generally agree with the views there stated?—Yes; we agree with all the points stated in that petition, with the exception of two, which the miners of Lancashire and Cheshire have since modified, with a view of meeting the wishes of the masters.

3766. Do you mean that the men of Northumberland and Durham have made no compromise?—No, they stand by their petition. The first point we gave up was the appointment of sub-inspectors, expecting that the masters would recommend an addition to the number of inspectors; but they have deceived us in that respect.

3767. *Chairman.*] The appointment of a larger number of inspectors would meet the views of the workmen?—Yes.

3768. Mr. *Cayley.*] It was rather with reference to the subject of education that I asked whether you agreed with the views stated in the petition?—As to working in the pit six hours per day, we think that altogether impracticable.

3769. Mr. *Thicknesse.*] Is there not in Lancashire what they call "Pay Mondays"?—At some of the collieries, but at others the masters have done away with it; they have laid down a rule that any man neglecting his work on a "Pay Monday," shall be fined 5 *s.*, and on any other day in the week, 2 *s.* 6 *d.*, except in cases of sickness, and then a medical certificate to that effect must be sent to the colliery office.

Mr. D. Swallow.
 30 May 1854.

3770. Mr. Cayley.] You consider the system of shifts impracticable?—There is a very great difference between coal mines and factories, and it would take up so much of the boys' time in descending the pits and going along to their various places of work, that it would be found totally impossible to carry it out; we would recommend, in preference to that, that a boy should only work four days in the week, and that would render necessary the addition of one-third in number to the present staff of boys.

3771. You agree that the workman should pay the 2 *d.* per week?—Yes.

3772. And that that should provide education for the whole family?—Yes; it is so in some places, and is said to be quite ample.

3773. I believe those are the principal points mentioned in the petition: the shifts, and that the workmen should pay 2 *d.* per week for the education of the whole family?—We agree in all points but one, and that is the education question.

3774. Mr. Ingham.] Do you think it desirable that the Act of Parliament should specify certain heads of education, which ought to be included in all regulations?—Yes.

3775. Have you read a copy of the regulations sent out by the masters of Northumberland and Durham?—Yes; we embrace the whole of them.

3776. Viscount Goderich.] You said just now, that you would have a regulation that no boy should go into the pit until he could read and write; do you think it fair to make such a regulation as that with the amount of education which is at present provided for the people?—In the districts that I am acquainted with, Lancashire and Cheshire, the parents might give their children the means of learning to read and write if they would pay sufficient attention to it.

3777. Mr. Cayley.] Would you, by any such test, exclude from the mine a boy who has already worked in them?—No; any recommendation I am making now should be entirely prospective.

3778. You assume a system of education to be in operation, before you establish such a test?—Yes.

3779. Viscount Goderich.] I understood you to say, that although you had agreed to a compromise upon the subject of permitting boys under 12 years of age to go into the pits, still that the delegates of the workmen retain the opinion, that they should not be allowed to work in the pits before they are 12 years of age?—That is my opinion only. The reason assigned by the masters is, that in many mines where the seams are worked at 20, 22, and 24 inches, the seams are so very thin that it would be very expensive to take down the roof to enable bigger boys to work the seams, which they would have to do if boys under 12 years of age were excluded.

3780. Mr. Cayley.] Why would it be more expensive?—It is very expensive to take the roof down, and to take it out.

3781. The small stature of the boys is necessary to work in so small an area?—Yes; they say that, if bigger boys are to work those seams, the pits must be set aside altogether.

F O U R T H
R E P O R T

FROM THE

SELECT COMMITTEE

ON

ACCIDENTS IN COAL MINES.

*Ordered, by The House of Commons, to be Printed,
26 June 1854.*

Martis, 14° die Februarii, 1854.

Ordered, THAT a Select Committee be appointed to Inquire into the Causes of the numerous ACCIDENTS IN COAL MINES, with a view of suggesting the best Means for their Prevention.

Committee nominated, of—

Mr. Hutchins.	Mr. Locke.
Mr. Cayley.	Mr. Cobbett.
Mr. Stephenson.	Mr. Farrer.
Mr. Ingham.	Mr. Baird.
Mr. Cumming Bruce.	Mr. Fitzroy.
Mr. Hussey Vivian.	Colonel Pennant.
Mr. Henry Austin Bruce.	Mr. Child.
Mr. Mostyn.	

Ordered, THAT the Committee have power to send for Persons, Papers, and Records.

Ordered, THAT Five be the Quorum of the Committee.

Veneris, 7° die Aprilis, 1854.

Ordered, THAT the Committee have power to report the Minutes of Evidence taken before them, from time to time, to The House.

Jovis, 27° die Aprilis, 1854.

Ordered, THAT Mr. Thicknesse be added to the Committee.

Jovis, 4° die Maii, 1854.

Ordered, THAT Colonel Pennant be discharged from further attendance on the Committee, and that Viscount Goderich be added thereto.

R E P O R T.

THE SELECT COMMITTEE appointed to Inquire into the Causes of the numerous ACCIDENTS in COAL MINES, with a view of suggesting the best Means for their Prevention, and who were empowered to Report the Minutes of Evidence taken before them from time to time to The House, and to whom a Petition, and the Reports of the Committee on Coal Mines 1852, and on Accidents in Coal Mines 1853, were referred;— HAVE further considered the Matters to them referred, and have agreed to the following REPORT:

YOUR COMMITTEE have especially directed their inquiries to the state of the Coal Mines since the year 1849, in order to ascertain whether any and what improvements have taken place since that period, when a Committee of the House of Lords sat and received Evidence, which, with their Report, was laid upon the table of your Honourable House. In examining those witnesses who appeared before the Committee of the House of Commons in 1852, Your Committee have endeavoured, as much as possible, to follow up the investigations of that Committee, believing that the late period of the Session precluded more evidence being received on all the subjects which ought to be included in such an inquiry.

Your Committee first proceeded to examine two gentlemen who were sent by the Home Secretary to Belgium and other parts of the Continent, with a view of inquiring into the state of mining, and of ascertaining the rules and regulations adopted in those countries. Their evidence was laid before your Honourable House on the 30th of June 1853. They reported that a very stringent and expensive system of inspection is adopted, more particularly in Belgium, where, next to this country, the most extensive coal mines are found. Your Committee, however, are of opinion that such a system is not applicable to this country, because in Belgium and Prussia, the mines being the property of the Government, the duty of the inspectors is not only to insure the safety of the workmen, but also to ascertain the profits of each colliery, and to take care that the mine is worked in the best way to secure the largest income to their Government. Mechanical means of ventilation are for the most part used; but, in no instance, producing 40,000 cubic feet per minute, and in most cases not half that amount; and although some rules might be adopted with advantage, neither as regards management nor ventilation do Your Committee consider the system equal to that of the best regulated collieries in this country.

Having well weighed the evidence which has been published, Your Committee are of opinion that imperfect ventilation is the cause of the numerous accidents from fire-damp in this country, and that an abundant supply of pure air, properly distributed, must be considered as the great and effectual means of preventing explosions, and the consequent sacrifice of human life.

Your Committee directed their attention to the various methods by which a supply of air might be obtained, with a view to determine their relative efficiency. Those which were brought under their notice may be stated under four heads, viz. the Furnace System, the Steam-jet, Mechanical means, and Natural Ventilation. They have had the result of various experiments laid before them, and have examined witnesses as to the merits of the different modes of ventilation above alluded to, and have to report that the preponderance of evidence is decidedly in favour of the Furnace.

Your Committee are aware that the Committee of the House of Lords called attention to the steam-jet, and that the Committee of the House of Commons

in 1852 reported in favour of it; but since that time investigations and experiments on a much larger scale have been instituted by Mr. Nicholas Wood and others, the results of which, together with the evidence before Your Committee, lead them to an opposite conclusion, and induce them to think that, especially where the coal lies at a considerable distance below the surface, and the shafts are consequently deep, the Furnace is the most effective, as well as the most economical, mode of ventilation.

They have also taken the opinions of some of the most competent viewers and Government inspectors on the objections raised against the Furnace. These were designated under the title of Furnace Limit, Furnace Paradox, and Natural Brattice; and they are led to the conclusion that these are theoretical views, and do not establish any positive law affecting prejudicially the action of the Furnace.

Having received from Mr. T. E. Forster and others evidence of very good ventilation produced by the steam-jet, Your Committee are of opinion, that under some circumstances, more particularly where the coal to be excavated lies near the surface, it may be applied with advantage.

Your Committee cannot fail to observe, that the controversy which has been going on respecting the merits of the furnace and steam-jet systems, has had very beneficial results, and has produced an emulation, which has been the means of improving ventilation in many districts, and of developing the merits and the power of each system to an extent not before known.

Your Committee had also evidence laid before them of the economy and power of a machine invented by Mr. Struvé, which has been materially improved since it was brought to the notice of the Committee of the House of Lords in 1849. They are favourably impressed with the value of this invention, especially in shallow pits and level collieries; but would suggest that, in consequence of the liability to derangement of all such mechanical means, a duplicate apparatus should always be kept in reserve, and ready for operation.

Your Committee think that it is not desirable to enforce any particular system, but recommend that no colliery should be without some artificial means of ventilation, and that power should be given by the Legislature to enforce this recommendation.

Having investigated the different modes of producing a current of air, Your Committee had to consider how best to distribute it through every part of the colliery. They find that passing it in one stream through a mine is attended with such resistance, even where the air-ways are capacious, that it is impossible, where the galleries are long and the mine extensive, to obtain a sufficient quantity; and that, even if that were not the case, the air travelling from one department to another becomes charged with gas, as well as with the breath of the workmen, and other effluvia, before it has nearly finished its course, and is rendered so impure as to be detrimental to the health of those who have the disadvantage to be at the far end of its channel, while, in the case of fiery mines, it becomes dangerously charged with gas.

In the districts of Northumberland and Durham this has been long known, and the system of dividing the currents, which is technically called *splitting the air*, has been adopted, by which a greater quantity is obtained by the same amount of ventilating power, and each department receives its quota of fresh air, which is passed directly from it to the upcast shaft; but your Committee regret to say that this is entirely neglected in many of the coal districts, in consequence of which, and of no artificial means of producing ventilation being resorted to, the health of the workmen is much impaired, and great danger incurred.

Your Committee are of opinion that special care ought to be taken to make and maintain the main air-ways of sufficient capacity and number. They are sorry to observe, however, that in many districts this is not attended to. In some, the air-ways are made so small that it is difficult for a man to pass through them; the consequence is, that they are seldom visited, and that, either from falls of the roof or sides, the passages, originally of too little area, are nearly choked up, and the ventilation almost suspended. For this reason, without specifying size more minutely, they are of opinion, that the air-passages of

of a mine should always be so made and maintained as to allow the person in charge of them to pass through without difficulty.

It appears certain that, after explosions, two-thirds of the deaths are occasioned by after-damp. Your Committee have received evidence of the best means of preventing so great a sacrifice of human life. They have inquired into the merits of the plan of refuge stalls, suggested by Mr. Gurney to the Committee of 1852, and have come to the conclusion, that unless they could be maintained in great numbers, and at very short distances from the departments where the men are at work, and could, by some mode, be supplied with fresh air, they would not answer the purpose intended. Your Committee prefer to place reliance on dispensing, as far as possible, with the use of doors, on having the stoppings and crossings made so solid that the force of the blast cannot disturb them, and thus cut off the air from the departments, and on some rapid means of restoring ventilation by steam-jet or otherwise, and thus overcoming the stagnation consequent on an explosion. They beg particularly to direct attention to Mr. Nicholas Wood's evidence, who states, that in one of his mines he has made all the stoppings and crossings so strong that the most powerful blast would not affect them.

The opinions as to the necessity of clearing *goaves* of the foul air are so contradictory, that Your Committee are unable to discover any preponderance of evidence on that subject; but they are of opinion that to make bore-holes from the surface would, in many cases, be impracticable, and, even when practicable, would not be attended with satisfactory results.

The accidents which occur from falls of the roof and sides of mines led Your Committee to inquire minutely what means could be suggested for their prevention. Undoubtedly an efficient system of supervision, with the abundant use of props, is highly necessary. But by *long-wall* working, which in some districts has been extensively used, and is gradually making its way into all parts of the country, the risk of this class of accidents appears to be materially decreased; and not only in this respect do they consider this mode as compared with the *pillar-and-stall* system to be the best, but the evidence leads them also to the conclusion, that for facility of conveying the air through a mine, and for obtaining the greatest quantity of coal, the *long-wall* system, where it can be adopted, is preferable to any other.

The deaths that take place in and about shafts are almost entirely to be attributed either to defective machinery or to want of care. At the conclusion of this Report will be found some rules, which if enforced will materially diminish the number of those accidents.

Your Committee have received various opinions on the security of the Davy lamp, the majority of which are in its favour. They have also had detailed to them the results of experiments conducted by Messrs. Wood and Elliott, to test the powers of resisting explosion of all the lamps which up to that time had been invented; and although they consider that these experiments would have been more satisfactory had the boxes in which they were made been larger, so that the explosive atmosphere might not have acquired motion, yet they deem them a better test than those made by Dr. Backhoffner at the Polytechnic Institution before the Committee of 1852; the first-mentioned experiments having been made with the actual gas of a mine, and those of Dr. Backhoffner with common street gas, which, according to his own evidence (page 113, Report 1852), is far more easily exploded than fire-damp.

Weighing carefully all the circumstances connected with this branch of the inquiry, Your Committee are of opinion,

That safety-lamps, however valuable, should not be relied upon for the prevention of explosions.

That the ventilation of mines should be kept so good, that under ordinary circumstances it would be safe to work with naked lights.

That in fiery mines, especially those that are liable to sudden outbursts of gas, safety-lamps add largely to the security from explosion, and can be used without much, if any, extra cost over the naked light.

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Your Committee had also evidence laid before them of the economy and power of a machine invented by Mr. Struvé, which has been materially improved since it was brought to the notice of the Committee of the House of Lords in 1849. They are favourably impressed with the value of this invention, especially in shallow pits and level collieries ; but would suggest that, in consequence of the liability to derangement of all such mechanical means, a duplicate apparatus should always be kept in reserve, and ready for operation.

Your Committee think that it is not desirable to enforce any particular system, but recommend that no colliery should be without some artificial means of ventilation, and that power should be given by the Legislature to enforce this recommendation.

Having investigated the different modes of producing a current of air, Your Committee had to consider how best to distribute it through every part of the colliery. They find that passing it in one stream through a mine is attended with such resistance, even where the air-ways are capacious, that it is impossible, where the galleries are long and the mine extensive, to obtain a sufficient quantity ; and that, even if that were not the case, the air travelling from one department to another becomes charged with gas, as well as with the breath of the workmen, and other effluvia, before it has nearly finished its course, and is rendered so impure as to be detrimental to the health of those who have the disadvantage to be at the far end of its channel, while, in the case of fiery mines, it becomes dangerously charged with gas.

In the districts of Northumberland and Durham this has been long known, and the system of dividing the currents, which is technically called *splitting the air*, has been adopted, by which a greater quantity is obtained by the same amount of ventilating power, and each department receives its quota of fresh air, which is passed directly from it to the upcast shaft ; but your Committee regret to say that this is entirely neglected in many of the coal districts, in consequence of which, and of no artificial means of producing ventilation being resorted to, the health of the workmen is much impaired, and great danger incurred.

Your Committee are of opinion that special care ought to be taken to make and maintain the main air-ways of sufficient capacity and number. They are sorry to observe, however, that in many districts this is not attended to. In some, the air-ways are made so small that it is difficult for a man to pass through them ; the consequence is, that they are seldom visited, and that, either from falls of the roof or sides, the passages, originally of too little area, are nearly choked up, and the ventilation almost suspended. For this reason, without specifying size more minutely, they are of opinion, that the air passages of

of a mine should always be so made and maintained as to allow the person in charge of them to pass through without difficulty.

It appears certain that, after explosions, two-thirds of the deaths are occasioned by after-damp. Your Committee have received evidence of the best means of preventing so great a sacrifice of human life. They have inquired into the merits of the plan of refuge stalls, suggested by Mr. Gurney to the Committee of 1852, and have come to the conclusion, that unless they could be maintained in great numbers, and at very short distances from the departments where the men are at work, and could, by some mode, be supplied with fresh air, they would not answer the purpose intended. Your Committee prefer to place reliance on dispensing, as far as possible, with the use of doors, on having the stoppings and crossings made so solid that the force of the blast cannot disturb them, and thus cut off the air from the departments, and on some rapid means of restoring ventilation by steam-jet or otherwise, and thus overcoming the stagnation consequent on an explosion. They beg particularly to direct attention to Mr. Nicholas Wood's evidence, who states, that in one of his mines he has made all the stoppings and crossings so strong that the most powerful blast would not affect them.

The opinions as to the necessity of clearing *goaves* of the foul air are so contradictory; that Your Committee are unable to discover any preponderance of evidence on that subject; but they are of opinion that to make bore-holes from the surface would, in many cases, be impracticable, and, even when practicable, would not be attended with satisfactory results.

The accidents which occur from falls of the roof and sides of mines led Your Committee to inquire minutely what means could be suggested for their prevention. Undoubtedly an efficient system of supervision, with the abundant use of props, is highly necessary. But by *long-wall* working, which in some districts has been extensively used, and is gradually making its way into all parts of the country, the risk of this class of accidents appears to be materially decreased; and not only in this respect do they consider this mode as compared with the *pillar-and-stall* system to be the best, but the evidence leads them also to the conclusion, that for facility of conveying the air through a mine, and for obtaining the greatest quantity of coal, the *long-wall* system, where it can be adopted, is preferable to any other.

The deaths that take place in and about shafts are almost entirely to be attributed either to defective machinery or to want of care. At the conclusion of this Report will be found some rules, which if enforced will materially diminish the number of those accidents.

Your Committee have received various opinions on the security of the Davy lamp, the majority of which are in its favour. They have also had detailed to them the results of experiments conducted by Messrs. Wood and Elliott, to test the powers of resisting explosion of all the lamps which up to that time had been invented; and although they consider that these experiments would have been more satisfactory had the boxes in which they were made been larger, so that the explosive atmosphere might not have acquired motion, yet they deem them a better test than those made by Dr. Backhoffner at the Polytechnic Institution before the Committee of 1852; the first-mentioned experiments having been made with the actual gas of a mine, and those of Dr. Backhoffner with common street gas, which, according to his own evidence (page 113, Report 1852), is far more easily exploded than fire-damp.

Weighing carefully all the circumstances connected with this branch of the inquiry, Your Committee are of opinion,

That safety-lamps, however valuable, should not be relied upon for the prevention of explosions.

That the ventilation of mines should be kept so good, that under ordinary circumstances it would be safe to work with naked lights.

That in fiery mines, especially those that are liable to sudden outbursts of gas, safety-lamps add largely to the security from explosion, and can be used without much, if any, extra cost over the naked light.

The dreadful catastrophe which occurred at Ince Hall during the course of this inquiry, induced the Secretary of State to call for the opinions of the Government inspectors as to whether gunpowder should be permitted to be used in fiery mines. Those reports were transmitted for the consideration of Your Committee. They have also received much contradictory evidence on this subject. On the whole, they are of opinion that, although the utmost care is necessary, it would not be advisable to pass any law for prohibiting its use.

Although they entirely agree with the Committee of 1852, that the number of inspectors is decidedly too small, Your Committee have pleasure in being able to say that, considering the large number of collieries that have necessarily been allotted to each inspector, they have given general satisfaction; that the effect of their appointment has been beneficially felt, and their recommendations have, with few exceptions, been concurred in and carried out by the owners of mines.

The inspectors represent that their salaries are too small, stating that in consequence they have been obliged, by way of increasing their emoluments, to attend to references and other private business. This practice ought, in the opinion of Your Committee, to be put an end to, the whole of their time be devoted to their several districts, and their salaries sufficiently large to recompense persons of practical and scientific acquirements for filling the appointment.

Your Committee think it would not be advisable to add to the power of the inspectors, but would prefer to rely on the increased responsibility which is thrown on the owner of a mine who either neglects or refuses to carry out the suggestion of an inspector, and to having the names of those parties who neglect their duty brought prominently before the public by the publication of the inspector's report.

With these views Your Committee recommend,—

That the number of inspectors be increased.

That their salaries be augmented.

That under no circumstances should they be allowed to attend to any business but that connected with their public duties as inspectors of mines.

That no new inspector be appointed who has not had at least seven years' experience as the practical manager of a mine.

That as soon as practicable, every person before his appointment as an inspector be subjected to an examination in all the branches of science connected with mining.

That Reports of the inspectors be laid periodically before Parliament.

It was stated to Your Committee by the witnesses who represented the working men, that they desired the establishment of sub-inspectors of mines taken from the class which now supplies the overmen and other subordinate officers in the collieries, believing that men of such a class would be physically more competent than inspectors to laborious examinations of the workings; and that the miners would resort to them with more freedom to state their complaints and suspicions. Your Committee have not approved of this suggestion, considering that the increased staff of inspectors, which they have recommended, will accomplish the objects of the miners, it being plainly the duty of inspectors to encourage and protect every honest statement of apprehended danger for the interests of the employers as well as of the workmen. Their interest, indeed, in all that regards the safety of the mine is identical, and Your Committee hope that the conviction of this truth, and the growth of a good understanding between the workmen and their employers, will render year by year the intervention of the inspectors less necessary. As their warrant for this hope, they refer with satisfaction to the impartial and intelligent views of the representatives of the working men, as stated in the minutes of the general conference, and in the evidence before Your Committee.

Against the system of employing contractors under the name of "*butties*," which prevails extensively in South Staffordshire, and partially in other districts, Your Committee cannot speak too strongly. It will be found by the returns upon the

the table of the House that in those districts the accidents are more numerous than in others where greater danger is to be apprehended. These "*butties*" have no object in view but to diminish, by every means in their power, the cost of production. The ventilation, as well as the safety of the men in other respects, is neglected, and the responsibility is apparently shifted from the chief owners of the mine to these men, who, in point of education, are not superior to the workmen themselves.

Some complaints were made by witnesses as to the defective or injurious operation of existing laws, which it may be right to notice; although, as the alleged grievance must affect many other classes as well as the mining class, it does not belong peculiarly to this Committee to suggest the remedy.

These complaints were as to the unsatisfactory constitution and working of the coroners' courts, the difficulty of enforcing compensation to survivors in case of death by negligence, under what is called "Lord Campbell's Act," and the unwillingness of magistrates to convict in cases of misconduct in service by the workmen.

It was stated, as to the coroners' courts, that the jurors summoned were generally workmen, or small tradesmen dependent on the collieries, without instruction, and open to the suspicion of partiality. This is sometimes the case, and seems to be the result of the ancient law directing coroners to summon the inhabitants of the district where death occurred, rather to be questioned as to their knowledge of the facts, than to be themselves judges of the evidence. At the present day the coroner, or rather the constable, takes the jurors from the neighbourhood, without reference to qualification. Considering that the questions brought before an inquest, particularly in cases where the death is supposed to have occurred from neglect or unskilfulness, require careful investigation, it is desirable that the law should be altered, so as to ensure the requisite amount of knowledge in the jury.

The next objection was raised by some witnesses who erroneously conceived that there were greater facilities in Scotland for the representatives of persons killed by accident recovering compensation under Lord Campbell's Act (9 & 10 Vict. c. 93), at the instance of a public officer, than in England. This, however, is an error; it is only in criminal charges, not in any matters of damage, that the public officer in Scotland interferes; and the cases in England, where the representatives of a person killed in service by the neglect of others have failed of success, have not failed from any defect in the law, or lack of parties to put it in motion, but because the judges have held "that a servant, on his hiring, undertakes, as between him and his master, to run all the ordinary risks of the service, including the risk of negligence on the part of a fellow-servant;" presuming always "that the master has taken reasonable care to preserve him from such risk by associating him with persons of ordinary skill and care." (Vol. 5, Exchequer Reports, p. 343.)

The last complaint was, as to the refusal of magistrates to convict when cases had been brought before them of gross misconduct by colliers in the course of their service, such as unscrewing their lamps in explosive mines, or wantonly disturbing the ventilation. These were proceedings under the General Act 4 Geo. 4, c. 34, giving power to justices to determine complaints between masters and servants, and it may well have been, in the cases complained of, that the magistrates refused to convict, because they were dissatisfied with the proof, and not from any doubt as to their jurisdiction. One benefit to be expected from the establishment in all collieries of a code of rules, and from bringing a thorough knowledge of them personally home to every one engaged in the mine is, that any disobedience of the rules will bear such a stamp of wilfulness that it is to be presumed that no magistrate will hesitate in convicting the delinquents; and it might be enacted that every wilful breach of the rules should be deemed misconduct in service, within the meaning of the Act. One alteration in the Act will clearly be necessary. According to the third clause, the complaints against his collier must be at the instance of the person who "has engaged him, or his steward, manager, or agent;" but, as the mischief which may ensue on his breach of the rules, may bring loss of limb or life to his fellow-workmen, more grievous than any loss

of property to his employer, it is right that every one in the mine, whether master or servant, should have power to bring the offender before the magistrates, and the like power might be given to the inspector.

In prosecuting this inquiry, Your Committee felt that, while it was their duty to investigate every means that could be suggested for diminishing the number of violent deaths that occur in and about collieries, care should be taken to avoid undue interference with that most important branch of commercial enterprise, the coal trade.

With that view, Your Committee at the conclusion of last Session thought it right to suggest to the owners and viewers of collieries that a conference should take place between themselves, the Government inspectors and the delegates of the workmen. In consequence of that suggestion meetings were held in London, to which too great importance cannot be attached.

The report of the proceedings was handed in by Mr. Nicholas Wood, as chairman of that meeting, and explanations were given by him to Your Committee; Mr. Dickenson also attended on the part of the Government inspectors, and Mr. Swallow on that of the workmen.

To these proceedings Your Committee beg to call especial attention.

Having well considered and weighed them with the evidence, they have to recommend that the following rules be enforced by the Legislature:—

1st. That the owners or occupiers of every colliery should frame a set of rules applicable to its particular state and circumstances, which rules should be agreed to and certified by the Government inspector of the district.

2d. That adequate artificial means of ventilation be provided at all collieries, and that there shall be at all times a sufficient current of air through the workings to dilute and render harmless all noxious gases.

3d. That every shaft or pit which is out of use, or used only as an air pit, should be securely fenced by its owner.

4th. That every working and pumping pit or shaft be properly fenced when not at work.

5th. That every working and pumping pit or shaft, where the natural strata are not safe, shall be securely cased or lined.

6th. That every working pit or shaft where a steam-engine or other mechanical power is used shall be provided with guides or conductors, and that all cages or apparatus in which men descend and ascend shall be provided with covers of suitable strength,

7th. That single-link chains, except the short coupling chain at the end of a rope, shall not be used for lowering or raising persons in the pits or shafts.

8th. That every working pit or shaft shall be provided with some proper means of signalling from underground to the surface, and *vice versa*.

9th. That a proper indicator, to show the position of the load in the pit or shaft, shall be attached to every machine used for raising or lowering persons.

10th. That every steam-boiler shall be provided with a proper steam-gauge, water-gauge, and safety-valve.

11th. That after months' notice given by the inspector to the owner or occupier of each colliery, any such owner or occupier shall be subject to a penalty of *l.* for every day after the expiration of said months for neglect of any of the above rules; and that a like system of penalties shall be applied to any default of the owners or occupiers under the existing Act; such penalty to be enforced on complaint to a magistrate.

12th. That a clause be inserted in any Act to be passed for the purpose of punishing all persons employed in or about mines, for breach of colliery rules.

The

The Government inspectors have suggested that ironstone mines be included in the Act and made subject to the same rules and regulations as coal mines. The duty delegated to Your Committee being limited to the latter, they have not taken that recommendation into consideration.

The establishment of benefit societies and funds for the relief of widows and orphans of colliers has been considered by Your Committee: they are happy to observe that these are so generally adopted that no further special legislative powers are necessary.

Your Committee having now recommended the rules and regulations which they think necessary, and which, if adopted, will, in their opinion, cause a diminution of fatal accidents, and an improvement in the physical condition of persons employed in coal mines, have only to allude to education, which, if liberally carried on, will improve their moral and intellectual condition, and gradually lead to better management and care on the part of the overlookers, and to less recklessness on the part of the workmen.

For the overlookers and officers of the mines additional means of education are beginning to be provided. In Newcastle a mining school is established, the good effects of which, it is stated, are already felt; and Your Committee cannot too strongly recommend the establishment of similar institutions in other districts, at which the branches of science bearing upon mining should be taught.

Facilities would thus be afforded for imparting to the superintendents or overlookers, upon whom the daily and hourly conduct of the mines necessarily falls, an amount of scientific information which could not fail to induce greater vigilance in carrying out rules and precautions, obvious enough to scientific men, but which it is difficult, if not almost impossible, to have faithfully realised in practice by those who, however willing to do their duty, do not fully understand or appreciate the value of such rules and precautions. Your Committee believe that the increased scientific information thus afforded to this class of men (the overlookers) would prove an important step towards lessening the number of accidents in coal mines, and more especially those arising from defective arrangements of ventilation; and they would urge upon Government to foster, by grants in aid, the establishment and maintenance of mining schools in the large mining districts throughout the country.

Education is also required for the children of the men. The necessity of this is felt by none more than the workmen themselves, who have stated their willingness to contribute, by authorised reductions from their wages, towards the support of teachers if school accommodation be provided.

Your Committee examined Mr. Seymour Tremenheere, who detailed a plan, taken from the Print Works Act, for compelling the attendance of boys between 10 and 14 at school for 150 hours in every six months. This plan was approved of by the meeting of the masters in London, and, after some hesitation, acquiesced in by the delegates of the workmen. Your Committee would refer Your Honourable House, on this question, to the words of the Rev. Mr. Kennedy, in a communication addressed to Mr. Horner, the inspector of factories, and embodied in his Report of 30th April 1853, to this effect: "If ever the boys between 10 and 13 years of age who work in coal mines should be required to attend school, as the people of Durham and Northumberland seem to desire, I hope the half-time system, and not the print-work system, will be applied to them." Some of the witnesses, and some of the petitions referred to Your Committee, express an opinion that children ought not to be permitted to work in coal mines until they have attained their twelfth year; because their hours of work are so long as to render it difficult to secure their attendance at school after they quit the mine. Many objections, however, were made with regard to the practicability of carrying either of these plans into effect.

In conclusion, Your Committee have to observe, that although their Report differs from that of the Committee of 1852, as to the mode of carrying out various details, yet it will be seen, on comparing the two, that the conclusions

arrived at by each Committee are nearly identical, viz. that improved ventilation, efficient supervision, increased inspection, and the education of all parties engaged in this dangerous branch of commercial enterprise, must be relied on for the decrease of the numerous fatal accidents that occur annually in the coal mines.

Your Committee cannot close this Report without expressing an earnest hope that Her Majesty's Ministers may be induced to take the important subject of the ACCIDENTS IN COAL MINES into their consideration as soon as possible, in order that no time may be lost in revising the law now in force, and in applying such further remedies as may appear practicable and effective.

26 *June* 1854.

PROCEEDINGS OF THE COMMITTEE.

Lunæ, 20^o die Martii, 1854.

MEMBERS PRESENT:

Mr. Hutchins.
Mr. Ingham.
Mr. Baird.

Mr. Cayley.
Mr. Cobbett.

Mr. HUTCHINS, called to the Chair.

[Adjourned till Friday, at Twelve o'clock.]

Veneris, 24^o die Martii, 1854.

MEMBERS PRESENT:

Mr. HUTCHINS, in the Chair.

Mr. H. A. Bruce.
Mr. Ingham.

Mr. Cobbett.
Mr. Locke.

Mr. *George Elliott*, examined.

[Adjourned till Monday, at Twelve o'clock.]

Lunæ, 27^o die Martii, 1854.

MEMBERS PRESENT:

Mr. HUTCHINS, in the Chair.

Mr. Cumming Bruce.
Mr. Ingham.
M. H. A. Bruce.
Mr. Cobbett.

Mr. Farrer.
Mr. Cayley.
Mr. Locke.

Mr. *James Darlington*, examined.

Mr. *George Elliott*, further examined.

[Adjourned till Friday, at One o'clock.]

Veneris, 31^o die Martii, 1854.

MEMBERS PRESENT:

Mr. HUTCHINS, in the Chair.

Mr. H. A. Bruce.
Mr. Ingham.
Mr. Baird.
Mr. Mostyn.

Mr. Child.
Mr. Farrer.
Mr. Locke.

Mr. *James Darlington*, further examined.

[Adjourned till Friday, at One o'clock.]

Veneris, 28^o die Aprilis, 1854.

MEMBERS PRESENT:

Mr. HUTCHINS, in the Chair.

Mr. Farrer.
Mr. Thicknesse.
Mr. Ingham.

Mr. H. A. Bruce.
Mr. Cobbett.
Mr. Child.

Mr. George Elliott, further examined.

[Adjourned till Monday, at Twelve o'clock.]

Lunæ, 1^o die Maii, 1854.

MEMBERS PRESENT:

Mr. HUTCHINS, in the Chair.

Mr. Cobbett.
Mr. Thicknesse.
Mr. H. A. Bruce.
Mr. Child.
Mr. Farrer.

Mr. Ingham.
Mr. Baird.
Mr. Locke.
Mr. Hussey Vivian.

Mr. Thomas John Taylor, examined.

[Adjourned till Friday, at Twelve o'clock.]

Veneris, 5^o die Maii, 1854.

MEMBERS PRESENT:

Mr. HUTCHINS, in the Chair.

Mr. Child.
Mr. Thicknesse.
Mr. H. A. Bruce.
Mr. Ingham.
Mr. Baird.

Lord Goderich.
Mr. Hussey Vivian.
Mr. Locke.
Mr. Cobbett.

Mr. Seymour Tremenheere, examined.

Sir Henry de la Beche, examined.

[Adjourned till Monday, at Twelve o'clock.]

Lunæ, 8^o die Maii, 1854.

MEMBERS PRESENT:

Mr. HUTCHINS, in the Chair.

Mr. Ingham.
Mr. Thicknesse.
Lord Goderich.

Mr. Cobbett.
Mr. Vivian.
Mr. Baird.

Mr. James Mather, examined.

[Adjourned till Friday, at Twelve o'clock.]

Veneris, 12^o die Maii, 1854.

MEMBERS PRESENT:

Mr. HUTCHINS, in the Chair.

Mr. Ingham.
Lord Goderich,
Mr. Farrer.
Mr. Thicknesse.
Mr. H. A. Bruce.

Mr. Cobbett.
Mr. Child.
Mr. Hussey Vivian.
Mr. Locke.
Mr. Baird.

Mr. *James Mather*, further examined.

Mr. *Warrington Smyth*, examined.

Mr. *Seymour Tremeneere*, examined.

[Adjourned till Monday, at Twelve o'clock.]

Lunæ, 15^o die Maii, 1854.

MEMBERS PRESENT:

Mr. HUTCHINS, in the Chair.

Mr. Ingham.
Mr. Thicknesse.
Lord Goderich.
Mr. Cobbett.

Mr. Locke.
Mr. Hussey Vivian.
Mr. H. A. Bruce.

Mr. *John Thomas Woodhouse*, examined.

[Adjourned till Monday, at Twelve o'clock.]

Veneris, 19^o die Maii, 1854.

MEMBERS PRESENT:

Mr. HUTCHINS, in the Chair.

Mr. Baird.
Mr. Thicknesse.
Lord Goderich.

Mr. Child.
Mr. Cobbett.
Mr. Locke.

Mr. *John Evans*, examined.

Mr. *John Atkinson*, examined.

[Adjourned till Monday, at Twelve o'clock.]

Lunæ, 22^o die Maii, 1854.

MEMBERS PRESENT:

Mr. HUTCHINS, in the Chair.

Mr. Thicknesse.
Mr. Cobbett.
Lord Goderich.
Mr. H. Vivian.

Mr. Locke.
Mr. Cayley.
Mr. H. A. Bruce.
Mr. Baird.

Mr. *David Landale*, examined.

Mr. *Samuel Dobson*, examined.

[Adjourned till Wednesday, at Twelve o'clock.]

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BRANCH LIBRARY
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Mercurii, 24^o die Maii, 1854.

MEMBERS PRESENT :

Mr. HUTCHINS, in the Chair.

Lord Goderich.
Mr. Thicknesse.
Mr. H. A. Bruce.
Mr. Childe.

Mr. Locke.
Mr. Cobbett.
Mr. Cayley.

Mr. *Thomas Wynne*, examined.Mr. *Matthias Dunn*, examined.

[Adjourned till Monday, at One o'clock.]

Lunæ, 29^o die Maii, 1854.

MEMBERS PRESENT :

Mr. HUTCHINS, in the Chair.

Mr. Cobbett.
Mr. Thicknesse.
Mr. Locke.

Mr. H. A. Bruce.
Mr. H. Vivian.

Mr. *Nicholas Wood* examined.

[Adjourned till To-morrow, at Twelve o'clock.]

Martis, 30^o die Maii, 1854.

MEMBERS PRESENT :

Mr. HUTCHINS, in the Chair.

Mr. Farrer.
Mr. Locke.
Mr. Thicknesse.
Mr. Cobbett.

Mr. H. Vivian.
Mr. Ingham.
Lord Goderich.
Mr. Cayley.

Mr. *Nicholas Wood*, examined.Mr. *Joseph Dickinson*, examined.Mr. *David Swallow*, examined.

Adjourned.

Lunæ, 19^o die Junii, 1854.

MEMBERS PRESENT :

Mr. HUTCHINS, in the Chair.

Mr. Cobbett.
Mr. Ingham.
Mr. H. Vivian.
Mr. Thicknesse.

Mr. Cayley.
Mr. Stephenson.
Mr. Locke.
Mr. Fitzroy.

Draft Report, proposed by Chairman, read 1^o.Draft Report, read 2^o, paragraph by paragraph.

Paragraphs 1-4 amended and agreed to.

Paragraph

Paragraph 5 read as follows: "Your Committee are aware that the Committee of the House of Lords called attention to the steam-jet, and the Committee of 1852 reported in favour of it; but since that time investigations and experiments on a much larger scale have been instituted by Mr. N. Wood and others, the results of which lead them to an opposite conclusion, and induce them to think that, especially where the coal lies at a considerable distance below the surface, and the shafts are consequently deep, the furnace is the most effective, as well as the most economical mode of ventilation."

Several Amendments made.

Amendment proposed (Mr. Cayley), to leave out the words "the most effective, as well as," in the last line. Question, "That these words stand part of the paragraph," put, and agreed to.

Paragraph, as amended, agreed to.

Amendment proposed (Mr. Cayley), after paragraph 5 to insert the paragraph following: "Your Committee think it right, however, to observe, that as these experiments were made in the absence of all parties who proposed, or of those who have had them in operation (more especially since those parties have stated their opinion that the experiments were not made according to the rules laid down for using the steam-jet), they recommend that an experiment be made to test the comparative powers of these systems by some competent and disinterested persons appointed by Government." Question, "That this paragraph be there inserted," put, and negatived.

Paragraph 6, read, as follows: "They have also taken the opinions of some of the most competent viewers and Government inspectors on the objections raised against the furnace. These are designated under the title of Furnace Limit, Furnace Paradox, and Natural Brattice; and they are led to the conclusion that these are theoretical inductions, having no practical effect." Amendments made, by striking out the word "are," in line 2, and inserting the word "were," and by striking out from "theoretical" to the end of the paragraph, and inserting the words "views, and do not establish any positive law prejudicially affecting the action of the furnace."

Amendment proposed (Mr. Cayley) at the end of the paragraph to add the words following: "But result only in producing the well-known inconvenience of smoky chimnies. The upcast shaft of a coal-pit is neither more nor less than a long chimney, acting in obedience to the same laws. When a chimney smokes from want of air in the room (a case not unfrequent) two currents may always be observed in the chimney, one descending and passing its smoke into the room, the other ascending immediately above the fire. The term 'natural brattice,' is a mere expression for explaining, on scientific principles, this very ordinary phenomenon. A homely and more visible illustration of the same thing is seen in an Irish cabin, where the smoke goes up in a column immediately above the fire, and falls in a return current down the sides in all cases to a greater or less level, depending on the amount of supply; namely, whether it be cut off altogether, or limited by the doors or windows being shut. The same disturbances occur under the same conditions in the chimney, or upcast of a coal-pit, except that, the air being less visible than the smoke, they are less easily detected. In case, however, of certain winds, this retrograde motion cannot be overlooked by a careful observer; the air is then returned down the upcast precisely as the smoke is down a smoking chimney: the hot column, on which the whole power of the upcast depends, is then partially cooled, the pull of the shaft becomes diminished, less air in consequence is drawn through the workings, the supply at the base becomes more and more limited, until at last the brattice reaches the bottom. The power of the upcast now ceases; and hence that want of sufficient fresh air to dilute the inflammable gases, which results in explosions, and the lamentable loss of life which led to the appointment of this inquiry. The phenomena here described and explained may always happen under the furnace system; the less frequently, however, in proportion to the skill with which that system is applied. The virtue of the steam-jet, properly applied, consists in its acting at all times independently of such casualties, and of its appearing not to be limited in its power, which the furnace system certainly seems to be, under the circumstances described by Mr. Gurney as constituting the 'furnace limit.'

"The inductions of your Committee therefore being necessarily theoretical on this subject, which is one so vital to the interests of a large body of the working classes, and since men of high mathematical standing, well acquainted with the laws of pneumatics (amongst them a senior wrangler of Cambridge), have given a different opinion to that entertained by a majority of your Committee, they recommend that the same persons appointed to report on the efficacy of the steam-jet, should report likewise as to the truth or otherwise of the points just referred to, as on their admission or rejection might depend the presence or absence of such precautions or powers of ventilation, as were indispensable to the proper security of human life." Question, "that these words be there added." Put, and negatived.

Question, "That the paragraph, as amended, stand part of the Report," put. The Committee divided:

Ayes, 4.	Noes, 2.
Mr. Stephenson.	Mr. Ingham.
Mr. Vivian.	Mr. Cobbett.
Mr. Thicknesse.	
Mr. Locke.	

[Adjourned till Thursday next, at Half-past Twelve o'clock.]

Jovis, 22^o die Junii, 1854.

MEMBERS PRESENT:

Mr. HUTCHINS, in the Chair.

Mr. Vivian.	Mr. Cobbett.
Mr. Thicknesse.	Mr. Locke.
Mr. Farrer.	Mr. Stephenson.
Mr. Ingham.	Mr. Cayley.

The Committee proceeded in the Draft Report.

Amendment proposed (*Mr. Stephenson*), after paragraph 30, to insert the paragraph following:—"That as soon as practicable, every person, before his appointment as an inspector, be subjected to an examination in all the branches of science connected with mining." Question, "That this paragraph be there inserted," put. The Committee divided:

Ayes, 4.	Noes, 4.
Mr. Stephenson.	Mr. Vivian.
Mr. Cobbett.	Mr. Thicknesse.
Mr. Ingham.	Mr. Farrer.
Mr. Cayley.	Mr. Locke.

The Chairman gave his vote with the Ayes.

Last paragraph but 5, read, as follows:—"For the overlookers and officers of the mines additional means of education are beginning to be provided. In Newcastle a mining school is established, the good effects of which, it is stated, are already felt; and your Committee cannot too strongly recommend the establishment of similar institutions in other districts, at which the branches of science bearing upon mining should be taught." Amendment proposed (*Mr. Ingham*), at the end of the paragraph to add the words, "and where certificates of proficiency might be gained." Question, "That these words be there added," put. The Committee divided:

Ayes, 2.	Noes, 5.
Mr. Ingham.	Mr. Stephenson.
Mr. Cayley.	Mr. Cobbett.
	Mr. Vivian.
	Mr. Thicknesse.
	Mr. Locke.

Paragraph agreed to.

[Adjourned till Monday, at One o'clock.]

Lunæ, 26^o die Junii, 1854.

MEMBERS PRESENT:

Mr. HUTCHINS, in the Chair.

Mr. Thicknesse.	Mr. Stephenson.
Mr. Cayley.	Mr. Vivian.
Mr. Ingham.	Mr. Fitzroy.
Mr. Cobbett.	

The Committee proceeded in the Draft Report.

Amendment proposed (*Mr. Stephenson*), after the last paragraph but five, to insert the paragraph following: "Facilities would thus be afforded for imparting to the superintendents or overlookers, upon whom the daily and hourly conduct of the mines necessarily falls, an amount of scientific information which could not fail to induce greater vigilance in carrying out rules and precautions, obvious enough to scientific men, but which it is difficult, if not almost impossible, to have faithfully realised in practice by those who, however willing to do their duty, do not fully understand or appreciate the value of such rules and precautions."

Your

Your Committee believe that the increased scientific information thus afforded to this class of men (the overlookers) would prove an important step towards lessening the number of accidents in coal mines, and more especially those arising from defective arrangements of ventilation; and they would urge upon Government to foster, by grants in aid, the establishment and maintenance of mining schools in the large mining districts throughout the country." Amendment proposed to the proposed paragraph, to leave out the words, "by grants in aid," in the last line but one. Question, "That the words, 'by grants in aid,' stand part of the proposed paragraph," put. The Committee divided:

Ayes, 4.
Mr. Ingham.
Mr. Cobbett.
Mr. Stephenson.
Mr. Vivian.

Noes, 2.
Mr. Fitzroy.
Mr. Thicknesse.

Question, "That this paragraph be there inserted," put. The Committee divided:

Ayes, 4.
Mr. Ingham.
Mr. Cobbett.
Mr. Stephenson.
Mr. Vivian.

Noes, 2.
Mr. Fitzroy.
Mr. Thicknesse.

Report further amended and agreed to.

Ordered, to Report.

EXPENSES OF WITNESSES.

N A M E of WITNESS.	PROFESSION or CONDITION.	By what Member of Committee Motion made for Attendance of the Witness.	Date of Arrival.	Date of Discharge.	Total Number of Days in London.	Number of Days under Examina- tion by Committee, or acting specially under their Orders.	Expenses of Journey to London and back.	Expenses in London.	TOTAL Expenses Allowed to Witness.
Joseph Dickinson	Inspector of Mines	Chairman	-- For attendance in Session 1853.		25	- -	£. s. d. 16 - -	£. s. d. 26 5 -	£. s. d. 45 19 -
Hubert Mackworth	- - -	ditto	- - ditto		22	- -	10 5 -	23 2 -	39 9 -
James Darlington	Engineer	ditto	- -	- -	6	- -	8 - -	18 18 -	26 18 -
George Elliott	Ditto	ditto	- -	- -	10	- -	21 12 -	31 10 -	53 2 -
James Mather	Ditto	ditto	- -	- -	3	- -	7 11 -	9 9 -	17 - -
John Thomas Wood- house.	Ditto	ditto	- -	- -	3	- -	4 4 -	9 9 -	13 13 -
John Atkinson	- - -	ditto	- -	- -	3	- -	3 18 -	3 3 -	7 1 -
David Landale	Engineer	ditto	- -	- -	4	- -	6 - -	12 12 -	20 12 -
Thomas Wynne	- - -	ditto	- -	- -	5	- -	8 - -	5 5 -	13 5 -
Matthias Dunn	- - -	ditto	- -	- -	3	- -	8 - -	3 3 -	11 3 -
Joseph Dickinson	- - -	ditto	- -	- -	4	- -	5 - -	4 4 -	9 4 -
Martin Jude	- - -	ditto	- -	- -	6	- -	- - -	6 6 -	6 6 -
David Swallow	- - -	ditto	- -	- -	6	- -	- - -	6 6 -	6 6 -
							£.	269 11 -	

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1. *Particulars as to the System of Education ; its Effects :*

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1. *Great Importance of Remedying the present want of Education among Miners.*
2. *State of Education in particular Districts.*
3. *Act of 5 & 6 Vict. c. 89.*
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5. *Proposition by Mr. Tremenheere for continuing the Education of Boys at Work between the Ages of Ten and Fourteen.*
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7. *Other Proposals for supplying the required Instruction.*

1. *Great Importance of Remedying the present want of Education among Miners:*

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2. *State of Education in particular Districts :*

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Objections to preventing boys from working till they are twelve years old, with a view to their better education, *Taylor* 1213-1216; *Smyth* 1850, 1851; *Evans* 2408-2412; *Wood* 3595-3599—Advantages of their still being allowed to commence work when ten years old, *Tremenheere* 1234, 1235. 1267-1273; *Woodhouse* 2292, 2293. 2308. 2311-2316—Respects in which the age of ten is too young for a boy to commence work in a colliery, *Evans* 2345.

5. *Proposition by Mr Tremenheere for continuing the Education of Boys at Work between the Ages of Ten and Fourteen.*

Recent communication between witness and delegates from the coalowners and the men in regard to the education of children between ten and fourteen years of age after their entering the pit, *Tremenheere* 1236-1246—Proposition made by witness that it should be compulsory on parents to provide 150 hours of education every six months for boys between the ages of ten and fourteen, *ib.* 1247-1251—Favourable manner in which the proposal was received by the delegates from the men, *ib.* 1249-1251. 1334-1342—Adoption of this principle from the Print Works Act; its satisfactory working in the latter case adverted to, *ib.* 1253. 1304. 1305—Existence of numerous suitable schools in the mining districts, easily accessible to the boys who work in the pits, *ib.* 1253. 1302.

Consideration of the character of the labour of the boys and of the number of hours daily for which they work, as showing that they might still attend evening schools, *Tremenheere* 1253-1264. 1282. 1301-1305—Numerous attendance at evening schools, in Scotland, of boys engaged in underground employment, adverted to, *ib.* 1301-1304—Mention of other opportunities besides evening schools for providing the 150 hours' education; use to be made of idle Mondays and other occasions of cessation from labour, *ib.* 1265, 1266. 1277-1289—No difficulty would be felt in cases where there are no idle Mondays, or where a limit of employment to twelve years of age would be preferred, *ib.* 1292-1300—Hours passed at Sunday schools should not reckon, *ib.* 1301.

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6. *Evidence in consideration of Mr. Tremenheere's Scheme:*

Approval of Mr. Tremenheere's proposal, that children entering the pits when ten years old should still have 150 hours of education every six months, *Taylor* 1211; *Smyth* 1852, 1853; *Woodhouse* 2283-2310—Partial disapproval expressed by Mr. Swallow, as representing the colliers, of witness's scheme for continuing the education of boys, after they enter the mines, at ten years of age, *Tremenheere* 1935-1938—Mr. Swallow was of opinion that a boy, after working twelve hours, would be too exhausted to attend school, *ib.* 1935-1938—Means of carrying out this scheme, *Woodhouse* 2283-2310—Suggestion that the 150 hours be provided for on Saturdays, through means of part holidays given for the purpose, *ib.* 2289, 2296-2310—Approval by the meeting of coalowners, mining engineers, &c., of the measure brought forward by Mr. Tremenheere, *Wood* 3590—Practicability of carrying out the same, *Evans* 2378-2391; *Wood* 3591, 3592, 3594, 3595, 3600, 3601.

Difficulty in regard to the attendance at school of boys ten years of age after twelve hours' work in the mine, *Elliott* 945, 946, 976, 977; *Woodhouse* 2286-2288, 2296—Objection to continuing the education of boys up to the age of fourteen, after they have commenced work, *Evans* 2375-2377—Impracticability of the proposal for providing 150 hours' education in the course of six months for boys at work between the ages of ten and fourteen, *Laudale* 2856-2861—It would be better to make it imperative that boys should not work till twelve years old, *Laudale* 2858, 2865; *Swallow* 3758—Disapproval by the workmen of the details of Mr. Tremenheere's educational plan, *Swallow* 3756, 3757—Six hours at school weekly would be better than 150 hours in six months; difficulty in either case, *ib.* 3757, 3758.

Plan of Mr. Tremenheere adverted to by the Committee, *Fourth Rep.* p. 1—Suggestion made by the Rev. Mr. Kennedy, that the half-time system, and not the part-work system, be adopted, *ib.*

7. *Other Proposals for supplying the required Instruction:*

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Suggestions made by witness to colliers, that they should, of themselves, obtain intelligence, and communicate it to others, *Sir H. de la Beche* 1397, 1398—Advantages of a system of voluntary subscription, *ib.* 1399, 1400, 1443-1445—Advantage of letting the workman see the practical benefit to himself of education, *ib.* 1399, 1400—Objection to the principle of compulsory education, *ib.* 1399, 1400, 1439—Disposition of the coalowners to promote the education of the colliers, *Mather* 1642—Approval of compulsory education, *ib.* 1647—Parents would not object to the payment of a rate, *ib.* 1648—It is very desirable that boys, after entering the pits, should continue their education, *ib.* 1649.

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See also *Dowlais Works*, 1. *Mining College.* *Mining Schools.* *Prize System of Education.* *Staffordshire, &c. District.* *Strikes.*

Elliott, George. (Analysis of his Evidence.)—Agent of the Marquis of Londonderry, 1—Is owner of several collieries, 2—Has had the official management of collieries for about eighteen years, 3—The ventilation of coal mines has been much improved since the Lords' Committee on the subject in 1849; 4-6—There has been a great improvement effected in the furnaces, which are now made broader, and have increased power, 7-9—It is doubtful whether, as a rule, more ventilation is obtained by passing fresh air over the furnace than by passing return air, 10-12.

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Witness delivers in a paper showing an analysis of experiments made by him at the Adelaide and Antrim pits, Pittington Colliery, for the purpose of ascertaining the comparative value of the furnace and the steam-jet as a means of ventilation, 35; *First Rep.*, *Ev.* p. 3-6—The furnace produced 45,740 cubic feet of air per minute as against 36,267 by the steam-jet, *Ev.* p. 5—Diameters of the upcast and downcast shaft in this case, 36-38—Reason for Mr. Forster having obtained a larger result with the steam-jet, 39-42—Advantage, in trying the power of the steam-jet, of placing the boilers at the bottom rather than the top of the pit, 43, 44—Ordinary quantity of air passing per minute through the Pittington Colliery with only one furnace in use, 45-48—Number of men, boys, and horses employed in the colliery, 49, 50—Generation of the steam at the top of the pit; loss of power in conducting it, 51, 52.

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1. *As favourable to the Furnace :*

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I.

INCE HALL COAL AND CANNEL WORKS :

1. Explosions at the Arley Mine ; origin of the more recent one considered.
2. System of Working.
3. Ventilation generally.
4. How far expedient to sink another Shaft.
5. Other Evidence and Suggestions ; Precautions now taken.
6. Experiments with the Furnace and the Steam-jet.

1. Explosions at the Arley Mine ; origin of the more recent one considered :

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Considerable improvement of late in the management of mines in witness's district, which is in advance of any other, *Dunn* 3392-3395—Great decrease of accidents in proportion with the produce of coal, *ib.* 3396-3399—Such decrease attributed chiefly to the moral working of the Act, and to the scrutiny of the inspectors, *ib.* 3400-3404, 3409-3412—Frequent suggestions (always in writing) made by witness to owners or managers; they have been generally attended to, *ib.* 3405-3409—Instance of witness having made certain suggestions about the working of a mine, which were only partly attended to, *ib.* 3414-3418—Efficiency of the air-courses in the North, *ib.* 3448—Efficiency of the shafts generally, *ib.* 3449-3451.

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Pillar-and-Stall System. Greater waste of coal, greater expense, greater difficulty of ventilation, and greater liability to accident, under the pillar-and-stall system, than under long-wall work, *Wynne* 3091-3110.—See also *Long-wall Work*. *Splitting the Air*.

Pittington Colliery. Witness delivers in a paper, showing an analysis of experiments made by him at the Adelaide and Antrim pits, Pittington Colliery, for the purpose of ascertaining the comparative value of the furnace and the steam-jet as a means of ventilation, *Elliott's Ev. (First Rep.)*, p. 3-6—Greater consumption of coals, and less ventilation obtained, under the steam-jet than the furnace, *ib.* 4-6—The furnace produced 45,740 cubic feet of air per minute, as against 36,267 by the steam-jet, *ib.* 5—Diameters of the upcast and downcast shafts in this case, *Elliott* 36-38—Further particulars as to these experiments; similarity of the circumstances under which applied, *ib.* 263-279—The result shows unquestionably the greater power, and the less expense of the furnace, *ib.* 266.

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Props. Approval of the system of employing deputies to stand the props for the workmen, as better than allowing the workmen to attend to the matter, *Elliott* 337-340, 838-840; *Mather* 1539-1542; *Atkinson* 2473-2479—Importance of there being experienced men to set the props, and of having an abundance of timber at hand, *Darlington* 546-548—Difficulty in procuring a sufficiency of wooden props; employment by witness of cast-metal props, *Elliott* 841-859—Responsibility to be thrown on the prop-setters, *ib.* 860, 861—Superior class of workmen from whom they should be selected, *ib.* 862, 863.

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Return Air. Advantage in some cases of the steam-jet as a means of preventing the return air from coming in contact with the furnace, *Elliott* 20-23. 26—Paucity of accidents from the return air passing over the furnace, though as a rule the foul air should be worked off by means of a dumb-drift, *ib.* 812-815.—See also *Furnace*.

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Explanation as to several rules, drawn up by six inspectors and signed by four, which have just been communicated to the deputation of coalowners and workmen now sitting in London, and are recommended for enactment, *Wynne* 3227-3235; *Dickinson* 3679, 3680—A copy of these suggested rules delivered in, *Wynne* 3235; *Second Rep.*, p. 43—Copy of rules suggested by Mr. Dunn, *Third Rep.*, p. 73, 74—Concurrence generally of witness and Mr. Marton in the rules laid before the Committee by Mr. Wynne, *Dunn* 3509, 3510. 3518-3521—How far the workmen approve of the recommendation that printed rules be posted up in each colliery, *Swallow* 3734—Resolution of deputations of coalowners and mining engineers in favour of a code of rules for every colliery, *Third Rep.*, *Ev.* p. 68—Disapproval on the part of the workmen of this resolution, *Swallow* 3727.

All parties agree that every colliery should have a set of rules, *Wood's Ev. (Third Rep.)*, p. 86—The rules proposed for the safety of the workmen should be kept apart from those for the working of the mine, *Wood* 3530—It should be left to the option of the coalowner, under the advice or suggestions of the inspector and workmen, to frame any rules he may think best fitted to the circumstances of each colliery, *ib.* 3530-3540. 3623-3627—Some of the rules might be embodied in an Act of Parliament, and made compulsory in all collieries, *ib.* 3531, 3532. 3536. 3540—Anticipated adoption by each coalowner of the rules most requisite for his colliery; his responsibility in the matter adverted to, *ib.* 3534-3537. 3620, 3621. 3627—Great care and discrimination required in specifying any rules to be embodied in an Act of Parliament, and made applicable to all mines, *ib.* 3537, 3538. 3618-3622.

Sufficiency of the rules to be enacted by each coalowner to provide against the unsafe working of any mine, *Wood* 3568-3570. 3579—Mode of enforcing the necessary rules considered, *ib.* 3571-3575—Further reference to the character of the rules and regulations which may be embodied in the Act, *ib.* 3675-3677—Expediency of enacting rules which shall embrace and define certain essential points set forth by witness as applicable to every mine, *Swallow* 3727, 3728.

Recommendation of the Committee that the owners or occupiers of every colliery should frame a set of rules applicable to its particular state and circumstances, which rules should be agreed to and certified by the Government inspector of the district, *Fourth Rep.*, p. 8—And that a clause be inserted in any Act to be passed for the purpose of punishing all persons employed in or about mines for breach of colliery rules, *ib.*

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S.

SAFETY-LAMPS:

1. *Their Advantages generally.*
2. *Difficulty in exploding them.*
3. *Negligence in their use considered.*
4. *Other Particulars.*

1. *Their Advantages generally:*

Necessity for the safety-lamp in mines subject to sudden outbursts of gas, *Darlington* 215, 216, 218, 229-240; *Smyth* 1696; *Woodhouse* 2170-2172, 2181; *Dunn* 3421-3424—Estimated cost of lighting a mine exclusively with safety-lamps, as compared with the cost of using candles; slight difference in favour of the former, *Taylor* 1084-1087, and *Second Rep., Ev. p. 35, 36*—Circumstances under which the lamp should always be employed, *Sir H. De la Beche* 1424; *Mather* 1557, 1558, 1582; *Smyth* 1763-1769, 1773-1776; *Wynne* 3148-3155—Expediency of safety lamps under proper regulations, *Landale* 2744, 2745—Consideration of the Report of the Committee of 1852, as to the safety-lamp "being rather a lure to danger than a security," *Elliott* 821-832; *Taylor* 1065-1069, 1079-1081, 1091; *Woodhouse* 2149-2160.

Opinion of the Committee that in fiery mines, especially those that are liable to sudden outbursts of gas, safety-lamps add largely to the security from explosion, and can be used without much, if any, extra cost over the naked light, *Fourth Rep., p. 5*—Still safety-lamps, however valuable, should not be relied upon for the prevention of explosions, *ib.*

2. *Difficulty in exploding them:*

Impression as to the velocity of current in which the Davy or ordinary lamp will explode, *Darlington* 206-212, 219-228—Witness has never been able to explode a lamp so long as the gauze has been under red heat, *ib.* 220, 221—A slight movement will explode one at red heat, *ib.* 222, 223—Confidence of witness in Mr. Wood's experiments with safety-lamps, *ib.* 582, 583.

Except under extraordinary circumstances, the lamp is perfectly safe, *Elliott* 824-831—Great velocity required to cause explosion, *ib.* 828-830—Witness never heard of an explosion in North of England through the safety-lamp; his experiments on the subject alluded to, *Taylor* 1068, 1069—Reference to the safety-lamp produced by Mr. Wood before the Committee of 1853, *Mather* 1679-1682—When the gauze becomes red hot the work in the mine should be stopped, *Smyth* 1765, 1766—Satisfactory character of the experiments conducted by Messrs Wood and Elliott, *Fourth Rep., p. 5*.

3. *Negligence in their use considered:*

Occasions of workmen taking off the tops of the lamps; difficulty generally experienced, from the state of the law, in getting magistrates to punish properly for this offence, *Darlington* 590-598—Difficulty of applying the law adverted to, *Elliott* 936, 937—Frequent occurrence of accidents through the carelessness or want of intelligence of workmen with their lamps, &c.; such carelessness should be punishable, *Sir H. De la Beche* 1379-1381, 1390—The lamps should always be kept locked, *Smyth* 1765.

4. *Other Particulars:*

Parties by whom the use of the lamp should be determined, *Darlington* 241, 242; *Woodhouse* 2183-2188; *Wynne* 3156-3159—Respective merits of different lamps, *Elliott* 832-837—Compulsory use of safety-lamps recommended by witness in 1845, *Sir H. De la Beche* 1356—Difficulty in regard thereto, *ib.* 1377, 1382-1389—Danger of safety-lamps near some goaves, *Smyth* 1725—Degree of light given by the safety-lamp adverted to, *ib.* 1774, 1775—Instances of mines being worked exclusively with safety-lamps, *Taylor* 1083.

Objection to the safety-lamp being used in every mine, *Woodhouse* 2182—There is scarcely ever any necessity for the use of the safety-lamp in Scotch mines, *Landale* 2684—Dangerous characters of the lamps used in Scotland, and countenanced by the inspectors, *ib.* 2746-2751—Use of safety-lamps by witness as a precaution in dangerous mines, *Dobson* 2962-2967—Slight use of the safety-lamp in the Midland district, *Wynne* 3137, 3138—Care taken of the lamps in Northumberland and Durham, *Dunn* 3427, 3428—Danger of many lamps now in use, which are not constructed on the safe principles of the Davy lamp, *ib.* 3431-3434—Strict regulations advisable in using the lamp, *ib.* 3435, 3436—Rules and regulations as to the use of the lamp in fiery and non-fiery mines, *Third Rep., Ev. p. 78-80*—Paper showing the results of experiments at Wallsend Colliery in October 1849, and August 1853, for the purpose of testing the lighting powers of several safety-lamps, *Taylor* 1220 and *Second Rep., Ev. p. 55*.

See also *Blasting. Davy Lamp. Glover's Lamp. Hall's Lamp. Stephenson's Lamp.*

Sanchie Pit (Scotland). Unsuccessful application of the steam-jet to the Sanchie Pit, near Alloa, where the fires were never extinguished, and are still burning; the fault not attributed to the jet, *Landale* 2588-2595, 2840-2849.

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School of Mines. Inexpediency of referring questions of importance as to the conduct of collieries to the School of Mines, *Darlington* 672, 673.

Schoolmasters. See *Education*, 5.

Schools. See *Education.* *Mining Schools.*

SCOTLAND:

1. *Ventilation and Working of the Mines.*
2. *Nature of the Law in cases of Accidents, &c.*

1. *Ventilation and Working of the Mines:*

Different circumstances of the pits in Scotland and in the north of England, as regards ventilation, *Landale* 2663-2665—Greater danger in Scotland of pillar-and-stall work than of long-wall work, *ib.* 2699-2705—General rules handed in as applicable to Scotch mines, and embracing machinery, shafts, ventilation, mode of working, and proceedings on accidents, *Landale's Ev. (Third Rep.)*, p. 21, 22—Power of the procurator fiscal rather than of the inspector under these rules; sufficiency of remonstrances by the latter, *Landale* 2787-2791. 2813-2815—Use of the furnace in Scotland where fire-damp exists, *ib.* 2568—Particulars as to the upcast and downcast shafts in Scotland, *ib.* 2581-2584—The furnace or fire-lamp is used in Scotland where artificial ventilation is required, *ib.* 2587—Occurrence of fires in Scotch mines adverted to, *ib.* 2611.

2. *Nature of the Law in cases of Accidents, &c:*

Information given by the men to the procurator fiscal in cases of grievance, *Lundale* 2780-2783—Reference to the common law of Scotland as sufficient, in connexion with proper rules, without increased Government inspection, *ib.* 2775-2780—Evils of the law for assessing damages in cases of accidents, *ib.* 2816 *et seq.*—Course of the law in such cases, *ib.* 2817. 2819-2829—Occasional ignorance displayed by the judge and jury in the course of the trials, *ib.* 2818. 2838—Inexpediency of introducing the English law into Scotland, *ib.* 2835-2837—Inexpediency of adopting in England the Scotch law in regard to accidents, *Elliott* 930-934.

See also *Education*, 2. *Winding up and down.*

Seaton Delaval Colliery. Reference to the experiments of Mr. Forster with the steam-jet at this mine, *Taylor* 1132-1135—Result of these experiments adverted to, as showing the great power of the jet in large mines, *Mather* 1474-1478—Explanation of an allusion made by witness in his work on "Coal Mines, &c." to the mode of application of the steam-jet at Seaton Delaval, and to the want of knowledge of the Committee on the subject, *ib.* 1674.

SHAFTS:

1. *Size and Expense.*
2. *Proposed Precautions for the prevention of Accidents.*

1. *Size and Expense:*

Opinion that the smaller shaft should be the upcast and the larger the downcast, *Elliott* 308—Great expense of the shafts, *Darlington* 512-516; *Dunn* 3452, 3453—Impracticability, frequently, of sinking additional shafts; cases in point, *Taylor* 1179-1182—Means by which the proper size for the shafts might be decided, *Woodhouse* 2087-2093—Extent of area which may be safely worked with two pits of a certain diameter, *Landale* 2625, 2626. 2636-2638—Rule proposed for Scotland as to the size, &c., *Third Rep.*, p. 21—Explanation of this rule, *Landale* 2805, 2806.

2. *Proposed Precautions for the prevention of Accidents:*

It should be compulsory to arch over or fence round the mouths of the pit, *Darlington* 564, 565; *Mather* 1543; *Wynne* 3209, 3210—Necessity for abandoned pits being walled round or filled up, *Elliott* 865, 866—Expediency of fencing or walling round the mouths of the shafts considered; objection to fences, *Woodhouse* 2118-2123—Rules suggested for the proper condition of the shafts in Scotland, *Landale* 2786—Custom in Scotland of walling round disused pits, *ib.* 2804—Occurrence of accidents through the bad condition of the shafts, *Wynne* 3198-3202—Necessity of walling round abandoned pits in Staffordshire, &c.; penalty proposed, *ib.* 3203-3207.

Suggestions by the inspectors as to the condition and care of the shafts, *Third Rep.*, p. 43—Resolutions of coalowners and mining engineers on this subject, *ib.* 69—Reference to the propositions of the inspectors for the better prevention of accidents in the shafts, *Wood* 3608-3611—Views of the coalowners in regard to the propositions of the inspectors, *ib.* 3656-3662—Suggested enactment of the inspectors' proposal for the fencing and lining, &c., of the pits, *Dickinson* 3681-3683. 3687-3690—How far the workmen approve of this proposition, *Swallow* 3729, 3730.

Recommendation of the Committee that every shaft or pit which is out of use, or used only as an air pit, should be securely fenced by its owner, *Fourth Rep.*, p. 8—

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SHAFTS—continued.

2. Proposed Precautions for the prevention of Accidents—continued.

Also that every working and pumping pit or shaft be properly fenced when not at work, *Fourth Rep.*, p. 8—Also that every working and pumping pit or shaft where the natural strata are not safe shall be securely cased and lined, *ib.*

See also *Winding up and down.*

Shallow Mines. See *Steam-jet*, 2.

Sick Clubs. See *Provident Societies.*

Silesia. Reference to a mining school in Silesia, where science has been introduced with great advantage, *Smyth* 1856, 1857. 1859.

Smart Money. Particulars as to the payment of "smart money" to men and boys injured by accidents in the Northumberland and Durham mines *Taylor* 1027-1033.

Smyth, Warrington. (Analysis of his Evidence.)—Inquiries by witness, in conjunction with Sir H. De la Beche and Dr. Lyon Playfair, into the causes of accidents in coal mines; the result was published in 1845; 1694, 1695—Government inspection was recommended by witness, 1696—Also the imperative use of the safety-lamp in fiery mines, *ib.*—Attention paid by witness since that period to the subject of accidents in collieries; official inquiries made by him thereon, 1697, 1707—Improvements of late years in the ventilation of coal pits, 1698, 1699—Fairness with which Mr. Wood conducted his experiments with the steam-jet and furnace at the Killingworth Colliery, 1699-1703—Correct account of the experiments given in his book on the subject, 1704-1706.

Several sources to which witness attributes the occurrence of accidents, 1707-1711—He does not agree with Mr. Taylor that most of the accidents in Northumberland are attributable to sudden irruptions of gas, 1709-1711—Necessity of guarding against accumulations of gas in the goaves, 1711—Different modes in the Northern and in the Midland districts of distributing the air through the mine, 1712, 1713—Efficiency of the system of coursing the air where long-wall work is adopted; it is in such cases the only possible system, 1713, 1714—Necessity of splitting the air where the pillar-and-stall mode of working is employed, as in Northumberland; effect thereof upon the condition of the pit and the health of the colliers, 1715-1719—More ventilation required where carbonic acid gas exists than where there is carburetted hydrogen, 1720, 1721.

Best mode of ventilating the goaves, 1723-1724—Danger of safety-lamps near some goaves, 1725—Restrictions in Mr. Wood's pits at Hepburn as to the use of lights, adverted to, 1725-1728—Adoption of long-wall work in certain districts with much advantage; its extension desirable, 1729-1738—Modes of working the coal in Northumberland and in South Wales; advantages of the Northumberland practice, 1739-1744—Better condition generally of the mines in the North, attributed to the greater intelligence of the viewers, &c., in those districts than in the Midland Counties, 1745-1750—Great importance of highly educated managers as affecting the character of the ventilation, &c., 1751, 1760-1762, 1812-1814, 1843.

Expediency of leaving the peculiar mode of ventilation to the discretion of the managers and owners, 1752—Great importance of stoppings or regulators of solid coal in lieu of doors; their adoption generally considered, 1753-1760—Security and expediency of using safety-lamps under certain circumstances, 1763-1769, 1773-1776—They should always be kept locked, 1765—When the gauze becomes red hot the work should be stopped, 1765, 1766—Reference to a sudden outburst of gas which took place in sinking a shaft in South Wales, 1770-1772—Liability of mines occasionally to such outbursts, 1773—Degree of light given by the safety-lamp adverted to, 1774, 1775.

Good effects of the Government inspection, 1777—The visits of the inspectors should be unexpected by the managers, 1777, 1778—There should be seven or eight chief inspectors with smaller districts than at present, 1779, 1786, 1787—The chief inspectors should have assistants under them, who should be men of junior experience but of equal capabilities otherwise; how this suggestion might be carried out, 1780-1782, 1802-1811—Expediency of the inspectors being better paid, 1783, 1784—Their efficiency at present, 1785—How their visits to the pits should be regulated, 1788, 1789—Opportunities of the workmen to communicate their grievances to the inspectors, 1790-1801.

Importance of the responsibility of viewers and owners still continuing, 1815—Expediency of some central Board or authority to decide disputed points between the viewers and inspectors, 1816-1819—Quantity of coal now raised annually in England, 1820, 1821—Necessity of the inspector's reports being made to some authority who could proceed against owners for neglect of precautions pointed out to them, 1822-1825—Alterations requisite in the constitution and working of coroner's juries, 1825-1829

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Smyth, Warrington. (Analysis of his Evidence)—continued.

—Ventilation of some mines by natural means only; sufficiency thereof in many instances, 1830-1839—Cases in which natural ventilation should not be trusted, 1838, 1839.

Feelings of managers on the subject of education, 1841, 1842—Expediency of the workmen as well as the viewers being better educated, 1843, 1847, 1848—Approval of Mr. Wood's suggestions for the establishment of local mining schools of different classes, 1844-1846—Means proposed for enabling boys from the inferior schools to follow up their education at the higher schools, 1849—Difficulty in preventing boys from working till they are twelve years old, 1850, 1851—Advantages of the suggestion for continuing to educate boys after they have entered the pit, 1852, 1853.

Practical and scientific character of the education essential for colliers' children, 1853-1856—Reference to a mining school in Silesia, where science has been introduced with great advantage, 1856, 1857, 1859—Means contemplated for the support of the proposed schools, 1858, 1859, 1874, 1875—Difficulty which might be felt in procuring properly qualified schoolmasters, 1860—Objection to a system of lectures only, 1861—Feasibility of affording scientific education to boys between twelve and eighteen, in conjunction with the practical experience they are obtaining underground, 1862-1870—How far the mines in Belgium, &c., may be more safely and economically worked than those in this country, 1871-1873.

Expediency of a large class of managers being better educated, as they might be, through the proposed schools, 1876, 1877—Belief, that with two or three dozen exceptions, there is a great deficiency among the present managers of collieries, 1878-1880, 1888-1892, 1896—Expediency of every manager understanding not only the circumstances of ventilation, &c., in his own pit, but the principles and circumstances of ventilation under all contingencies, 1881-1887—Slight acquaintance of owners with mining operations, 1893-1895.

Sources of Accidents. Several sources to which witness attributes the occurrence of accidents, *Smyth* 1707-1711.

South Shields Committee. Witness was the originator of the South Shields Committee; acted as secretary, and prepared the report, *Mather* 1446-1449.

South Staffordshire. See *Staffordshire, &c., District.*

South Wales. See *Wales.*

Splitting the Air. Importance of paying especial attention to the "splitting" and dissemination of the air when in the pit, *Darlington* 191, 192; *Elliott* 309-312; *Taylor* 1150, 1151; *Mather* 1515-1521; *Dunn* 3438, 3439—Improvements of late years on this point, *Darlington* 192—Explanation of the present mode of splitting and circulating the air; diagrams referred to, *Taylor* 1152-1162—Necessity of splitting the air where the pillar-and-stall mode of working is employed, as in Northumberland; effect thereof upon the condition of the pit and the health of the colliers, *Smyth* 1715-1719—Mode of splitting the air in the Midland Counties; defects of the system, *Woodhouse* 1925, 1998-2006, 2010, 2011—Advantage of the system, as adopted in Northumberland and Durham, adverted to by the Committee, *Fourth Rep.*, p. 4.

See also *Bensham Wallsend Pit.* *Buddle, Mr.*

Staffordshire, Shropshire, and Worcestershire District. Demand for the labour of boys in South Staffordshire adverted to, *Tremenheere* 1270-1273—Inconvenience of limiting the employment of boys underground in South Staffordshire to the age of twelve instead of ten years, *ib.* 1271-1273—Anxious and unsuccessful endeavours of the South Staffordshire iron-masters to promote education in their districts, 1274-1276.

The ventilation of collieries in the Midland Districts has much improved since 1849 through the more general adoption of artificial means, *Woodhouse* 1944-1947—Respects in which the condition of these mines has improved of late or still needs improvement, *ib.* 1989-1992—Deficiency of the discipline, *ib.* 1991, 1992—Dangerous character of some of the mines, *ib.* 1993, 1994—Large number of collieries in the Midland District, *ib.* 2216, 2221, 2222.

Witness is Government inspector of coal mines in Staffordshire, Worcestershire, and Shropshire; resides at Longton, *Wynne* 2977-2980—Has been inspector two years and a half, *ib.* 2982, 3194, 3195—Experience of witness before his appointment, *ib.* 2984-2986—Inferior manner in which the collieries in his district are ventilated and conducted; special reference to South Staffordshire, *ib.* 2987-2990, 2993 *et seq.*—Great improvement being effected in North Staffordshire, *ib.* 2989, 2991-2993, 3006, 3040, 3049-3051, 3224—Non-attention paid by owners to witness's complaints, *ib.* 3007, 3008.

Insufficient size of the air-ways in the district, chiefly in South Staffordshire; reasons given for not enlarging them, *Wynne* 3023-3052—Attention paid to the air-ways in North

Staffordshire, Shropshire, and Worcestershire District—continued.

North Staffordshire, *Wynne* 3040. 3049-3051—Working of the South Staffordshire collieries on the pillar-and-stall system, except in three instances, where the long-wall system is employed, *ib.* 3053, 3054—There are about 400 collieries under the inspection of witness, *ib.* 3196—The loss of life is greater than in any other district, *ib.* 3197—Accidents in the shafts and in the winding up occur chiefly in South Staffordshire, *ib.* 3223—Non-attention paid to witness's suggestions on these points, *ib.* 3225, 3226—Exception to be made in the case of South Staffordshire as regards enactments for winding up and down the shafts, *Dickinson* 3686, 3687.

See also *Butties. Education, 2. Prize System of Education.*

Steam Boilers. How far more desirable to provide by Act of Parliament, as suggested in the 13th proposition of the inspectors, than by rules, that every steam-boiler should be provided with a proper steam-gauge, water-gauge, and two safety-valves, *Wood* 3613-3617—Recommendation of the Committee that every steam-boiler shall be provided with a proper steam-gauge, water-gauge, and safety-valve, *Fourth Rep. p. 8.*

Steam Engines. There should not be a steam-engine in any pit without a downcast and upcast shaft, *Wynne* 3276.—See also *Spurbridge.*

STEAM-JET :

1. *Its proper mode of Application considered.*
2. *Its Advantages or otherwise, as compared with the Furnace.*

1. *Its proper mode of Application considered :*

Advantage, in trying the power of the steam-jet, of placing the boilers at the bottom rather than the top of the pit, *Elliott* 43, 44; *Darlington* 141-143. 146-154. 167; *Mather* 1490, 1491—The success of the jet depends upon the precision of its arrangements, *Darlington* 100—Necessity of the cylinders being of the same size, and also the jets, *ib.* 116. 124—Greater efficiency of the jets in the shaft than in the dumb-drift, *ib.* 132—Necessity of the same area of fire space in any comparison between the steam-jet and the furnace; gain in the ventilation by the jet under such a comparison, *ib.* 138-140.

Necessity of the application of the jet being properly understood, *Mather* 1473. 1497. 1499—Reference to the application of the jet to certain manufactories on the Tyne, as proving its action by propulsion against the law of expansion, *ib.* 1479, 1480—Propelling power of the jet illustrated by these applications, *ib.* 1536-1538—Necessity of not extending the jet beyond one foot sectional area, or thereabouts, *ib.* 1497—Large area adopted nevertheless in Mr. Wood's experiments, *ib.*

2. *Its Advantages or otherwise, as compared with the Furnace :*

There are certain exceptional situations in which the steam-jet may be used with advantage; definition of these, *Elliott* 17-23. 26. 59. 291; *Woodhouse* 1986-1988; *Dobson* 2893-2904. 2919-2922—In these exceptional cases it would only be useful as an auxiliary to the furnace, *Elliott* 24—Greatest quantity of air, in cubic feet, which may be passed through a shaft by means of the steam-jet, *ib.* 25. 27. 28. 34—Reason for Mr. Forster having obtained a larger result than witness with the steam-jet, *ib.* 39-42—Conclusion that the same amount of ventilation cannot be produced by the steam-jet as by the furnace, from the same means and with the same economy, *ib.* 55-58.

High opinion entertained by witness of the power of the steam-jet, *Darlington* 71-75—Particular circumstance under which the application of the jet is superior to that of the furnace, *ib.* 75-78. 82. 84—When both are worked with pure air, the jet is greatly superior, *ib.* 76-78—Greater advantage and economy of the jet in proportion as the pit is more shallow, *ib.* 82-84—Greater capabilities of the jet if the combustion of the coal under the boiler be made perfect, *ib.* 96-99. 164—Advantage of the steam-jet at the top of the pit in shallow mines, and in cases of impending accident, *ib.* 166, 167—Inapplicability of the steam-jet to the ventilation of every mine, *ib.* 177—Advantage of using it when the mine is charged with explosive gas, *ib.*—Preference given to the steam-jet and furnace over any other process, *ib.* 184, 185.

Doubts as to the same ventilation being procured from boiler fires at the bottom of the pit as from the furnace, on account of the necessarily different combustion of the coal, *Elliott* 282-290—Similar ventilation from the boiler fires as from the furnace, if possible, to procure combustion of the coals, *ib.* 287—Diminution of the heat imbibed from the boiler in its passage up the shaft, *ib.* 288-290—Doubts as to the advantages of the steam-jet, even in shallow mines, *Taylor* 1136-1138.

Decided preference of the steam-jet to the furnace, *Mather* 1472, 1473—Advantages of the steam-jet in deep as well as in shallow mines, *ib.* 1474—Advantages due to the controversy on the subject of the steam-jet and the furnace, *Mather* 1498; *Fourth Rep. p. 4*—Diagram, showing how Mr. Mather illustrates the greater power of the jet than of the furnace, *Second Rep. p. 90*—Several imperfect trials of the steam-jet have been

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made in Scotland without success, *Landale* 2588-2596—Greater expense of the steam-jet than of the furnace, or Struvé's machine, *Dobson* 2915.

In concluding that the steam-jet is on the whole inferior to the furnace, the Committee consider that the former may, under some circumstances, especially in shallow mines, be used with advantage, *Fourth Rep.* p. 4.

See also *Alloa Mine (Scotland)*. *Drumpelner Mine*. *Experiments in Ventilation*. *Furnace*. *Pumps, &c.* *Sanchie Pit*.

Steam-mill. Witness produces and explains the operation of the steam-mill formerly employed in lighting dangerous mines, *Mather* 1675-1679—The rudeness of this instrument as compared with the safety-lamp shows the advance of science in recent years, *ib.* 1678.

Stephenson's Lamp. Principle of security possessed by this lamp, *Elliott* 832, 833—Superiority generally of Stephenson's lamp, *Woodhouse* 2166-2169.

Stoppings. Danger sometimes arising from stoppings, *Darlington* 200—Importance of the stoppings being strongly secured, *Darlington* 204, 217; *Taylor* 1166, 1167; *Dunn* 3440, 3441—Strong construction of the stoppings in the north of England; regulations about to be adopted on the subject, *Taylor* 1163-1165—Improvements being made to render stoppings as strong as possible, *Mather* 1522, 1525, 1526—Great importance of stoppings or regulators of solid coal in lieu of doors; their adoption generally considered, *Smyth* 1753-1760—Recommendation of the Committee in favour of very strong stoppings and crossings, *Fourth Rep.*, p. 5.

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Stourbridge. Particulars as to an accident near Stourbridge through the use of a steam-engine where there was only one shaft; resolution of the manager to continue working the mine on the same principle notwithstanding witness's remonstrances, *Wynne* 3268-3278.

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