

**S E C O N D**  
**R E P O R T**

FROM THE

SELECT COMMITTEE

ON

**ACCIDENTS IN COAL MINES;**

WITH THE

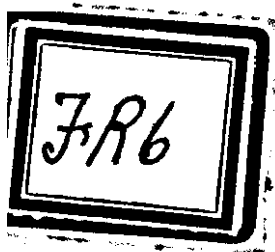
MINUTES OF EVIDENCE,

AND APPENDIX.

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*Ordered, by The House of Commons, to be Printed,*  
*11 July 1853.*

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*Martis, 31<sup>o</sup> die Maii, 1853.*

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*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.*

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*Jovis, 2<sup>o</sup> die Junii, 1853.*

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Committee nominated of,—

Mr. Hutchins.  
Mr. Fitzroy.  
Mr. Ingham.  
Mr. Hussey Vivian.  
Mr. Baird.  
Mr. Cumming Bruce.  
Mr. Cayley.  
Colonel Pennant.

Mr. Stephenson.  
Mr. Mostyn.  
Viscount Goderich.  
Mr. Farrer.  
Mr. Child.  
Mr. Henry Austin Bruce.  
Mr. Cobbett.

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

*Ordered, THAT Five be the Quorum of the Committee.*

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*Jovis, 9<sup>o</sup> die Junii, 1853.*

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*Ordered, THAT Viscount Goderich be discharged from further attendance on the Committee, and that Mr. Locke be added thereto.*

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*Lunæ, 27<sup>o</sup> die Junii, 1853.*

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

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38859

X9(D 3551) = 9.

A8!

## S E C O N D   R E P O R T .

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**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 from time-to time to The House,—

**H**AVE made further progress in the Matters to them referred, and have agreed to Report the Minutes of Evidence taken before them.

11 *July* 1853.

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A P P E N D I X,

Appendix, No. 1.

Appendix, No. 1.

EXPERIMENTS AT SEATON DELAVAL By *Jude* and Others.

SEATON DELAVAL COLLIERY.

15 June 1853.

MEMORANDA relative to Underground Ventilation. Only ventilating power, "Steam Jets," of which there are 33, each jet being  $\frac{1}{16}$  of an inch diameter at orifice. Pressure of steam in boiler 35 lbs. per square inch.

Number of Boilers in use 3.

FIRST EXPERIMENT:

Engine Scale or Fire Drift.

	ft.	in.		ft.	in.
Section 9	6	by	5	8	
	9	7	"	5	6
	9	8	"	5	6

Distance, 30 feet.

$$\text{Velocity } \left( \frac{\text{sec.}}{5} + \frac{\text{sec.}}{5\frac{1}{2}} + \frac{\text{sec.}}{5\frac{1}{2}} \right) \div 3 = 5.3 \text{ Mean Velocity.}$$

$$\text{Then } \left\{ \begin{array}{l} \text{ft. in.} \quad \text{ft. in.} \quad \text{ft. in.} \quad \text{ft. in.} \quad \text{ft. in.} \quad \text{ft. in.} \quad \text{inches.} \\ 9 \ 6 + 9 \ 7 + 9 \ 8 = 28 \ 9 \text{ and } \frac{28 \ 9}{3} = 9 \ 7 = 115 \\ 5 \ 8 + 5 \ 6 + 5 \ 6 = 16 \ 8 \text{ and } \frac{16 \ 8}{2} = 5 \ 7 = 67 \end{array} \right.$$

$$\frac{115 \times 67}{144} = 53.5 \text{ and } \frac{53.5 \times 30 \times 60}{5.3 \text{ sec.}} = 18,169 \text{ cubic feet per minute.}$$

Then, by setting open the door, and letting the air have free access to the engine-fires, we have the velocities thus— $3\frac{1}{2}$  seconds (mean).

$$\text{Then again } \frac{53.5 \times 30 \times 60}{3\frac{1}{2} \text{ seconds.}} = 27,514.$$

Giving an increase, by the door being open, of 9,345 cubic feet.

SECOND EXPERIMENT:

Victoria Way.

	ft.	in.		ft.	in.
Sections	8	7	by	6	4
"	9	0	"	6	2

Distance, 30 feet.

$$\text{Velocity } \left( \frac{\text{sec.}}{5} + \frac{\text{sec.}}{5} + \frac{\text{sec.}}{4\frac{1}{2}} + \frac{\text{sec.}}{4\frac{1}{2}} \right) \div 4 = 4.75 \text{ mean velocity.}$$

$$\text{ft. in.} \quad \text{ft. in.} \quad \text{ft. in.} \quad \text{ft. in.} \quad \text{ft. in.} \quad \text{inches.}$$

$$8 \ 7 + 9 \ 0 = 17 \ 7 \text{ and } \frac{17 \ 7}{2} = 8 \ 10 \text{ or } 106 \text{ nearly.}$$

$$6 \ 4 + 6 \ 2 = 12 \ 6 \text{ and } \frac{12 \ 6}{2} = 6 \ 3 \text{ or } 75$$

$$\text{Then } \frac{\text{in.} \quad \text{in.}}{106 \times 75} = 55.20 \text{ and } \frac{\text{feet} \quad \text{cub. ft. per minute.}}{55.20 \times 30 \times 60} = 20,917. \text{}$$

$$\frac{\quad}{144} = 55.20 \text{ and } \frac{\quad}{4.75 \text{ seconds.}} = 20,917.$$

Appendix, No. 1.

Then again, by setting open the boiler drift-door as before, we have:—

$$\text{Velocity } \left( \frac{\text{sec.}}{3\frac{1}{2}} + \frac{\text{sec.}}{4} + \frac{\text{sec.}}{4} \right) \div 3 = 3.8.$$

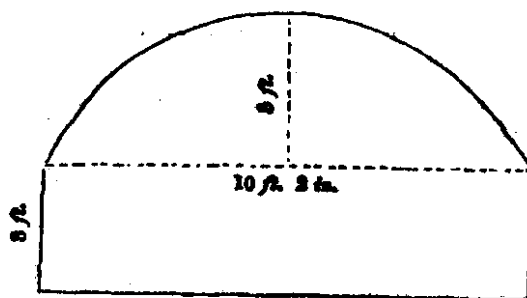
$$\frac{55.20 \times 30 \times 60}{3.8 \text{ seconds.}} = 26,147 \text{ cubic feet.}$$

Giving an increase, by the doors being open, of 5,230.

## THIRD EXPERIMENT.

Big Arch in Engine Plane.

SECTION.



Distance, 30 feet; mean velocity, 2 seconds.

Here 3 feet = 36 inches.

10 feet 2 inches = 122 inches.

$$\text{Then } \frac{36 \times 122}{144} = 30.5$$

$$\text{And } \frac{10 \times 10 \times .7854}{2} = 39.27 \quad \left. \vphantom{\frac{10 \times 10 \times .7854}{2}} \right\} = 69.77 \text{ mean area.}$$

$$\text{Thus } \frac{69.77 \times 30 \times 60}{2 \text{ sec.}} = 62,793 \text{ cubic feet per minute.}$$

Then, by setting open the boiler fire-doors, the velocities were—

$$\left( \frac{\text{sec.}}{2} + \frac{\text{sec.}}{1\frac{1}{2}} + \frac{\text{sec.}}{1\frac{1}{2}} + \frac{\text{sec.}}{2} + \frac{\text{sec.}}{1\frac{1}{2}} \right) \div 5 = 1.85 \text{ mean velocity.}$$

$$\text{Here } \frac{69.77 \times 30 \times 60}{1.85 \text{ sec.}} = 67,884 \text{ cubic feet per minute.}$$

Giving an increase, by doors being open, of 5,091.

## RECAPITULATION.

	Doors Open.	Doors Shut.	Increase.
1. Engine Scale at Fire Drift	27,514 cubic ft. per min.	— 18,169	= 9,345
2. Victoria Way - - -	26,147 " "	— 20,917	= 5,230
3. Engine Plane - - -	67,884 " "	— 62,793	= 5,091
	121,545 " "	— 101,879	= 19,666

Showing an increase, by the fire-drift door being open, of 19,666 cubic feet per minute, or nearly 20 per cent.

## Appendix, No. 2.

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 PAPERS delivered in by Mr. *David Swallow*.
 

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## RULES and REGULATIONS of the Lancashire and Cheshire Branch of the MINERS' ASSOCIATION.

Appendix, No. 2.

Established 7 November 1842.

 REVISED and Adopted at a County Delegate Meeting, held at the Oddfellows' Arms, *Hurstbrook, Ashton-under-Lyne*, 29th March 1852.
 

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*Preface.*

THE objects of this society, in conjunction with those of other counties, and in accordance with the General Rules of the Association, shall be to unite all miners of the United Kingdom, with a view to equalise and diminish the hours of labour; to obtain, by strictly legal and peaceable means, the highest possible amount of wages; and to raise from time to time, by subscriptions amongst the members thereof, various stocks or funds for the mutual support of each other in time of need, as there is no security that the members of any society shall receive the benefits set forth in the rules of such society, unless the society is in possession of sufficient funds. Therefore, it is highly desirable that, in accordance with the following rules, each district commence to accumulate funds as speedily as possible. The objects are, furthermore, to improve and elevate the condition of the working miners and their families; to procure for the miners a more healthful atmosphere to work in; to obtain a sufficient number of sub-inspectors to assist the present inspectors, such sub-inspectors to be practical miners of not less than 30 years of age, and to have worked in coal mines at least 15 years; to obtain an Eight Hours' Bill; to have all coals worked by weight and not by measure, and to secure to our children a proper system of education. To effect such purposes we agree to be governed by the following rules and regulations, and such other improvements and additions as may be made from time to time, legally and constitutionally, by properly authorised parties, and according to the rule, as is hereafter made and provided for. This society shall be called and known by the title of "The Lancashire and Cheshire Branch of the Miners' Association of the United Kingdom;" and for the benefit of its members, it shall be divided into districts and lodges, in such numbers as may be deemed necessary and advisable, and in conformity with the rules provided for that purpose. Every district and lodge of this society shall appoint its own officers, and conduct its own business in the manner set forth in the following rules.

All grades of miners are eligible to become members of this society.

Whilst all classes are experiencing the necessity of extended organisation, some individuals are still retaining their old prejudices and narrow-mindedness of sectional unions, and creating prejudice amongst miners whose interests are identical; if one suffers the others must feel it. Not only are the most enlightened trades' unions experiencing the necessity of general union, but Odd Fellows and other benevolent societies have seen the great and urgent necessity of extended organisation. Alas! how frequently does it happen that a man has paid a great number of years into societies, in the fond hope that he would be relieved by its funds in time of sickness and distress; but, when he applies for the amount set forth in the rules, he discovers to his great dismay that sick pay is either greatly reduced, or stopped altogether, whilst other lodges in the same district have no sick at all, and are accumulating funds daily. Yet all are members of one society; all are called by one name; and the rules of the society require that they should call each other brother; but we must confess we can see no brotherly love in it, one starving and the other adding to his funds. It is impossible to enter into this subject in detail here; but, on referring to a table published by the board of management of the sick union of the Preston district of Odd Fellows, Manchester Unity, I find that there two lodges, ending the two years on 31st April 1850 and 1851, have no sick members at all, whilst others have expended 49s. 10½d. a member, and the funeral fund besides; whilst each man only paid into the funds of the society in two years 34s. 8d., leaving the funds minus 15s. 2½d. in two years, besides the money paid for funerals, which varied in different lodges for the year



Appendix, No. 2.

ending 9th April 1851, from 15s. 9d. to nothing at all; but on the whole district it only cost for funerals 4s. per member, and 12s. 8½d. for sickness. Although some lodges were so very heavily pressed upon, the whole district added to its funds 7½d. a member. If we had room for the tables referred to, they would amply illustrate the folly of sectional unions.\* The individuals who are most opposed to a general union acknowledge that the broader basis of any society the better; also that sectional unions cannot do any lasting and permanent good. They will then turn round and say, We know that a general union would be the best if it were honestly carried out and fairly dealt with; and they will ask, Was the last fairly dealt with? To this we reply, No, it was not, it was scandalously abused; but by whom was it abused? The answer is, By the very parties who are now the advocates of sectional unions. Who advocated the crying abuses of the law fund, the travelling committee, &c., with all their abuses; Who were they, do you ask? Why, the sharers of the plunder and partakers of the spoil, and the parties in question. Are there any men who have laboured and done their best to remove those evils? So have we. Are there any parties who intend to keep a sharp look out and see that the same practices are not permitted to occur again? So do we. We are determined to prevent the evils of 1844-5, 6, 7, &c. The same parties, when they see they cannot be permitted to play the old games, are like the old fox in the fable; when he could not get the grapes he turned round and said he would not have them because they were sour.

It is not our wish to impose on either the good sense or the prejudices of any one; at the same time we are in justice bound to remark that many who, through ignorance, were opposed to our views, are now members of our society, and are its most zealous advocates and constant supporters; many, since the establishment of our society, having both seen and experienced the beneficial results of our system, have acknowledged its superiority over any other previous society of miners with which they had been connected.

We hope no prejudices will arise in the breast of any one from the many unsuccessful attempts to establish a permanent society amongst miners, since those failures only tend to point out the errors that have thwarted the good intentions of their founders and supporters.

That a society ought to exist amongst miners we think few will deny, and for this purpose we fondly hope that every miner will see it his duty and interest to come forward and join us.

A few there may be whose contracted hearts refuse to expand with benevolence towards a brother miner in distress, who consider themselves in permanent situations, and think that they will never stand in need of the helping hand of others. We would only call upon such to bring to their recollections how many instances have come within the sphere of their own observation of individuals, lodges, and districts who have thought themselves secure, and yet have fallen when there was no one to help. We have no other end in view than a wish to see a permanent society established, and funds raised adequate to withstand the inclement blasts of adversity and oppression, and that its members may outvie those of similar institutions, and their children have occasion to bless the exertions of their forefathers.

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## RULES.

### *How County Meeting to be held.*

First Rule. THAT the county meeting be held at such stated times and periods as may be deemed necessary and agreed upon by the delegates, and each county meeting shall have the power of fixing where it shall next be held; but no meeting shall have the power of fixing more than the next succeeding meeting.

### *Duties of Delegates.*

2. That each district shall appoint one or two delegates to attend each county meeting, whose business shall be to transact all the general business of the society in connexion with the two counties, in the name of and for the districts they represent; such as electing officers and agents, fixing the rate of wages, appointing the routes of the agents, taking an account of their labours, fixing the levy for each member to pay at the next county meeting, according to the 14th rule, making such rules from time to time as may be deemed necessary, according to the provisions of the last rule, and in accordance with the spirit and meaning of these rules; to inquire into the state of the markets and stocks of coal in each district, average wages of each colliery in each district, the state of ventilation in each mine; to order petitions to Parliament for the appointment of sub-inspectors of mines, for an eight hours' Bill, for all coals to be worked by weight and not by measure, to get a proper system of education for the miners' children, or any other matter connected with the welfare of the miners; to take cognizance of any proposed alteration of wages in any district, to devise plans

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\* See Lectures on Friendly Societies, their History, Progress, Prospects, and Utility, 1851, by Mr. Charles Hardwick. Sold by all booksellers.

plans and means of preventing reductions of wages, if possible; to have power to order statements to be sent to the masters in those districts where this society extends, soliciting an advance of wages at proper times and seasons, and to do such other matter or thing as may be deemed necessary to promote the interests of the miners generally.

*Duties of President.*

3. That the county meeting shall be governed by a president (and vice-president if necessary). The president shall be elected either from the delegates then present or from among the officials, at the discretion of the delegates, to retain office three months. The duty of the president shall be to preside over the meeting to preserve order, and to see that the discussions are conducted according to the usual rules of debate. The proposer of any motion to be allowed to speak 10 minutes upon his proposition, if he requires to do so; and each delegate five minutes. The officials to be allowed to speak upon any motion, and to give their advice freely upon any subject; to be governed by the same rules of debate as the delegates, but not to vote, move, or second any resolution. No one to be allowed to speak twice until every one present has had an opportunity of speaking once on the subject, if they choose. The order of speaking to go the sun way about. Any one being out of order and disobeying the chairman, when called to order, shall be fined 1*d.* for each offence.

*Duties of Financial Secretary.*

4. There shall be a financial secretary elected by the delegates at the county meeting, who shall be retained in office so long as he gives general satisfaction. He shall furnish quarterly, and oftener, if necessary, and ordered to do so by the county meeting, an account clearly and accurately setting forth the income and expenditure of both the expense-fund and victim-fund separately. He shall keep his books and papers in such form and manner as the delegates may order. He shall receive the sum of 10*s.* per fortnight for his wages; if the county meeting lasts two days, he shall be paid one day's wages extra. He is to be paid his coach fare to the county meeting and home again, over and above his wages.

*Duties of the Treasurer.*

5. The treasurer to have 5*s.* per fortnight; if more than one day at the county meeting, he shall be paid extra, and also be paid extra for any other work that he may do besides his office of treasurership, at the same rate that other people are paid; to be paid coach fare same as secretary, and to be governed by the same rules. The duties of the treasurer shall be to receive all the moneys of this society, and shall pay them according to the orders of the county meeting, and not otherwise. All moneys paid without the sanction of the county meeting shall be refunded. He shall give such security for the moneys in his hands as the society may deem proper.

*Duties of Corresponding Secretary.*

6. The corresponding secretary shall be elected as the other officers are, and subject to the same rules. His duties shall be to keep up a correspondence with Members of Parliament and other parties on the subject of a short-time Bill, getting coals by weight, appointing sub-inspectors of mines, education for miners' children; to correspond with other counties, to write letters in newspapers, and answer all letters on the business of the society. Either the financial secretary, treasurer, or registrar may be elected to this office if the majority think proper; or any other individual may, not holding any other office, at the discretion of the delegates. He shall be paid such sum for his labour as a majority of delegates may deem proper.

*Duties of Registrar.*

7. That a registrar be appointed, to be governed by the same rules and conditions as the other officers, whose duties shall be to register every member's name and contributions in a book kept for that purpose. Every lodge secretary shall forward, once per month, in a book or paper provided for that purpose, the amount of subscriptions paid by each individual for county fund and victim fund separately, which sum shall be correctly entered in the book, so that the delegates at the county Board can tell when an individual who is proposed at the county Board is entitled to victim pay, and whether he is a legal member or not, as a great number of persons have received victim pay on former occasions who were not entitled to it. Any of the officers named in the three last rules either may or may not be elected to act as registrar, at the discretion of the delegates; to be paid for his labour according to his work, the delegates to fix the rate of wages for such work.

*County Fund and Victim Fund to be kept Separate.*

8. That the general-fund money and victim-fund money shall be entered in the secretary's and registrar's books distinctly and separately; the income and expenditure shall also be published separately in the balance-sheet, and the secretary shall give to each delegate a receipt for the moneys paid into the hands of the treasurer, such receipt to set forth how much money has been paid to each fund. The county-fund levy at no time to exceed one penny per week.

*Election of Agents, &c.*

9. The county meeting shall elect such number of agents from time to time as to them shall seem needful, for the purpose of advocating the interests of the society; and they, like the other officers, shall be entirely under the control of the county meeting, and shall visit such districts as they are ordered and appointed to, and hold meetings, and attend to such other matters as may be needful. That no person shall for the future be elected as agent, or to any other office in this society, unless he has had at least 10 years practical experience as a miner, so as to be able to illustrate and explain the grievances in a proper and intelligible manner.

*Slander.*

10. That any member slandering or impugning the character of any agent or other officer of this society, without just cause, shall be fined two shillings for each offence. Officers or agents proved guilty of the above-named offence shall be liable to the above-named penalty.

*Time before entitled to Benefits.*

11. That no person be entitled to any support from the funds of this society until he has been a member of the same not less than eight weeks, and must have paid up all dues and demands to the lodge, district, and general fund, except those who may be discharged for becoming members of this society, going on any deputation, delegation, or advocating the principles of the society, or attending as delegate at any meeting; provided that the person so getting discharged for any of the above-named offences has been authorised by any properly authorised parties to perform such acts. *N.B.*—No person will be entitled to the benefits of this rule who has not paid at least once before he gets discharged, or notices of his discharge. Men will not be supported under the provisions of this rule for frivolous things of any sort; if they leave their work under any other conditions than according to the 12th and 13th rules, they must take the responsibility upon themselves.

*Strikes.*

12. That no colliery or pit set of men, or any portion of a pit set of men, shall be permitted to stop work or turn out without the consent of five-sixths of such pit or colliery. When five-sixths of the members at any pit or colliery shall have come to a decision that they have a just cause to cease work, they must call, or else cause the district secretary to call, a special general meeting of the district, if the matter should be of urgent importance that it cannot lay over until the regular district meeting, to submit the grievance of such pit or colliery, along with the decision the men have come to upon the matter; the district meeting to enter fully into the subject, and, if it be thought desirable to have arbitration to appoint the same from some members working in the same mine at any colliery either in their own or neighbouring districts; also to make what inquiry and investigation they think proper and advisable; and if after a full and fair investigation the district be of opinion that it is a fair case to send to the county meeting, then they must forward it there, with a full explanation, so that the delegates may take it back to the districts, and bring a decision to the next county meeting whether the men must cease work or not. If after it has been before all the districts, the majority are of opinion that it is a just case in which to cease work, then the men so stopped according to the orders of the board, shall be supported at the same rate as other victims, from the general victim fund, levied and paid for such purposes, in the same manner and on the same terms and conditions as other victims are paid as set forth in the rules. But if after a full, fair, and impartial investigation, the judgment of the county meeting should be against the decision of the men in the matter in question, and the men should stop or cease work in opposition to such decision, then they shall not receive any support from the general victim fund, and must take the responsibility on themselves. No pit set, or any portion of a pit set of men, nor colliery, will be allowed to turn out by this board until they have got 10s. per man in their funds, and boys in proportion.

*Instructions and Rules for Persons becoming Victims.*

13. That members who have paid not less than eight weeks' contributions, and are clear on the book, shall receive an equal share of victim pay along with the other victims, from the general victim fund, in accordance with the following regulations: If a man's life be in positive danger, either from explosions, black-damp, want of props, sudden inundations of water, or bad ropes, he shall be permitted to cease work immediately, if he thinks proper; but be it therefore clearly and distinctly understood, that no man will be permitted to leave his work on account of bad place, alteration of system of working, or any of the thousand-and-one frivolous things that have been urged on former occasions, until he has complied with the following orders: as soon as a free member has a real grievance to complain of, before he leaves his work he shall go to the secretary of his colliery or pit and lay the case before him, who shall call a meeting of the members of such pit or lodge, and they shall have full power to make a proper and searching inquiry into the whole affair; and if the lodge, or as many members as can be got together after proper notice, think

think that it is a fit case to go before the district, then the delegate to the next district meeting must take it there: and if the districts think that it is a fit case for the county board, they must send it in a proper manner, and all particulars along with it; and if the county board sanction it, then the person shall be permitted to cease work and have support at the same rate as other victims. If either the lodge, district, or the county are of opinion that the matter can be settled by arbitration, they are hereby empowered and instructed to appoint the same, on the same terms and conditions as are set forth in the 12th rule, in regard to strikes.

*Amount of Contributions, and how used.*

14. That it is highly desirable that each district should begin to accumulate funds as soon as possible, as there is no guarantee nor security for any member of any society without adequate funds; therefore it is deemed advisable that the members of this society should pay 6 *d.* per week, or 1 *s.* per fortnight, during the present year, to be disposed of as follows:—To be added to the funds at home, 5 *d.*; general fund, not to exceed 2 *d.*; victim fund, at county board, 2 *d.*; lodge and district expenses, 1 *d.* If 2 *d.* per fortnight more than meets the demands of the general fund, the delegates shall have power of reducing the levy to a proper amount. The delegates at the county meeting shall not have the power of raising the levy at such meeting, until the second county meeting, after a motion has been made to that effect. When a motion is made at the county meeting for an advance in the levies, it shall go back to all the districts and lodges; general meetings must be called to consider the propriety of granting it or not; and all votes for raising the levy at county board must be taken by proxy, 28 days after the motion is made, so that all parties can have the whole matter laid before them, and, if they choose, have a voice and vote in it. *N.B.*—All money for ale and liquors must be paid over and above the 1 *s.* per fortnight.

*Entrance Money, &c.*

15. That any person becoming a member of this society must pay the same amount for entrance money as the members have in the funds per man, one fortnight's contributions, and 2 *d.* for a copy of these rules; the above law to be in operation only during the year 1852. All persons entering after the close of the present year must pay a premium of 3 *d.* per shilling, besides the sums named above; each district to charge as much more than the above-named sums as they may deem wise and prudent, to be added to their own funds at home, which funds are to be deposited in some safe and secure bank, in the names of three trustees, to be chosen by the men themselves. It is very desirable that one of the officers of the society should be chosen as one of the trustees, so as to prevent the money from being drawn out for any other purpose than that for which it was contributed; the district to have the full control of the funds, where they shall be deposited, and how disposed of, at all times. When any money is wanted out of the bank, the three trustees shall sign a proper cheque for the amount, and at least one of them shall accompany to the bank the person who is authorised by the district to receive the money, so that he may be a witness to what is transacted.

*Victims, how paid.*

16. That victims of every district shall be paid in such form and manner as the delegates at the county board may deem proper. They shall send the victims' pay either by the delegate from the district, or by one of the officers, or by any other delegate or member from any other district, or by post-office order, as to the delegates may seem wise and prudent; but the victims shall be paid at least once in 12 weeks by some other person than by their own district officers. Every victim's name shall be sent to the county board every fortnight, and shall be published once every eight weeks, with the whole time they have been victims, the amount of money received during the eight weeks, and the whole amount since they became a victim, from both county and districts. All victims, residing within three miles of the place where the county meeting is held, shall fetch their own money from that meeting, which money shall be paid by the financial secretary or treasurer, either in the presence of one of the other officers or a delegate or other person from a neighbouring district. Each victim to draw his own money, except in the case of boys who are members' sons, when the father will be permitted to draw for the whole family. If a person be away from home in search of work, he must send a letter, or else leave a written statement, authorizing either his wife or other member of his family to draw his pay; any person going away from home and wanting his pay forwarding to him, must send a note to the county meeting, signed by some district lodge secretary, to certify that he is not working. That no victim receive more than 13 weeks' pay in succession, except in the case of a strike; if any one is victimized at the termination of a strike, the 13 weeks to commence from the termination of such strike.

*Victims' Contributions when Sick, &c.*

17. That members who during the time they are victims may become sick or lame, or be playing them, shall only pay general fund and district money.

*Arrears and Re-entrance.*

18. Any member allowing his arrears to exceed eight weeks' contributions shall not be entitled to any support from the funds of this society until he has paid his arrears and four weeks have expired from the time of clearing himself on the books; any one in arrear may, at their own option, either pay up their arrears according to this rule, or re-enter as new members, according to rule 15.

*Restriction.*

19. That as far as it may be practicable the system of restriction shall be acted upon; and all officers of this society shall at the various public district, or other meetings of the society, urge upon the men generally the necessity of acting in accordance therewith, by showing them the good that will necessarily follow from their not sending too many coals into the market.

*Boasting about Work, telling Tales, &c.*

20. That if any member of this society shall, in a boasting or swaggering manner, tell other people how much money he has earned in a short time (which has too often been the case, and proved very injurious to the coal-miners), on just proof before his lodge, he shall be fined 2 s., which, if not paid within one month, shall be added to his contributions, and put down as arrears.

*Victims to meet every other Day.*

21. That every member receiving support from the funds of this society shall attend at a certain place every other day (with the exception of Sunday) to enter his name in a book kept for that purpose; the districts to have power of fixing the place and time of meeting. Any victim not attending at the proper time without a lawful reason, shall forfeit one day's pay. Every victim shall, when ordered by any of the recognised officers of this society, do any work that they may require them to do, providing they are qualified to do such work, such as posting bills, warning meetings, getting petitions signed, &c. Any victim refusing to obey such orders shall be fined 1 s. 8 d.; but the officer shall sign him a certificate that he has done such work, and he shall receive 1 d. per mile to defray his travelling expenses, from the county board. Lodges and districts to have the same power as officers over victims.

*Frauds.*

22. That any member who may fraudulently draw or misapply any money belonging to this society, shall either refund the same, or be prosecuted by the parties so defrauded; the lodge, or district, or county, if they agree to let him refund it, shall determine what sum he shall refund per fortnight.

*Ballot.*

23. That all votes be taken by a show of hands at the county or district meetings, unless some one delegate desire the ballot; and if any delegate desires the ballot he shall have the power of claiming it; and when it is taken upon any subject of importance, the votes must be recorded, so that each district may see if their representative voted according to their instructions.

*Clearances.*

24. That clearances be provided by the county board, and supplied to the districts; so that when a member is necessitated to remove from one county to another, or from one district to another, or from one lodge to another, he shall draw a clearance from the lodge he belongs, and must pay all dues and demands up to such lodge for his clearance, and present the same to the lodge belonging to the colliery he goes to work at, within one month after commencing work, or be fined 2 s. to the lodge for such neglect. All clearances to be duly stamped with the district seal, and none others to be considered genuine.

*Appeal.*

25. Any member being dissatisfied with the decision of his lodge or district, may appeal to the county board, the decision of which shall be final.

*To be divided into Districts and Lodges.*

26. That the two counties shall remain as at present, divided into sub-districts; each district to elect a sub-secretary and sub-treasurer, whose business shall be to keep the accounts of the district to which they may belong, and to transmit the county levy to each county meeting, for delivery to the county treasurer, and the items to the county secretary, for insertion in the county books. All district officers to be paid in such a manner as the districts may think proper.

*Government of Districts and Lodges.*

27. That districts shall have power to elect their own officers for their own government, and to make their own bye-laws; but all bye-laws to be strictly in accordance with these general laws.

*Propositions for County Meeting.*

28. That no business be entertained by the county delegate meeting, unless a proposition in writing, signed by the district secretary, and stamped with the district seal or stamp, be given to the chairman, certifying that such business has been duly investigated by the district from which it emanated, and a majority of the members of such district record their opinions that such business should be decided at the county meeting.

*Lodges leaving one District to join another.*

29. That districts shall be composed of two or more lodges, as most convenient. Any lodge desirous of leaving one district to join another must give six weeks' notice to the district they belong to of their intention to do so, and must pay up all dues and demands to the said district, according to rule; then the district secretary shall sign them a certificate of their having paid up all dues and demands to the district they are leaving; but if, after obtaining a certificate, the district they intend to join should refuse to have them, the district from which they received their certificate shall take them back again.

*Dividing of Funds.*

30. That no lodge or district belonging to this branch of the Miners' Association shall be broken up so long as there are three members true to each other in such lodge or district.

*Arrears.*

31. That any member being eight weeks in arrears shall not be allowed to vote upon any subject connected with this society.

*Violation of Laws of Land.*

32. That this association will not defend or support any member who shall in any way violate the laws of the country.

*Victims not to receive Support, if they refuse to Work at a lawful Place.*

33. That if any brother miner can find any victim or victims work, and they refuse to work, such victim or victims shall not receive any more victim pay.

*Contributions of Members not in full Work.*

34. That those who only work six days in the fortnight shall pay one penny for general fund, and half of the regular fortnightly levy to the lodge, district, county, and victim funds besides; but if they work eight days, they shall pay a full fortnight's levy; if they play the whole fortnight they shall only pay the district and county levy.

*Alteration of Laws.*

35. That these laws shall not be altered or rescinded, or new ones made, without giving one month's notice to the county secretary, who shall inform all the districts of the proposed change, so that each district and lodge may have time to consider such alteration or new law, give their calm and deliberate opinion thereon, and vote accordingly.

## Appendix, No. 3.

PAPER delivered in by Mr. *W. Gray*.

## STEAM JET VENTILATION.

Appendix, No. 3.

THE Morfa was worked in 1849 with only one pit, divided by 3-inch plank brattice, into winding shaft on one side and pumping shaft on the other side; winding shaft was the down cast of 50 feet area; pumping shaft the upcast of 25 feet area: making an allowance for pumps, rods, beams, &c., the upcast would not exceed 18 feet area. The ventilation was worked by high-pressure steam, a culvert leading from the upcast to a stack 60 feet high, with 16 feet area at the top, with the jet pipes 8 feet from the bottom of the stack, 75 jets of  $\frac{1}{2}$ -inch square, worked by two Cornish boilers 30 feet long by 6 feet diameter, burning three tons of coal per 24 hours, steam worked up 50 lbs. per inch pressure; and according to Biram's anemometer, measured—

19 December 1849	-	-	-	11,600 feet per minute.
30 December 1849	-	-	-	13,104 feet per minute.
17 February 1850	-	-	-	14,300 feet per minute.

Averaging about 13,000 feet per minute; this plan of applying the steam was abandoned.

To apply the blast pipes, a chamber was built 10 feet high, with sufficient area for 35 blast pipes 10 feet long, 5 inches diameter, the bottom part coned out to 10 inches diameter at the bottom or receiving end, 35 jet tubes 12 inches long served perpendicular into the horizontal branch pipes, and each jet reaching 12 inches up the blast pipes, and about two inches above the cone, or two inches into the parallel part of the blast pipe; 18 of these jet tubes were  $\frac{3}{8}$ -inch area and 17 tubes  $\frac{1}{2}$ -inch area, worked from the same boilers at 50 lbs. pressure per square inch, and burning three tons of coal per 24 hours, and measuring according to Biram's anemometer—

20 June 1850	-	-	-	19,000 feet per minute.
1 July 1850	-	-	-	18,000 feet per minute.
14 September 1850	-	-	-	21,300 feet per minute.

Averaging about 19,000 feet per minute, this gave us an increase of 6,000 feet per minute over the jets merely going into the stack. The air was split into four divisions; average length of air course 1,300 yards of about 36 feet area each, which is about 4,077 feet of air per minute for one lb. of coal consumed.

**RULES and REGULATIONS to be observed by the Workmen employed at the Morfa Colliery.**

MORE than six men are in no case to ride at one time, and the engine-man is to lessen the speed of the engine to one-half.

The firemen are to enter the colliery every morning at a sufficiently early hour to enable them to try each stall where a man is required to work; and, having done so, to report to the overman the state of the colliery before the arrival of the men. As an additional precaution, should they find any stall dangerous, they are required to fix a signal board, with the words "No person to enter this stall."

The cutter is required to see either the overman or fireman before proceeding to his work. Should the cutter at any time consider that his stall is in a dangerous state, he is at once to leave it, and report the same to the overman.

The onsetter must send all the men and boys up the pit before he leaves the pit bottom.

The bankman must not leave the top of the pit until the onsetter has come to bank.

No cutter or trammer is allowed to use a safety-lamp without its being first examined by the lamp inspector, and then locked, and again re-examined by the overman or fireman.

Should any accident happen to a lamp while in use, by which the oil may be spilt upon the

the gauze, or by which it might in any other way be rendered unsafe, it is immediately to be taken out to the station fixed upon by the overman, and not again used until after having been properly examined by the overman or fireman.

Any cutter, trammer, or workman, on the appearance of fire-damp, is to retreat to a pure atmosphere.

All persons to whom the safety-lamp is entrusted are strictly prohibited from interfering in any way whatever with the lamp, beyond the necessary trimming of the wick with the picker; and the lamp is not to be placed within three feet of the side of the goaf, and not nearer the face of the coal than five feet.

Should any cutter, trammer, or other person, when in charge of a safety-lamp, lose his light, he is to take it to the station fixed upon by the overman, to be relighted; and, when relighted, it is to be examined and locked by the fireman before being again used.

It is particularly requested that any person witnessing improper treatment of the safety-lamp, will give immediate information to the overman in charge of the pit, in order that proper steps may be taken to guard the lives of the workmen employed in the mine.

Smoking is not allowed in any part of the mine; and persons found so offending will be liable to a fine of 10s., or be taken before a magistrate, and the fine to be paid to the informer.

No candle to be taken nearer to the pillar working than the station fixed upon by the overman; and any one found with a lighted candle within that distance will be fined 10s., the fine to be paid to the informer.

On no account is any person to keep a gun or dog of any kind.

No person is to have any description of gins, traps, or nets used for snaring game; and, if found with any, he will be fined 15s.

No one not connected with the colliery will be allowed to remain about it, and the time-keeper will be fined 2s. 6d. for each person so offending.

The workmen that are employed at the colliery are required to keep the direct road, and in nowise to trespass on the land by coming to or going from their work; and if found so trespassing will be either discharged or fined.

*Caution to all that are Working in the Pits at the Morfa Colliery.*

1. Any person found smoking tobacco, or has in his possession pipes, tubes, cigars, or lucifer matches within these pits will be fined one guinea.

2. All blasting powder to be discharged by the overman or deputies.

3. Any other person in the coal-working district of the colliery discharging blasting powder will be heavily fined.

The plans and section represent the working veins of coal. The principal vein is called the Nine Feet Vein, but generally 11 feet thick, being with a very strong bottom; the top is black shale, two feet thick, which is very soft loose stuff. Upon strata, is a very strong cliff, with lines of rock. This vein generally runs 11 feet thick; seven feet of coal is taken away in the stall until holed at the top; and the top coal brought back.

Average run of air about 3,000 yards.

South Fawr Vein has a very soft bottom;      puck very much. Shaley coal mixed through the thill. Pretty good top.

North Fawr Vein has a very fair bottom and top.

The ventilation is carried on by the splitting system.

The air is divided at the pit bottom; one part goes west and ventilates a vein not at work, known as the Four Feet Vein; the next is a main split, one part going north to air South and North Fawr Veins; it there splits again, one part to the South Fawr, and the other part to the North Fawr, both returns are brought into a return drift, and joins the Four Feet return, and keeps the course to the furnace. The other part is taken 300 yards through a stone drift, 70 feet area, and splits east and west. The air has a double run east, or two intakes, and two returns at the highest part of the work by two returns left near the crop with the first pillar left below to support the return, so that any gas flowing from the edge of the goaf as the angle of the vein is generally 20 degrees. No gas can remain in the excavated part, but this support pillar must be taken out eventually, and the whole laid down after no district is left behind.

Three years ago we had an explosion, in which seven men lost their lives. One man since killed by a fall of coal. One with not getting properly into the cage or carriage coming up the pit.

Three at different times on the surface railway. One of these, a stoker on the locomotive; another was run over by the locomotive at night, he being very deaf. The other trying to get on to the train when in motion, and fell under the wagon.



*Description of Furnace.*

The ventilation is by furnace.

The height of the furnace 10 feet under the fire arch, and one foot between fire arch and protection arch, to prevent the upper strata from taking fire.

Breadth of furnace, eight feet; about six inches of masonry on each side of the fire bars, to prevent burning the main arch; reducing the breadth of the fire to seven feet. Length of bars 9 feet 6 inches, making 66½ feet superficial. All the surface cannot be covered with fire, say 60 feet of working space, burning about 2½ tons of coal per 24 hours, producing 68,500 per minute, which is rarefied from 62°, before going on to the furnace, to 163°, 20 feet from the top of the upcast pit. Three-fourths of the air is carried over the furnace, and one-fourth taken into the upcast by a separate drift, generally called the dumb drift. This air joins the hot steam from the underground engine.

Temperature of air before getting into the furnace, 62 degrees.

Temperature of air at the top of furnace, before entering the shaft, 230 degrees.

Temperature at middle shaft, 40 fathoms, 195 degrees.

Temperature at top of upcast shaft, 163 degrees.

Temperature at the bottom of downcast shaft, 58 degrees.

Water-gauge, nine-tenths of an inch, equal to five lbs. per foot.

17,655 feet of air per minute, heated from 62 degrees up to 163 degrees, at the top of the pit, by one lb. of coal.

Steam to work an underground engine is brought down the upcast pit from a boiler at surface; this steam to some extent heats the air, and adds to the ventilation.

*Section of Pit.*

Upcast pit is sunk at a distance of 300 yards, full rise of the measures from the downcast, bearing S. 39 W. Distance under ground is much more by bearing level course 100 yards, and 300 yards full rise, and 100 yards back to the pit, which makes the distance 500 yards to travel from pit to pit. As the vein lies at an angle of from 20 to 30 degrees, the vein at the bottom of downcast pit crops at the gravel before reaching the upcast. The upcast pit cuts the present working Nine Feet Vein between 60 and 70 fathoms from the surface, as shown on section.

The furnace is placed at the depth of about 60 fathoms from the surface; in this vein of coal, about 70 yards from the ingate of upcast pit.

The upcast pit is tubbed off at the depth of 30 fathoms, by fire-bricks and lias lime; the other part is walled up to the tubbing, making the whole distance walled from the furnace area of upcast, 90 feet. Downcast is tubbed off at 20 fathoms from the surface, divided into winding and pumping pits, making 70 feet area in both.

*Expenses on Safety Lamps.*

To Maintain and keep in Good Repair a sufficient number of Safety Lamps, to work 100,000 tons per Annum.

	£.	s.	d.
220 lamps in daily use on 300 working days per annum, 1,050 gallons of oil, at an average of 2s. 10d. per gallon	148	5	-
60 new lamps per annum, at 6s. 3d.	18	15	-
70 lbs. of fine cotton, at 1s. 4d. per lb.	4	13	4
Wire-gauze, wire for poles, solder, tools, &c.	10	-	-
Wages: to oiling, trimming, and keeping the same in good repair, at 12s. per week	31	4	-
To locking lamps, under ground, 300 at 6d.	7	10	-
£.	220	7	4

Cost of each light per day, '80 d.

*Expenses on Candles.*

	£.	s.	d.
To maintain 220 lights per day:—180 workmen, averaging 10 hours per day, using six candles each, of 30 to the pound; 40 boys averaging 12 hours per day, using seven candles each of 30 to the pound, equal to 45½ per day, at 6d. per pound, by allowing 300 working days per annum	340	-	-
Wages to one man for taking charge of these candles, and serving them out, at 12s. per week	31	4	-
£.	371	4	-

Cost of each light per day, 1'34d.