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Health Hazards over the Centuries at Prestongrange

Kirsty Black

PRESTOUNGRANGE UNIVERSITY PRESS
http://www.prestoungrange.org

FOREWORD

This series of books has been specifically developed to provided an authoritative briefing to all who seek to enjoy the Industrial Heritage Museum at the old Prestongrange Colliery site. They are complemented by learning guides for educational leaders. All are available on the Internet at http://www.prestoungrange.org the Baron Court's website.

They have been sponsored by the Baron Court of Prestoungrange which my family and I re-established when I was granted access to the feudal barony in 1998. But the credit for the scholarship involved and their timeous appearance is entirely attributable to the skill with which Annette MacTavish and Jane Bonnar of the Industrial Heritage Museum service found the excellent authors involved and managed the series through from conception to benefit in use with educational groups.

The Baron Court is delighted to be able to work with the Industrial Heritage Museum in this way. We thank the authors one and all for a job well done. It is one more practical contribution to the Museum's role in helping its visitors to lead their lives today and tomorrow with a better understanding of the lives of those who went before us all. For better and for worse, we stand on their shoulders as we view and enjoy our lives today, and as we in turn craft the world of tomorrow for our children. As we are enabled through this series to learn about the first millennium of the barony of Prestoungrange we can clearly see what sacrifices were made by those who worked, and how the fortunes of those who ruled rose and fell. Today's cast of characters may differ, and the specifics of working and ruling have surely changed, but the issues remain the same.

I mentioned above the benefit-in-use of this series. The Baron Court is adamant that it shall not be 'one more resource' that lies little used on the shelves. A comprehensive programme of onsite activities and feedback reports by users has been designed by Annette MacTavish and Jane Bonnar and is available at our website http://www.prestoungrange.org – and be sure to note the archaic use of the 'u' in the baronial name.

But we do also confidently expect that this series will arouse the interest of many who are not directly involved in

educational or indeed museum services. Those who live locally and previously worked at Prestongrange, or had relatives and ancestors there (as I did in my maternal grandfather William Park who worked in the colliery), will surely find the information both fascinating and rewarding to read. It is very much for them also to benefit – and we hope they will.

Dr Gordon Prestoungrange
Baron of Prestoungrange
July 1st 2000

Kirsty Black

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SERVITUDE TO FREEDOM

> 'Mother took me down four years ago, as father had died of typhus. I work with three brothers and one sister, usually 10 and 12 hours, many times longer, as we wait our turns for the gig to draw up the cart; I am not very strong, as my thigh bone was broken two years since by the cart. All the family have had typhus within the last three years, and I have had it twice. Putting is very sore work; the coal weighs four cwt., and the cart is nearly as heavy. Mother has ceased to work for two years; she is fashed with pains in the stomach, owing to hard labour.'[1]

THIS IS the testimony of a twelve year old boy who worked down an East Lothian colliery in the mid nineteenth century. It gives some idea of the conditions and the health hazards which existed for those who worked underground at this time.

There had been mining in the area of East Lothian around Prestonpans since the thirteenth century when, in 1210, a charter was granted to monks living in this area which allowed them to mine for coal.[2] By the latter part of the eighteenth century, Scotland and Britain experienced a period of rapid industrial expansion; an escalating rate of population growth and urbanisation.[3] Next to textile and agricultural workers coal miners rapidly became one of Scotland's largest working-class groups. In Scotland, however there were two main difficulties within the coal industry at this time: the labour supply and drainage. The latter will be discussed later, the former related to the serfdom in which miners lived and worked. This did not encourage people into the industry.[4]

In 1606 an Act of Parliament prevented the employment of salters and colliers unless they could prove that they had been released from their last place of employment.[5] In 1701 an Act

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1 First Report of the Commissioners of Mines for the Childrens Employment Commission Volume 189. Appendix: Reports and Evidence from Sub Commissioners (1842) HMSO: London, p. 65

2 P. MacNeill (1902) *Prestonpans and its Vicinity: Historial, Ecclesiastical and Traditional.* Remploy Ltd.: Leicester, pp. 9–10

3 T. C. Smout (1998) *A History of the Scottish People 1560-1830*. Fontana Press, p. 230

4 Ibid, p. 403. R.H Campbell (1971) S*cotland Since 1707: The Rise of an Industrial Society.* Basil Blackwell: Oxford, p. 128

5 T. C. Smout (1998) p. 168. And T.M. Devine & R. Mitchison (Ed.) (1998) *People and Society in Scotland*: Volume I. 1760-1830. John Donald Publishers LTD: Edinburgh, p. 237

of Parliament made colliers and salters serfs bound for life to a colliery owner and outside the powers of Scotland's Habeas Corpus Act of the same year. The latter Act stated that 'the imprisonment of persons without expressing the reasons thereof, and delaying to put them to trial is contrary to law'.[6] Further legislation in 1762 meant that the colliery owner had the power to move colliers to whereever they had work for them, and the collier had no powers to resist. This is demonstrated in the letter below, recorded in the Prestongrange Collier Books, which was written to Lord Grange by six of his colliers in 1746, requesting that they be allowed to continue working at a neighbouring mine whilst Prestongrange mine was closed.

'UNTO YE Honourable ye Lord Grange, at Prestongrange, ye petition of Robert Pride, James Pride his son, James Pride, Robert Thomson, and William Ines, all collers belonging to his Lordship:

> Humble shewerh, that we are all your Lordship's servants, and is willing to serve your Lordship qn yt you have work for us; but since yt your Lordship's work is not going at Prestongrange, we are at ye tyme is at Pinky, under Mr Robertson, and not far from your Lordship, if yt qn yt you are pleased to fit your work in Prestongrange we are near to be gatton qn yt your Lordship pleases. And at ye tyme John Binel, oversman to ye Duke of Hamilton, is hard upon us in stopping us of bread, where we now are by lifting out of ys work to place us in yt sd Duke's work at Bawerestness. And now ye workman yt is there sweres yt of yt we go to yt work yt they shall be our dead. And now we humbly beg yt you out of your clemency and goodness will keep us from guing to yt place, where our lives will be in so much danger, and we your Lordship's humble petitioners shall ever pray.'[7]

Figure 1: Copy of Pride's Petition to Lord Prestongrange (1746)

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6 First Report of the Commissioners of Mines (1842): Appendix, p. 385

7 First Report of the Commissioners of Mines(1842): Appendix, p. 385. T. C. Smout (1998) pp. 403-404. P. MacNeill (1902), p. 13

It has been argued that while serfdom limited a collier's freedom it did not equate directly with low wages. In fact by the 1770s the push to remove serfdom came not from the colliers and salters themselves, for whom this life contract offered an element of employment security, but from industrialists and mine owners, primarily in the west of Scotland, who were concerned with labour shortages and high rates of pay.[8] The result of this turn away from serfdom was two pieces of legislation. The Act of 1775 acknowledged firstly the state of servitude in which colliers and salters lived and secondly that there were insufficient colliers and salters in Scotland to meet the countries needs. It stated:

> '… the emancipating or setting free of the Colliers, Coal bearers and Salters in Scotland, who are now in a State of Servitude, gradually and upon reasonable Conditions … would be the Means of increasing the Number of Colliers, Coal bearers and Salters, to the great Benefit of the Publick, with out doing any injury to the present Masters …'.[9]

This legislation did not decree that every collier, coal bearer and salter was to be immediately freed but rather that those under 21 years of age would be freed after 7 years service; those ages 21 to 35 after 10 years service; those aged 35 to 45 after 7 years service and those over 45 years of age after 3 years. This was to be replaced with the 'long contract' which would bind colliers, coal bearers and salters to their employment for a minimum of 1 year whilst those under 18 years of age would be tied into apprenticeships for between 3 and 7 years.[10] In fact it was not until 1799 that miners finally got their freedom. This was as a result of a second Act which amended the first and freed any colliers still living in servitude.[11] What all of this meant was that by the time Prestongrange sunk its first shaft in 1829 its colliers were free, although still bound by long contracts.

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[8] T.M. Devine &R. Mitchison (Ed.) (1998), p. 197

[9] R.H. Campbell & J.B.A. Dow (1968) *Source Book of Scottish Economic and Social History*. Basil Blackwell: Oxford. p. 143

[10] Ibid, p. 144

[11] R.H. Campbell & J.B.A. Dow (1968), p. 145. T.C. Smout (1998) pp. 403–4

THE HEALTH HAZARDS

CRITICAL HAZARDS to health and general safety which confronted underground workers during the nineteenth century were drainage, ventilation, haulage and lighting. Each of these presented specific difficulties within this environment which shaped the roles and experiences of men, women and children.

Prestongrange colliery sank its first main shaft in 1829; the second in 1840 and the third in 1873. Discussion of the period from 1829 'until the closure of Prestongrange Colliery in 1962–3 will enable identification of the experiences within East Lothian and Prestongrange colliery. It will also highlight attempts to improve the situations through technological and legislative developments; improvements in safety precautions, which had to be combined with a need for efficiency and productivity in coal production; and as a result of increased knowledge and awareness of medical and health problems.

Drainage

The problem of drainage has always been present in mining. When a hole is dug it will fill with water, a problem which increases depending on the depth of the hole. The drive to improve drainage came from increasing demands for coal to meet the domestic and industrial needs of a rapidly developing nation.[12] This need for more coal led to the sinking of shaft pits and as they became deeper so the problems associated with drainage increased. Church[13] pointed out strongly that a great threat to sinking pits in the nineteenth century was the presence of water and hence drainage was vital. He identified several early methods which were used to remove water from a pit: these included water tubs or kibbles which would have been carried up by hand, then by a horse gin and later by a steam pump. An example of a typical one-horse gin from East Lothian in the mid nineteenth century can be seen in Figure 2 opposite. From the 1780s Watt's steam engine was used in mills and factories and to propel trains and ships.[14] The

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[12] R.H. Campbell (1971), p. 128

[13] R. Church (1986) *The History of the British Coal Industry*: volume III 1830–1913. Clarendon Press: Oxford, p. 317

[14] C. More (1989) *The Industrial Age: Economy and Society in Britain 1750–1985*. Longman: London and New York, p. 114

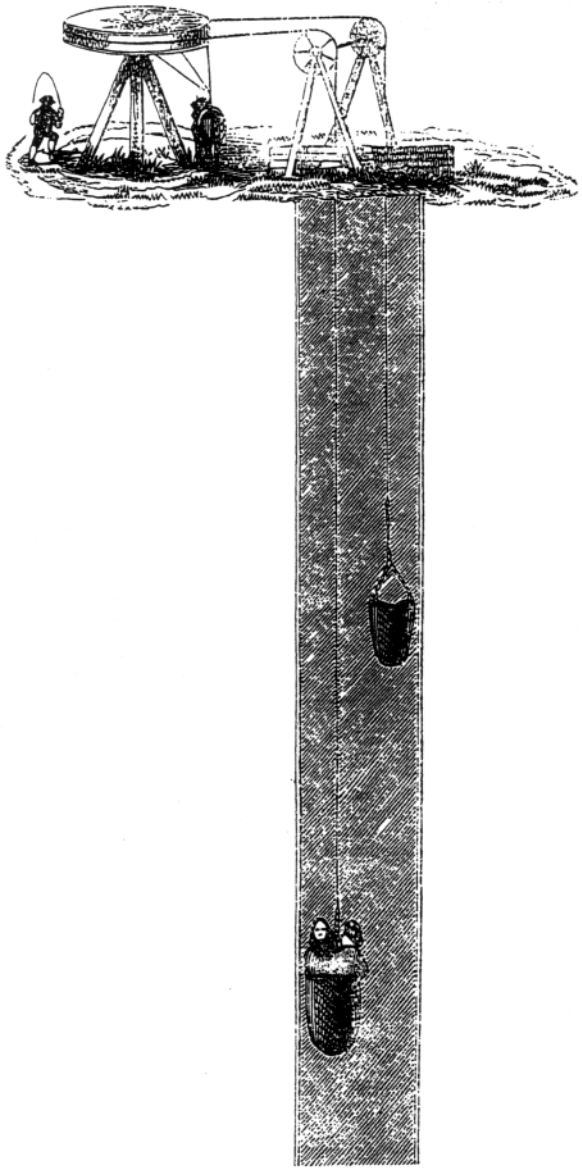

Figure 2: One horse gin
Source: First Report of the Commissioners of Mines (1842): Appendix, p.382

development of the steam engine necessitated the increased use of coal as a power source.

The limitations of horse gins were clear, in wet pits, such as some of those in the East of Scotland. It was difficult to remove a large quantity of water in buckets raised on chains, pulled by a horse and this prevented pits from being dug to any great

depth. Accordingly as steam power was introduced into British industry coal was no exception in the attempts to harness this power. Therefore while the growth of steam power necessitated increased production of coal it also helped to facilitate its own production. Early attempts included the development of the 'Newcomen engine' in the early eighteenth century.

The ineffective drainage of collieries was a potential health hazard for all those working within the mine. Prestongrange colliery was situated on the coast, on the shores of the Firth of Forth, and the proximity to water made mines even more likely to be wet: 'those near to a coast or a river were often excessively wet... In Scotland it was not unusual for miners to come up the pit at night drenched to the skin with water'.[15] This was reiterated by the findings of the Commissioners appointed to report to the Children's Employment Commission in 1842. They said of the East of Scotland that underground 'the roads are most commonly wet, but in some places so much so as to come up to the ankles; and where the roofs are soft the drippy and slushy state of the entire chamber is such that none can be said to work in a dry condition.'[16] The water colliers and coal bearers worked in often contained chemicals, and salt, which would soak into their clothing and harnesses, rubbing the skin raw.[17]

In the case of Prestongrange colliery, the problem of flooding was such that in 1840 when the Royal Commission's enquiries were being conducted the mine was actually closed due to flooding so none of its employees were interviewed.[18] Despite this the Commission did cover a wide range of mines in East Lothian so it is reasonable to assume that the experiences described in other mines were similar to those of Prestongrange when it was operational. In 1872 a Cornish Beam Engine was finally installed at Prestongrange colliery which enabled the colliery to be drained much more efficiently.

Ventilation and Explosion

A second health hazard in coal mining was ventilation.The main hazards here were a lack of oxygen, the presence of gases

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[15] J. Benson (1989) *British Coal Miners in the Nineteenth Century: A Social History.* Longman: London and New York, p. 34

[16] First Report of the Commissioners of Mines for the Childrens Employment Commission (1842) *Parliamentary Papers* Volume 188. HMSO: London, p. 61

[17] J. Benson (1989), p. 34

[18] First Report of the Commissioners of Mines (1842), Appendix, p. 380. P. MacNeill (1902), p. 16

and the risk of explosion. As drainage methods improved so pits became deeper. Deeper shafts and hence larger mines meant a greater need for efficient ventilation due to the risk of pockets of gas developing. Two of the earliest gases identified were: 'choke damp' which caused suffocation, and 'fire damp' which created the risk of explosion. Early methods of detecting the presence of gas included carrying a candle on a pole to alert colliers to any pockets of gas before they reached them and carrying a bird in a cage, because the bird would be more sensitive to the effects of gas. Neither was particularly scientific or effective. However, irrespective of the presence of gas, for colliers to be able to work hewing coal, or for any of the other tasks which were performed below ground it was necessary to ventilate mines.

By the 1830s the use of wooden partition doors along the length of roads underground was common. These trap doors enabled the air to be channelled throughout the mine. Trap doors were relatively effective in ventilating coal mines in the first half of the nineteenth century but there were serious flaws and risks involved in this method. When the trap doors were correctly operated they would ventilate the mine, but the primary problem here was that if they were left open this would reduce the flow of air and increase the risk of explosion. This job of opening and closing the doors was therefore given to the trapper. A trapper was usually a young child, generally a boy, who had the task of sitting at one of these trap door and opening it to allow colliers or coal bearers through and then closing it again. An example of a trapper at work can be seen in Figure 3 over in an illustration taken from the Report of the Royal Commission into the Employment of Children in Mines.[19]

In that Report it was stated that 'in regards to ventilation, the coal mines in the East of Scotland are in general in a deplorable state … the main principles of ventilation in many parts of Scotland are ill understood, and as illpracticed as understood, to the great danger of the workmen, they can exist in this state, but accidents are constantly happening'.[20] Several of the testimonies which the Commissioners collected were from trappers who spoke of the long hours, of sitting alone in the dark and often in wet conditions, waiting to open their door.[21] It was not only however that young primary

[19] R. Church (1986), p. 362: illustrations
[20] First Report of the Commissioners of Mines (1842), p. 60
[21] First Report of the Commissioners of Mines (1842): Appendix, p. 444

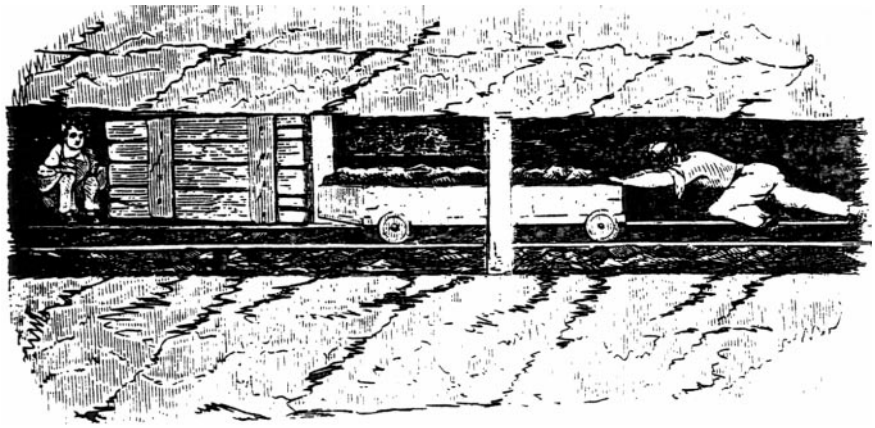

Figure 3: A Trapper Boy
Source: *First Report of of the Commissioners of Mines for the Children's Employment Commission* (1842) Vol 189. Appendix: Reports & Evidence from Sub Commissioners. HMSO: London, P444

school aged children, were employed below ground but that they were given a job as important as the efficient working of a ventilation system which is significant here. The safety and ultimately the lives of the mine and all of those working within it were put into the hands of children.[22]

The Mines and Colliers Act of 1842 made illegal the employment of women and children under 10 years of age underground. It also prevented the operation of winding gear from being given to children under 15 years of age. This was another example of the way that the lives and health of all those who worked in a colliery had been put at risk by allowing children to operate important pieces of equipment.[23]

By the 1840s the incorporation of two shafts and the use of furnace ventilation had become popular. This involved lighting a fire at the bottom of the 'up shaft' which operated like a chimney, hot air rose up this shaft and as a result sucked fresh air down the second shaft to ventilate the mine.[24] It is reasonable to assume that this was a method used by the middle of the nineteenth century at Prestongrange Colliery since a second shaft was dug in 1840. Even as late in the century as 1882, by which time Prestongrange had three shafts, shafts number 1 and 2 were still operated on the furnace method.[25] In fact the number 2 shaft actually had

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[22] A. Burton (1976) *The Miners*. Futura Publications Ltd.: Norwich, p. 116
[23] T.C. Smout (1997) *A Century of the Scottish People 1830–1950*. Fontana Press, p. 95
[24] R. Church (1986), p. 315
[25] R.Moore Esq., Report on the Eastern Districts of Scotland in: HMSO (1883) *Report of the Inspectors of Coal Mines for 1882*. George Edward Eyre & William Spottiswood: London, p. 295

three furnaces in operation in 1882, which highlights the point made by Church that the furnace method of ventilation could be enhanced by the use of several furnaces.[26]

As mines got larger it became increasingly difficult to maintain a sufficient flow of air using furnace ventilation. Were a furnace to be extinguished it was not easy to relight. It was difficult to carry out repairs in the up shaft, since there was a furnace burning at the bottom of it. As a result the risk of injury in this up shaft was great.[27] A further problem was the risk of explosion. For the flow of air created by a furnace to effectively ventilate a mine the underground roads had to be well maintained. If they were not of a high standard then pockets of flammable and explosive gases could gather in poorly ventilated areas which increased the risk of explosion with the naked flames of a furnace. Not only did the roads which were in use have to be maintained, but any old or discarded workings also had to be continually ventilated to prevent a build up of gases within them. The health hazards as a result of explosion meant not just the risk of burns for those working underground but also there was the risk of the fall or collapse of the roof or sides of an underground road, creating the threat of being trapped or crushed. Any of these were sufficient to cause death.[28]

Unfortunately this was the case at Prestongrange. There are no comprehensive reports of all minor accidents at Prestongrange Colliery but some of those reported to the Inspectors of Mines in the years 1880 to 1900 can be seen in Figure 4 over. Explosions did occur, and although it is not possible to say exactly what the causes of those explosions were, in some cases it is a reasonable assumption to make that had there been a completely effective ventilation system the explosion in 1882, and those caused by fire damp in 1884, and again in 1894 would not have occurred.

What is also worthy of attention is the fact that the miners at Prestongrange were well aware of the inadequacies of their ventilation system. In 1861 a group of miners from across East Lothian met to discuss the problem of ventilation systems. With the exception of three mines, of which Prestongrange was not one, all were found to be defective. The meeting decided to apply to the Inspectors of Mines to improve the

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[26] R. Church (1986) , p. 321
[27] Ibid, p. 321
[28] A. Burton (1976), p. 31 and R. Church (1986), p. 321

DATE	OCCUPATION	AGE	ACCIDENT	INJURIES	TIME ABSENT
2.5.1882	Collier		Fall of roof or sides	Arm fracture	94 days
8.7.1882	Collier	25	Fall of roof or sides	Spine injury	
19.9.1882	Oncostman	40	in an explosion	Burned	41
19.9.1882	Oncostman	50	in an explosion	Bruised	1
16.12.1882	Drawer	35	Miscellaneous underground	Bruised	left
15.6.1883	Sinker	30	Miscellaneous underground	Bruised	
25.9.1883	Drawer	13	In shaft	bruised	left
5.11.1883	Collier	25	Miscellaneous underground	Spinal injuries	left
14.3.1884	Hewer	40	Fall of roof or sides	Fractured collarbone	10
16.7.1884	Hewer	32	Fall of roof or sides	Cut on head	90
13.10.1884	Inspector	50	Explosion of Fire Damp	Burned	
18.10.1884	Drawer	48	Fall of roof or sides	Internal injuries	
22.10.1884	Hewer	15	Fall of roof or sides	Collarbone fracture	28
5.12.1884	Drawer	17	Miscellaneous underground	Arm fracture	6
20.12.1884	Drawer	15	Miscellaneous underground	Hand fracture	
14.3.1888	Collier		Fall of roof or sides	Scalp wound	left
29.3.1888	Fitter		On surface	Shoulder dislocation	left
25.5.1888	Drawer		Miscellaneous underground	Hand injury	21
2.8.1888	Collier		Fall of roof or sides	Shoulder injury	21
2.8.1888	Collier		Fall of roof or sides	Foot injury	28
2.8.1888	Collier		Fall of roof or sides	Hand injury	left
26.10.1888	Bottomer		On surface	Hand injury	
27.12.1888	Oversman		Miscellaneous underground	Eye injury	10
18.2.1892	Collier	38	Miscellaneous gunpowder	Burned	42
18.2.1892	Collier	32	Fall of roof or sides	Bruising & injuries	
4.3.1892	Collier	43	Fall of roof or sides	Bruising & injuries	
2.5.1892	Oversman	35	In shaft: crushed by cage	Internal & external	
11.11.1892	Collier	50	Fall of roof or sides	Bruising & injuries	
27.12.1892	Collier	42	Fall of roof or sides	Bruising & injuries	
24.7.1893	Miner	57	Fall of roof or sides	Bruising & injuries	
8.2.1894	Drawer	19	Drawing before tubs when hit		
13.2.1894	Drawer		fall of clay		
18.5.1894	Drawer		Fall of roof or sides		
8.6.1894	Miner		Explosion of fire damp		

Figure 4: Table of Non Fatal Accidents at Prestongrange

Source: Report on the Eastern Districts of Scotland in HMSO: *Report of the Inspectors of Coal Mine*s. Each incident taken from the report of the year of its occurrence 1882–1900

situation and decided to gather a petition together to send to the Home Secretary highlighting the problem.[29]

None of the accidents above produced fatalities, but there were fatal accidents as a result of explosions at Prestongrange.

[29] *Haddingtonshire Courier* 5 April 1861

One such accident occurred in 1877 and was the result of bad ventilation and inappropriate lighting, according to the Haddingtonshire Courier of the day. Not only did they claim the accident was preventable, but it left a fireman dead. The article was titled 'Explosion of Fire Damp at Prestongrange:

> 'On Monday morning, George Sneddon, fireman, while examining the workings ... before the miners commenced their shift proceeded to the end of the pit workings, when an explosion of fire damp occurred which injured him so badly that he has since died in the infirmary. Another miner ... was also slightly burned about the arms. We believe the unfortunate deceased was provided with a Davy Lamp in addition to the one commonly used by miners where the workings are considered free from fire damp. It is not known how the accident occurred but it is safe to affirm that had the Davy lamp been used the unfortunate casualty would not in all probability have occurred.'[30]

During the second half of the nineteenth century the use of fans to ventilate mines increased. In 1882 Prestongrange was using one mechanical ventilator, a Guibal fan.[31] The striking difference between the use of furnaces and the use of fans, aside from the obvious prevention of the health hazards described above, is the difference in the current of air provided. In 1882 at Prestongrange the furnace ventilation in operation in shafts number 1 and 2 were averaging air currents of between 100 and 250 yards in length. However, the fan in use in shaft number 3 was producing an air current of between 1900 and 2100 yards in length.[32] This was a striking improvement in ventilation, but there was still not room for complacency.

Lighting

In early mines light was provided by the use of a candle's naked flame. This provided a third health hazard since the presence of explosive gases in the atmosphere made such a practice dangerous. Because of this, improvements in lighting

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[30] *Haddingstone Courier*, 1 June 1877. The firemen were the men who would go down the pit each day before a shift began to ensure that it was safe for colliers to work in

[31] R. Moore Esq., (1883), p. 295 & P. MacNeill (1902), p. 19

[32] R. Moore Esq., (1883), p. 295

and ventilation were closely related. An early attempt to combat the problem of suitable lighting was the development, in 1815, of the Davy Safety Lamp, pioneered by scientist Sir Humphry Davy.[33]

The Davy Safety Lamp used a wire gauze to protect the flame, preventing it from coming into contact with volatile gases. In fact the flame would change colour if there were any gases present. In principle, therefore, safety lamps such as the Davy lamp and those which followed it should have made working in coal mines safer.

There were three main disadvantages to the safety lamp however. The first was that safety lamps were considered a defensive rather than a standard practice, and were only used where it was deemed necessary. In fact naked lights remained the standard form of lighting in Scotland as late as 1913 when there were only 0.3 safety lamps in use for every underground worker, against the national average of 0.85.[34] The second disadvantage of the early safety lamp was that it was possible for them to be extinguished or for a breeze to extend their flame outside of the protective gauze, once again creating a risk of explosion. The third disadvantage was probably the most pressing concern for miners themselves. It was generally acknowledged that Davy lamps were safer, but their level of illumination was eight times weaker than a paraffin lamp. Hewers, or coal face workers depended on the amount of coal they cut for their wages. Yet if they worked with Davy lamps they could not see the coal face as well, nor could they identify any possible dangers as easily. They depended on good light for job efficiency and also for safety, so they would remove the gauze from safety lamps and also take candles with them to enable them to see better.[35]

In 1835 a House of Commons Committee who reviewed Safety Lamps described them as dangerous, stating that they improved safety only in suitable conditions and if properly used. In 1843 a South Shields Committee further stated the dangers of safety lamps in general, claiming ironically that 'no lamp is safe unless in a well ventilated area'. It also stated that while the Mueseler lamp was safer than a Davy lamp it was still only half as bright as a candle.[36] What this demonstrated

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[33] A. Burton (1976), p. 115
[34] R. Church (1986) , p. 327
[35] R. Church (1986) , p. 325–7 & J. Benson (1989), p. 33
[36] R. Church (1986) , p. 325–9

was that while science was making progress with regards to safety and lighting, the primary task still remained to convince miners themselves to use them. The historian Anthony Burton pondered why, with clear examples of explosions and deaths in every colliery would miners continue using naked flames, and further why would their employers allow it, and continue to send them into inadequately ventilated mines.[37] The solution to this dilemma was the search to find a common ground between efficiency and safety. Brighter light provided better vision, better vision provided greater efficiency at work and also the perception of greater safety for those working underground.

Despite this clear acknowledgement of the potential hazards to health inherent in lighting, the Coal Mines Acts of 1872 and 1887 failed to make the use of safety lamps compulsory. Consequently miners continued to be injured and killed because of inappropriate lighting and the use of naked flames. At Prestongrange Colliery in 1887 a serious accident resulted in the loss of three lives. The deceased were James McEwan, a fireman, Fredrick Curtis, a miner and his fourteen year old son Francis. The cause of the accident was an explosion of fire damp, and is reported to have been so severe as to have been heard at the pit head. Fortunately there was a workers' strike in progress at the time otherwise the accident may have been a great deal worse.[38]

The Coal Mines Act of 1911 eventually required that only locked safety lamps were to be used underground and that where safety lamps had been introduced the use of naked flames was to be made illegal. This Act further stipulated that after 1913 only colliery owners could provide safety lamps and that they could only be opened or checked at appointed lamp stations and by competent and appointed persons. However this Act of 1911 stated that safety lamps should only be made absolutely compulsory if there was a dangerous level of fire damp present.[39] What this Act did do however was to ban all those working underground from carrying anything which could produce a spark or light, such as matches, cigarettes or a pipe and it appointed officials who had the authority to search anyone going underground for such banned

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[37] A. Burton (1976), p. 115–6

[38] *Haddingtonshire Courier* 2 September 1887

[39] Ministry of Fuel & Power (1955) *Coal Mines Act 1911: Regulations and orders relating to safety and health* (Supplement to the 1953 edition), HMSO: London, pp. 44–50

substances. An example of a search sheet from the 1950s is in Figure 5. Anyone caught in possession of matches or cigarettes could be prosecuted for this contravention of safety policy. At Prestongrange an incident was reported to the Inspector of Mines in 1914 where a twenty year old miner, John Adams, had been badly burned as a result of an explosion of fire damp underground which had been caused by the use of a naked flame.[40] Clearly such an example demonstrates that the 1911 Act was not totally effective. Indeed this example clarifies the way miners' own behaviour contributed to the problems in lighting and ventilation which had been voiced for over a century and which were responsible for many deaths and accidents at Prestongrange.

By 1917 the number of accidents due to the presence of gases was growing. It was again suggested that the cause of these accidents was a combination of problems in ventilation and lighting and had the use of safety lamps been universal then some could have been prevented.[41] The Inspector's Report on the condition of mines in the Eastern District of Scotland in 1883 stated the the two reasons for the slow uptake of electric lighting were the cost and the perception it was only experimental.[42] By the early twentieth century electric lighting was becoming common on the main underground roads, but had not reached the smaller passages or the coal face. In 1911 there were over 1 million miners in Great Britain, but only 4298 portable electric lights in use.[43] In Scotland the numbers of lamps used were recorded by the Inspectors of Mines. In 1910 they recorded 549 non shielded and 232 shielded Davy Safety Lamps, 211 Clanny Safety Lamps, 415 Mueseler Safety Lamps, many hundreds of other safety lamps but only 14 Electric Lamps. By 1911 they reported 135 electric lamps in their district.[44]

By this time, however, a shortage of lamps was not the only problem with electricity. The suppliers of other safety lamps

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[40] W. Walker, Report for the Scotland Division: HMSO (1915) *Report of the Inspectors of Coal Mines for 1914*. Harrison & Sons: London, p. 67

[41] W. Walker, Report for the Scotland Division: HMSO (1919) *Report of the Inspectors of Coal Mines for 1915–18*. Harrison & Sons: London, p. 25

[42] R. Moore, Esq., Report on the Eastern Districts of Scotland in HMSO (1884) *Report of the Inpectors of Coal Mines for 1883*. George Edward Eyre & William Spottiswood: London, p. 98

[43] J. Benson (1989), p. 33

[44] W. Walker, Report on the Eastern Districts of Scotland in HMSO (1911) *Report of the Inspectors of Coal Mines for 1910*. Darling & Son Ltd: London, p. 28. W. Walker, Report on the Eastern Districts of Scotland in HMSO (1912) *Report of the Inspectors of Coal Mines for 1911*. Darling & Son Ltd: London, p. 47

SERIES 570. FORM P.40.

SEARCH OF UNDERGROUND WORKERS FOR SMOKING MATERIALS

Mines and Quarries Act, 1956, Section 66(2)

Date	Shift	No. In Shift	Number Searched	Result (Enter "NIL" or specify articles found, and on whom)	Signature(s) of Authorised Person(s) making the Search, and of Witnesses (if articles were found)	Signatures of Workmen Searching the Authorised Searcher

Countersigned: ______________________ Under-manager. ______________ Date

______________________ Manager. ______________ Date

Figure 5: 1956 Form for search of underground Workers for smoking material

Source: National Coal Board (1954) *Diary for Search of Underground Workers for Smoking Materials* (Mines & Quarries Act 1954, Section 66). HMSO: London

capitalised on a suspiciousness about them which is evidenced by advertisements printed at the time. Colliers were concerned that if electric lamps broke underground there would be a risk of further explosions and accidents. Despite this by 1923 the Lothians were highly regarded for their level of electrification, and mechanisation. Prestongrange was one of the largest pits

in the area, employing 899 workers and one of the few pits, to use electric lighting.[45]

Haulage

By the turn of the twentieth century haulage was one of the two main causes of fatal accidents in coal mines, the other main cause was falls from the roof or sides of underground roads and passages.[46] Haulage as a source of hazard was not a new phenomenon. In 1842 the Royal Commission report clearly illustrated the health hazards which existed as a result of the system of haulage used in coal mines. The basic problem was that once coal had been cut it then had to be transported from the coal face to the shaft and thence from the base of the shaft to the surface. There were two main methods of transporting coal from the coal face to the main shaft in the first half of the nineteenth century. The first was to carry it. This was a job carried out by 'coal bearers'. The second was to push or pull it in a cart, carried out by 'coal putters' or 'drawers'. The other distinguishing feature of these jobs was that they were commonly carried out by women or children.

Burton stated that the employment of women as coal bearers was exclusive to Scotland by the middle of the nineteenth century, and in fact was localised in the east. The Report of the Commissioners in 1842 corroborates this statement and described the job of coal bearers as being to 'carry coal on their backs in unrailed roads with burdens varying from three quarters of a cwt. to three cwt.' It further describes the occupation as being predominantly carried out by female or child labour, and peculiar to the Lothians. The report stated that these women and children would work for 12 to 14 hours daily in the 'damp, heated and unwholesome atmosphere of the coal mine.'[47] The illustrations in Figure 6 below are from that report. The report had many examples of testimonies from coal bearers. Consider the following from Isabella Reid a twelve year old coal bearer:

> 'I am wrought with sister and brother, it is very sore work; cannot say how many rakes or journeys I make

[45] C.P. Snodgrass (1953) *The Third Statistical Account of Scotland: The Country of East Lothian*. Oliver and Boyd: Edinburgh and London, p. 48

[46] T.W. Edmond (1981) *Reflections on the Life and Times of the Edinburgh Collieries Company Ltd*, p. 89

[47] First Report of the Commissioners of Mines (1842), pp. 28–9

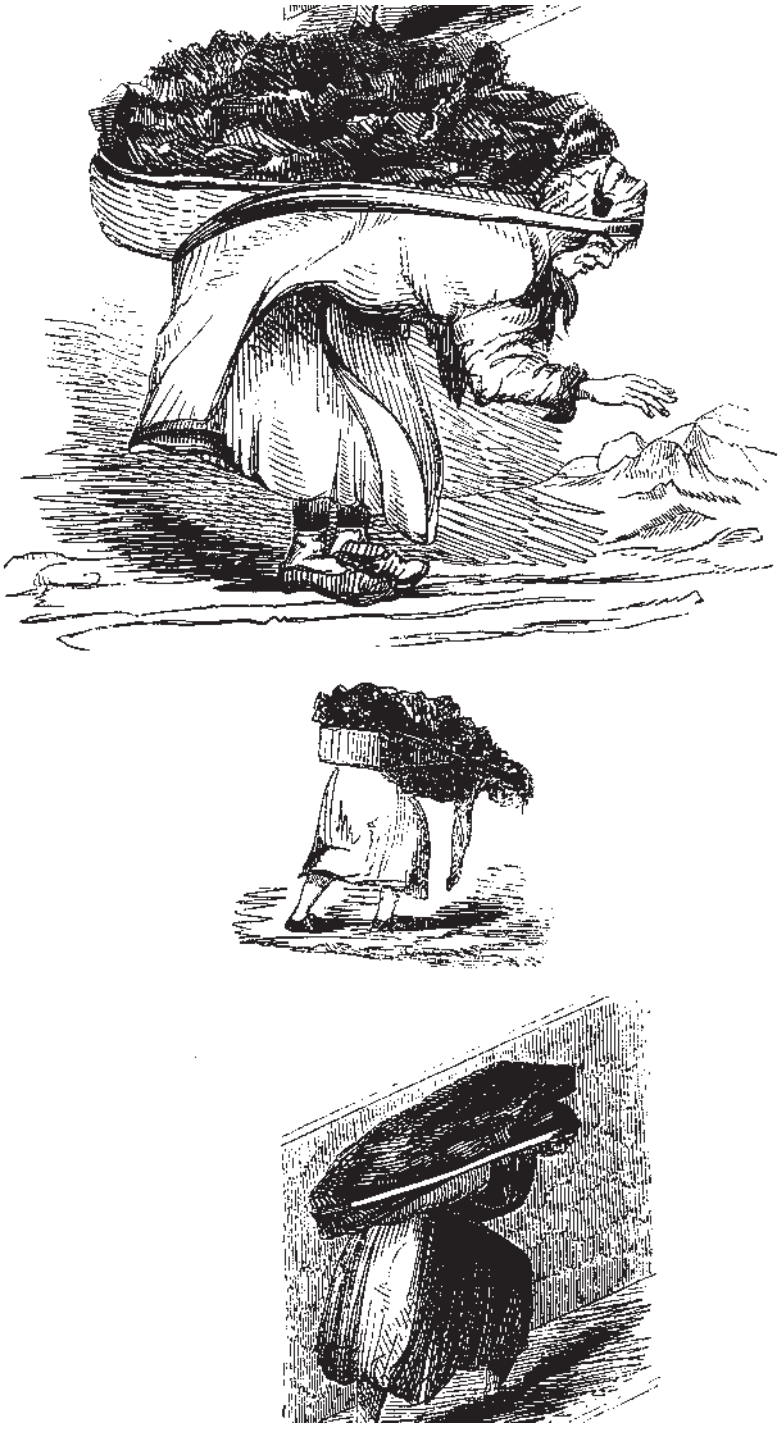

Figure 6: Coal bearers

Source: First Report of the Commissioners of Mines (1842): Appendix, pp. 386–7

> from pit's bottom to wall face and back; thinks about 30 or 25 on average; the distance varies from 100 to 250 fathoms. I carry about 1cwt and a quarter on my back; have to stoop much and creep through water which is frequently up to the calves of my legs. When first down fell asleep while waiting for coal from heat and fatigue. I do not like the work, nor do the lassies, but they are made to like it. When the weather is warm there is difficulty in breathing, and frequently the lights go out.'[48]

Margaret Jaques, a seventeen year old coal bearer also offered testimony:

> 'I have been seven years at coal bearing; it is horrible sore work ... I make 30 rakes a day with two cwt of coal on my creel. It is a guid distance I journey, and very dangerous on parts of the road. The distance fast increases as the coals are cut down.'[49]

Further testimonies highlight more coal bearing hazards, for example, a loss of footing or a fall or if a strap which secured the coal to the bearer broke, carrying such a weight of coal could cause serious injury to the bearer. The report stated that the oppression of coal bearing injured women for life, leaving them with damaged or crushed legs,ankles and backs. It also stated that they often continued to work whilst pregnant and that the women believed that their miscarriages were a result of their work.[50]

The second method of transporting coal to the main shaft was the use of 'putters', or 'drawers'. In this case a cart was filled with between three and ten cwts of coal and either pushed by the 'putters' or dragged by the 'drawers' to the main shaft. The putter would be harnessed over the shoulders and back to their cart (see Figure 7). The 1842 Commissioners' report described putting as next in level of severity and physical oppression to coal bearing. It pointed out that as with coal bearing often the roads along which workers transported the coal were steeply sloped and wet with ceilings of less than three foot high. In such conditions the putters had to crawl on their hands and knees.[51]

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[48] Ibid, p. 29
[49] First Report of the Commissioners of Mines (1842), p. 29
[50] First Report of the Commissioners of Mines (1842), pp. 29–30
[51] Ibid, pp. 29–30

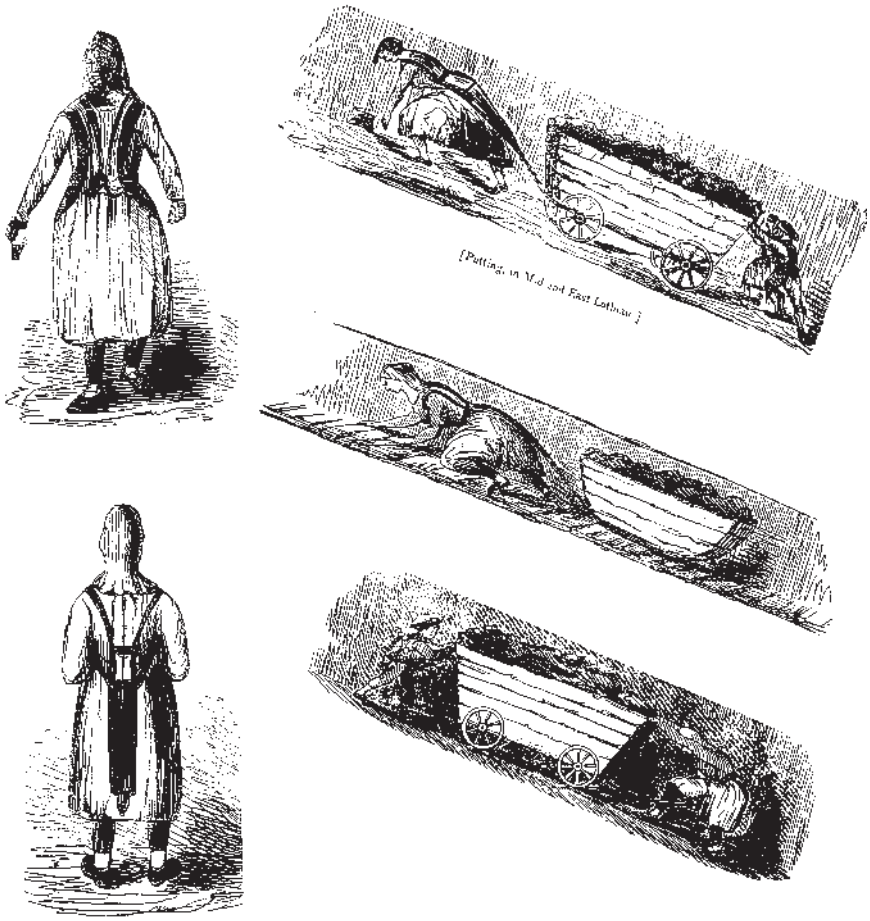

Figure 7: Putters and drawers

Source: First Report of the Commissioners of Mines (1842): Appendix, pp. 388–9 and First Report of the Commissioners of Mines (1842), pp. 94–5

The list of non fatal accidents at Prestongrange between 1880 and 1900 demonstrates that although the 1842 Coal Mines Act removed women and children under ten years old from the mines, the hardships for drawers continued. Nine of the thirty five recorded accidents happened to drawers and of the nine injured drawers the youngest was 13 and the oldest 48, with four of these aged under twenty. These statistics must not be assumed to be definitive of all accidents at Prestongrange Colliery during this period. There were almost certainly many more haulage accidents, but accidents were so frequent that many were not recorded. A further confusion with these statistics is what they omit to say. They do not always explain whether the injured person recovered or if they returned to work. It is possible that of those with no details in the column

'time absent' may have returned underground, however in the case of a drawer injured in 1884, a report in the Haddingtonshire Courier from the following year stated that he had died as a result of his injuries.[52] Haulage accidents did not only injure drawer, putters or coal bearers. A report in the Haddingtonshire Courier in 1861 highlights the danger and injuries suffered by one particular collier as a result of run away coal wagons.

> 'On the 8th, David Innes, collier, residing at Cuthill met with an accident, while working in the Prestongrange coal pit. He was walking before a wagon down an incline and had to turn in order to ascertain the cause of a sudden stoppage of the wagon, when it came away again, and running down upon him before he could move out of the road, crushed his legs and body pretty severely.[53]

Coal was therefore transported, through narrow, wet roads which could be over 200 yards long and which sloped to assist drainage, to the bottom of the main shaft. The second aspect of haulage was to raise the coal to the surface.[54] For bearers this could involve carrying the coal up steps or ladders, as can be seen in Figure 8.

Later methods of raising coal included horse gins (see Figure 2), followed by steam driven pumps and mechanical and electric pumps in the twentieth century. By the 1830s and 40s steam pumps operated iron ropes and cages, and the women and young children were replaced by ponies and later railways. A statement given to the Royal Commission of 1842 by Sir George Grant Suttie Bart., the owner of Prestongrange colliery at the time, proves that he did employ women and children before 1842, and further identifies the need for the legislative change to remove women and children from coal mines:

> 'I have no control whatever over the colliers in my employment; the engagement on their part is nominal; as, although a fortnight's notice is stipulated for previous to leaving their employment, it is in point of fact of no avail; the colliers, men women and children go to their work at whatever hour of the night or day they think proper, and work just as long as they choose. There is in all the mines

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[52] *Haddingtonshire Courier* 9 January 1885
[53] Ibid, 12 July 1861
[54] A. Burton (1976), p. 33

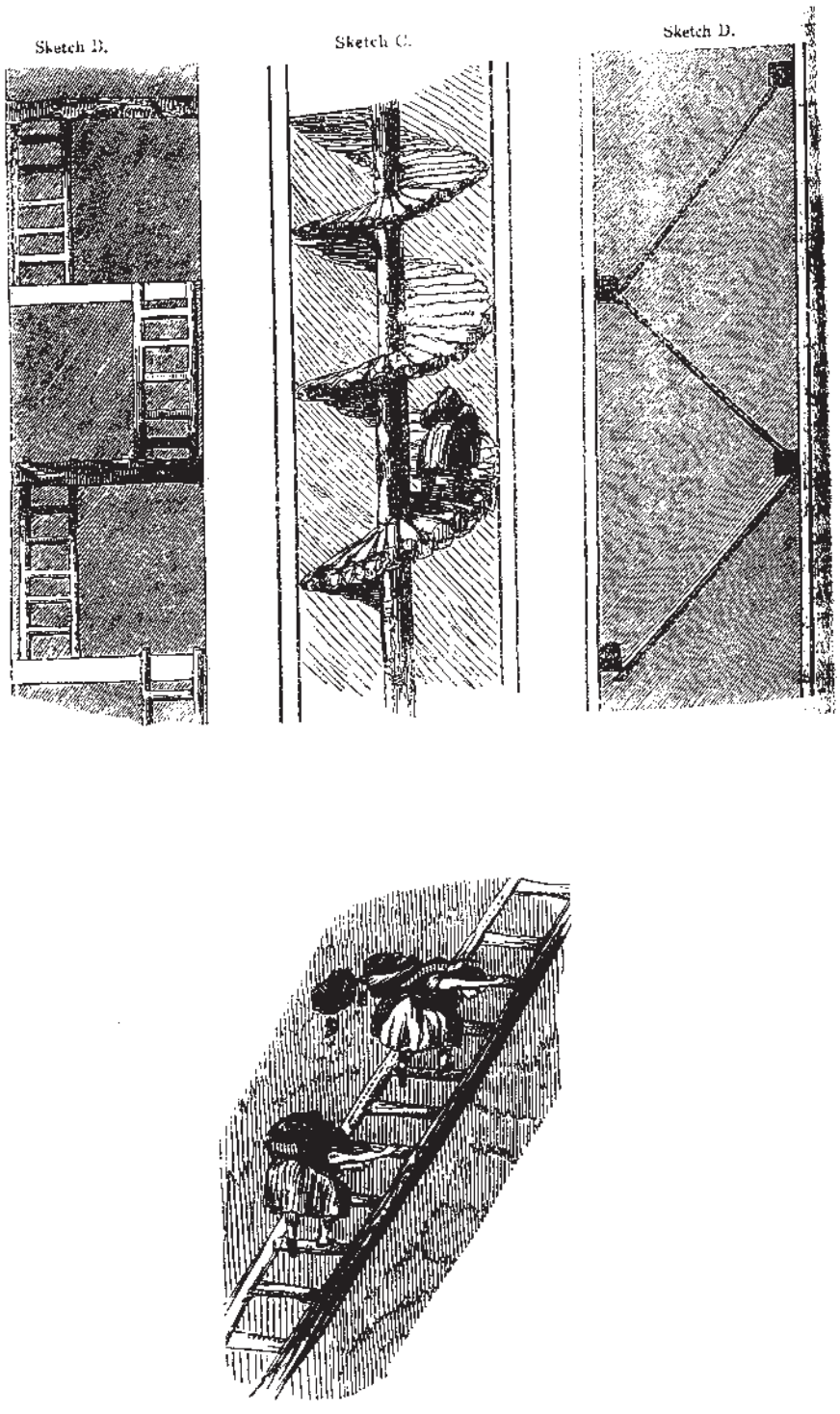

Figure 8: Coal Bearers Steps & Ladders
Source: First Report of the Commissioners of Mines (1842): Appendix, p. 382

> in this district, a greater or less number of women and children employed; and I beg leave to tell to you my conviction that the employment of women in the mines of Scotland is one of the reasons which tends to depreciate the character and habits of the collier population; and that to remedy this evil a legislative enactment is required as any resolution on the part of one or two mine proprietors, not to employ women or children would be injurious to them, without tending at all to remedy the evil ...'[55]

The examples given from the nineteenth century prove that men and teenaged boys continued to be employed as drawers at Prestongrange Colliery after the underground employment of women and young children ceased. A piece of evidence to suggest that Prestongrange colliery employed women and children underground, pre 1842, as coal bearers is the diagram of Prestongrange colliery taken from the Prestongrange Colliery Book which details the depth and thickness of seams in use and in which coal bearers are present. See Figure 9.

Colliers worked long hours in dark and cramped conditions.

> '... underground work was different from all others. The pit was a world apart – dark, dusty, insanitary and unpredictable and very often hot, stuffy, wet and cramped as well.'[56]

It is hard to calculate the number of working hours since travelling time to and from the coal face in long and narrow passages must be added. At Prestongrange, workings on the Great Seam actually extended for two miles under the Firth of Forth so colliers would have to travel this distance each day to get to and from the coal face.[57] Scottish coal was hard with narrow seams, and the work required 'constant exertion and twisting of the body, that unless a person had been habituated to it from his earliest years, he cannot submit to the operation. The work could involve 'lying full length in a thirty inch seam, or sitting with the body bent to one side.'[58]

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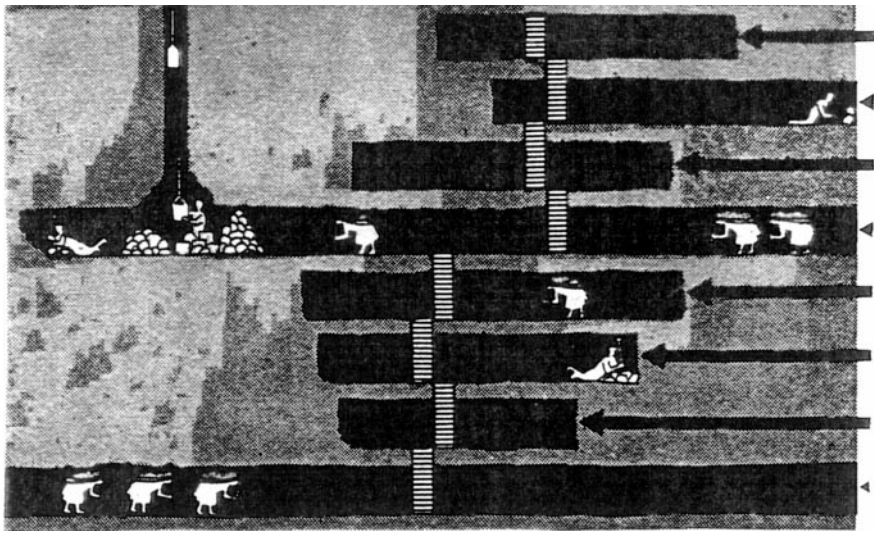
[55] First Report of the Commissioners of Mines (1842): Appendix, p. 470
[56] J. Benson (1989), p. 32
[57] www.scran.ac.uk, SCRAN ID:000-000-014-910-C
[58] A. Burton (1976), p. 32



1 Seam from the Grass or Superfice of the Earth called the Great Seam is nine feet thick and lies twenty fathom below the grass.

2 Seam is called Diver Coall is three and a half feet thick and lyes nine fathom below the Great Seam.

3 Seam is called the Splenty Coall is three feet thick and lyes Eight fathom below the Diver Coall.

4 Seam is called the five foot Coall is about five foot thick and lyes four fathom below the Splenty Coall.

5 Seam is called the Rough Coall and is about three quarters of an Ell thick and lyes four fathom below the five foot Coall.

6 Seam called Souterclout Coall is four foot thick and lies twenty six fathoms below the Rough Coall.

7 Seam is called Beggar's Coall is three foot and a half thick and lyes six fathoms below the Souterclout Coall.

8 Seam is called Splenty Coall is three and a half foot thick and lyes eight fathom below the Beggar Coall.

Figure 9: Diagram of the seams of coal at Prestongrange

Source: Poster of Collier Serfs at Prestongrange Colliery, at Scottish National Mining Museum at Newton Grange

Falls of Roof and Sides

The second main cause of fatal accidents in coal mines was falls from the roof or sides of coal seams.[59]

The pictures in Figure 10 (see over) demonstrate the cramped working conditions of colliers. They show examples of men working in spaces so cramped that they were required to lie on their sides to excavate the coal. They also show how easily an

[59] Edmond T.W. (1981), p. 89

Figure 10: Photographs of Colliers at work

Source: Part of the collection at Newton Grange: Scottish National Mining Museum, references 1997: 568, 1997: 568a & 1997: 261.

accident could occur and how serious that could be in such cramped conditions. One in particular highlights the danger inherent in the use of wooden supports to hold up the roof of the coal seam, as it shows a support which had split and was being repaired. The Haddingtonshire Courier repeatedly reported accidents at Prestongrange Colliery as a result of falls from the roof or sides of coal seams. In 1865 a collier had two ribs broken and was badly bruised when a large quantity of coal fell on him. A more serious roof fall in 1870 left one collier with head injuries and one leg broken at both the ankle and knee, while another collier involved in the same accident walked away with only some bruising. In 1877 another miner was involved in a fall of two tons of coal from the roof of a seam. He suffered serious internal injuries however it was believed that he escaped death only because of the soft nature of the ground on which he stood.[60]

Accidents at Prestongrange were sometimes fatal. The 1842 Commissioners Report detailed three deaths.[61] The table in Figure 11 details only the deaths reported to the Inspectors of Mines between 1858 and 1914. Ten of the seventeen deaths listed were a result of a fall from the roof or side of a seam.

This list is not inclusive of all the fatal accidents which occurred at Prestongrange. The Haddingtonshire Courier during the nineteenth century reported on many others for example the case of a 23 year old collier who died in 1883 and another in 1886, both as a result of a fall of coal and stone from the roof of a seam.[62] Unfortunately work related deaths continued into the twentieth century. During both wars many colliers joined the armed forces and there were concerns about the dilution of labour and the possible increased risk to health and safety which this could cause.[63] At Prestongrange there were three deaths reported to the Inspector of Coal Mines in 1914 alone,[64] but it would be foolhardy to attribute those incidents simply to the outbreak of war several months earlier.

The outbreak of the Second World War again resulted in high levels of recruitment among colliers. Production and employment levels fell and once again Britain found it difficult to

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60 *Haddingtonshire Courier* 28 July 1865, 7 October 1870, 4 May 1877
61 First Report of the Commissioners of Mines (1842): Appendixn, p. 394
62 *Haddingtonshire Courier* 13 January 1883 and 30 April 1886
63 C. More (1989), p. 222.
64 See table of fatal accidents in Figure 12.

DATE	NAME & AGE	OCCUPATION	ACCIDENT
1858	Alexander Watson	Collier	Fall of coal
12.2.1883		Stone Miner	Roof fall
14.5.1898	Robert Harline, 17	Brusher	Deceased had turned out a loaded tub onto a haulage road … the roof came in over a length of 25 foot, completely burying him.
31.12.1901		Labourer	Killed when run over by a train of wagons powered by a locomotive on the surface.
23.4.1902	James Walker, 34	Reddsman	Deceased was laying rails on underground roadways when a mass of stone fell on him.
18.11.1902	William Walters, 14	Haulage attendant	Deceased fell in front of a moving loaded tub on a steep underground roadway.
24.9.1904	Joseph Stafford, 24	Brusher	Deceased was engaged in cutting needle holes in side walls for crowns, when the roof fell in on him.
24.2.1905	William Craig, 20	Sinker	Shaft enlarged for pumping and winding coal from 35 fathoms, so scaffolding removed to allow sinkers to work. When sinker later descended the shaft, forgetting the absence of scaffolding, stepped out cage and plunged a further 15 fathoms.
10.3.1910	James Curren, 37	Brusher	The chain attached to a tub slipped and ran back, fatally injuring deceased.
28.4.1910	Henry Somers, 15	Haulage boy	Failed to separate chains attached to tubs, one caught under a rail and jammed the deceased between the wall and a hutch.
6.10.1910	Thomas Gorman, 24 & Thomas Campbell, 48	Stone mine drivers	A roof fall swung out over 10 sets of timbers, three men were buried, all were extricated alive, but two later died.
1.12.1910	Hugh McConnell, aged 63	Fireman	Killed on entering a new seam to check its safety, carrying a safety lamp and a naked light which ignited the gas present.
1913	aged 39	Road repairer	Killed in fall of stones from the side.
23.10.1914	James Johnston, 36 & James Couper, 32	Miners	Straightening the line of the upper portion of a conveyor face when the roof above them, over an area of 9ft 8inches by 5ft 10 inches collapsed and buried them.
15.11.1914	William Boyd, 19	Pony driver	Knocked down by a 15 wagon locomotive.
14.10.1922	Edward Gunn, 26	Drawer	Killed by the falling of a large stone.

Figure 11: Table of fatal accidents at Prestongrange

Source: Report on the Eastern Districts of Scotland in HMSO: *Report f the Inspectors of Coal Mines*. Each incident taken from the report of the year of its occurrence 1883–1922

match coal supplies with demand levels. By 1942 the government was acutely aware of the need to maintain coal production within Britain and so in 1942 the Ministry of Fuel and Power was created by Anthony Bevin to control the industry. Continued labour shortages led to the creation of the 'Bevin Boys'. These were boys who, on reaching conscription age, were selected using a ballot system to go and work in the coal mines. It was said of the Bevin Boys however that they

did little to increase production levels but that since they came from a broad spectrum of society, through the ballot system they may have helped to publicise both the nature of colliers work and the conditions in which they worked.[65]

LONG TERM HEALTH EFFECTS

THERE ARE two types of health hazard which coal mining presented. The first includes accidents, for example, the risk and level of occurrence of explosion. This group of hazards are to some extent quantifiable in relation to specific experiences at Prestongrange. However colliers worked day to day in a dangerous and hazardous environment, small accidents or injuries were often accepted as being a result of the nature of the job, so there are not comprehensive records of accidents or injuries, as was stated by Charles Brister:

> 'It has always been the tragedy of the miner that no one sees him at work. Even in this world of mass communication his life remains very much a closed book except to those who are near and know him well... Certainly the miner is a brave man for he faces daily that which he fears most.'[66]

The second significant group of hazards include long-term health problems such as arthritis, lung disease or eye problems such as nystagmus which colliers experienced. This group is more difficult to quantify since Prestongrange employees medical records are private. A further problem is that some of the health problems experienced by colliers are not immediately evident and indeed may only become a problem after a collier has retired, or stopped working e.g. rheumatism. Therefore, inevitably, any discussion of such problems in relation to Prestongrange Colliery will ultimately be of a more general nature than any discussion of the occurrence of deaths or serious injuries arising from accidents within the mine.

Benson identified four sources of health hazards within the coal industry. The first was the physical nature of the work; the second was the impurity of the air in coal mines; the third was the poor illumination underground and the fourth health

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[65] A. Calder (1997) *The Peoples War: Britain 1939–45*. Jonathan Cape: London, pp. 438–9.
[66] C. Brister *This Is My Kingdom*, as quoted in T.W. Edmond (1981)

hazard was insanitary and dirty conditions.[67] The 1842 Commissioners Report into the employment of children in mines stated that:

> 'About the age of twenty few colliers are in perfect health, almost all being more or less affected with difficulty of breathing, cough and expectoration, either occurring occasionally or in a permanent form. … After the thirtieth year it is rare to find health collier … perhaps not one in ten could pass the necessary examination to enter as a soldier'[68]

It claimed that after thirty breathing would become worse, coughing would seldom cease and muscular strength would decline. The report claimed to find relatively few miners surviving beyond 50 years old. It further stated that chronic bronchitis was one of the most common diseases found.[69]

The conditions which led to illness and disease are the same conditions which gave rise to the danger of health hazards from accidents. The photographs in Figure 10 and the illustrations in Figures 3, 6 and 7 clearly depict the uncomfortable and difficult physical nature of the work in collieries such as Prestongrange. Health problems which have been attributed to these include rheumatism; arthritis and bent hand, knee and elbow. The poor quality of the air underground and the presence of impurities, gases and coal dust in the air led to further health hazards which included headaches; pneumoconiosis (miners' asthma); chronic bronchitis and in the East of Scotland specifically silicosis (black spit) as a result of inhaling stone dust. A lack of good, clear and safe lighting has been linked to headaches, giddiness, night blindness and nystagmus, which caused a vibration or a flickering of the eye balls. Nystagmus became more common with the introduction of early safety lamps, but would improve if the sufferer stopped going underground to work. Finally insanitary and unhealthy conditions could lead to diseases of the blood. These problems were not unknown in East Lothian in the nineteenth century as the Haddingtonshire *Courier* article dated 21 November 1879 demonstrated.

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[67] J. Benson (1989), pp. 44–46

[68] First Report of the Commissioners of Mines (1842): Appendix, pp. 411–12.

[69] Ibid, p. 412.

> 'IS COAL MINING A HEALTH OCCUPATION?
> The impartial inquiry into the varying merits of different occupations would it appears to me have some difficulty in finding any advantages accruing to the operative in coal mining, or indeed mining in any form. To be obliged to leave the light and the fresh, open air, and descend into comparative and sometimes absolute darkness in the bowels of the earth, where the best efforts fail to induce fresh air to enter sufficiently and to lie on his side or back on damp or wet ground and drive his pick against the coal bank either horizontally or from below upwards, the nearest approach he can attain to the upright posture being sitting or stooping; to breath continually during working hours a close and gas charged atmosphere; to begin life by crawling on hands and knees while pushing with his head 'corves' laden with coal, and to end it prematurely old, shaken with cough and exhausted by expectoration – if indeed some explosion of fire damp has not sooner ended suddenly an existence doomed at best to painful termination – these are plain every day incidents in the life of miners.'[70]

This article does however go on to discuss how accustomed the human frame can become to such conditions, and in fact implied that coal miners suffered less in reality than was often suggested. It stated that 'coal mining is not necessarily a particularly unhealthy or particularly dangerous occupation'.[71]

Despite this suggestion, developments were made to improve the health, situation and safety of collieries and to minimise the risk of health hazards as a result of various Acts of Parliament throughout the nineteenth and twentieth centuries. This reflected a greater understanding and awareness of health and illness and saw a great many developments in health and safety regulations within mines. An 1850 Act called for the appointment of Inspectors for Coal Mines, and by 1855 they had been given the power to establish safety regulations. In 1851 the Royal School of Mining was established and by 1872 mine managers had to pass government competence exams.[72]

Another safety measure was the use of firemen. They were required to descend into a mine before the first shift of

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[70] *Haddingtonshire Courier*, 21 November 1879
[71] Ibid, 21 November 1879
[72] A. Burton (1976), p. 117.

workmen to check the pit to ensure it was safe and a fireman had to be below ground at all times if colliers were below.[73] At least three fireman lost their lives at Prestongrange colliery, one as late as 1910. He entered a new seam carrying both a safety lamp and a naked flame.[74] The firemen were given inspection sheets on which to record their examination of the mines. Such a sheet, based on the regulations of the 1911 Coal Mines Act is given below (Figure 12).

Report of Inspection by Fireman. Coal Mines Act, 1911.

I hereby certify that I have inspected every part of the mine situated beyond the

Strike out words in italics for report of Inspection during shift.

_____Station, and in which workmen are to work or pass during the shift,

and all working places in which work is temporarily stopped within any ventilating district in which the men have to work

and that the following is a full and accurate report of my Inspection.

19		Between the Hours of	A.M. or P.M.		SIGNATURE
		&			
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		&			
		&			
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Figure 12: Report of inspection by fireman

Source: HMSO (1912) Fireman's Pocket Diary or Daily Report Book. William Craig & Sons, Colliery Printers & Publishers: Coatbridge

73 R. Church, (1986) d, p. 256.

74 See table in figure 15. The others were mentioned earlier and occurred in 1877 and 1887; *Haddingtonshire Courie*r, 1 June 1877 and 2 September 1887.

Sanitation and Welfare

As this awareness of health and safety grew during the nineteenth century so the problem of poor sanitation became more pressing both above and below ground. There were no toilets below ground in the nineteenth century so old workings would be used instead which meant that for colliers 'eating, drinking, urinating and defecating all went on side by side'.[75] A further problem was that there were no set meal times when colliers would stop work and take a break to eat. This meant they would eat where they worked and when they wanted without taking a proper break. Not only did these activities continue side by side, there were no means of washing their hands and since colliers would often have to move around on their hands and knees the need for sanitary provisions became all the more pressing. In fact it was reported that some colliers would even drink the stagnant water that lay underground.[76] The problem of eating underground and leaving rubbish, crumbs or uneaten food behind is highlighted in the poster in Figure 13.

During the twentieth century the development of health and safety measures and general improvements to colliery areas began to accelerate. In 1920 the Miners Welfare Act acknowledged the lack of amenities and also the lack of recreational provision in collieries and the surrounding areas and set about developing miners institutes, parks and sports grounds etc.[77] By 1921 Inspectors of Mines detailed four key areas for the Health and Safety provisions in mines. The first was regulation and inspection, which involved the development of codes of practice and regulations concerning safety lamps, ventilation, haulage and roof supports etc. The second was focussed on the Safety in Mines Research Board, which looked into the causes and effects of diseases such as beat hand, beat knee and nystagmus, and questioned the effects of inhalation of stone dust. The third area of health and safety involved the statutory testing and analysis of safety lamps, explosives, mine air and dust samples to ensure high standards of safety and air. The final area considered was the use of mine exams to ensure that those who went underground had some knowledge of the environment they were entering.[78]

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[75] J. Benson (1989), p. 33

[76] First Report of the Commissioners of Mines(1842), pp. 121 and J. Benson (1989) , p. 34

[77] C.P. Snodgras, (1953), p. 64.

[78] J. Masterton, Report for the Scotland Division: HMSO (1922) *Mines & Quarries: Annual Reports of (a) Secretary of Mines, (b) H.M. Chief Inspector of Mines, (c) H.M. Inspector of Mines for 19*21. Harrison & Sons: London, pp. 32–38

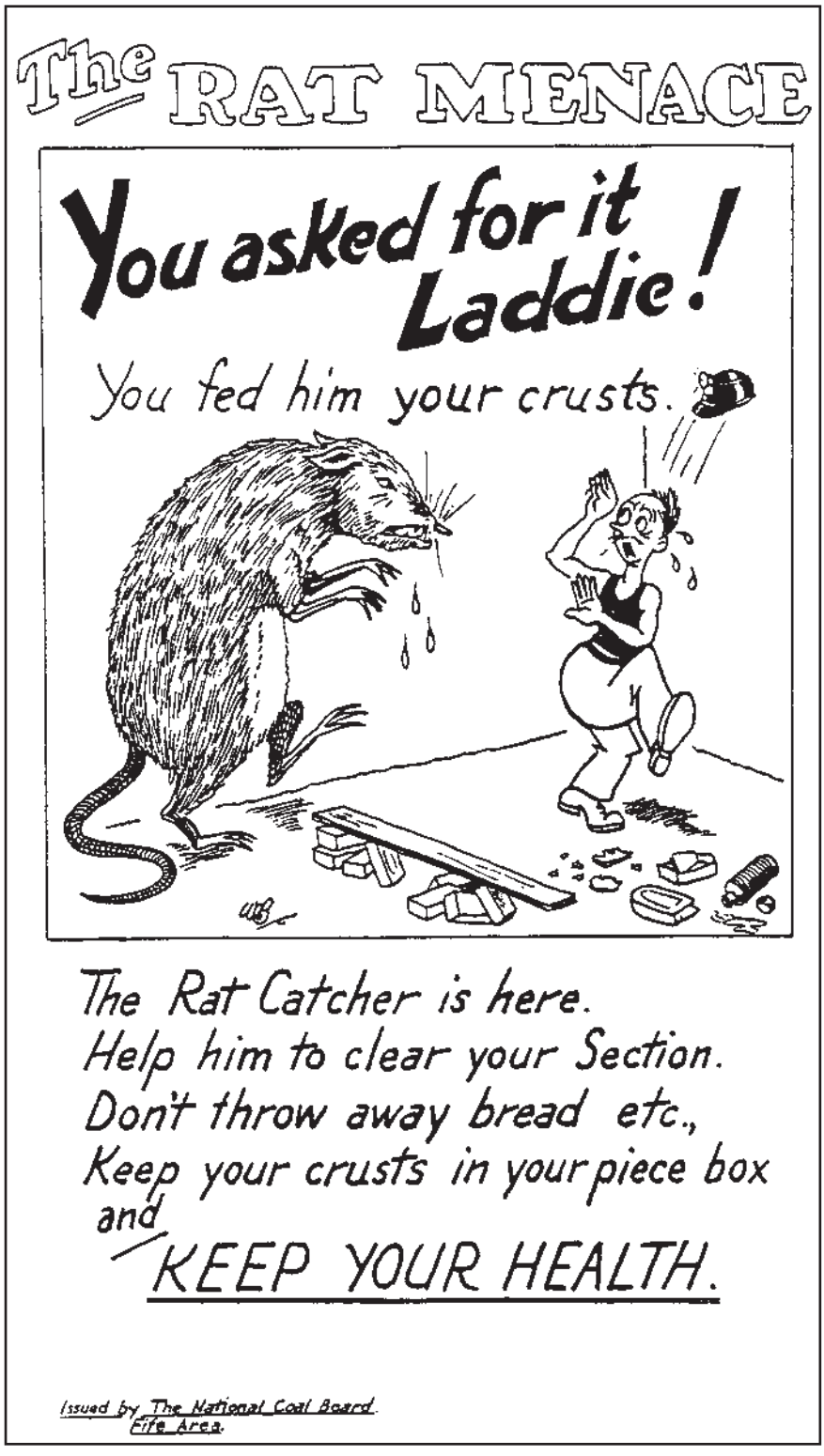

Figure 13: Hygiene poster

Source: Widdas W., Ministry of Fuel and Power (1954) *Report for the Scotland Division of H.M. Inspector of Mines for 1953*. Under the Coal Mines Act 1911. HMSO: London, p. 17

Between 1900 and 1947 the national level of fatalities within collieries was approximately one fatality for every 800 employees, decreasing to 1 in 1500 by the end of the period. Edmond claims that collieries in the Lothians were generally representative of this pattern.[79] By 1923 Prestongrange employed 988 workers, but fortunately although deaths did continue to occur the death rate does not seem to have been as high as the national average given above which would have equated to approximately one death every second year. However, even well into the twentieth century accidents did occur. For example in 1945 a collier was killed when a large piece of ice fell onto the cage in which he was descending causing a fatal head injury. There was another death in 1956, as a result of an explosion this time.[80]

Rescue Teams and Safety First

In the 1920s the Safety First campaign was instituted to try to raise awareness and to change behaviour to ensure greater health and safety. In 1922 the Safety in Mines Research Board set up a competition among rescue teams. The rescue teams had two tasks underground: to rescue lives and to penetrate and recover sections of underground workings.[81] The rescue competition was based on these basic needs. The competitions were set up in four regional areas. The competition in the Lothians was held at the mining department attached to Heriot Watt College. For many it was the highlight of the year.[82] The test had three parts, firstly a gallery test with mine research apparatus e.g. an underwater test could be set; secondly there was an oral examination for everyone in a team with questions on regulations, apparatus, plan reading, signalling and testing for gas; finally there was a test of the use of artificial respirators and oxygen reviving equipment.[83] Once a winner and a runner up had been found in each of the four regions, Coatbridge, Cowdenbeath, Edinburgh and Kilmarnock, the successful eight would go forward to the overall final.

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79 T.W. Edmond (1981), p. 86

80 *Haddingtonshire Courier* 24 January 1945 and 29 June 1956

81 R. McAdam & D. Davidson (1955) Mine Rescue Work. Oliver & Boyd: Edinburgh & London, p. 108

82 T. W. Edmond (1981), p. 90

83 J. Masterton , Report for the Scotland Division: HMSO (1924) *Mines & Quarries: Annual Reports of (a) Secretary of Mines, (b) H.M. Chief Inspector of Mines, (c) H.M. Inspector of Mines for 192*3. Harrison & Sons: London, pp. 35–36.

Prestongrange Colliery won this competition on several occasions, as can be seen in Figure 14 which shows two of Prestongrange's winning teams, one probably from the 1920s and others in 1958–9. They won in 1956, 1957, 1959 and in 1962 which was National Safety Year.[84]

In 1923 the Inspectors of Mines reported little activity with the 'Safety First' movement despite twelve months activity. The idea of this campaign was to promote health and safety and to make miners aware of the need to take appropriate precautions.[85] By 1924 the Safety First campaign was issuing monthly posters and was encouraging managers of mines to display them to raise awareness.[86]

Despite the increased publicity involved in the campaigns for health and safety, even when the National Coal Board (NCB) took over the running of all Britain's coal mines in 1947, the protective equipment used by colliers was still generally only a safety hat, knee pads and boots, even goggles were a rarity.[87]

NATIONAL COAL BOARD IMPROVEMENTS

ONCE IN control the NCB set about improving health and safety provisions in mines. It was thought that perhaps mines being owned by so many small operators meant that there was not sufficient funds for large scale modernisation and improvements so the Labour governments nationalisation of the industry was to pool these resources and set about improvements.[88] In 1952 the construction of the pit head baths at

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84 W. Widdas, Ministry of Fuel and Power (1957) *Report for the Scotland Division of H.M. Inspector of Mines for 1956*. Under the Coal Mines Act 1911. HMSO: London, p. 19. W. Widdas , Ministry of Fuel and Power (1958) *Report for the Scotland Division of H.M. Inspector of Mines for 1957*. Under the Coal Mines Act 1911. HMSO: London, p. 20. H. Hyde, Ministry of Fuel and Power (1960) *Report for the Scotland Division of H.M. Inspector of Mines for 1959*. Under the Coal Mines Act 1911. HMSO: London, p. 26. H.Hyde, Ministry of Fuel and Power (1963) *Report for the Scotland Division of H.M. Inspector of Mines for 1962*. Under the Coal Mines Act 1911. HMSO: London, p. 274
H.Hyde, Ministry of Fuel and Power (1963) *Report for the Scotland Division of H.M. Inspector of Mines for 1962*. Under the Coal Mines Act 1911. HMSO: London, p. 274

85 J. Masterton (1924), p. 33

86 J. Masterton, Report for the Scotland Division: HMSO (1925) *Mines and Quarries: Annual Reports of (a) Secretary of Mines, (b) H.M. Chief Inspector of Mines, (c) H.M. Inspector of Mines for 1924*. Harrison & Sons: London, p. 45

87 T. Ashley, Report for the Scotland Division: HMSO (1948) *Mines & Quarries: Annual Reports of (a) Secretary of Mines (b) H.M. Chief Inspector of Mines, (c) H.M. Inspector of Mines for 1939–47*. Harrison & Sons: London, pp. 36–7

88 P. Johnson (1994) *20th Century Britian: Economic, Social and Cultural Change*. Longman: London & New York & C. More (1989)

Figure 14: Photographs of Rescue Teams

Source: Part of the collection at Newton Grange: Scottish National Mining Museum, references 1998: 1338, 1997: 314 and 1997: 301

Prestongrange was completed. It was formally opened on 12 September 1952.[89] The Prestongrange baths were the one hundredth installed by the NCB in Scotland and were built at a cost of £63,578. The facilities included washing and storage for 969 men; a canteen; a bicycle store for 50 bicycles and room for 6 cars. The total cost of NCB improvements thus far was over £354,000 and provided facilities for 7,500 men. The funds came from the NCB and the Miners Welfare Fund.[90] The pit head baths and canteen can be seen in the photograph in Figure 15. These improvements at Prestongrange continued in 1953 with the completion of the Prestongrange Medical Centre.[91]

In 1952 the Inspectors' report stated that only 18% of the total accidents in Scotland were not preventable. It stated that 15.9% would have been prevented if rules had not been breached and a further 50% prevented by using ordinary caution.[92] This was a pattern which was to continue.

Despite all of the improvements which were made one issue continued to stand out. Was it the duty of management to ensure safe working conditions or were accidents and ill health

Figure 15: Pit Head Baths and Canteen

Source: Scottish Mining Museum. NGSMM.1996.2464

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89 *Glasgow Herald*, 12 September 1952

90 *Haddingtonshire Courier* 19 September 1952

91 W. Widdas (1954), p. 20

92 H.R. Houston, Ministry of Fuel and Power (1953) *Report for the Scotland Division of H.M. Inspector of Mines for 1952*. Under the Coal Mines Act 1911. HMSO: London, p. 4

the result of the workers lack of regard for safety and their own health? This is a dilemma for which there can be no definitive answer. What is clear is that the health and the lives of the people who work in any colliery is the responsibility not only of themselves but also of all those with whom they work and all those for whom they work.

Duckham suggested that mining accidents on a large scale and the death and devastation which that could bring to a community could be compared only with war and the 'decimation of a local regiment'. Prestongrange was fortunate in this respect. Although there were health hazards, safety risks and accidents there was never a large scale disaster. What Duckham implied was that the frequency of small scale accidents, injury and disease which has been shown to exist at many collieries, including Prestongrange, in fact 'dulled perceptiveness and blunted sympathy'. What is meant by this is that accidents, injuries and health hazards were an every day part of the job, something which no one liked but which was still generally accepted. He further suggests that this led to complacency both from the workers themselves and from the management, who would each blame the other for inadequacies in the standards of health and safety within coal mines.[93]

CONCLUSION

OVER THE course of the active life of Prestongrange Colliery from 1829 until 1963 there were many different health hazards to which the workers were exposed. They ranged from difficulties with drainage, ventilation, haulage, lighting and falls each of which brought with it a risk of injury, accident, ill health and death. Throughout this period, however, mining had not stood still: it had progressed from human to mechanical and electrical labour. Nor had the problem of health hazards remained static, throughout the period there were developments based on technology, a greater understanding of medical and health problems and legislative developments all of which made Prestongrange Colliery, and all others, safer and better regulated places to work. That is not to say that all the risk and the hazards were removed from the occupation,

[93] H. & B. Ducham (1973) *Great Pit Disasters in Britian 1700 to the Present Day*. David & Charles: Newton Abbot, pp. 14–16

nor even that the progression was rapid and wide ranging in the early days. However the risks were reduced, and continued to be reduced after the closure of Prestongrange, provided that miners and managers alike avoided complacency adhered to the necessary regulations.

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