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The Llanerch Colliery Disaster, February 1890: Why was the adoption of safety lamps delayed in south Wales collieries?

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How to cite:

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The Llanerch Colliery Disaster, February 1890:

Why was the adoption of safety lamps delayed in south Wales collieries?

Colin Hebden

25 May 2019

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Chapter 1 – Introduction

In the latter half of the nineteenth century, while Britain's coal production increased fivefold, the contribution from the south Wales coalfields accelerated from 15% of the total in 1854 to 20% in 1913 (Evans, 1989, p. 186). According to *The Welsh Academy Encyclopedia of Wales*, this growth happened largely because British Admiralty trials in the 1840s had shown that 'Welsh steam coal [was far superior to] the hitherto preferred coal of Newcastle upon Tyne' (Davies et al., 2008). However, this rapid growth led to 'acute social problems, ... Urban overcrowding, poverty and ill-health reigned' (Evans, 1989, p. 308). The mining communities also suffered tragically high mortality: 'between 1880 and 1900, ... although south Wales miners constituted only 18% of the miners of Britain, they suffered 48% of the 2328 deaths' (Davies et al., 2008). Some of these deaths occurred in disastrous explosions. The authors of one popular account of the Gwent coal industry, commenting on the frequency of south Wales mining disasters, such as at Llanerch, observe that 'in their efforts to reap the rich harvest of coal from the bowels of the earth many perished ... [and] coal became *The Bitter Harvest*' (Williams and Jones, 1988, p. viii).

In his article about colliery explosions in south Wales in the late nineteenth century, Trevor Boyns elaborates the reasons for the high death toll in south Wales, confirming the '*Bitter Harvest*' characterisation. The 'very gaseous nature of the steam coal seams, together with the friable, dusty nature of the coal' greatly increased the risk of explosions (Boyns, 1986, p. 156). He states that both 'the number of deaths ... and the frequency of major explosions were greater than in any other [British] coalfield region', accounting 'for more than one-third of the fatalities from explosions between 1874 and 1914 (p. 155). He shows that 'too little was done by colliery management'

(p. 156), that colliery owners often escaped censure despite poor adherence to regulations (p. 175) and that the region lagged other areas of the UK in adopting safety measures, particularly the safety lamp (pp. 168-9). A table (p. 177) shows that there were eighteen explosions that resulted in more than thirty deaths in the period 1846-1889, of which fourteen were attributed to a naked light or to a damaged or open safety lamp. One of these, in 1890, was at the Llanerch colliery near Abersychan where 176 men and boys died when a naked light ignited an accumulation of methane (p. 163). This dissertation examines the Llanerch tragedy in order to understand the reasons for this tardy adoption of the safety lamp in south Wales and to cast light on how the lessons learnt from the disaster subsequently improved safety.

In the face of recurrent tragic events, one might expect to find vigorous efforts by miners and their representatives to obtain safer working condition. Indeed, Boyns refers to the growing influence of the trade unions after 1899 and praises the 'active role played by executive members of the Miners' Federation of Great Britain' (Boyns, 1986, p. 176) citing Robin Page Arnot's *The Miners: Years of Struggle* in support. However, the Miners' Federation of Great Britain (MFGB) was not founded until 1889 (Davies, 2007, p. 461) and the South Wales Miners' Federation (SWMF - 'The Fed') not until 1898 (Curtis, 2013, p. 27). In fact, for most of the second half of the nineteenth century, unionisation in south Wales was weak. According to John Davies, by 1893, 'of the 118,000 men who worked in the collieries of the south Wales coalfield, 6,000 belonged to the [MFGB] and 40,000 to [other] unions' so that the 'part played by unionism in the life of the coal communities can be exaggerated' (Davies, 2007, p. 461). Indeed, 'there had been no effective organization in the coalfield as a whole before 1898' (Evans, 1989, p. 310). Clearly, unionised labour

could not have influenced safety standards in south Wales at the time of the Llanerch disaster.

Later historians have questioned the version of the history of miners' organisations provided by Arnot and others. Chris Williams describes Arnot's accounts as 'Whiggish', a 'struggle leading to success', and as suffering from a political slant that lionises the embryonic unions (Williams, 1998, pp. 44-5). Instead, he argues for a more nuanced approach to the relationship between workforces and colliery owners, citing John Williams's essay, 'The myth of miners' solidarity' (published in 1995) in urging a move away from 'the conventional but unhelpful demonology of the coal owners' (Williams, 1998, p. 47).

Boyns accords more prominence to the role of the Mines Inspectors in improving safety in the south Wales collieries. He reviews their annual reports that identified the failures that contributed to the disasters, noting their repeated urgings, and describes the subsequent changes in regulation and law that followed. Catherine Mills also believes the Inspectorate's role was significant and she describes the Home Office, initially 'defensive', as being 'more proactive' in the 'late nineteenth century' (Mills, 2010, p. 183), referring to unprompted initiatives from the Home Office (in 1879) that resulted in significant improvements to the legislation (pp. 186-8). She also believes that the improved safety measures were 'driven by ... advances in scientific, technological and medical knowledge ... [notably in the] recognition and acceptance of the explosive characteristics of coal dust' (p. 183).

Mills does not mention the role of miners' representatives during these years of improving safety regulation in the period 1850-90, although she does refer to the 'positive contributions made by organized colliery labour towards securing safety

concessions' that resulted in the Inspectorate's formation (pp. 7-8). She also asserts that, during the early regulatory years, the incremental improvements were the result of Government 'treading a fine line between appeasing labour whilst protecting strategic interests' (p. 8), although there are no specific examples of pressure from organised labour.

The delayed uptake of safety lamps in south Wales is explored in the remainder of this dissertation. In chapter 2, the Llanerch colliery explosion of February 1890 is described, referring to contemporary reports from officials and the press. Chapter 3 looks back from 1890 at the development of the regulatory regime. It reviews the role of the Mines Inspectors in urging improvements and examines the attitudes to the use of safety lamps amongst miners, the coal-owners and public opinion as expressed in the press. In Chapter 4, the longer term consequences of the Llanerch disaster are examined in terms of the attitudes to and the adoption of safety lamps in south Wales and the development of regulation in this matter, especially showing how regulation of the use of the safety lamp was strengthened. The final chapter summarises the findings and draws conclusions regarding the reasons south Wales delayed the widespread adoption of the safety lamp and how the Llanerch disaster influenced subsequent improvements.

Chapter 2 – The disaster at Llanerch

Situated four miles north of Pontypool in the easternmost of the valleys that formed the heart of the south Wales coal industry, Abersychan developed during the nineteenth century initially through its iron industry comprising interdependent blast furnaces, iron ore mines and the collieries that produced the coal that fed the furnaces. One of the collieries, known then as Llanerch, but originally called Cwmnantddu (Welsh Coal Mines, n.d.), was ‘situated [in] the Cwmnantddu Valley, about a mile and a half from [Abersychan]’ (*Pontypool Free Press*, 1890). It was managed by Partridge, Jones and Co., who owned several iron works and other collieries in the region (Gwent Archives, n.d.). On the morning of Thursday 6 February 1890, at ‘about half-past eight, ... officials at the mouth of the [Llanerch] pit were startled by the sound of a tremendous explosion’ (*South Wales Daily News*, 1890a). Hurried repairs to the shattered head of the shaft’ enabled a cage to be lowered to retrieve ‘about fifty men and boys ... [whose] news was of a most woeful description’ (*South Wales Daily News*, 1890a). It was clear that the remainder of the day shift of 230 men and boys, who had descended two hours before the explosion, would not be brought out alive.

Removing the bodies was gruesome work. According to the *South Wales Echo* (1890), some men had suffocated but most had been burned, one ‘colliery official, ... [reporting that] many victims presented the appearance of having been grilled, and the sight presented was so sickening that some of the rescuing hands could not at first be prevailed on to lift the bodies’. The same newspaper reported details that highlighted the extent of the impact on some individual families: ‘a father and five sons were

discovered dead; ... a man and his two sons were found lying close together'; 'In one row of ten houses [in Abersychan] no less than 13 dead have been carried'.

On Sunday 9 February, thousands of people travelled to the area transported by special trains (Foster, pp. 20-21). The resulting scenes can only have added to the distress of the community: one newspaper reported drunkenness amongst the inquisitive visitors, but, on the following day, gravity was restored as some of the victims were 'laid reverently to rest in the local cemeteries' (*South Wales Daily News*, 1890b). Public sympathy was sincere and widespread, locally and nationally, expressed in subscriptions to funds such as those initiated by the Mayor of Newport (*South Wales Echo*, 1890), which received a donation of £50 from Queen Victoria (*South Wales Daily News* 1890c), and the people of Pontypool (*South Wales Daily News*, 1890b). These donations supplemented the provisions of the Monmouthshire and South Wales Permanent Fund, which 'in case of a single man the death allowance [was] £20, widows ... 5s weekly during their widowhood, and [for] each orphan 2s 6d per week until the age of 13' (*South Wales Echo*, 1890) and which was expected to amount to a total of £25,000 (*South Wales Daily News*, 1890e).

The inquest into the deaths opened on 8 February 1890. The official report was prepared by H. D. Greene, Esq., Q.C., attending on behalf of the Secretary of State for the Home Department. The inquest sat for a total of six days until the jury returned its verdict of accidental death on the evening of Wednesday 26 March (Greene, 1890, p. 3). Greene reported that 'no exception could be taken to the ventilation of [the area where the explosion occurred]' and that 'the mine was in all respects "well found" and carefully managed' (p. 5). The jury concluded that 176 men and boys were 'killed on the spot or died subsequently in consequence of an explosion of inflammable gas in

Cook's Slope, Meadow Vein Seam', adding that they thought 'the owners, staff and men [reasonably believed] that the mine was safe to be worked with naked lights', that there was 'no evidence to show that' any work on the morning of the explosion was deficient, nor that anyone could be held to be culpably liable for the disaster, specifically in relation to the use of naked lights (pp. 11-12). They formed the opinion that the initial explosion occurred 'from an outburst or accumulation of gas' (p. 11).

The probable origin of the explosion, a sudden outburst of gas, commonly referred to as a 'blower', was essentially unpredictable, but was known to present a serious danger even in the best ventilated mines, such as Llanerch (Boyns, 1986, pp. 162-3). However, the inquest did present evidence of a warning that the mine was not as safe as had been thought. In October 1889, a 'slight non-fatal explosion' had resulted in two men being burned, although not seriously (Greene, 1890, p. 5). Following this event, 'Mr J. S. Martin, Her Majesty's Inspector [of Mines] for the district, spoke to Mr. Ed. Jones, the managing director [of the company], with reference to the use of safety lamps, and urged their introduction as an additional precaution.' (p. 5). It also emerged at the inquest that, during 1889, the daily report book had recorded occasional discoveries of 'small quantities of gas' in Cook's Slope during the routine pre-shift inspections, although the colliers and the management had all felt there was nothing to cause alarm (pp. 5-6). This impression was confirmed as a result of a formal inspection of the mine on 14 November 1889 that was undertaken by 'two experienced workmen' (p. 4). Their report 'was discussed at a meeting of the men, and ... [the workings were] deemed to be quite satisfactory' (p. 6). There was a follow-up inspection on 14 January 1890 by two examiners appointed by the workmen. They certified that the mine was 'free from gas' (p. 7).

Mr. Jones wrote formally to Mr. Martin on 5 December stating that ‘we think the colliery is thoroughly well ventilated and safe to work with naked lights’, referring to the safety record over thirty years and the modern ventilation system, and noting that the circumstances of the incident in October were ‘exceptional’ (Greene, 1890, p. 6). In his response the next day, Mr. Martin pointed out that the previous good record with naked lights did not demonstrate that their continued use would be safe and that ‘the use of safety lamps is not in lieu of ventilation, but only as a safeguard in such cases as may be exceptional or unexpected [as occurred in October]’. Referring to the discoveries of gas in the mine over the recent past, coupled with the ever-present possibility of something interfering with the effectiveness of the ventilation system, ‘fire-damp may be expected to accumulate more or less’ (p. 6). This emphasis of the safety lamp being a precaution against the unexpected, such as a ‘blower’, was tragically prescient.

The Llanerch disaster was horrific, even in an industry in which such devastating explosions were not uncommon. Mr. Greene concluded that ‘this explosion would [probably] not have occurred if locked safety lamps had been used in Cook’s Slope’. It is also clear that, while the Inspector of Mines had urged their introduction after the minor explosion in October 1889, the mine’s management and workforce were satisfied that the mine was safe for working with naked lights. The question thus arises as to why safety lamps were rejected at Llanerch and, more generally as indicated in Chapter 1, not widely adopted in south Wales. This will be addressed in the next chapter.

Chapter 3 – Safety lamps: reforming pressure and resistance, 1850 to 1890

The debate about the introduction of safety lamps at Llanerch exemplified a long-standing struggle between the Inspectorate on one hand and colliery owners and their workforces on the other. The Inspectorate was founded in 1850 under the Inspection of Coal Mines Act following public pressure and official enquiries (Mills, 2010, p. 2; Morris and Williams, 1958, p. 184). At this time, across the country, the life expectancy of a collier was 36 years (it was 62 years for an agricultural labourer) and there were approximately 1,000 fatal injuries suffered by British colliers every year (Mills, 2010, pp. 1-2). An Inspector for South Western District of Great Britain, which included south Wales, was appointed in 1850, but in 1855, a separate district, ‘South Wales’, was formed, although Monmouthshire (which included the Llanerch colliery) was retained within the (English) South Western District (Morris and Williams, 1958, p. 185). Although inspection for the south Wales coalfield thereafter fell under two Inspectors, there is no evidence that this diminished their effectiveness.

Prior to the 1850 Act, mine owners were against government interference in the operation of their industry, looking ‘to the protection of their property’ while ‘the adult male labour force was left ultimately responsible for ... safety’ (Mills, 2010, p. 2). However, in meetings with the Inspectorate in the early 1850s, ‘the coal-owners, while still apprehensive about “interference”, ... agreed that it was desirable to establish safety rules which would have the force of law’ (Morris and Williams, 1958, pp. 196-7). Thus, it can be argued that, from this time, most coal-owners subscribed to the need for safety regulation. Nonetheless, there were examples of bad management (Morris and Williams, 1958, pp. 198-9). Early reports of the region’s

Inspectors contrasted improvements in some mines after inspections with others who ignored suggestions (Morris and Williams, 1958, p. 192). In a 1854 Report, most accidents were attributed “to the neglect or recklessness of the proprietors or managers of the mines” (p. 187). Furthermore, the capacity for owners, agents and managers to act as magistrates in trials of other owners and managers blunted the force of the Act, particularly in Monmouthshire, until this practice was barred under the 1872 Act (Morris and Williams, 1958, p. 200).

The Inspectorate was given wider and stronger powers and greater numbers of inspectors through a series of further Acts of Parliament and codes of conduct (Mills, 2010, p. 2). Over the next thirty-five years, regulation was strengthened through Acts in 1855, 1860, 1862, 1872 and 1887 which were informed by a number of Royal Commissions and Parliamentary Select Committees (Mills, 2010, pp. xv-xxii). The 1855 Act required that a rulebook be displayed at every colliery with a copy handed to each workman; seven ‘general rules’ applied to every colliery, while each colliery added its own ‘special rules’, approved by the Inspectorate, to suit local conditions (Morris and Williams, 1958, p. 197). There followed a consistent improvement in the safety record. Mills (2010, pp. 2-3) observes that accidents across the country remained constant at around 1,000 per annum from 1850 to 1870 despite a doubling of coal output and manpower. The 1875 report for the South Wales inspection district tabulated tons of coal raised per death: 42,421 tons in 1856 to 1862 doubling to 88,890 in 1873-75 (Morris and Williams, 1958, p. 207). Morris and Williams add that the ‘most important single influence reducing the accident rate was the growing authority of the [Inspectorate]’ and that ‘trade journals no longer maintained that safety could be left solely to the discretion of the coal-owners and the men’.

Nevertheless, explosions in south Wales were too frequent and could be devastating, as at Llanerch. In the South Wales and Monmouthshire districts, in the five years 1851-55 there were 738 deaths from accidents in coal-mines, of which 173 were caused by explosions (Morris and Williams, 1958, p. 184). Much of the early regulation addressed the elimination of explosive gas in mines through better standards for ventilation with rules for regular inspections by colliery ‘firemen’ for evidence of gas, a procedure that was followed at Llanerch (Greene, 1890, p. 8). But, there was a second avenue for reducing the risk of explosion through ameliorating the sources of ignition, including ‘naked lights underground’ (Boyns, 1986, pp. 167-8). In the 1860 Act, General Rule 8 was introduced requiring that, ‘wherever safety lamps were required to be used, they were to be first examined and then securely locked by an authorized person’ (Morris and Williams, 1958, p. 201). By 1890, at the time of the Llanerch disaster, the rule also provided guidance on when the lamps were to be mandated. The Inquest Report quoted from the 1887 Act:

‘No lamp or light other than a locked safety lamp shall be allowed or used —
(a) in any place in a mine in which there is “likely to be” any “such quantity” of inflammable gas as to render the use of naked lights “dangerous,” or (b) in “any working” approaching near a place in which there is “likely to be” an accumulation of inflammable gas.’ (Greene, 1890, p. 12).

However, the subjectiveness and imprecision of this definition of when safety lamps should be used is obvious.

One might expect that miners would have demanded safety lamps wherever their use seemed prudent, but the miners of south Wales did not like them. There were several reasons, all contributing to the miners’ view that output per shift would be reduced if

safety lamps were used since they were dimmer than a naked flame and were heavier and more cumbersome. These factors also led to a belief that, in the poor light, other dangers, such as potential roof falls, might be missed (Boyns, 1986, p. 169).

Furthermore, when a safety lamp was accidentally extinguished, a return to a lighting station was needed, thus reducing the time at the coalface and exacerbating the problem of reduced output (Boyns, 1986, p. 171). This output issue was important, uniquely to Welsh miners, as their wage was linked to the amount of coal mined. To compensate, the miners negotiated a premium of 7 ½ per cent for using the safety lamp, thus imposing a cost that would have weighed on even the most safety-conscious colliery owner (Boyns, 1986, p. 169).

The result was that, in 1886, only one quarter of miners in south Wales used safety lamps and, in 1890, just under a third of collieries in the South Wales inspection district were worked entirely by safety lamps (Boyns, 1986, p. 168), even though, during this period of 1850-90, as significantly more steam coal was mined in south Wales and the mines became deeper and more extensive, the risk of explosion increased. However, improved ventilation mitigated the risk and it appears that miners preferred to trust the ventilation and the fireman's inspection routine (Morris and Williams, 1958, p. 189), rather than adopt the added safeguard of a safety lamp.

Even where adopted, safety lamps did not always provide adequate protection. Miners were permitted to (and preferred to) purchase and maintain their own lamps, just as they had paid for their own candles (Morris and Williams, 1958, p. 189).

According to Boyns (1986, p. 171), as late as 1890 'in the South Wales inspection district approximately two-thirds of the lamps were owned by the workmen'. Of these, a significant number were maintained by the men who were thus able to tamper

with the locks on their lamps in order to increase the light when working or to relight an extinguished lamp at the coalface to avoid the time spent in visiting the approved lamp station. Morris and Williams (1958, pp. 204-5) give examples of the lax discipline sometimes exhibited by miners, although this could be exacerbated by ineffective management, including poor record keeping. The fireman's inspection was no guard against a 'blower' (Morris and Williams, 1958, p. 189).

Whilst much of the colliers' early rejection or circumvention of the adoption of the safety lamp was generally a feature of individual collieries, miners' district associations had a role to play. Amongst reports of various mass meetings held by miners, the Nantyglo and Blaina district colliers discussed the proposed introduction of safety lamps at two pits, resolving to refer to arbitration their demand for ten per cent extra (*South Wales Echo*, 1889). Whilst demanding extra money for safer working conditions may seem perverse, the miners felt this was recompense for lower output and hence lower remuneration. There appears to have been no attempt to offer alternative counsel at these meetings.

The explosion at Llanerch occurred forty years after the beginning of formal regulation of the coal mining industry. During that time, although still high, accident rates had declined, specifically in south Wales, largely because the Inspectorate worked with the colliery owners and managers to implement the regulations, sanctioning those that failed to comply while urging better practices wherever possible. At the same time, Inspectors influenced the development of the regulations culminating in the 1877 Act. Coal-owners accepted the need for safer conditions, despite incurring additional costs. However, the miners themselves resisted the safety lamp for what, to them, were sound reasons, demanding and obtaining a premium on

their wages. The next chapter explores the lessons learned from Llanerch and examines whether further legislation reduced the risk of explosions in the south Wales coalfield.

Chapter 4 – Improving safety in south Wales after 1890

The Llanerch disaster and the ensuing inquest were widely reported in both local and national press. Many urged the authorities to mandate the use of safety lamps. One newspaper described as outdated the view that a naked light gave an early warning of gas allowing workers to escape before a serious explosion since ‘locked lamps and deep sinkings are characteristic of our own times’ (*The Western Mail*, 1890). The paper warned that ‘greater calamities may be expected from the deeper measures in bituminous districts [such as Monmouthshire]’ unless locked safety lamps replaced naked lights, citing a list of past disasters, including ‘from 1846 to 1882 ... four explosions at Risca, causing a total loss of 311 lives’.

Despite the death toll, the miners still resisted the use of safety lamps. In the inquest report, Mr. Greene noted that, since the disaster, the management had introduced locked safety lamps, but one collier testified that locked lamps were unnecessary since the mine had been sufficiently well-ventilated and that using naked lights was safe, adding that he would prefer to return to using them despite what had happened and despite the additional wages (Greene, 1890, pp. 14-15). Notably, the coal-owner claimed that cost had never been an issue, as was made clear by Mr. Jones in his letter of 5 December 1889 where he stated that the ‘additional rate of wages ... shall not stand of course in the way when locked lamps become necessary’ (Greene, 1890, p. 6).

In his report of the Llanerch inquest, Mr. Greene made a number of ‘suggestions’ and recorded the jury’s riders on their verdict. The jury recommended better adherence to rules concerning reporting by the colliery’s supervisory staff, particularly more diligent reporting and recording of the results of routine inspections, although they

believed the inspections were carried out properly. These deficiencies included the failure always to report the presence of gas and, specifically, a roof fall on 5 and 6 February in the area where the ‘blower’ probably occurred. It is, perhaps, surprising that these aspects did not attract more censure. As noted in Chapter 3, this lax record keeping appears to have been fairly common in the coalfield (Morris and Williams, 1958, p. 189). More significantly, the jury voiced their ‘opinion’ that it was ‘advisable that locked safety lamps should be compulsory in all mines where there was the least probability of danger from gas’ (Greene, 1890, p. 12). Greene himself expressed his view that the wording of General Rule 8 be tightened so that there was an unambiguous definition of when naked lights should be banned, including that if any gas was found in previous twelve months (p. 15).

The explosions and the issue of safety lamps naturally featured in the 1890 reports of the Inspectors of Mines for the two districts that covered the south Wales coalfield. Mr. Martin, covering Monmouthshire as part of the South Western district, reported that the explosion at Llanerch caused him to press for wider use of safety lamps at the Cwmbran Colliery, where he had previously agreed a compromise arrangement (Martin, 1891, pp. 5-7). In his 1891 report (Martin, 1892, p. 5), he stated that he had considered that the mine was of the type where it was prone to sudden outbursts of gas, which appeared to have been the case at Llanerch. The miners disagreed. A ‘Cwmbran workman’ stated in a letter published in a local newspaper, ‘I sincerely hope it will be many years before we shall want the safety lamps used in the colliery’ (*South Wales Daily News*, 1890d). At arbitration the matter was found in favour of the Inspector in July 1891 (Martin, 1892, pp. 5-7). The owners and the miners had ‘advanced the usual argument’ that output would be reduced, but that, in fact, a few weeks after the safety lamps had been adopted, the miners had again ‘attained their

maximum output' (Martin, 1892, p. 7). He added that similar results had been experienced at other collieries where safety lamps were adopted after initial resistance.

In his 1890 report, Mr. Martin presented figures for the period 1885 to 1890 for a group of six collieries in Monmouthshire working the same Black Vein seam (Martin, 1891, pp. 5-6). The figures showed that the four collieries exclusively using locked safety lamps had a much better safety record in terms of coal extracted per death. His figures considered deaths from all causes, explosions and roof falls included, thus repudiating the miners' contention that using safety lamps increased the risk of falls. The Inspector for the South Wales district, in his report for 1890, listed a number of both fatal and non-fatal incidents of explosion of gas, all of which, bar three, 'occurred where naked lights were ordinarily used in mines more or less fiery [and none] of them would have happened with Safety-lamps, in proper condition' (Robson, 1891, p. 10). He observed that such are the objections on the part of 'certain owners, managers, and workmen, that until [there is a change in the law] ... little progress will be made in the prevention of explosions of gas and the injury and loss of life therefrom.'

It was fourteen years before the pleas of the Inspectors were met by changes in the law. The 1896 Coal Mines Regulation Act removed one of the weaknesses of General Rule 8 by requiring that all safety lamps be provided by colliery owners, rather than by miners, thus forcing the south Wales collieries to adopt what had been standard practice in other coalfields since the 1880s (Boyns, p. 171). A Royal Commission, which was initially appointed in 1906 primarily to examine the role of coal dust in explosions, was recommissioned twice. The third commission reported in May 1910

and led to the Coal Mines Act of 1911, which, together with subsequent consolidations and amendments, removed the other weakness of General Rule 8 by specifying precisely the conditions under which safety lamps were to be compulsory in any particular mine. In particular, a safe limit of ‘one half percent of inflammable gas’ measured in return airways was established together with a protocol for determining this value over at least two weeks’ measurements (Coal Mines (Consolidation) Bill, 1912-13, Clause 38). The Act also required that safety lamps must be used if there had been any injurious explosion in the previous twelve months, echoing Mr. Greene’s ‘suggestion’ in his report on the Llanerch inquest (Greene, 1890, p. 15).

Regulations were not always followed, however. According to Boyns (1986, p. 172), ‘certain iniquitous practices, with or without the connivance of management, could neutralise the advantages gained by using safety lamps’. In 1890, in the months following the disaster and after the adoption of safety lamps, seven miners at Llanerch Colliery were punished by magistrates for having matches or for other contravention of the safety lamp rules (Martin, 1891, p. 31). The same report listed a number of incidents at other mines where miners were found asleep ‘in charge of a safety-lamp’, an occurrence so common that the justices threatened imprisonment, since fines did not seem to deter repeated offending. But colliery management could also be at fault. The discovery that coal dust could be a major accelerator of explosions resulted in the watering of mines as a routine preventative measure, but this was not always ‘carried out efficiently or on a sufficient scale’ resulting in ‘a number of explosions in the 1890s and early twentieth century’ (Boyns, pp. 165-6).

After the Llanerch explosion, the use of safety lamps in the south Wales coalfield steadily increased under pressure from the inspectors (Martin, 1891, p. 5). In the years between Llanerch and 1914, the region suffered just two explosions that were attributed to misused or damaged safety lamp or naked light and where thirty or more men lost their lives (Boyns, p. 177). Significantly, attitudes had also changed since the Inspectorate was formed in 1850. Quoting from *The Economist* of 12 August 1854, Morris and Williams (1958, p. 196) cite contemporary opinion that ‘those in the [coal] industry could be told “to make their own bargains, and to blame only themselves if they go down a pit with worthless gear, or work in a pit which an ignorant or greedy proprietor will not so ventilate as to secure it from an explosion”’. This was a harsh judgement on the working miner, who would have had little option other than to go on strike if he did not trust the working conditions. In contrast, at a public meeting in Ferndale in 1911, Clem Edwards, the M.P. for East Glamorgan, briefed the audience on the 1911 Coal Mines Bill declaring, at one point, that ‘A most extraordinary suggestion was made the other day by one of the Welsh members [of Parliament] to have naked lights in the mines. A more insane suggestion he [Edwards] could never think of (cheers)’ (*The Rhondda Leader*, 1911).

Chapter 5 – Summary and conclusions

In 1890, at the time of the disaster at Llanerch, it had been forty years since the government responded to public pressure by legislating for the regulation of the mining industry through safety standards and a Mines Inspectorate. Subsequent researches conducted by a succession of Royal Commissions had culminated in a significant consolidation in the 1887 Act. This evolving legislation, supported by a regional inspection regime, had seen reductions in accident rates and deaths in relation to coal extracted and men employed.

Although coal owners deeply distrusted the idea of government regulation when it was introduced in 1850, the efforts of the Inspectors convinced them of the benefits. As can be seen from the report on the Llanerch inquest, by 1890 owners generally cooperated with the local Inspector and collieries were mostly well-managed in accordance with the rules.

In respect of explosions in mines, improvements in the standards of ventilation and in rules requiring a fireman's inspection before each shift were key. These reduced the risk of explosive gas accumulating in the mine, but unpredictable events (such as so-called 'blowers') and inconsistent adherence to safety procedures by both colliery managers and miners meant the risk could never be entirely eliminated.

Consequently, attention turned to minimising the possibility of ignition and standards for the use of safety lamps were established in General Rule 8.

However, despite the additional legislation, south Wales continued to suffer disproportionately from explosions. The disaster at Llanerch, where naked lights were still generally used, starkly illustrated why south Wales had such a poor safety

record The district Inspectors, supported by public opinion urged the wider use of safety lamps, especially in the steam coal mines, which were particularly susceptible to unexpected accumulations of gas. The criteria in General Rule 8 governing when safety lamps were to be used were imprecise and standards for the ownership and maintenance of the lamps were weak. As a result, any discussion between Inspector and management about this vital safety measure was subject to judgement and interpretation. This was amply demonstrated at Llanerch in the exchange of letters following an incident four months before the tragedy. These letters also indicated that the colliery owner intended to adopt the lamps anyway, regardless of any cost implication. The lamps were indeed introduced immediately the pit resumed work.

However, the miners in south Wales resisted attempts to introduce this one additional measure that would make them safer. They insisted that the reduced light from the lamps made working the face more difficult, they found the safety lamp cumbersome and they resented the trips to the lamp station when the lamp was extinguished. The miners believed that these factors reduced the amount of coal that could be mined and consequently reduced their wages. Such was their resistance that they had negotiated a wage premium for using the lamps that could save their lives.

The disaster motivated the district's Mines Inspector to revisit an ongoing case at another colliery, successfully taking the owners to arbitration. Safety lamps were mandated there as a result and he later reported that the miners' fears of reduced output were unfounded. And yet still the miners resisted.

Over the ensuing fourteen years, legislation was further tightened. In 1896, legislation required that all safety lamps be provided by and maintained by the colliery owner, thus forcing the south Wales miners to follow what had been standard

practice in the rest of the country for several years. In the 1911 Act, specific thresholds for mandating the use of safety lamps at any particular mine were codified. One of the new criteria had been suggested by the author of the Llanerch Inquest Report.

In south Wales, despite a poor record on mining explosions, the uptake of safety lamps was delayed and among the most significant delaying factors were the miners' own conservatism and obduracy, fatally contributing to unnecessary loss of life and misery.

[Total 6,061 words]

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