

**EASTON. Bristol, Gloucestershire. 19th. February, 1886.**

The colliery was the property of Leonard Boulton and Company which was in the eastern suburbs of Bristol. An explosion occurred in the seam which was known locally as the Fiery or Smith's Coal Vein which resulted in the deaths of eight persons. The seam was reached by an incline from the downcast shaft, at the end of which a level branch was driven back to cut the coal, on which a level was driven from the west to east and a road down to the deep, which was known as the crosscut.

There were only a limited number of men employed in the seam and an examination of the workings was made by the fireman with a Davy lamp between five and six in the morning and he reported the workings free from gas. The men then began to descend to their work and shortly afterwards the explosion took place. Very little damage was done to the pit. A door was blown out and some brick work was displaced.

The Government Inspector, Mr. Thomas Cadman and his assistant, Mr. Bain made a thorough examination of the pit. There was evidence to show that the seam was relatively free from gas and it was the custom for the colliers to work with naked lights. The fan was working as usual and there was nothing to show that the ventilation had been deranged between the time of the fireman's inspection and the explosion. Explosives were used in the mine but only when there was no working and there had been no shots fired.

The explosion seemed to have occurred on the dip road near the crosscut. This conclusion was arrived at by the way in which the door was blown and indications of charring and coking of the coal dust. The Inspector thought that there might have been a sudden outburst of gas from the surrounding strata or from the old workings.

Those who died were-

George Bennett aged 45 years, hewer,

William Clarke aged 33 years, hewer,

Samuel Long aged 40 years, hewer,

Robert Smith aged 32 years, hewer,

Isaac Rawlings aged 29 years, trammer.

Charles Bryant aged 21 years, trammer. He was injured in the explosion and died on the 22nd,

Henry Bennett aged 32 years, trammer. He was injured in the explosion and died on the 22nd and

Henry Gay aged 34 years, trammer. Injured in the explosion and died on the 25th.

At the inquest into the men's deaths, the jury returned a verdict of 'Accidental Death.' The Inspectors recommended that the mine should be worked with locked safety lamps and the management of the colliery agreed with these measures. In his report on the accident, Mr. Cadman commented-

"Notwithstanding the loss of life that had been suffered, considerable difficulty was experienced in getting the colliers to work with locked lamps, and those who went in were principally the men who had been in the Welsh coalfield or in some of the fiery mines in Somersetshire where they had been accustomed to use locked lamps."

**BEDFORD. Wood End Pits. Leigh, Lancashire. 13th. August, 1886.**

The pit was called the No.2 Pit and was owned by John Speakman. It had been working only for about two years and the shaft was bricked all the way down. It was known to be a fiery pit and great care was taken and it was sunk to 470 yards but the accident occurred at a depth of 530 yards in the top part of the No.1 Jig in the Crombuck or Four Foot Mine at about 10.30 a.m. on a Friday morning. The men started work about 6 a.m. and would have worked until 3 p.m. Several men working in the lower workings felt the explosion and quickly made their way to the pit eye. When the explosion occurred

there were 159 men in the pit but the majority of these escaped. All the men were withdrawn from the pit and exploring parties organised. An exploring party went down and got to within 180 yards of the majority of the men. The party were using Belgian Meussler Lamps.

The bodies of two boys, William Heaton and one named Hilton were found at the pit bottom. Both the boy's fathers were with the rescue a party. The first of the injured that were brought to the surface was Joseph Oakes who had been thrown down and had a badly cut head. During the course of the exploration the underlooker, James Calland who had worked for a continuous eighteen hours, showed signs of fatigue and was brought up the shaft. He stayed at the surface for half an hour before going down into the pit again. They found John Wooley alive and brought him to the pit top where he asked for his pipe which he began to smoke. He was taken home by Dr. Doyle in his trap. He was badly burnt about his head, face and hands and he was reported as 'being in a very bad state.' A drawer who was working at the lower end of the jig, was thrown to the roof three times. He then crawled to his mate and together crawled 50 yards and then got up and ran down the back row to the pit eye.

The owner of the colliery, John Speakman was confined to his bed at the time of the disaster but his son Ernest went down with the exploring party. Between twenty and thirty men went down but because of the afterdamp and the falls they made slow progress. The first body was found about 1 p.m. and it was very disfigured.

Miners from other collieries arrived at the pit to give assistance. At 4.20 a.m. a party arrived from Bickershaw colliery, Astley and Tyldesley Coal Company and Wigan Iron and Coal Company and the opinion of these men was that there could be no one left alive in the mine. The underlooker, James Calland said-

"I went down the pit when the fire occurred. I found flames in No.4 place and there was flame for about 400 yards, We commenced to extinguish it by putting up brattice cloths and restoring the ventilation. As soon as we got to a body, we took measures to have it taken to the surface. From the top of the pit to the place where the fire occurred was about 700 yards. I turned down the pit at half past five and after breakfast went down again. The afterdamp is very strong and makes the men very dizzy. When they have this feeling they have to come up quickly to the fresh air. Since I started I have got 15 men out. The flame did not last long, dying out quickly. There was no debris of any kind save bits of coal and a lot of dust. The roof, being good, prevented a considerable falling of coal. The men down the mine looked as if they were asleep. One had his hand over his mouth, whilst another had a handkerchief. Some of the men seemed to have run and then dropped being unable to go further."

The news quickly spread and by 11.30 a.m. crowds of women were soon on their way to the pit head. The police took charge of the pit head to keep large crowds back and in the confusion no one seemed to have any idea of how many men were in the mine but it was reckoned that between 30 to 40 were working in the jig. The pit head scenes were reported to be heartrending and at about 8 p.m. a crowd estimated to be between 8 to 10,000 had gathered. As the bodies were taken down a ladder from the pit mouth there were cries and exclamations of pity but they faces could not be seen as the bodies were wrapped in tarpaulins. The dead were taken to the joiner's shop and then to the wheelwrights shop near the engine house.

Those who died were-

Benjamin Hilton, aged 17 years of Down Croft, Leigh. Unmarried.

William Heaton aged 15 years of Green Lane, Bedford.

John Hilton aged 16 years of 68, Trafalgar Street, Bedford.

John Nuttall aged 19 years of Miller Street, Bedford.

John Henry Cooke aged 17 years of Capel Street, Bedford. Unmarried.

Henry Smith aged 40 years, of Marsh Street, Bedford. Married.

Richard Bowden aged 46 years of Bradshawgate, Leigh.  
 James Brown aged 46 years Higginson Street, Beford, who left five children.  
 Peter Stones aged 17 years of Dukinfield Street, Bedford.  
 Thomas Stones aged 15 years of Dukinfield Street. Bedford.  
 William Stones aged 40 years of Dukinfield Street, Bedford. Father of Peter and Thomas.  
 Thomas Fairclough aged 34 years of Ellesmere Street, Leigh.  
 Michael Daniels aged between 40 and 50 of Charlton's Buildings, Bedford who left six children.  
 Allan Hadfield aged 17 years, Charlton's Buildings, Bedford.  
 Thomas Hilton aged 41 years of Spring View, Kirkhall Lane. Married with two sons.  
 Hiram Pemberton aged 38 years of Etherstone Street, Pennington. Married with six children who left six children.  
 Peter Radcliffe aged 25 years of 173, Brigg's Building, Westleigh. Married.  
 Allen Shovelton aged 26 years of 6, Abbey Street, Kirkahall Lane, Atherton. Single.  
 Thomas Hilton aged 50 years of Brown Street, Leigh who left three children.  
 George Parkes aged 23 years of Brewery Lane, Bedford.  
 Stephen Hampson aged 50 years of Trafalagar Street, Bedford.  
 Robert Hoyle aged 65 years of Marshland Green, Astley.  
 William Eckersley aged 54 years of Kirkhall Lanes, Leigh.  
 William Urmston aged 17 years of Cleworth's Place Cross Street, Bedford.  
 Isaac Worthington aged 40 years of Kirkhall Lane, Leigh. Thomas Killee, son of Michael aged 17 years of Bach Lane Westleigh.  
 Michael Killee aged 52 years. Father of Isasc who left four children.  
 Thomas Smith aged 18 years, son of Thomas aged 52 years of Gelebe Street, Westleigh who left three children.  
 Robert Elliott aged 17 years of Gelebe Street, Westleigh.  
 Henry Collier aged 19 years of Coal Pit Lane , Bedford.  
 Joaseph Hope aged 42 years of Marsh Street, Bedford. Married.  
 Alfred Mort aged 46 years of Dukinfield Street, Bedford who left four children.  
 Henry Parsonage aged 25 years of Lord Street, Hindsford who left four children.  
 Richard Mort aged 25 years of Hampson's Court, Chapel Street, Bedford who left a child.  
 Thoams Clayton aged 25 years of Welsh Hill. Married with two children.  
 John Ward aged 21 years of 2, Albion Street, leigh.  
 William Brown of Sidney Street.

William Brown was found in a remote part of the pit and the Coroner's jury went to view the body. His body brought the death toll to 38. The joiners shop was used as a mortuary and the bodies were given a number and the relatives asked to make an identification. There were difficulties as some men were known only by their nicknames such as '*Ratcatcher*' and '*Scotty*'.

The victims left a total of forty eight children fatherless and there was a public meeting in the Drill Hall at Leigh of the Relief Committee convened by Mr. James Thorp who was chairman of the Local Board. The meeting was well attended and it met to-

"Consider the question of affording the adequate relief to those placed in distress by the explosion at the Woodend and also the desirability of forming a preeminent relief fund for cases of accident in the district."

A Subscription Fund was opened and the Permanent Relief Society allowed relatives of a single man £20 and 5/- a week for each widow, 2/6d. for each child up to the age of 13 years together with a lump sum of £5. They were also entitled to an allowance of £5 from the North and East Lancashire Mining Fund for people over the age of 16 years and £2-10s, for those under that age. Mr Campbell, of the Society said that all the claims had been promptly paid and that the Society provided for 350 widows and 750 children in Lancashire.

The inquest was held at the Colliery Offices before Mr. J. Edge the Coroner and the Inspector made a special report to the Secretary of State on the 18th. October 1886. In the 1886 Report Mr. Dickinson commented-

"It may be briefly stated that the seam was 3 feet 8 inches in thickness and the first opening gave off firedamp very freely, and that on the rise to the shafts, the inclination being 1 in 6, the mine was worked as to have three goaves or worked out spaces in the interior, and the ventilation was discensional instead of ascensional which are principles considered to entail danger. The explosion did not however, occur from this cause but at a goaf where the coal was being worked back from the far end in a manner which is considered to be safest. A large drawing of props was taking place, and as the roof fell, firedamp issued from the breaking strata. The gas was seen firing in the prop-taker's Davy lamp, when instead of lowering his lamp to the floor and taking it steadily into the fresh air, avoiding jerks, as the old established rule required, he, losing his presence of mind, raised his lamp, shook it and blew at it which passed the flame through the gauze, the Davy not being able to resist such treatment in an explosive current and the gas which had come from the roof was thus exploded and also other gas that was wafted out from the goaf. The explosion went away with the air current from the point of ignition, the greatest force being exerted beyond, and the force pined of almost entirely before reaching the shafts, and without affecting gas that might be accumulated in the goaves, or the explosion might have been very much more serious. The question of props drawing with ordinary miners in the pit, as illustrated by this explosion, was raised at the inquest and has since been considered by the inspectors of mines at their annual meeting. The inspectors are of the opinion that the question, if met at all, should be by special and not general rule, as it would disarrange work in some instances and in others be dangerous from shot firing &c."

The jury brought in a verdict after fifty minutes of deliberation that the men's deaths were accidental and caused by an explosion of firedamp and they commented that in future the fireman should spend more time in his examination before the men were let down the pit, that greater care should be taken in the examination of the lamps. It was regretted that the gas was not reported by the prop-takers. The owners of the colliery bought 150 Masault lamps and 50 new Clanny lamps which had a bonnet fitted.

#### **DEAN LANE. Bedminster, Somersetershire. 10th. September 1886.**

The Colliery was the property of the Bedminster Coal Company and the explosion took place at about 2 p.m. in one of the lower seams at an archway on the landing from the shaft known as the 'Tip'. It was not the main shaft but a single shaft that was worked in connection with it. The colliery was worked by two shafts, an upcast and a downcast, both of which were 500 yards deep. The seam in which the explosion took place, was reached by another shaft 50 yards deep and sunk on the side of the main level which acted as the downcast or air intake for this seam. The air returned by passing up an inclined road driven in the coal.

On the morning of the explosion the fireman, Hamilton, found gas in a part of the workings and cautioned the men and the mine was worked with naked lights. There were sixteen men and boys in the mine at the time of the explosion of which nine were killed. Of the survivors, William and Edward Summers gave an account of the events. They were working where the roadway joined the incline and was changing the points to move a tub of coal when his lamp was blown out and he was thrown against the tub. While he was on the ground, he was burnt. William was a little further down when the air put out their candles and he saw a light pass in the incline. He rushed into the incline and then heard a noise like a cannon which knocked him over. He was not burnt but he was affected by the afterdamp.

The explosion destroyed the ventilation and the archway was blown down and made an opening into the return which crossed at this point. The result was that the air did not go down the incline. After the rescuing party consisting of Mr. Bennett, the manager, W. Morgan, the engineer and Henry Houghton had gone down through this opening into the archway, they sent up a boy named Jeffries and Moses Roland and found Higham's body. They then erected a brattice and restored the ventilation. All the dead were found to have died from suffocation and ten were sent to the hospital.

Those who died were-

John Drake aged 14 years, filler,  
Robert Tovey aged 19 years, filler,  
James Millard aged 16 years, filler,  
Alfred Latham aged 18 years, filler,  
James Marsh aged 34 years, hewer,  
Richard Davies aged 27 years, hewer,  
Sam Moxham aged 48 years, hewer,  
William Garland aged 29 years, hewer,  
George Higham aged 16 years, banksman and  
Samuel Jones aged 26 years, a hewer who was found alive but died later.

Those who were found alive were-

Isaac Gibbs,  
Will Summers and  
Sam Bolt.

The inquest was held at Bedminster on the 20th. September and all the evidence pointed to an explosion of gas at the archway but it was not clear how the gas collected there but it was suggested that it collected in the workings and came up the incline but there was no evidence to suggest this. As part of its verdict, the jury thought that there was a sudden interruption of gas from a fissure in the seam above the archway but the Inspector thought this only conjecture. After hearing the coroner summed up, and the jury brought in a verdict of 'Accidental death'.

#### **DEAN LANE. Bristol, Somersetshire. 14th. August, 1886.**

The colliery was the property of the Bedminster Coal Company. The explosion occurred in the Gas Coal Seam in which there were twenty men working at the time. Only ten escaped with their lives and ten died in the explosion. The seam was about two feet eight inches thick and pitched to the south at about fifteen inches to the yard. It was reached by a staple which was known as the 'tip' about 50 yards deep and sunk on the side of the great vein up which the coal was raised in a single cage worked by a small engine on the opposite side of the branch. At the top of the 'tip' there was a level which cut the coal after about 28 yards. At the end of this there was an incline driven 300 yards to the seam. Carts were hauled up here by means of an engine at the top of the pit.

The seam was known to give off firedamp but only in small quantities and was worked with open lights. On the 1st. September, some gas was found in a working which was known as 'P', in a hole in the roof. The men who were working there, were provided with a safety lamp but after that, according to the evidence that was presented at the inquest, no gas was found there again.

When the explosion occurred, the cage was blown up the shaft into the pulley and jammed there. A door on the west side was blown and an arch was damaged. It was also found that the timbers on the incline were covered with burnt dust on the upper side.

Those who died were-

The hewers-

James Marsh aged 34 years.

Richard Davies aged 27 years.

Samuel Moxham aged 48 years.

William Garland aged 29 years.

James Jones aged 26 years.

The fillers-

Albert Latham aged 18 years.

Robert Towey aged 18 years.

James Millard aged 16 years.

John Brake aged 14 years.

George Higham aged 16 years, banksman.

All the men who died lost their lives from suffocation with the exception of the banksman at the top of the 'tip'. He was pushing a tram in to the cage when it was blown over his head and he fell with the tram into the pit.

The inquest was opened by Mr. Wasborough, coroner, on the 11th. and adjourned until the 20th., when all interested parties were represented. The general arrangements for the colliery were closely looked into and evidence was given by men who worked in the mine, disclosed that the air supply to the west roads was defective but this could not have affected the explosion occurring at the top of the incline. a theory was put forward and strongly pressed by some of the men that the gas fired at the bottom of an old incline known as 'K' but this was discounted by the evidence since if the explosion had originated there, the force would not have been enough to throw the cage into the pulley, would have destroyed two doors and the dust and charring would have been on the other side of the props.

One of the overmen was in the main return with a naked light shortly before the accident, it was evident that there was no gas then. A thick piece of coal which gave off firedamp was driven through while driving the level from the shaft and the most probable explanation that Mr. Cadman, the Government Inspector, made was that the gas came from this and had found it's way through cracks in the arch and exploded at a naked light carried by a boy named, Jeffries who was standing close to the place where the explosion was thought to have started.

The jury found that the explosion originated in the arch and that the ventilation was sufficient which amounted a verdict of 'Accidental Death'. After the accident new ventilation roads were driven and locked lamps adopted in the mine. Mr. Cadman commented-

"The colliery is dry and dusty, which greatly aggravates and extends the effects of an explosion. Had there been no dust it is reasonable to suppose that only two persons who were in the arch at the time, both of whom recovered, would have been affected."

### **ALTOFT'S. Normanton, Yorkshire. 2nd. October, 1886.**

The colliery was the property of Messrs. Pope and Pearson. The pit had been worked for over twenty years and there had been no explosions until this one which occurred in the Silkstone Seam, worked by a longwall system, at a depth of about 430 yards. Mr. Garforth was the agent with Mr. Fisher as manager and Burton was the underviewer. Until just before the explosion the mine had been worked by naked lights but safety lamps had been recently introduced and at the time of the disaster were used at all the faces and throughout the pit beyond stations in the main intake road. The pit porches, the underground engine house and the roads near the shaft were lit by means of gas brought

by pipes from the surface. The colliery was ventilated by furnaces which produced 147,925 cubic feet per minute through the workings. About 40,000 cubic feet passed down the West Chain road and it was here that the explosion originated.

On the day of the explosion the day shift had finished work and left the pit about 1 p.m. so that the total number below ground was 28. Of these 20 were killed in the disaster, eight injured of which two later died from their injuries which brought the death toll to 22. Nine men were working at the end of 'Roper's Drift' which was an intake and they were straightening the road and using gunpowder to blast stone. Word of the disaster was sent to Mr. Wardell by special messenger and he arrived at the colliery, went down the pit and rendered all assistance in the rescue operations. The operations took about two weeks and work went on day and night. Jacob Higson and Marshall Nicholson, mining engineers were called in to assist in the operations.

The coal was on fire and the undercast and stoppings were destroyed and there was a total failure of the ventilation system yet work in recovering the bodies, restoring the ventilation and work to get the fires under control went on with no lack of willing help. The Inspector commented-

"Men came forward, brave volunteers, anxious to save life if it were possible, and to recover the bodies of their comrades, though they knew full well they risked their own lives by doing so. My experience of times like these is that the men are always eager to throw themselves into what is often a forlorn hope, and that the difficulty is not to find volunteers but to select from the every ready throng a number required for work, and here be it remembered, is no open enemy, no battlefield with fair fight and all the consequent excitement, but a treacherous foe to be encountered below ground and to be fought with cool calm deliberation and with the knowledge that if certain conditions arise, escape from the foe is impossible."

Those recovered 3rd. October 1886-

G. Cookson aged 18 years, a lamp lad,  
G. Allatt aged 28 years, engineman,  
S. Green aged 54 years, furnaceman,  
J. Gill aged 50 years, furnaceman,  
T. Ibbeson aged 15 years, assistant plumber,  
G. Colley aged 28 years, plumber and  
W. Barker aged 27 years, fitter.

Those recovered 9th. October.-

M. Buxton aged 44 years, byworker and  
A. Davies aged 17 years, byworker.

Those recovered 9th. November-

J. Newton aged 38 years, contractor,  
J. Nicholson aged 44 years, contractor,  
J. Hancock aged 36 years, contractor,  
G. Wilcox aged 30 years, byworker,  
W. Trueman aged 38 years, byworker and  
J. Fox aged 27 years, byworker.

The others who died were-

S. Flint aged 42 years, byworker. Recovered 10th. November,  
H. Deakin aged 53 years, deputy. Recovered 11th. November,  
T. Oakley aged 21 years, corporal. Recovered 20th. November,  
C. Plimmer aged 18 years, chain lad. Recovered 20th. November,  
S. Lomax aged 59 years, deputy. Recovered 20th. November,  
W. Megson aged 33 years, a smith who died 4th. October 1886 and

J. Worthington aged 25 years, stoker who died 31st. October 1886.

The injured were-

Joseph Whitaker, hanger-on,  
Edward Kaye, lampman,  
Allen Kaye aged 14 years, his son,  
J. Worthington, engineman,  
John Richardson, horse keeper,  
Samuel Plummer, byeworker and  
James Harris, bricklayer.

Mr. Wardell made an examination of the pit with Mr. Cowey and Mr. Pickard M.P., the president and secretary of the Yorkshire Miners's association and by two workmen of the colliery and all agreed as to the facts of the disaster.

At the inquiry into the disaster it became evident that three shot holes had been drilled and shots fired. All the shot holes had been badly planted. Two of the shafts had been fired without any adverse effects beyond filling the air with fine dust particles as the mine was very dusty and dry. The third shot due to the unskillful drilling of the hole did not do its work and although it was not a blown out shot caused a large flame which ignited the dust particles and cause the explosion. The Inspector commented-

“Such as small percentage of gas mixed with the coal dust as to be practically undisernable, and which cannot be detected by the ordinary test from a safety lamp and yet this forms a highly explosive mixture. In this instance, however, it is very difficult to believe that there could be even a small quantity of gas for there was a current of fresh air of about 40, 000 cubic feet per minute passing along the road where the shots were fired and there did not appear to be any place where gas could have lodged or accumulated.”

The jury returned the following verdict-

“That the whole of the workmen killed except the two deputies, met their deaths from an explosion of coal dust which originated in the West Chain Road, which explosion was caused by the firing of an unskillfully-drilled shot by one of the workmen engaged in widening the road. That the two deputies were suffocated by the stoppage of the ventilation consequent on the explosion.”

Mr. Wardell did not think that dust in itself could be the sole cause of the disaster but that it intensified and aggravated it and so must be regarded as an element of danger. He said, “*Wherever coal dust ceased, there ceased also all trace of the explosion.*”

### **ELEMORE. Hetton, Durham. 2nd. December, 1886.**

The colliery was in the Parish of Pitlington and was one of a large group of collieries owned by the Hetton Coal Company and was sunk between 1825 and 26. Since that date it extensively worked the Main Coal, the Low Main and the Hutton Coal seams. The latter was almost exhausted and before the explosion the workings were confined mainly to the Main Coal and the Low Main seams. Two pits had been sunk to the bottom of the Hutton Seam about 47 yards apart and 142 fathoms deep and the Isabella pit was 9 feet in diameter and 129 feet deep to the same seam. The difference in level was caused by two faults near the shafts one of which threw the seams about 8 fathoms to the west and the other, a little to the south of the George Pit ran almost at right angles to the other and threw the seam three and a half fathoms to the north. This caused a lot of complicated work to be done to enable the coal to be loaded in the shaft at different levels.

The George shaft was divided into two equal parts by a 3-inch wooden brattice which formed two drawing shafts one on the east side being called the Lady Pit and the one on the west side known as the George Pit, both of which were used as downcast shafts. The Isabella shaft was used solely as a furnace shaft and the seams were worked on three



different levels, the High, the Middle and the Low. The High workings on the west side of the 8-fathoms fault were called the George pit workings, the Middle or the workings on the north and east of the faults were called the 'Lyons' workings and those on the east or low side of the faults the Lady Pit workings. The Low or lady Hutton seam and the George Hutton seam were connected by a tortuous sloping stone drift called Allen's Drift.

The ventilation was produced by a furnace ten feet long and seven and a half feet wide with side doors for firing. It was placed in the Lyons Low Main seam near to the Isabella pit. Three men were employed at the furnace, each working eight hours. They were supplied with small coal and the furnace burned 9 tons in 24 hours. The total quantity of the air passing over the furnace as measured the day before the explosion was found to be 100,078 cubic feet per minute. The return air from the three main coals and the pipe drift in the George Low Main districts passed into the upcast shaft without contact with the furnace.

The Company employed about 600 people underground and about 150 above ground and the annual output was about 200,000 tons. The official staff of the colliery consisted of a certificated and general manager, one underviewer and one assistant underviewer. There were one overman and one back overman for the Hutton and the Lady Low Main Seams and one overman and one back overman from the George Low Main and East Main Coal Seams. One master wasteman for the whole of the return air roads, one master shifter and one assistant master shifter for the whole of the wagon ways and stone work. In the East Main Coal there was one deputy for the fore shift and one for the back shift, in the George Low Main, six for the fore shift, two for the middle shift, six for the back shift and one for the night shift. The Lady Low Main had three deputies for the fore shift and two for the back shift, the Lady Hutton, one for the fore shift and one for the back shift and two for the night shift.

Coals were drawn 11 hours per day from 6 a.m. to 5 p.m. and the fore shift deputies descended at 3 a.m. and ascended at 11 a.m., the fore shift hewers went down at 4 a.m. and came up at 11.30 a.m.. The coal drawing men and boys started at 6 a.m. and came up at 5.30 p.m., the back shift deputies went down at 9.30 a.m. and came up at 5.30 p.m., the back shift hewers worked from 10 a.m to 5.30 p.m. The night shift deputies went below at 3 p.m. and up at 11 p.m. The night shift hewers and 1st. shift stonemen went down at 4 p.m. and came up 11.30 to 12 p.m. The stonemen and shifters worked from 6 p.m. to 2 a.m., the night shift and back shift hewers from 10 p.m. to 5 a.m. and two shifts of stonemen, the second shift went down at 11 p.m. and came up at 7 a.m. The 4 a.m. were the regular shifts for the hewers and there were only a few employed on the night shift. No coals were hauled or drawn at night.

The coal was worked by pillar and stall with a little long wall working in some of the districts. The coal was inclined at 1 in 50 and the Main coal was 5 feet 9 inches thick including bands that were not worked, the George Low Main coal seam, 3 feet 6 inches thick and the Hutton Seam 4 feet 11 inches thick. Powder was used for blasting coal during the day but was allowed to be used only by the deputies or competent men who had authority in writing. The requirements of the Act were strictly carried out. All blasting in stonework was done at night.

The explosion took place on the George Hutton Seam and Lady Low Main Level and it was seen to enter that level from the downcast shaft. There was no evidence that the explosion originated at the furnace and the separations doors were blown from the intake, past the furnace. The only level above the Lyons Low Main where there were men and lights was in the George Low Main. The point of origin of the explosion lay in this level at some place between the downcast shaft and the Moorsley Way End and was most probably at the end of the arching. The only men working between the shaft and the Moorsley Way End were three stonemen, Johnson, Luke and Appleby who were enlarging the road arch about 200 yards from the shaft. They were blasting with gunpowder and the evidence pointed to this as the cause of the disaster. John Luke

made a statement before his death that a shot was fired in the arch just before the explosion but this statement was contradicted by Johnson at the inquest.

There was a naked light at the dynamo engine close to the bottom of the pit in the George Low Main but it was thought this had little to do with the explosion as it was found undamaged. The other lights in the pit were either electric bulbs or Davy lamps.

There was evidence that the flame had passed through the workings from the arch workings and then returned burning Johnson Luke and Appleby and Lawson, who was the dynamo engine man. It entered the shaft and passed both up and down. Flame was seen coming from the top of the shaft and down and put of the shaft at the Lady Low Main Level. There was considerable damage to the fittings in the shaft. The explosion did not extend into the George Hutton Seam and two men and the rapperman who was in his cabin close to the shaft escaped but two men, Henry Buckingham and Frank Straughan, heard a loud report which was followed by a rush of flame. They were burned and later died from their injuries.

Those found in the Lady Hutton Seam-

R. Hills aged 64 years, deputy, M. Tempest aged 38 years, hewer, W. Hunter aged 40 years, hewer., W. Seeds aged 41 years, hewer, J. Carr aged 65 years, hewer, G. Nicholson aged 21 years, putter, G. Walton aged 17 years, putter and R. Fishburn aged 60 years, horsekeeper.

Those from the Lady Low Main-

H. Buckingham aged 22 years, stoneman, Frank Strangham aged 32 years, stoneman. Both were rescued alive but died later.

Those from the George Low Main-

Sam Grice aged 29 years, stoneman.

George Pattison aged 54 years, stoneman.

William Robson aged 43 years, hewer.

Joseph Williams aged 37 years, hewer.

S. Parkinson aged 27 years, hewer.

R. Pearson aged 54 years, hewer.

Thomas Robins aged 20 years, putter.

Thomas Clark aged 51 years, deputy.

J.G. Laverick aged 22 years, stoneman.

John Johnson aged 58 years, stoneman.

George Pattison aged 31 years, stoneman.

R. Appleby aged 53 years, stoneman.

John Luke aged 38 years, stoneman. Rescued alive but died later.

G. Thompson aged 43 years, hewer.

John Thompson aged 19 years, hewer.

G.J. Taylor aged 17 years, putter.

Ralph Lawson aged 44 years, electric engineman.

From the Lyons Low Main-

Thomas Spence aged 36 years, furnaceman.

Those rescued from the George Hutton Seam-

E. Eggleston, fitter and

H. Moss, horsekeeper.

Those rescued from the Lady Low Main-

H. Johnson, rapperman,

William Johnson, stoneman,

J. Gleghorn, stoneman,

Willam Johnson, driver,  
R. Bousfield, shifter,  
G. Gustard, shifter and  
H. Johnson, jnr., stoneman.

Those rescued from the East Main Coal (Dale Way)-  
T. Hope, stoneman and Ralph Corner, putter.

Those rescued from George Low Main-  
Thomas Charlton, master wasteman and  
Thomas Johnson, stoneman.

There were 25 found dead in the pit and 16 rescued. Of these three died later. There were also 74 horses and ponies in the pit at the time. Twenty of them escaped and fifty four were killed.

The inquest was held by Mr. Crofton Maynard, H.M. Coroner for the Easington Division of the County of Durham at the Hetton Inn, Hetton-le-Hole from the 20th. to the 22nd. December 1886 and continued on the 18th. and 19th. January 1887.

The main road was arched with brick and it was found necessary to add two yards to the end and widen it. Three men on Charlton's shift were sent in to take some stone off the side at 6 p.m. They worked on the right hand side going inbye and left the pit when their shift ended at 2 a.m. They were succeeded by Johnson, Luke and Appleby who went down at 11 p.m. and it was during this shift that the explosion took place. Johnson and Luke were severely burnt and Appleby killed but it was thought the Luke had some evidence to give on the use of the gunpowder they were using. The manager, a colliery doctor, the Inspector and a magistrate went to question Luke that same night and he made the following statement-

"Johnson, Appleby and I were working at the end of the arch in the George Low Main Seam, about 200 yards inbye, south of the shaft, between 40 and 50 yards on the inbye side of the Dale Way end. We went in at 11 o'clock on the 1st. instant and relieved William Charlton, R. Bousfield and Henderson. Charlton's shift was the first for some time to go into that place. Charlton fired one shot on the right hand going inbye. It was a high place where we were working. One of the men in Charlton's shift had been up to the place to see it was all right. The baulks were notched on the right side, the place was all right, and baulks were propped at the left side. We started to drill a hole on the right side near the bottom the hole slanted inbye (it was a machine hole). We fired the first shot about two o'clock. Fired another shot after that (second hole was a double hand-hole) on the left side it was nearly straight down over the hole at the inbye nook of the caunch. Hole drilled about 20 inches deep. Fired with a straw and kitty, by taking the lamp out of the case, and heating a piece of wire through the gauze. Appleby and I came outbye over when the shot was ready. Appleby went into the Dale Way end and I went into the 'chest' hole, just besides the boy's rapper. Johnson lighted the shot, then went inbye over. Johnson had got away inbye after lighting the shot, into his proper position. I thought I saw a flash of flame before I heard the report proper of the shot. The flame that passed me appeared red and filled the whole place. Did not hear any extra report other than what might be due to firing the shot. When sitting in the refuge hole looking towards the shaft, the flame seemed to come past me towards the shaft. I was knocked down, and then, although I cannot be sure, I think there was return of flame from the shaft again. Did not hear any report as the flame passed and went towards the shaft as I was partly stunned but did not loose consciousness. I left the hole and went to the shaft as soon as I could. I had Johnson's lamp in the hole which was previously put out, and Johnson had my lamp to light the shot. I never saw my lamp any more, but made for the shaft. I heard one or both of my mates shouting. Men went to the

shaft. The other men told me that they had been up to examine the top of the place so we did not examine the top. The stone seemed solid at the side and there were no crevices. We did not water the place before we started working. The previous shift also had not watered it and I did not notice much dust. There was the usual current of air at the place. I have passed it frequently.

I declare this to be a true account to the best of my knowledge.”

Each paragraph of the statement was taken down in writing and read to him and he gave his assent and was reported to have thoroughly understood the position. The doctor certified that he was conscious and knew what he was asking. He died from shock and burns on the 18th.

Johnson had recovered from his injuries to appear at the inquiry and his evidence contradicted that of Luke. He said he fired one shot and never touched the left hand side. He admitted that before firing the shot he did not examine the top of the place for gas, but examined only the arch. John Daghish, a mining engineer for over forty years and formerly chief engineer at the Hetton Collieries gave evidence that the explosion did not occur in any of the working places but all the evidence pointed to the source of ignition at the spot where the shot was fired.

The jury deliberated for two hours and came back with the following verdict-

“That Ralph Fishburn and others met their death by an explosion in the George Low Main Seam, Elemore Colliery, on the morning of December 2nd. 1886 that the said explosion occurred between the Dale Way end and the ‘greaser’ but what caused the ignition there is not sufficient evidence to show.”

The Coroner asked if they had anything to say about shot firing and they replied that they did not.

The manager of the colliery, Mr. T. Lishman, later informed the Inspector that the use of gunpowder at the colliery had been discontinued at all the collieries of the Hetton Coal Company and where blasting was required, they were using gelatine dynamite in water cartridges and firing the charges with electricity.

**GEORGE PIT. Mountain Ash, Glamorganshire. 9th. December, 1886.** The colliery was the property of Powell Duffryn Steam Coal Company Limited and five men lost their lives when there was a collision of railway trucks on the self-acting incline between the George and Lower Duffryn Collieries when a stone was deliberately placed on the self-acting points below the meetings. Eleven men were riding to their work at the time but riding was prohibited on the incline and several men had been prosecuted for doing so and other fined.

Those who lost their lives were-  
Daniel Crowley aged 38 years, stower,  
David Davies aged 21 years, stower,  
Michael Miskell aged 17 years, stower,  
Richard Thomas aged 21 years, collier and  
Samuel Thomas aged 58 years, collier.

**HOUGHTON MAIN. Barnsley, Yorkshire. 30th December, 1886.**

The colliery was about seven miles from Barnsley. Many of the afternoon shift had been raised to the surface in a three deck cage when Allen Beresford, the engineman was winding men up the shaft at 7.50 a.m. When the cage was about 150 yards from the surface he heard a crash on the drum and that was the last he remembered as a piece of wood hit him on the forehead and knocked him out. The wood had come from the roof of the winding house which had been shattered. The cage had gone into the head frame

and fallen 535 yards down the shaft with the men in it. The rope had broken and 15 inch square timbers had been demolished.

Two men, Elliot and Dawson went down the shaft and found that the conductors were all right and John Gerrard, the colliery engineer and Elliot supervised the recovery of the bodies from the sump.

Those who died were-

WALKER Joseph 49 Collier Widower With Family

WALKER Samuel 20 Trammer Son of Joseph

WALKER Charles 19 Trammer Another son of Joseph

HARDCASTLE James 49 Collier Widow & grown up family

HARDCASTLE Alvin 18 Trammer Son of James

PEARSON Joseph 47 Collier Married

PEARSON Joseph Jnr 20 Trammer Son of Joseph

BAXTER Edward 29 Collier SINGLE

MANNING William 40 Trammer Of Snape Hill

BARTON William 17 Pony driver

At the inquest a man named Charles Atkinson, the hanger-on at the pit bottom, said that he signalled the cage to go up and a short time later he heard it coming down at great speed. He ran away but saw the cage go through the sump boards. Albert Holdsworth, the banksman who was son duty at the time said that the usual signals were received and returned. As the cage neared the surface, he saw a flash in the shaft. There was a crash and the engine house was damaged. Holdsworth worked the lever at the pit bank that placed the stops in position to stop the cage going down the shaft, said that he did not get them in position and after the accident it was found that this was so. It was stated that even if they had been in position, they would not have stopped the cage falling down the shaft. he saw Beresford coming out of the engine house and was told that he had been hit by a piece of wood.

The jury deliberated for about four hours and returned the verdict that-

“The men had been killed by falling down the shaft when they had been overwound by Beresford.”

Allen Beresford was charged with manslaughter and bound over for two weeks on bail. Indicted for manslaughter of the 10 men but the jury 'after 3 minutes' deliberation found him not guilty.

### **NATIONAL. Pontypridd, Glamorganshire. 18th. February. 1887.**

The owners of the colliery were Messrs. Watts, Ward and Company with Mr. Edgar Watts as the agent and Mr. J. H. Williams the certificated manager. There were two shafts sunk in 1880 which were 454 yards deep to the Six Feet Seam. With the exception of a drift connecting the shafts there were no openings in the seam. The only seam that was being worked when the explosion took place was the Four Feet which was cut at 425 yards in the shafts but as the working extended below the mountain, there was an additional depth of strata at and near the working faces of about 100 yards.

The seam lay almost flat and a few faults had been encountered. The workings extended 1,000 yards to the north, 600 yards to the south and 600 yards to the east, an area of about 170 acres which had been worked on longwall which was the method general to the district. The coal was semi-bituminous and was an excellent steam, coal. It was dry and large quantities of dust was deposited in the roads and held in the air in the mine. Inflammable gas was given off freely from the coal and from cracks in the roof.

The colliery was well equipped with machinery and appliances and was fairly well laid out with respect to its working and ventilation.. The winding shaft was also the downcast and was seventeen and a half feet in diameter. The upcast was twenty seven yards away

and was fifteen feet in diameter. This shaft was occasionally used for winding water when a bucket was used to raise the water that collected below the Four Feet Seam. There was also a small pumping engine at 120 yards deep for raising water which collected in a lodgement at that point. The whole of this shaft was an upcast with a Schiele fan, 15 feet in diameter running at 150 r.p.m. which exhausted about 150,000 cubic feet of air per minute at a water gauge of 2.9 inches. There was a Waddle fan, 45 feet in diameter which was used as an emergency fan. The air was distributed through the workings by splitting the air into different currents with the quantities reaching the working faces being adequate for the requirements of the mine.

There was one main day shift of colliers who worked in the leading places and about 500 others who started work at 7 a.m. and ended their shift at 4.30 p.m. The night shift was made up mainly of repairers which started work at 7 p.m. and finished at 4.30 a.m. There were also some colliers who worked in leading places who worked continuous eight hour shifts starting at 6 a.m., 2 p.m. and 10 p.m. The ordinary colliers who got the coal built the gob walls and cogs of timber which were necessary to support the roof of the stalls and roads as they advanced.

A bed of clod from six to eighteen inches thick which lay over the coal, was taken down over the whole face and built into the gob. In the roads, a bed of bottom coal, 18 inches thick, was cut by the colliers. The small coal was stowed in the gob behind the working faces. The roads at the face were about 7 feet high and 9 feet wide between the walls.

No blasting was required at or near the face. The maintenance of the roads and air courses which were about 9 feet wide and six feet high and the timbering was seen to by the repairing shift. Although the roadways at the face were fully 7 feet high, after the subsidence of the strata 80 to 100 yards back from the face, the height was reduced to 5 feet or under and to make the roof height a strong '*clift*' was ripped. This was done by blasting.

The owners intended the blasting to be done as follows-

"Shots were only to be fired in the interval between the principle day shift leaving work and the repairing shift commencing, the holes having been bored during the previous repairing shift. The only explosive use was gelatine-dynamite in conjunction with Professor Able's water cartridge, fired by the means of an electric battery and cable."

This method was adopted by the owners as the safest for firing where safety lamps were used and to prevent the possibility of flame from a shot. The shots were fired by night overman and firemen and no one else was allowed to be in possession of firing equipment.

The pit was lit by Marsaut safety lamps and the cleaning and trimming of them was done by men employed for the purpose in a proper lamp room at the surface. No naked light was allowed in the workings or even in the pit with the exception of the bottom of the downcast shaft. There were stations at which lamps were examined and re-lit by appointed persons and the fires of the steam boilers, all of which were in the intake air currents and within 250 yards of the downcast shaft. The shaft bottom, sidings and engine house were lit by electric lamps, the current being carried down the shaft from the surface installation.

Then roads were watered at intervals by water tanks drawn by horses. This was done at night but it was not carried out in an organised manner.

Mr. Edgar Watts was the resident agent, Mr. J.H. Williams the certificated manager, Mr. George Wilkinson, consulting engineer but he did not interfere with the details of management. William Meredith was the day overman and Griffith Griffiths was the night overman who lost his life in the disaster. There were three day and two night fireman, Griffiths, the overman, acted as fireman in one district during the night shift. The reports required by the General Rules were made in books for the purpose. The colliery was regularly examined every month on behalf of the workmen under the terms of General Rule 30.

The explosion occurred about 6.40 p.m. on the 18th. February at a time when the men of the repairing shift were gathered at the pit head ready to go down as soon as they received the report that all was well. There was a discharge of smoke and dust from the mouth of the downcast shaft and the winding rope was thrown off the sheave. Part of a corrugated iron roof was blown off and there was damage to the top of both shafts.

Mr. Robson arrived at the colliery as soon as possible the following morning and Mr. Randall, the Assistant Inspector had arrived during the night and was with the first party who went below at about 10 a.m. The blast had reached the top of both the upcast and downcast shafts and had damaged one of the cages and the signalling wires but fortunately the Schiele fan was still running. The covering of the top of the upcast shaft and the fan drift was fortunately built of light material and was easily displaced by the blast and this saved greater damage.

On descending the pit the explorers soon found that the explosion had affected the north side of the workings but had not passed beyond the shaft on the opposite side. It had been felt by the men on this side and they had left their workplaces at once to come to the shaft. There were twenty eight of these men and they were sent to the surface at once. There were eight men burned and injured at and near the bottom of the shafts. They were attended to and sent to the surface as soon as possible. One of them was found to be delirious in the north side shaft amongst the bodies of the horses, all of which were killed on that side of the shaft. Eight bodies were found at the bottom or within 70 yards of it.

Messrs. Randall and Robson assisted with the explorations and were present until all the bodies had been recovered. It was soon seen that with the exception of those who had been sent to the surface from near the bottom of the shaft, all the men in the pit were lost. This was evident from the extent to which the afterdamp in the roads and return air ways except for a short distance to the north where the ventilation was cut off due to an air stopping being blown down and all the doors separating the intake and return on that side of the pit, destroyed.

The work of recovering the bodies from the workings was difficult and hazardous as the ventilation was partly restored by there were large pockets of gas and several falls on the main roads some of which were 18 to 20 feet high and almost filled the passage. The extreme parts of the workings were reached on Wednesday 23rd. February, five days after the explosion

Those who lost their lives were-

Daniel Davies aged 22 years, stoker.  
Walter Bevan aged 30 years, haulier.  
David Owen aged 33 years, farrier.  
Frank Belbin aged 26 years, haulier.  
Henry Wilford aged 32 years, saddler.  
Richard Arthur aged 60 years, ostler.  
John Price aged 29 years, hitcher.  
Samuel Richards aged 27 years, haulier.  
Albert Shewry aged 24 years, pump engineman.  
Daniel Jones aged 52 years, collier.  
William David Williams aged 14 years, colliers boy.  
Richard Pritchard aged 42 years, contractor.  
William Roberts aged 22 years, haulier.  
William Guy aged 18 years, labourer.  
Griffith Griffiths aged 51 years, overman.  
Thomas Tovey aged 28 years, cogman.  
Morgan Davies aged 40 years, roadman.  
Henry Davies aged 32 years, collier.  
John Charles aged 22 years, collier.

John Evans aged 34 years, ripper.  
John Curley aged 36 years, collier.  
Charles Williams aged 25, collier.  
Watkin Jones aged 23 years, collier.  
Richard Powell aged 37 years, collier.  
Morgan Gibbon aged 26 years, collier.  
John Lewis aged 32 years, collier.  
Phillip Jeffries aged 28 years, collier.  
Thomas Morgan aged 38 years, collier.  
William Llewellyn aged 31 years, haulier.  
Oliver Clements aged 23 years, haulier.  
Thomas Jones aged 23 years, haulier.  
Edward Goodwin aged 25 years, haulier.  
John Jones aged 36 years, ripper.  
Thomas Tudor aged 38 years, collier.

The injured who survived were-

Daniel Davies aged 28 years, hitcher,  
Lewis Evan Williams, haulier,  
William Thomas Pritchard aged 17 years, ostler,  
William Tucker aged 24 years, ripper,  
William Watkins aged 27 years, rider,  
Samuel Strange aged 50 years, ostler and  
two were taken out of the mine alive but later died. They were:-  
Thomas Griffiths aged 25 years, haulier and  
William Reed aged 22 years, haulier.

It was apparent from beginning that the explosion originated in the north workings and that blast had travelled from some point there but the exact point could not be defined for sure. It had passed through the intakes, driven doors into returns and stopped about 250 yards on the opposite or east side of shaft, killing or injuring every person in its range.

The blast occurred at the moment when, under normal circumstances, the night overman and firemen should have arrived at the bottom of the shaft after having completed their inspections and fired any shots which had to be fired. They had not arrived from north side for they were not among the dead or injured near the shaft, nor were they on road for as far as it could be travelled.

It was known to under officials that shots had been prepared for firing that night in the north district. As the exploration proceeded, the position of these six shots were discovered. Two of them were charged ready for firing in Salvation district, another was found on Straight heading where a new double parting was being constructed. A fourth, 25 yards further on in the No.1 East had been fired. The fifth and sixth shots were found at the top of dips in Cwm Nedd district, within three yards of each other. The first of these was charged but had not been fired. The second had been fired and had done its work. It was here that the bodies of night overman and fireman were found with the apparatus for firing the shots. The body of overman was found close to the spot where he had sat when firing the shot with the battery connected to wires,. The body of fireman was found between the two shots about ten yards away. Two others who were found here were men who assisted shotfirers to carry the apparatus from place to place. The remaining three men had been in working place, cutting bottom, relaying rails and removing the debris so that work could resume as soon as possible as there were colliers at work in this district whose coal was brought out by road on which shot was fired.

No body was found near the first or second unfired shots. The man who had prepared these, after waiting and finding the shot firers were late, had gone over to the other side of the workings where his body was found. Near the third shot, which had been fired, was



the body of the contractor who was making the double parting, he had begun work after the shot had been fired. Close by him was the body of a haulier who had been returning with his horse from the shaft. There was no body found near the fourth shot that had been fired.

Safety lamps belonging to those who had been killed in the north workings were found, except for two. Three were badly damaged by the blast but no other lamps were found that had any fault.

Although it was suspected when the bodies were found that the firing of the shot had been responsible for the explosion, it was not until three weeks later that the position of the shot was discovered and proof of it having been fired was placed beyond any dispute.

The inquest into the disaster was held before Mr. R.J. Rees, Coroner for the district. All interested parties were represented. The Inspector, Mr. Robson, said-

"There can be no doubt that the explosion was caused by a shot being fired in the return airway charged with gas and thickly covered with fine coal dust, the road being the main horse road on which there was great deal of traffic. It clearly showed that the danger which attends shot firing in fiery and dusty seams, notwithstanding precautionary measures which owners may be willing and anxious to have carried out to prevent such accidents, for the precautions may be neglected, as certainly they were in this case.

It is so far satisfactory, as showing that the danger referred to is becoming more generally admitted, that for the most part blasting is only resorted to in ripping strong ground and indeed in several collieries the owners do not permit it at all, excepting in special cases, such as driving stone drifts."

The jury brought in the following verdict-

"That an explosion of gas occurred at the National Colliery, in the Parish of Llanwonno, at 6.40 p.m. on February 18th., 1887 whereby Griffith Griffiths and others lost their lives, and they cannot in consequence of the lack of evidence find out the cause of the explosion nor where it started."

The added the following rider-

"It is the unanimous opinion of the jury that the management of the said colliery was conducted in a loose manner and not so carefully as the case required."

The same verdict applied to thirty seven more of those who lost their lives. The verdict recorded on Albert Shewry was -

"That he met his death by falling down the upcast shaft at the National Colliery on the 18th. February, 1887 and was found dead in the sump of the 23rd. of February, 1887."

Mr. Robson concluded his report-

"The discipline of the colliery was certainly not what it ought to have been. The day fireman in the Cwm Medd had not reported in the book the finding of gas and the withdrawal of workmen which took place on the day before the explosion. This was breach of the 6th. General Rule. Shots were not fired in the manner strictly in accordance with the instructions given by the owners. There were many persons allowed to be in the pit who should not have been there when shots were fired. This was within the knowledge of the agent and managers, and was a contravention of the 8th. General Rule.

The occurrence of this lamentable explosion is another proof of the danger of shot firing in mines producing gas, and which are also dry and dusty and shows how absolutely necessary it is that some thoroughly effective mode of removing the dust or preventing its deposition, and of watering the vicinity of the shots, should be enforced."

**UDSTON. Hamilton, Lanarkshire. 28th. May, 1887.**

The colliery was on a farm in the Parish of Hamilton, Lanarkshire and the royalties extended over 150 acres and was close to the Blantyre, Earnock and Greenfield Collieries. They were owned by the Udston Coal Company, Limited with Mr. William Turner as Chairman and Mr. John Morton as Secretary. The Udston Colliery was managed by Mr. Gavin who was 35 years of age and had worked in collieries since he was 14 years old when he started work as a miner with the Dalmellington Iron and Coal Company in Ayrshire. He obtained qualifications and became a manager of a colliery in the north of England where he continued until he took up the post at Udston in February 1885. The mines under his control all gave off firedamp but this was the first explosion that had occurred under his management.

Mr. Gavin lived at Hamilton about 2 to 3 miles from the colliery and was at the colliery regularly to perform his duties which frequently took him underground into the workings. He visited the Splint seam about three times a week when he was accompanied by the overseer of the seam but he went alone on some occasions.

Three seams were worked at the colliery, the Ell at 125 fathoms, the Main at 140 fathoms and the Split at 150 fathoms. There was an oversman under the manager for each of the seams and in addition, one fireman in the Main coal and two firemen and a roadsman, who was in effect an assistant fireman, in the splint coal. The oversman in the Ell coal acted as fireman there. The appointment of these officials was made by the manager or if he was satisfied that the person proposed was suitably qualified.

There were two shafts at the colliery, 45 yards apart and the No.1 was the upcast and was used for winding coal from the Main seam. The No.2 was the downcast and wound coal from the Ell and Splint seams. Both the shafts were oblong and were fitted with wooden conductors for the cages. There were two cages in each shaft. Two hutches, each containing two hundredweight of coal were wound on each cage in the No.2 shaft and one in each cage of the No.1 shaft. The downcast shaft was 18 feet by 6 feet but at the buntons which were 6 feet apart, the size was seventeen and half feet by six feet. The cages were grated at the bottom, with 18 spaces, each space being four feet long by one and three eighths wide, but the overhead cover to each cage was close, each being 6 feet 10 inches long by 4 feet 4 inches wide. The upcast shaft was 15 feet by 6 feet, each cage bottom being closed and 5 feet long by three and half feet wide, the overhead cover being three and half feet long by three feet wide.

The system of working was known as 'stoop and room' in Scotland which was pillar and bord workings. The Main seam was worked out to about half its extent and the remaining half was about two thirds cut into stoops and rooms. In the Splint coal where the explosion took place, the rooms were on average 8 feet wide by 4 feet 11 inches high and the stoops 22 yards square. There were four larger stoops or pillars near the shafts and at one place in the workings there was a stoop which was 40 yards square which was in the course of being formed. In the first drivings the top bed of coal was not worked and was taken only when the stoops were worked. The Splint seam was reached in 1883-4.

The strata dipped to the north east and the inclination of the upper part near a main dyke upthrow of 200 fathoms was 1 in 6 which flattened to 1 in 8 at the shafts, 1 in 12 lower down and less than that at the lowest point.

The ventilation of the mine was effected by a Guibal fan, 20 feet in diameter which was driven by a horizontal steam engine at 56 r.p.m. A spare engine was kept in readiness and the change from one engine to another could be effected in 4 to 5 minutes. The fan was placed near the top of the upcast shaft and was connected to it by a fan drift with a semicircular top and an area of over 79 square feet. The head of the upcast shaft was fitted with a covers to separate the air that came from the fan race from any air that might escape down the shaft mouth. 18,000 cubic feet of air per minute went to the Ell coal, 23,000 to the Main coal and 24,000 to the Splint coal.

The firemen went down the mine at 4.30 a.m. which was before the men and they went down an hour earlier on Saturdays. There were 46 men and boys employed in the Ell coal, 66 in the Main and 73 in the Splint coal. Open lights were used near the downcast

shaft from which the Ell and Splint coal was raised but not at the upcast from which the Main coal was raised.

The explosion took place at about 9.15 a.m. and a total of 73 lives were lost. Of these one man was killed in the downcast shaft, four in the Main coal near the shaft and the remainder in the Split coal. Work seemed to have been going on as usual without any known problem when a cloud of dust and smoke shot out of the downcast shaft and a second or two after a large volume of flame came up the upcast shaft setting the wooden shed at the pit top on fire. The water hose was at once applied and in about 10 minutes the fire was got under control. Flame came almost halfway up the downcast shaft also slightly burnt the oversman who was in the shaft at the time. The fan was not damaged and continued to run but the covers which prevented the air entering the roof the upcast shaft were blown away. These covers were replaced as soon as the fire was extinguished and the air went down the shaft as usual. Large volumes of afterdamp came up the upcast shaft. One was cage stuck in the downcast shaft but the other was free and was brought to the surface in about an hour. An oversman of the Split coal, and assistant pit-bottomer named McQuirk together with an oversman and an assistant from the Ell coal were in the cage. McQuirk was found to be dead.

The rope of the cage that was stuck was a disconnected from the engine and the other cage used. James Gilchrist of Earnock Colliery, William Watson, oversman, Daniel McPhail, James Gavin, manager and others descended and brought up some of the men who had climbed up the buntons and slides. One of these said that the slides a short distance below were damaged. Robertson the joiner and two men, McBride and Bowie, and oversman from Blantyre went in the cage and repaired the shaft after which the other men were brought out of the Ell coal. The joiner and his party went down again and repaired the shaft to the Main coal where four people were found suffocated near the shaft but all the others in that seam were brought out alive.

About this time Ralph Moore the Inspector arrived at the colliery and it was decided that the shaft below the Main coal was so badly damaged that it was impossible for the cage to pass. A chain and a iron bucket or kettle was lowered below the cage. In the kettle there were three miners, Daniel McPhail, John McBride and Boyd. They made their way passed the displaced guides and reached fallen debris at the shaft bottom. Here the entrance to the workings was found to be half closed with only a low space over the top over which the crept. They explored a little but found no survivors and saw that the blast had opened a connection to the upcast shaft which allowed air to escape that way. They went up and reported what they had found.

James Gilchrist, James Hastie and Robert Beith, managers from neighbouring collieries then went down in the kettle and were followed by the manager and others and the exploration commenced. In a short time McLean, a pony driver was found alive in the lamp cabin along with a dead body. James Lang, the bottomer, was also found alive at the third opening on the low side of the west level. These two men and the oversman were the only survivors of the men who entered the Splint coal that morning. All the rest were found dead afterwards as well as all the horses in the seam.

The kettle was used for some time until the shaft was repaired and made passable for one cage. Work was continued until 31st. May when all the bodies were recovered except three, which were subsequently found buried under falls.

There are 67 listed in Mr. Moore's report but with the three that were found under falls give the official death toll as 73.

Those found in the Blantyre Section-

James Crichton aged 31 years, miner, burned and suffocated.

William John Boyce aged 23 years, suffocated and found with a lamp key.

Thomas Berry aged 25 years, suffocated.

John McDade aged 21 years, suffocated.

James Nelson aged 16 years, suffocated.

James Spiers aged 40 years, suffocated.  
William Berry aged 22 years, miner, burning and suffocation.  
Hugh Auchterlonie aged 41 years, miner, suffocated. Key for opening safety lamp attached to bottom hole of drawers.  
George Parker or Harkness aged 30 years, miner, suffocated.  
William Boyce aged 22 years, suffocated.  
Gavin Malcolm aged 15 years, miner, burning and suffocation.  
John Reid aged 24 years, miner.  
Christopher Boyce aged 22 years, miner, suffocated.

Those found in the Rise Section-

Thomas Denniston aged 18 years, miner, burning and suffocation. Large wound on his back.  
William Denniston aged 23 years, miner, burning and suffocation.  
Michael Quin aged 21 years, miner, severely burned and suffocated.  
Alexander McLean aged 48 years, miner, severely burned and suffocated.  
John Dodds aged 14 years, miner, burning and suffocation.  
James McCulloch aged 15 years, miner, burning and suffocation. Both arms fractured.  
James McCulloch aged 36 years, miner, burning and suffocation. Father of James.  
David Shanks aged 45 years, miner, burning and suffocation.  
David Shanks jnr. aged 15 years, miner, slightly burned and suffocated. Right leg broken. Key for opening safety lamp, nail and lemonade wire found in trouser pocket. Son of David.  
Walter Winters aged 22 years, miner, burned and suffocated. Legs broken.

Those found in the Horse Road Section-

John Harkness aged 24 years, miner, suffocated. Key for opening safety lamp found in trouser pocket.  
William Murdoch aged 26 years, miner, severely burned and suffocated.  
Allan Stirling aged 22 years, miner, severely burned on the head and suffocated. Nail for opening lamp found in trouser pocket.  
David Flaming aged 27 years, miner, burned and suffocated.  
Joseph Neilson aged 22 years, miner, burned and suffocated.  
John Wilson aged 20 years, miner, burned and suffocated.  
George Davies or Davis aged 26 years, miner, burned and suffocated.  
James Kane aged 14 years, miner, burned and suffocated.  
John Smith aged 26 years, miner, burned and suffocated.  
William Babes aged 41 years, miner, burned and suffocated.  
Robert Jarvie or Jarvis aged 31 years, miner, burned and suffocated.  
Daniel Robertson aged 14 years, miner, burned and suffocated.  
William Brown aged 52 years, miner, burned and suffocated. Key for opening safety lamps found in pocket of trousers.  
Thomas Penman aged 20 years, pony driver, burned and suffocated.

Those found in the Horse Road Stoops-

William Harrison aged 34 years, miner, severely burned and suffocated.  
David Crichton aged 20 years, miner, severely burned and suffocated. Two nails found in trouser pocket.  
Joseph Boyce aged 18 years, miner, shock and suffocation. Nail in trouser pocket.  
John Nobel, miner, suffocated.

Those found in the stables-

Walter Penman aged 22 years, driver, burning and he had suffered from afterdamp.

James Leadbetter aged 40 years, ostler, slight burning and had suffered from afterdamp. Clay pipe, knife and tobacco pouch found in trouser pocket.

Those found in the sump-

Andrew Thomas Watson aged 48 years, bottomer, burned and suffocated. Left arm fractured. Pocket knife and key for opening lamps found in trouser pockets.

Alexander Torley aged 26 years, fireman, burned and suffocated. Left arm and leg fractured. Tobacco and box, lamp key and knife and a watch which had stopped at 9.07 a.m.

Those found in the Dook Section-

James Allison aged 45 years, chainman. A number of matches ignited and not ignited found in his vest pocket.

Peter McGuinness aged 22 years, miner, burned and suffocated. Face torn and smashed.

Richard Cook aged 50 years, miner, burned and suffocated. Clay pipe and two nails for opening lamps. Father to Thomas and James.

Thomas Cook aged 21 years, miner, burned and suffocated.

James Cook aged 17 years, miner, burned and suffocated.

Washington Crewe aged 25 years, miner burned and suffocated. Body much mutilated.

William Lawson aged 42 years, miner, burned and suffocated. Left leg broken.

Andrew Lawson aged 21 years, miner, burned and suffocated. Much bruised on left side. Two nails for opening lamp found in trousers pocket. Bottom all that remained of his safety lamp. Son of William.

Joseph Cunning aged 39 years, miner burned and suffocated. Key for opening lamp in trouser pocket.

William Drain aged 19 years, miner, burned and suffocated.

James Wilson aged 50 years, miner, bruising and suffocation. Key for opening lamp in trouser pocket.

Isaac Cameron aged 24 years, miner, suffocated.

James Gaw aged 15 years, miner, burned and suffocated.

Francis McGourty aged 54 years, miner, burned and suffocated.

Terence Rooney aged 55 years, miner, suffocated.

George Dingsdale aged 21 years, miner, burned and suffocated. Right leg broken at knee and ankle.

Michael McDade aged 34 years, miner, burned and suffocated.

A man named McGinnes.

Felix Torley aged 40 years, miner, burned and suffocated.

John Crewe aged 22 years, miner, burned and suffocated.

The Report on the Udston Colliery explosion by J., Dickinson, Esq., H.M. Inspector for Mines and C.C. Maconochie, Esq, Advocate, was presented to the Secretary of State for the Home Department after a full and detailed inquiry into the disaster.

There was no evidence of any sudden outburst of gas and in the previous months very little gas had been reported. Shots were fired and two had been fired either at the time or not long before the explosion and there had been evidence that there was some illegal shotfiring when one such shot was fired some months before when the men were reported to the procurator Fiscal and on being tried before the sheriff, two men were fined.

James Gavin, the manager, thought that there had been some gas which must have fired at an open light and Ralph Moore, the Inspector thought that a little gas had fired which was carried on by coal dust.

In his report, Mr. Moore commented:-

“I confirm my opinion that the disastrous effects of the explosion were due to the ignition of coal dust in the mine and not to an accumulation of firedamp. There had probably been a small quantity of gas in the place where the explosion began and a shot fired surreptitiously, without an examination for gas, ignited this gas. This raised and ignited a cloud of coal dust and the flame, fed by the dust in the workings, traversed the whole seam.”

The official inquiry by Mr. Dickenson was critical of the management of the mine on the following points-

“1. In regard to the safety lamps, both as to the use of lamps incapable of withstanding some of the currents met with, and as to the perfunctory examination, and the fact that as the lamp required trimming, and some men did not come, it might have been inferred that men opened and trimmed the lamps themselves.

2. In respect that a new assistant fireman was not at once appointed when the former left.

3. in regard to the stoppings in the horse road division of the east section which from their position in the midst of the workings and not an extremity, were a source of danger.

4. As too many rooms not at work having been commenced and left uncompleted, with bratticing in them contracting the air instead of the stops being completed before the rooms were left and air allowed to circulate freely.”

The report went on to cite the following reasons for the exploit-

“a. That the explosion originated in the stooping in the West or Blantyre section or at Harkness’s shot in the east section, the former place being the most likely.

b. That it was primarily caused by the ignition of some quantity of firedamp at an open light, or at a match, or being drawn through the gauze of a Scotch safety lamp.

c. That being thus commenced it was reinforced by gas with which the ventilation was impregnated, and by dust, together with gas drawn out from the solid coal and from cavities at the stoppings and elsewhere by the suck and pressure set up by the explosion, and that some of the issues of gas were ignited separately by the pressure or through the gauze of the lamps at open lights.

d. That some of the miners were clearly guilty of contravention of the principle Act in having lamp keys and matches in their possession and in opening their lamps.

e. That no apparent contravention of the Act is proved against the officials of the mine.”

### **WALKER. Northumberland. 24th. October 1887.**

The colliery was on the banks of the River Tyne and belonged to the Walker Coal Company. The manager of the colliery had been at his post only a few weeks before the explosion caused the deaths of six men and two later died at their homes. The manager who started working the seam, had died after a long illness and some time had elapsed before another manager was appointed.

There were three seams worked at the colliery, the Low Main at 165 fathoms, the Beaumont at 190 fathoms and the Brockwell at 206 fathoms. The explosion originated and was confined to the last of these seams.

There were two shafts at the mine the Ann Pit was the downcast and was eleven and a half feet in diameter sunk to the Brockwell seam. The shaft was also used for coal drawing from the Beaumont Seam and the coal from the Brockwell seam up a staple about 30 yards south west of the shaft. The staple continued up to the Low Main seam and formed the upcast shaft and second outlet from the Beaumont and Brockwell seams.

The Jane Pit was 640 yards to the south of the Ann Pit and was sunk to the Low Main seam at 165 fathoms. It was ten and a half feet in diameter and was used as an upcast and a second outlet. There was a Guibal fan at the top of this shaft which exhausted the

air from the mine. On the 17th. October the Low Main seam was receiving 41,398 cubic feet of air per minute, the Beaumont, 27,445 and the Brockwell 12,025.

The Brockwell seam had the following section, 2 feet 10 inches of coal, 6 inches to 1 foot band and 4 inches of coal. There was about 9 inches of grey metalstone immediately above the coal and sandstone above that. The band and the coal under it were taken up only when the roads were made. The coal was a clean black coal, friable and dusty.

Firedamp came freely from this seam and the adjoining strata and had been known to come off suddenly in large volumes. At the working face, the coal was dry and hot and the roads from it were dry and dusty with the exception of the road to the staple where water from the seam and that passing down the staple from the Beaumont seam collected and rose onto the roads. The air ventilating the Brockwell seam passed in one current round the workings and the staple always contained water and the air passed over this before reaching the upcast staple.

The roads along which the coal passed to the staple from the two districts was not used for ventilation and the air in them was either stationary or slow moving. During the day the coal was worked in the Brockwell seam from two districts, the west and the north. In the former the coal was worked by longwall and in the latter partly by longwall and partly from two exploring places.

At the time of the explosion shifters and stonemen were working at the face, 113 in the west district and 9 including the master shifter in the north district. An onsetter at the staple bottom made a total of 23 people in the Brockwell seam. The explosion was confined to the north district. When the bodies were found there was nothing to say that they had any warning of the blast. Six were at their working places and two with the master shifter were in a place of refuge waiting for the firing of a shot.

The men who lost their lives were-

William Richardson aged 35 years, stoneman,

Joseph Cokburn aged 40 years, stoneman,

Anthony Hogg aged 26 years, stoneman,

John Pickard aged 56 years, master shifter,

James McMullen aged 31 years, stoneman,

John Hylton aged 37 years, stoneman,

Henry Defty aged 36 years, shifter and

Robert L. Wilson aged 28 years, stoneman.

The last two were found alive but died later and a man named Hall was also rescued alive and survived.

At the inquest there was evidence given regarding complaints by the men on the slackness of the air and the consequent high temperatures. these conditions had been there for some days before the explosion but no gas had been detected there. Mr. Willis commented-

“I am of the opinion that the powder gas projected from the shot raised a cloud of dust from the floor into the air containing some firedamp and that the flame from the shot had ignited the mixture. The expansion from this had raised more coal dust and the flame had extended in all directions until arrested by a falling quantity of coal dust in the wagon way and returned flame had not passed the wet ground. The amount of firedamp in the air at the time the shot was fired was probably harmless in itself and probably the coal dust alone would have transmitted the flame.”

Mr. Willis also commented that there was more work to do than officials to do it and this gave rise to a disinclination to listen and an unreadiness to remedy sources of complaint from the workmen.

**HILL CLOSE LEAD MINE. Darley Dale, Derbyshire. 3rd. November, 1887.**

The mine was the property of Wass and Son's Trustees. Mr. A.M. Wirksworth was the agent and Mr. Joseph Greatorex, the manger. The man had lamps but the wagoners had naked lights which were allowed to be taken within ten yards of the end of the Forefield. From the floor to the top of the working place was about 18 feet and about 20 feet wide. There was a roadway above the wagon way made of timber supported at the sides which was used as an air intake and for walking along. The roof above this was about two yards of stone. There was a ladder which went through the stone to the walk way about 20 yards fro the end of the Forefield.

John Heathcote made a report in the book about Stone's place which was the seat of the explosion, which stated for the 1st November, '*I find a great deal of gas in Stone's place*'. and for the 2nd. November, '*I find gas in Stone's place but not as much as yesterday*'. William Webster, one of the deputies in charge of the mine visited Stone's pace a little after 6 p.m., and again at midnight when he found gas in the place. He told Marsden to be very careful and wrote in his report book, '*I find no gas in Pett's and Webster's places but Stone's place was full by 12 o'clock*.' He told Job Stone not to let the wagoners near with their naked lights.

On the day of the disaster, Robert Marsden, of Birchover was working with Job Stone. They had gone down at midnight and were working in Stone's place in the Forefield. There was no one else at work when they got there. as they went in they met the deputy, William Webster, who told them to be careful as there was more gas than usual. Marsden led the way and the others followed. When they arrived at the ladder, the four men went up and the wagoners did not come to them at night. Their job was to take the ore from the working place to the bottom of the shaft.

He first found gas about half way between the top of the ladder and the end of the Forefield. The next place he tested was at the end of the Forefield and there, gas fired in his lamp. They carried on working and got some ore loose and then began to bore a shot hole which was charged and fired successfully by Job Stone. They cleared the stuff away and bored two more holes. These were charged with dynamite and Stone placed one packet in each of the holes. The shots were fired with a fuse and a detonating cap which was lit by a touch paper from a candle at the bottom of the wagon way. After a paper was lit it was carried in a shovel and handed up the hole where the ore came from the upper roadway.

Two men were left to fire the shot, Job Stone and George Allen. George Stone took the lighted paper to the men and gave it to them through the hole and the firer lit the fuse. All the men then went down the ladder and took cover about 50 yards from the end of the Forefield. There were two wagoners with them who had been standing for about a minute when they heard one shot go off. There was rush of wind from the explosion but the survivors did not see any flame. Marsden was knocked over and was unconscious for some time.

When he came to, he felt the edge of a fall of stone and saw George Bateman coming towards him with a candle. He went back with him and they met another man as they were making their way to the shaft. he went up and told what had happened. George Greatorex gave them lamps and a party including Marsden and the stoker went down. They shouted but there was no reply. They went up again when Marsden was treated by a doctor and went home.

John Heathcote, a miner of Webster, went down the one with others about two hours after the explosion and gas was found in the mine. A door had been blown out near Allen's body, about 12 yards from the Forefield. Another door, 60 yards further on had been blown to pieces. There were about seventeen to twenty charges lying about but no detonators were found. It appeared that the box had been on fire as there were pieces of burnt fuse lying about.

Those who died were-  
Benjamin Boam aged 23 years, miner,



George William Allen aged 31 years, miner,  
George Stone aged 31 years, miner,  
Job Stone aged 56 years, miner and  
George Needham aged 25 years, miner

The inquest into the disaster into the deaths of the men was held at the Stag's Head Inn, Darley Dale, before Mr. A.O. Brookes of Bakewell, the Deputy Coroner. Mr. Stokes, the Inspector, examined John Heathcote carefully about the question of him finding gas and yet allowed shots to be fired. The witness shad no explanations for his actions. It emerged that there had been some small explosions over the previous twelve months, all connected with the firing of shots.

The Coroner summed up and after twenty minute deliberation the jury returned the following verdict-

“The deaths were accidental and caused by an explosion of gas ignited by the firing of a shot.”

### **OAKLEY SLATE MINE. Blaeu Festiniog 16th. February, 1888.**

The Oakeley Company had taken over the mine seven weeks before the accident and the bridge had been inspected and it was reported as being safe. The accident took place in a slate mine when five men lost their lives when a bridge gave way. The bridge had a span of 41 feet and as constructed of wooden beams of pitch-pine which was supported in the middle by a cross beam of yellow pine which was hung from the roof on the underground chamber by iron rods. It was intended for a working load of 3 tons and the men had been told not to take more than one loaded wagon across.

On the day of the accident four loaded wagons, each pushed by two men and all starting from the same place were being taken out of the level. The first wagon, for some reason that was not clear, stopped just after crossing the bridge and caused a block. The second wagon was brought up close to the bridge. The third wagon was allowed forward and then the fourth. Under this load of about 9 tons, the cross beam gave way and the two main beams broke, sending the wagons and five of the six men to the floor sixty feet below.

All the victims were trammers.

Richard Edwards aged 48 years,  
David Davies aged 29 years,  
Evan Jones aged 26 years,  
William Lloyd aged 19 years and  
Owen Parry aged 31 years.

At the inquest into the inquiry, the Inspector said that he did not think that the men with the No.2 wagon failed in their duty by not calling 'Halt, so stopping the No.3 wagon. The survivor, who belonged to the No.2 wagon said he called, 'Halt' when the No.4 wagon was coming onto the bridge but then it was too late.

The inspector carefully examined the timbers of the bridge and found that they were in good condition but the yellow cross beam was a little decayed an he thought that this was the case of the accident and thought that the bridge builders were unwise in choosing yellow pine for the cross beam but the greatest blame lay with the men for over loading the bridge. The Coroner said that there should be stricter supervision and there was a prosecution following the inquest.

### **ST.HELENS. Workington, Cumberland. 19th. April, 1888.**

The colliery was owned by the St. Helens Colliery and Brick Company, Limited and the directors were Mr. P. Wedgewood, chairman, Mr. H.P. Stenhouse, Mr. T. Carey, Mr. W. McGowan and Mr. A. Helder. None of these men had any technical knowledge of mining. The resident mining engineer and also the certificated manager of the mine was Mr. J. H. Johnson with Mr. J. Davidson as the certificated undermanager. The Agent's name given in the special rules at the time of the explosion was Mr. C.J. Croudace, a mining engineer and shareholder of the Company who lived and practised in North Wales but had lived in Cumberland. Mr. Croudace did not admit that he was the agent but stated he was the consulting engineer to the colliery. Mr. Joseph Morrison was the overman and had a staff of four deputies in the Main seam where the explosion occurred.

The colliery was commenced in 1877 and coal was first raised from the Upper or Ten Quarter Seam in 1880. The shafts were deepened to the lower or Main seam and coal first raised in September 1882. There were two shafts twenty eight and half feet apart about a mile to the north of Workington and close to the sea shore. Both shafts were 119 fathoms deep where they cut the Main seam. The Ten Quarters seam lay at a depth of 85 fathoms, or 34 fathoms above the Main seam.

One shaft was ten feet eight inches in diameter and as the downcast. It was fitted with wooden guides to the Main seam and coal from this seam was raised through it. The other shaft was eleven feet eight inches in diameter and was the upcast. This was fitted with wooden guides to the Ten Quarter seam only from which coal was raised. It was possible to raise men in a kibble from the ten quarters if necessary. The water that collected in the sump at the bottom of the downcast shaft was drawn to the surface in water tubs and both the shafts were rather damp.

The coal was worked in the first instance, by pillars, which were later removed and this operation had been started at four points. The general dip of the seam was to the south-west at 5 inches per yard but this varied. The coal field was faulted. The levels ran almost north south and the haulage and some of the airways were driven 8 or 10 feet wide. Coal was left in the roof of these roads in order to use less timber and the height was between 5 and 6 feet. The bords were 24 feet wide and were driven next to the level where the coal was led and where the connection to another level was required for ventilation only, they were often driven in the upper part of the seam only and were narrow.

A Guibal fan, twelve feet wide and thirty six feet in diameter which ran at 55 r.p.m. was at the surface of the upcast shaft and exhausted the air from the mine. Both seams were being worked and those in the Ten Quarters direct from the shafts were extensive. These workings had no connection with the explosion and were little affected. The workings in the Main seam and a small portion of the Ten Quarters were approached from the main seam and it was in this plane that the explosion took place.

The air which ventilated the explosion area passed down the engine dip and had two intake passages. At the last measurement there was a total of 37,170 cubic feet per minute passing through the Main seam. All the splits were regulated by ordinary regulating doors with openings in the framework of large doors on the haulage roads.

The haulage of the coal to the shafts was done by horses and ponies by a self-acting incline and by an engine worked by compressed air piped down the downcast shaft. The air engine hauled the coal up the dip by means of a rope in trains from 14 to 16 tubs at 6 m.p.h. and the empty tubs ran into the mine by gravity taking the rope with them down a slop at three inches to the yards. There were landings at the bottom of the engine dip and at four intermediate points. From the bottom of the engine dip, Hogg's and Gilmour's brows rose at two and a half inches to the yard until they were near the face and then they started to dip. The coal was taken down these brows by horses. Part of the coal from the places next to Hogg's brow was brought out to the engine dip by the return airway. The dip parallel to the engine dip was used a travelling way for the men and horses. The bord parallel to the incline was also used in this way. There were 160 people working in the Ten Quarters seam. There was only one shift of hewers who started work at 6 a.m.

and finished at 2 p.m. About 200 tons of coal a day were raised from the Main seam and the adjacent Ten Quarters.

On the day of the explosion, work started as normal at 6 a.m. and the mine had been examined by the deputies before the men entered and their reports entered in the Report Books stated that the workings were safe. About 9 a.m. a shot was fired in the coal at the face of Hogg's brow. The shot was prepared by James Hogg, the hewer who was working in the place, and fired by John William Beaty, the deputy in charge of the district. Hogg's brow was then 42 yards beyond the holing and the air was directed to the face by canvas brattice which was damp. Gilmour's brow was not being worked on that day. At the inquiry, James Morrison, the overman said that the shot did not do its work and this was confirmed an examination after the disaster and the hole was drilled in an unusual place. The cartridges were of compressed gun powder and they were supplied by the owners and sometimes a 2lb. charge was used. The shots were stemmed with a plug of soft shale. Firedamp coming from the face ignited and continued to burn eventually setting fire to the coal and the brattice. efforts by Beaty and Hogg to put out the flame were not successful and the fire got a hold and forced workmen to the north to leave their working places. Hogg was killed in the explosion that occurred later and W.J. Beaty was injured and was said to have lost his reason.

The manager, Mr. Johnson, the undermanager, Mr. Davison and the overman Joseph Morrison were working near the top of the engine dip and were informed of the fire and went to the place at once. After an examination they decided to cut off the air with a brick 14 inch brick stopping, in Gilmour's brow. The work started about 10.30 a.m. and was completed about 2 p.m. with not difficulty. before the stopping was started, several men had left the Main seam level and during the building all the workmen were sent out before 11 a.m. except those who remained to deal with the fire.

Work continued as usual in the Ten Quarters seam direct from the shafts. Morrison was instructed by Davison to almost close the regulators controlling the air to the North Brow and the Ten Quarters, the east side and the west sides of the shaft level. This he did about 12.30 p.m. Under normal conditions the effect of this would have been to send more air down the engine dip and round the district where the fire was burning. Several stoppings had been completed but one in Hogg's brow could not be built because of the smoke and heat. It was stated at the inquest that loose stones were built up to try to close the road but this was found impractical and the men retreated before 3 p.m. While this work was going on near the fire several slight explosions took place. After an initial one there was one at 1.30 or 2 p.m. and one at 3 or 4 p.m. The manager denied all knowledge of these explosion at the inquiry and stated that falls might have taken place near the fire which could be mistaken for explosions and no one was burnt or injured. The Inspector thought there was good reason to think that the noises were explosions.

About 3 p.m. there was a consultation at the surface held in the office at which the manager, undermanager Mr. Wedgewood, the chairman of directors and Mr. J.E. Mulcaster, the Company secretary were present. It was decided to isolate the fire by flooding 130 yards of the lower parts of the engine and back dips and Hogg's and Gilmour's brows by building a stopping in the return airway through the nip out at the higher level. It was proposed to start the stopping in the first return and in order to do this it was decided to reverse the direction of the air current to clear away the smoke.

The stoppings were made of wood and canvas and the planks were nailed to props with a recess being cut in the coal on each side. The resulting structure was covered with canvas brattice cloth. The work began between 4 and 5 p.m. may have been completed before the explosion. One stopping had been completed and some doors were opened and propped back. Some other doors were opened slowly. The air then came down the engine and back dips, joining into one current near some doors on the back dip. Part of the air then passed to the right over a bridge crossing and the remainder passed to the left along the return and to the nip out where it was joined by a reduce current caused by the regulators from the district to the west of the shaft level. This combined current then

passed through the nip out and divided, one part passing along Hogg's brow through the third thirling from the face and then round the workings on the south side of Gilmour's brow to the engine dip where it met the other part of the air that went past the a canvas door on Hogg's brow below the return through the nip out. This current then went up the engine dip and passed through open doors to the upcast shaft.

About the time that the direction of the air was changed, James Morrison was directed by Mr. Davidson, the undermanager, to open the regulators he had closed that morning. Morrison went with Thomas Wright, a shiftman, and at about 7.30 p.m., opened the regulator near three air crossings which regulated the air to the east side of the shaft level and then went to the regulator on the west side of the shaft when the explosion took place. Neither Morrison nor Wright were injured. They lost their lights but came out in the dark to the shaft. Joseph Morrison, the overman remained in the pit for several hours after the explosion helping to recover the survivors and the bodies of the victims. There were 35 men underground on the level of the explosion and there were five survivors. Four men who were working in the Ten Quarters district direct from the shafts were not aware that the explosion had taken place until some time after.

Within a few minutes of the blast the cages were run down the downcast shaft to find out if it was clear. When the cage came to the surface it was found to contain, Joseph Robinson, the onsetter who was alive but injured. He died later. The fan and the connections with the upcast shaft were examined and found to be intact. A descent was made within half an hour and four men were found near the shaft, Joseph Morrison and Thomas Wright who were not injured and John Ballantine, the lampman who was alive but injured and died later and John Pearson, a mason who was under a drum of the compressed air engine at the time mixing mortar. He lost consciousness but was not injured.

Three men were found near the air engine, including the engineman, Henry Nicholson who was dead, Robert Clark, who was seriously injured but survived, William Gowan was found alive but died before he could be taken to the Infirmary. Most of the men down the dip were seen and most recovered during the night of the explosion. Three were brought to the surface alive, Joseph Iredale who died at the pit, Robert Hodgson, who was taken to the Infirmary and died the following day and W.J. Beaty, the deputy who fired the shot on Hogg's brow. He was taken to the infirmary but was not able to give evidence as the report records that, *'his mind was deranged.'*

Having rescued the survivors and recovered the bodies to the top of the engine brow, the explorers went down the engine dip but met afterdamp and fearing a second explosion, it was prudently decided to suspend further explorations and flood the mine to seal the roads hat communicated with the fire. Over the next 10 days eight or nine million gallons were poured into the mine.

On 30th. April, 11 days after the explosion, a second descent was made and the bodies of Henry Nicholson and William Peel were sent to the surface. They were clear of the water live and had been declared dead on the day of the explosion. On the 15th. May, two more bodies, those of Thomas Hogg and Thomas Marrs were recovered from the water by a diver named Mr. A. Lambert of 55, Strahan Road, Grove Road, Bow.

After the flooding was finished it was found that the water was rising in the engine dip. On the 4th.july, pumping was commenced and the remaining bodies recovered. Pumping was completed on 21st. September 1888. There had been nineteen horses in the stables at the time of the explosion, 12 were killed and seven survived although they were not fed between 19th. and 30th. April.

The men who died were-  
John Davison aged 53 years, underground manager.

The shiftmen-  
Robert Laybourn aged 22 years,

John Martin aged 58 years,  
George Wright aged 42 years,  
Wigan Beatie aged 24 years,  
Richard Jackson aged 27 years,  
Joseph Iredale aged 44 years,  
Lancelot Leyborne aged 48 years,  
William Dixon aged 23 years,  
John Johnson aged 26 years,  
Isaac Gaskin aged 42 years,  
William Holstead aged 45 years,  
Thomas Marrs aged 32 years,  
Thomas Hannah aged 25 years,  
James P. Smith aged 35 years, joiner,  
James Moffatt aged 53 years, joiner,  
Joseph Stevenson aged 42 years, deputy,  
William Peele aged 47 years, deputy,  
William Tunstall aged 41 years, deputy,  
John Nicholson aged 34 years, hewer,  
James Hogg aged 31 years, hewer,  
Robert Townsley aged 39 years, hewer and  
William Banton aged 37 years, hewer.

Those that died in hospital 21st. April-  
Robert Hodgson aged 39 years, hewer, died 20th. April,  
Joseph Robinson aged 37 years, onsetter,  
Henry Nicholson aged 22 years, engineman,  
William Gownan aged 28 years, whipper-in,  
Thompson Moore aged 25 years, whipper-in and  
John Ballantine aged 54 years, lampman.

The inquest into the deaths of the men was held by Mr. W.W. Lamb, Coroner for West Cumberland on the 20th. April and continued on the 1st., 17th, 18th, 24th, 25th and 26th, May. Two of the injured died in Workington Infirmary and an inquest was held by Mr. John Webster, Coroner for the Lordship of Egremont. This was adjourned sine die on the 7th. June. After the inquests were over another was held by Mr. Lumb on the 13 bodies that were recovered and a complete examination made of the mine. It was not proposed that any other inquest should take place.

After the water had been removed from the pit, a detailed inspection of the mine was made to ascertain the cause and direction of the explosion and coal dust was suspected in the spreading of the explosion. The Inspector came to the following conclusions-

- “1. The flame causing the ignition was that of a fire burning in Hogg’s brow.
2. An explosion of firedamp and gases due to the fire mixed with air in the unventilated parts of Hogg’s and Gilmour’s brows as the primary explosion.
3. The extension of the explosion from the unventilated parts of Hogg’s and Gilmour’s brows to the engine dip was direct down Gilmour’s brow, and may have been caused by firedamp, gasses due to the fire, coal dust, or to a combination.
4. The extension of the explosion down the engine dip to the stopping may have been caused by firedamp, gasses due to the fire, or to coal dust, or to a combination, but would be extended by coal dust alone.
5. The extension of the explosion from the stopping to the downcast shaft was due to coal dust alone.”

When all the evidence had been heard, the Coroner summed up and put a series of questions to the jury. In answer to these questions put to the jury by the Coroner they found that-

“The deaths were caused directly by the explosion and that the explosion occurred in Hoggs brow. It was an explosion of firedamp. That suitable means were adopted for dealing with the fire under the circumstances. That they could agree as to whether the number of men kept in the pit for dealing with the fire was excessive. That the explosion was accidental. That according to the evidence the presence of standing gas or excess coal dust prior to the explosion was not known to any of the managers of the colliery. That no blame was attributed to the management.”

**ABER. Ogmore Vale, Glamorganshire. 14th. May, 1888.**

The colliery was the property of the Aber Colliery Company. The colliery worked the No.2 Rhondda Seam from a level and the house coal that was produced made very little gas and so was worked with naked lights. It was regarded as so safe and gas free that the fan which produced the ventilation current was stopped on Saturday afternoons and not restarted until 9 p.m. on Sunday evening.

Shortly before midnight on the 13th. May, seven men went in to work. One of the men acted, as he had always done, as fireman and carried out an examination of the working with a safety lamp. Instead of the other men waiting at the station for his return, they either accompanied him or followed him into the working road in direct violation of General Rule 4 with the result that gas ignited and all but two were killed. The two who escaped had to make their way through the afterdamp.

Those who lost their lives were-  
Rees Joseph aged 62 years, fireman,  
Evan Jones aged 18 years, collier,  
Jenkin Stanford aged 27 years, collier,  
David Williams aged 30 years, haulier and  
Edward Gibbon aged 24 years, haulier.

At the inquiry the Coroner thought the verdict was equivalent to manslaughter against the manager and the undermanager but the case was subsequently dismissed when it came before magistrates. The agent, manager and undermanager were charged under the Mines Act for a breach of the First General Rule. The case against the agent was dismissed and the manager and undermanager were fined £10 and £5 respectively.

**DOUGLAS BANK. Wigan, Lancashire. 6th. April, 1888.**

The colliery was the property of the Rose Bridge and Douglas Bank Collieries Company, Limited. the accident occurred during the sinking of the shaft. The sinkers descended in the hoppet, which by some means, started to sway and struck the side of the pit. It turned over and three men were sent down the shaft. It then fell to the bottom of the shaft and killed two men who were working there.

Those who died were-  
Thomas Morris aged 45 years, contractor,  
Edward Gwatkin aged 36 years, sinker,  
Patrick Kief aged 36 years, sinker,  
William Baines aged 52 years, sinker and  
Barnard Haigh aged 36 years, sinker.

At the inquiry, Mr. Hall, the Inspector stated-

“Last Saturday I made an examination of the colliery. I heard of the accident almost as soon as it happened and I went to the pit. I made an examination and called again on Monday. I examined the winding engine and the rope and found them

perfectly satisfactory. We went down the pit and was run up and down two or three times, quickly and slowly to see how much clearance there was for the hoppet and I found it generally four feet clear of the walling. The tank was something like two feet six inches and the top of the pipe a little more. I found the hoppet ran very steadily, indeed more steadily than ever I remember one down a sinking pit before. I did not find any marks on the tank. The dust had accumulated on it. We examined the top of the pipe and the dust had accumulated there. I came to the conclusion that the hoppet did not strike the pipe or tank. I saw the signal wire was broken and I came to the conclusion that through some means which it is impossible to explain, when these men were going down in the hoppet, it began to sway, the hooks got entangled in the signal wire and the accident was caused this way. I do not say that it was so, but I may add that I was satisfied as to the sides and the machinery.”