

### **HYDE. Hyde, Cheshire. 18th. February 1889.**

At the time of the disaster the colliery was owned by Messrs. J.W. and J.N. Sidebotham and was in the Borough of Hyde about seven miles to the east of Manchester. The certificated manager of the colliery was Mr. Joseph Goodwin who also had charge of the Broomstair Colliery which belonged to the same owners. The undermanager was Edward Jackson and there were five firemen. Of the firemen two, Joseph Wylde and James Davies were employed in the Two Feet mine and they were assisted by a third, Eli Bradbury who was employed partly in the Two Feet mine and partly in the Peacock. The morning shift on the Two Feet mine consisted of one fireman, 26 colliers, 10 waggoners, 4 jiggers and takers-off, 2 drivers and a dataller. An afternoon shift of 30 men and boys succeeded the morning shift.

The colliery was worked by two shafts. The downcast was 272 yards deep and twelve and a half feet in diameter. It was used for drawing coal and pumping water and for the descent and ascent of the workmen. The upcast shaft which was 20 yards the north was 22 yards deep and eight feet in diameter and was used for ventilation but could carry men if necessary. The strata that the shaft penetrated dipped about 1 in 1.88 to the north west. Three coal seams were worked and in descending order they were the Two Feet mine, in which the explosion occurred, the Peacock mine 14 yards below and the Third mine about 50 yards below the Peacock.

The pit was ventilated by a furnace at the bottom of the upcast shaft in a short tunnel or stone drift. The air to the furnace was partly fresh air and partly air that had passed round a small district of the Third Mine to the rise of the shafts. The return air from the Two Feet and Peacock mine entered the upcast shaft 256 yards above the furnace in a dumb drift.

The district in the Two Feet mine in which the disaster occurred was approached from the downcast shaft by a level tunnel leaving that shaft to appoint 272 yards from the surface and 55 yard below the Two Feet seam in the shaft. Thirty six yards from the shaft a metal brow or dip stone drift 209 yards long left the tunnel at right angles and cut the Two Feet seam. There was a metal brow driven in the direction of the dip of the measure. from the point where the brow cut the Two Feet seam, the haulage road was continued in the same line as the Two Feet for about 120 yards and from there a pair of levels were being driven to win a district below that in which the explosion occurred.

At the point where the metal brow cut the Two Feet seam there were three levels driven to the south west for 1,150 yards. The middle level was called the horse road and for 650 yards from the metal brow, was the intake air way. At a distance the air was diverted by two doors into the low level and passed along this to the working face at the far end. The low level was known as the deep or load level and was used a a water course. The upper level or counter level was used for some distance as a return airway. At the end of these there was a inclined road known as the Far Jig Brow was driven on the full rise of the seam. Three hundred yards further from the Far Jig Brow a similar incline had been driven and was called the No.1 Jig Brow. Levels were in the course of being driven to the right and to the left of the jig Brow. Midway between between No.1 Jig Brow and the Far Jig Brown another one known as the New Jig Brow was in the course of preparation.

For the purpose of ventilation slits were driven between the levels and shortly before the explosion had been connected with the the New Brow. The levels were known by numbers. No.1 was the horse level and that above it was No.2 and so on to No. 10 which was the top level in the Far Jig Brow. The levels were driven 9 feet wide and the bottom stone was taken upon the high side so as to form a level road and the stone was used to build a pack wall four and half feet thick along the side of the levels and this reduced the available width to for and a half feet. The level out of the Far Jig Brow had been driven to it's full extent and the coal between then was being removed at the far

end. The two upper pillars of coal had no bearing on the explosion and the goaf covered about one statute acre.

When the coal was loaded at the working faces the loaded tubs were shoved by the waggoners along the level to the jig brows where they were lowered by rope to the horse levels by a wire rope. The rope passed round a drum at the top of the brow and was attached to a counter balance running on a line of rails at the side of the brow. The balance was arranged so that while the loaded tub was passing down the brow was able to draw the balance weight up the brow, the balance weight in turn was able to draw an empty tub up the brow while it descended.

In removing the pillars at the face the work was kept near the jig brow in the high level on that the working places on the pillars were in eschelon. An air way was maintained along the serrated face and was withdrawn as the face advanced. In order to maintain the air way from the top corner of one pillar to the low corner of the pillar above, a pack wall, 6 feet thick, made of stones from the goaf, was built in a line with the low side of the of the high pillar and kept up to within 3 to 5 feet from the face of that pillar. Holes were made at frequent intervals through the pack walls on the low side of the level. These holes were 3 feet apart.

The ventilating current came from the downcast shaft, down the engine level and along the horse level as far as No.1 Jig Brow. Here it was diverted by doors along the low level. A small portion scaled the goaf and the horse level and went up No.1 Jig Brow where it rejoined the main current. The main current passed along the low level to the working face and the edge of the goaf and then passed up the face to No.8 level which was the highest part of the goaf and then out of the No.8 level up slit to No.10 level when it continued until it arrived at the top of the New Brow where it divided.

The Two Feet seam at the colliery was not thought to be fiery and was worked with naked lights. There was no blasting with explosives as it was found not to be necessary and from the evidence given at the inquiry by men and officials gas was a very rare occurrence in the mine. Gas had been heard bubbling through the water from the lower workings but could not be detected at a lamp. The workings were damp in places and in others dry and dusty but there was no appreciable amount of coal dust in the roads and workings.

On the day of the disaster the men descended the pit about 5.30 a.m. they were met at the bottom of the shaft by the fireman, Joseph Wylde and he informed them that the pit was safe. He also made a written report of his morning inspection which was initialled by the undermanager. The men and boys went to their working places.

All went well until about 9.30 a.m. when the explosion occurred. it caused the reversal of the air at the downcast shaft and an alarm was given at the surface. The work of exploration was at once undertaken by the officials and workmen assisted by volunteers from neighbouring collieries. Some of the explorers were seriously affected by the afterdamp and Mr. Goodwin the manager was ill in bed for several days. The last of the bodies were brought to the surface 12 hours after the blast.

Those who died were:-

Fred Howles aged 17 years, wagoner.

Arthur Wildgoose aged 15 years, taker off.

Thomas Davies aged 46 years, collier.

James Broadbent aged 19 years, wagoner.

Frank Ashton aged 14 years, jigger.

Henry Slater aged 43 years, collier.

G.H. Wylde aged 19 years, wagoner.

Eman Bailey aged 47 years, collier.

Joseph Fish aged 23 years, collier.

William Haslem aged 30 years, wagoner.

James Hall aged 65 years, collier.

James Bradley aged 20 years, wagoner.  
William Catterall aged 63 years, collier.  
Thomas Shaw aged 5 years, collier.  
John Bailey aged 52 years, collier.  
Henry Slater jnr. aged 15 years, jigger.  
Samuel Watson aged 24 years, collier.  
Joseph Wilde aged 31 years, fireman.  
Joseph Gee aged 34 years, collier.  
William Slate aged 37 years, collier.  
Thomas Gee aged 27 years, collier.  
Peter Gee aged 27 years, collier.  
John Ridgeway aged 20 years, wagoner.

Those who were injured-  
William Gee, collier,  
John Wilde, wagoner,  
E. Etchells, taker-off and  
James Davies, collier.

The inquest was opened by Mr. T.W. Johnson, Deputy Coroner for the Stockport and Hyde Magisterial Division of the County of Chester on the 19th. January for the evidence of identification and then adjourned until the 7th. 8th. and 13th, February.

There was a full inspection of the workings after the disaster by Mr. Atkinson, the Inspector and he came to the conclusion that the blast had been caused by a inflammable or explosive mixture of gas had entered the air current from the goaf next to No.8 level which probably came from a sudden weight in the goaf. He went on to say that-

"I am of the opinion that the most dangerous element in this explosion was the coal dust of the Far Jig Brow and the loss of life was mainly due to its ignition. Until the predominating influence of coal dust on a large colliery explosions is more widely recognised than at present, explosions are likely to occur. It is therefore desirable that every opportunity should be taken to bring to the attention of all those interested all facts bearing on the question."

The jury returned the following verdict-

"that the deaths were caused by asphyxia and suffocation from the afterdamp caused by an explosion of firedamp in the Two Feet mine at the Hyde Lane Colliery on the 18th. January 1889 and that such an explosion was purely accidental."

The Inspector, Mr. Atkinson noted in his report that the colliery was worked after the accident with safety lamps of proper construction supplied by the owners.

### **BRYNMALLY. Wrexham, Denbighshire. 13th. March, 1889.**

The colliery was the property of Thomas Clayton with Mr. Frederick Hutchinson as the certificated manager of the Pendwill Pit of the Brynmally Colliery. The Pits were known as the Nos. 1 and 3 and the explosion took place in the Queen seam of the No.1 Pit. The pit was 290 yards deep. The No.2 shaft was closed and No.1 shaft was the down cast and No.2 the upcast and the colliery was ventilated by a Schiele fan 4 feet 6 inches in diameter which usually ran at 500 r.p.m.

The seams that were worked at the colliery were the Upper and Lower Queen seams in which there were 200 men and boys working. The lower Queen seam was 190 yards deep and was reached by a tunnel driven from the shaft and the ventilating air was split to the north and the south sides and the coal was worked on the longwall system. There was little blasting and safety lamps were used in the mine and open lights were closed at the pit eye of the downcast shaft but none in the workings. Men who lost their lights

went to the lamps station to relight them. There were two lamps stations, one at the bottom of Harry Garston's jig and the other near the overcast. Lamps keys were carried by Garston, Thomas Edwards, Charles Williams and E. Hughes, the chartermaster. Hugh Jones who was in charge of the roads also had a key as well as the fireman and underlooker.

The men went to work at 2 o'clock when William Parry inspected the south side and he had been fireman for about four months. He had been down the pit since 4.20 a.m. and found no gas.

William Henry Dodd who was a filler went down the pit 6 a.m. and met the fireman near the top of the break and he was told that everything was all right. He went to work and at about 2.30 a.m. he felt a shock like a wind working backwards and forwards. He asked Henry Griffiths to go and see what was the matter. He declined and Dodd went to investigate. He found Thomas Davis alive and then a horse and a boy. He thought that the lamps were open and at the inquiry he gave evidence that the system of relighting lamps in the mine was very lax.

Joan Powell, the manager of the Vron Colliery was in the exploring party that found most of the bodies. An inspection showed that the explosion had taken place near the jig wheel and everything was blown away from that point and gas was found during the rescue operations.

The men who lost their lives were-

James Davis aged 14 years, wagoner, son of David Davies, collier,  
Edward W. Edwards aged 14 years, wagoner, adopted son of Evan Roberts,  
Edward Rowland aged 14 years, hooker-on, son of Morris Rowland, chartermaster,  
Joseph Williams aged 15 years, pony driver, son of the late John William, ostler,  
Peter Jones aged 15 years, filler, son of Peter Jones, tailor,  
Charles Hughes aged 14 years wagoner, son of Samuel Hughes, horseman,  
William Davies aged 22 years, filler, and a single man.  
Evan William aged 53 years, collier who was a widower.  
Thomas Stanton Davies aged 16 years, pony driver,  
Thomas Edwards aged 40 years, chartermaster,  
Robert Thomas Edwards aged 17 years, filler,  
Arthur Thomas aged 17 years, filler,  
Thomas Jones aged 20 years, collier,  
Henry Tudor aged 17 years, jigger,  
Henry Garston aged 50 years, chartermaster,  
Thomas Williams aged 33 years, collier,  
Hugh Jones aged 48 years, byeman,  
Samuel Millington aged 18 years, filler,  
Thomas Jarvis aged 20 years, filler and  
Peter Griffiths aged 22 years, filler.

The inquiry into the disaster was held by Mr. B.H. Thelwall, Coroner at the Harp Inn, Moss. All interested parties were represented.

William Parry, fireman, had inspected the pit at 9 a.m. on the morning of the explosion and found no danger at the spot where the explosion occurred. Samuel Matthias was in the seam when the explosion took place and he told the court that if a lamp went out then he would try to find the fireman and if he could not find him, then the charter master would relight it. It was thought that the explosion occurred by men opening their lamps in the return airway and Mr. Hall, the Inspector, stated-

“ The contravention of the rules is to the greatest discredit of the working men of the district and it is more than disappointing, that after all that has been done by the legislature, the men were so reckless with their and other men's lives.”

In the Inspector's Report for 1888, Mr. Hall commented that he thought workmen's lives seemed to be less secure in the North Wales Collieries than in any others. He went on to say

"I believe that this unenviable condition is due principle to the 'butty' system of working which prevails. Under this system proper discipline is seldom maintained, the chartermaster of 'butty' being deputed to look after the safety of the workmen employed by him, and although he is under the supervision of the officials acting under the certificated manager, it is naturally assumed that he must, to a great extent, be responsible for the safety of those he directly employs."

There was strong evidence that there had been indiscipline with the workmen's lamps and Mr. Hall was critical of the recklessness of the workmen and he also thought that this reflected on the management of the colliery when he was asked by the Coroner if he blamed any of the officials he said that the situation occurred through generally bad management.

The Coroner summed up and the jury, after reflection, brought in the following verdict-  
"The explosion was caused by an accidental fall of roof in Garston's jig the nine-inch seam which caused a sudden outburst of gas which was ignited where three men and a boy were supposed to be sitting with lighted open lamps which in our opinion caused the explosion."

#### **BOTHWELL CASTLE No.2. Bothwell, Lanarkshire. 28th. June, 1889.**

The colliery was the property of William Baird and Company and the man were killed while descending the shaft. The engineman failed to shut off the steam in time and the cage struck the cage seat.

Those who died were all miners-  
Thomas Watson,  
James Cinnamond,  
James Crofield,  
Michael Allan and  
George Grant.

#### **MAURICEWOOD. Glencourse, Midlothian. 5th. September, 1889.**

The pit was at Glencourse in the County of Edinburgh and was owned by the Shotts Iron Company, Limited since 1875. The Company also owned other collieries and had blast furnaces in Lanark. Mr. Robert Bell was the chairman of the Company and Mr. A.W. Turnbull the secretary and general commercial manager.

Mr. John Lowe was the certificated manager of the Penicuik Mine which is on the west side of the Midlothian coalfield, and the other officials of the mine were, George Muir, overman who was killed by the fire, William Gall, a mechanical engineer, George Hunter who was an inspector or fireman who was killed, Edward Lydon, another fireman who was killed, David Penman fireman who was killed, Robert Dickenson, a roadsman who was killed and James Somerskill

The coalfield has a very steep dip and the seams, where they outcrop are known locally as 'edge' seams and are generally free from firedamp. The pit is at an angle of 40 to 50 degrees for four hundred yards from the outcrop and then they flatten out. The seam is known as the Great Seam. The Penicuik mines had two establishments, the Greenlaw and the Mauricewood pits, which were about one thousand yards apart and were connected by a single road called the 'Communication road'. The Greenlaw pit has a circular shaft up which coal is raised and this was the downcast shaft. There was an incline in the seam from the surface called the No.1 incline. This was used as the upcast shaft and was fitted with ladders and contained steam pipes.

At the Mauricewood pit there was an oval vertical shaft nineteen and a half feet by five and a half feet and 84 fathoms deep. This shaft was divided by a wooden wall, fourteen and a half feet by five and a half feet downcast for air and containing pumps cage and dook ropes and the other five feet by five and a half feet upcast shaft for air containing the steam pipes. The shaft passed through the Great Seam at 59 fathoms and was curtained 25 fathoms below. From the point where the shaft intersected the Great Seam, an incline extended to the basin. The incline was reached at the level of the bottom of the shaft by another level cross cut mine at a point called the 'dook head'.

The Mauricewood and the Greenlaw pits were managed as separate establishments and except for the fact that the Greenlaw was the second shaft for the Mauricewood pit, in compliance with Section 16 of the Coal Mines Act, and Greenlaw water flowed from the bottom of the Mauricewood shaft.

Mining operations had started at Mauricewood at the outcrop with coal being drawn up the No.2 incline some years before. As the workings went were continued, the shaft was sunk and from the bottom, and the incline was driven deeper until the bottom of the basin was reached. While this incline was being driven, another incline was driven the whole distance which was used as the return air-way from the 80 fathom level upwards but below that point it had to be abandoned. At the time of the fire the whole of the output came from the basin or flat portion of the coalfield and the No.2 incline from Mauricewood was not in use at the time of the fire. The mine was free from firedamp and coal dust and ordinary Scottish miners lamps were used.

The pit mined iron ore and coal on the east side ironstone was worked by a longwall method and on the west side, coal was worked, again by the longwall method below the ironstone waste. The ironstone and coal were filled into tubs called locally 'hutches' at the working places which were the passed to the 'lye' or sidings by the drawers. The ironstone on the south side passed down a self-acting endless chain incline and then drawn by ponies to the main winding incline the coal from the west side was drawn direct from the lye by ponies to the main incline. Three ponies, about twelve and a half hands high, were used and the roads were the normal size.

The mine was ventilated by a Waddle fan, eighteen feet in diameter at the surface which ran at 45 r.p.m. and the natural heat of the mine and the steam pipes also helped with the ventilation. The air went down the downcast shaft and where it reached the Great Seam, it was split down the incline to the dook head, where it joined the other portion which had passed from the bottom and along the cross-cut mine.

There was water in the mine which had to be pumped out and an engine raised water from the bottom of the shaft for eighteen hours a day at two hundred and sixty gallons per minute. An engine at the eighty fathom level, situated in the return air-way, forced the water to the dook head for seventeen hours a day raising thirty six gallons per minute.

On the 5th. September Mr. H. Hunter the engineman at the one hundred and sixty level, came to the surface at 5 a.m. and he had seen no signs of the fire near the enginehouse. George Hunter and E. Lydon, the night shift inspectors or firemen were in the mine from 10 p.m. on the 4th. to 7 a.m. on the 5th. and examined the mine before the day shift came down. Both made satisfactory reports and nothing was wrong at that time.

On the 5th. September one hundred and two men were employed at the colliery, seventy seven underground and twenty five above ground. The fire was first observed, there were seventy men underground of which sixty three lost their lives and only seven survived. The miners descended the shaft and the main incline about 6.30 a.m. and work went on as usual to 12 noon. The manager Mr. Lowe met the overman George Muir on the surface when he came up the pit for his breakfast at 10 a.m.

Muir returned to the mine about 11.15 a.m. and was seen at the bottom of the pit by the bottomer Mr. W. Robb. He had gone to do some repairs at the engine at 80 fathoms level with William Gall, a mechanical engineer and John Walker, a labourer. They

descended at 11.30 a.m. The day shift engineman Mr. H. Macpherson was there at the engine when they arrived. Of the seventy persons underground, there were five between the dook and the shaft, three at the 80 fathom level and there were sixty two at the 160 fathom level.

At 12 noon a pony driver, Mitchell Hamilton, came from the east side to the foot of the main incline and called the attention of Mr. Robb to a fire in the engine house. Robb saw that the door leading to the return upcast was on fire and he came put shutting the door to the level behind him. He raised the alarm and some boys at the foot of the incline ran to warn the miners. A signal came to the 160 fathom level to send away the carriage for men at the 80 fathom level. As the carriage went away, Robb stepped on to and it before he reached the 80 fathom level he met smoke pouring from the door of the enginehouse. The carriage was drawn to the dook head and Robb was the only survivor from the 160 fathom level.

As Robb saw the fire, Gall, Walker and Macpherson were at the engine at the 80 fathom level and were alarmed by bad air and smoke coming to them. They came through the door to the main incline and signalled for the carriage. Gall had shut the door as they came through and dense volumes of smoke followed them. Walker and Macpherson lay down between the incline and the door. Gall started to climb the incline and reached the dook head level. After it had known what had happened the carriages were run up and down several times without signals and four people came out but they were either dead or died immediately afterwards.

Attempts were made to reach the 80 fathom level on the carriages but it was found that it was impossible, owing to the smoke eddying upwards for 10 fathoms. The smoke was coming from the door past the enginehouse and to a lesser extent through the level of the main incline. The speed of the fan was increased and the area of the incline reduced by brattice to half its size in the hope that the increased velocity would clear the air. The smoke became less and the 80 fathom level was reached by midnight on the 5th. and the bodies of Macpherson and Walker were recovered. The rescuers made their way to the 80 fathom level and tried to shut the door by means of a long pole. The door was open a few inches but sprang back again and they were unable to keep it closed.

A stopping of brattice cloth was placed at the mouth of the 80 fathom level on the east side of the main incline. About 1 p.m. on 6th. September, twenty five hours after the fire broke out, the 120 fathom level was reached. Smoke was still hanging in the incline below, but on shutting the door in the air crossing at 120 fathoms level it cleared away and the 160 fathom level was reached at 2 p.m. on the 6th. It was soon found that the fire had extended to the enginehouse along the east side level to a few yards of the foot of the main incline. The timber was burning fiercely and the road was fallen and blackened. Near the foot of the incline and the coal workings nineteen bodies were found on the west side. Water from hoses was played on the fires and every effort was made to recover the bodies but the rising water stopped all operations.

An effort was made to reach the east side door in the air-crossing at the 120 level and proceeding inbye from that point but on opening the door, dense smoke came to the main incline of the 80 fathom level. The effort was abandoned and it was decided to close the mine. Air tight scaffolding was placed on the top of the Mauricewood and Greenlaw pits and the No.1 incline. This was done at 3 p.m. on the 7th. September and a day or two afterwards they were removed from the Greenlaw pit and the incline and a stopping erected in the communication road near Greenlaw pit.

On the 4th. October the mine was re-opened and the fire appeared to have been extinguished. Measures were taken to pump the water out of the pit. It had risen thirty seven fathoms up the slope from the bottom of the main incline. On the 7th. October, smoke was observed ascending the pipe upset at 80 fathom level and stoppings were placed in the roads leading downwards immediately below the 80 fathom level. The stoppings were removed and the water started to be pumped out. The 160 fathom level

was reached on 16th. March 1890 and from the main level the thirty six bodies in the mine were recovered. Three were found in the sump at the bottom of the main incline. Twenty nine on the east side of this, seventeen of them were headed by George Muir, the overman, were found in the intake side of the door separating the east side intake and the return air-way and the remaining four bodies were found on the west side of the return air-way. The position of the bodies threw no light on the disaster.

The victims recovered in September 1889-

James Somerville, aged 18 years, roadman.

Robert Dickson, aged 33 years roadman.

Thomas Foster, aged 17 years, pony driver on the west side.

Alexander Stewart. aged 21 years, drawer on the east side.

George Penicuik, jnr. Aged 14 years, drawer on the west side.

Richard Hamilton, aged 14 years, drawer on the west side.

James Wright, aged 16 years, drawer on the west side.

Andrew Wallace, aged 14 years, drawer on the west side.

William Daly, aged 33 years, miner on the west side.

Robert Miller, aged 17 years, miner on the west side.

John Walker, aged 38 years, miner on the west side.

George Livingstone, aged 45 years, miner on the west side.

John Frazer, aged 16 years, miner on the west side.

Thomas Adams, aged 24 years, miner on the west side.

William Hunter, aged 51 years, miner on the west side.

Robert Hamilton, aged 26 years, miner on the west side.

Alexander McKinlay, aged 28 years, miner on the west side.

David Wallace, aged 22 years, miner on the west side.

James Stark, aged 19 years, miner on the west side.

Martin Stark, aged 24 years, miner on the west side.

Robert Hunter, aged 44 years, miner on the west side.

John Sennet, aged 15 years who was working the fan on the west side.

Hugh McPherson, aged 60 years the engineman at the 80 fathom level.

John Walker, aged 62 years, mechanic at the 80 fathom level.

Robert Tomlie, aged 14 years and

William Urquhart, aged 18 years, bottomers who were working at the foot of the main incline.

Those recovered in March 1890-

George Muir, aged 45 years an overman.

David Penman, aged 27 years an inspector.

Thomas Hunter, aged 38 years, bottomer who was working on the east side incline.

Mitchell Hamilton, aged 16 years, pony driver on the east side.

Thomas Bennet, aged 29 years, drawer on the east side.

David Anderson, aged 32 years, drawer on the east side.

Martin Morgan, aged 20 years, drawer on the east side.

William Brockie, aged 26 years, drawer on the east side.

Robert Kinninmount, aged 17 years, drawer on the west side.

James Porteous, aged 29 years, miner working on the east side.

William Lamb, aged 22 years, miner on the east side.

Robert Porterfield, aged 15 years, miner on the east side.

David Porterfield, aged 15 years, miner on the east side.

William Dempster, aged 31 years, miner on the east side.

William Grieve, aged 33 years, miner on the east side.

William Meikle, aged 44 years, miner on the east side.

William Meikle jr, aged 15 years, miner on the east side.



Walter Meikle, aged 12 years, miner on the east side.  
James Irvine, aged 32 years, miner on the east side.  
William Brown, aged 21 years, miner on the east side.  
Thomas Meikle, aged 41 years, miner on the east side.  
Robert Dempster, aged 37 years, miner on the east side.  
Robert Dempster jnr, aged 14 years, miner on the east side.  
William Wright, aged 19 years, miner on the east side.  
John Purves, aged 26 years, miner on the east side.  
Daniel McKenzie, aged 16 years, miner on the east side.  
William Brown, aged 25 years, miner on the east side.  
Mitchell Hamilton, aged 41 years, miner on the east side.  
Thomas Strang, aged 31 years, miner on the east side.  
John Glass, aged 28 years, miner on the west side.  
George Penuick, aged 40 years, miner on the west side.  
Matthew Wright, aged 34 years, miner on the west side.  
Peter McPherson, aged 17 years, miner on the west side.  
David Kinninmount, aged 45 years, miner on the west side.  
William Miller, aged 14 years, pumper on the east side.  
Charles Hamilton, aged 14 years, pumper.

The Inspector thought that the cause of the accident was smoke from a fire the return which penetrated the workings but how the fire was caused there was no evidence to show or that it was due to any want of care of the management of the mine. The Inspector went on-

“It does not appear to me that the secondary cause of the accident, the inspection of a current of hot air and smoke from the return upset to the main incline at the 80 fathom level, was anticipated or might reasonably have been anticipated by the management of the mine. I am not aware of any loss of life from a similar cause although some case without loss of life have occurred and are recorded under the title of ‘Paradoxes in the ventilation of Mines’ in the Transactions of the North of England Institute of Mining Engineers Vol. XII, page 93.”

#### **MOSSFIELD. Longton, Staffordshire. 16th. October, 1889.**

The colliery belonged to Messrs. Hawsley and Bridgewood Limited. and was situated near Longton in the Parish of Cavershall, Staffordshire. It was worked by two shafts fifteen yards apart and ten feet six inches in diameter and both were used for raising coal. There was one cage in each shaft and both cages were worked by the same engine one cage descended while the other ascended. The cages each carried four tubs on two decks and run on wire rope guides. Water was periodically drawn up the downcast by means of the cage and both shafts were wet.

There were three seams worked at the colliery the Hardmine at two hundred and fifty yards, the Banbury at three hundred and sixty three yards and the Cockshead at four hundred and fourteen yards. The shafts are four hundred and forty yards deep to the hooking-on places near the bottom. The Hardmine was cut into the shaft at a depth of two hundred and fifty yards and the coal from this seam was put into the cage at the upcast shaft at a hooking-on place in mid-shaft. The workings of the Hardmine were not connected with those of the Banbury and the Cockshead seams except by the shafts and the Hardmine workings were not affected by the explosion. The workings of the Cockshead seams were reached by a cut or stone drift leaving the downcast shaft twenty yards below the Hardmine seam and through a short level cut of sixty yards and the Banbury seam was a hundred and sixty yards further on. The Cockshead seam was worked on a system of so called panel work. Levels were driven on the strike of the seam and from the upper levels excavations thirty to seventy yards thick were made.

These were known locally as 'drifts' and were driven to the rise sometimes exceeding one hundred yards. Between these drifts ribs of coal are left.

The Cockshead seam has the following section:- roof, strong metal with ironstone bands, one foot four inches of ironstone in bands two to three inches thick with some partings between each, four inches of bass, eleven inches of metal, called locally, 'thistle' which was loose bituminous shale, Top coal, three feet eight inches, Middle coal eight inches and Bottom coal three feet eight inches, a total of eight feet. The floor was of three inches of marl, too strong to hole in and then six inches of dark grey metal. This seam was holed in the Middle coal and in the first working the top coal was left to form the roof. Part of the top coal was taken down to make height for the horse roads and at other places when it is not required for the roof. As much of the top coal was got from behind the faces of the drift as was possible between the pack walls and when the roof is not required. The Cockshead was a very dusty seam and there was always coal dust throughout the workings and the roads.

The Banbury seam was worked by the longwall system and all the coal was removed in one operation. The roads through the goaf were made by pack walls and the roof immediately behind the advancing face was supported by timber and stone packs four yards thick at nine yard intervals. The coal was jiggged down self-acting incline to a level road on the deep side of the workings and then drawn to the shaft by horses. The seam had the following section:- Roof, strong grey bass, coal four foot one inches thick and holing dirt two feet seven inches. The floor was of grey metal. The holing was done in the dirt below the coal and this caused a lot of stone dust there was a large amount of coal dust on the roads.

A tram road was maintained on one or both sides of the drifts according to the width. One side of the tramway was the coal and the other was a pack wall four feet thick. The roof of the working face of the drifts was supported by timber and pack walls four feet thick and five yards apart. The coal got in the drifts was lowered by gravity to the lowest of the series and then taken to the shaft by horses. The ventilation for the pit was produced by a Waddle fan thirty feet in diameter, running at fifty revolutions per minute at one and a half inches water gauge and placed near the top of the upcast shaft. It was working properly at the time of the explosion. Both seams were worked by safety lamps but naked lights were used for lighting the bottom of the downcast shaft. The lamps that were of the Meusler and Mausault lamps. Some were locked by a screw lock and others by a lead plug. The lamp stations in the Banbury seam was in the air intake at the junction of the crut and the horse level and the one for the Cockshead at the bottom of the downcast shaft.

There was no blasting in the Cockshead and in the Banbury the roof of the gate-roads was blown down by gunpowder in water cartridges, the shots being electrically fired. Some explosive was used in the coal for driving a new engine road near the outer end of the horse road. In the new cruts driven from the Banbury to recover other seams, gunpowder was used but the places were watered before the shots were fired.

The officials of the colliery were, Mr. J.G. Blackwell, managing director, who was a mining engineer holding an managers certificate but he did take an active part in the direction of the colliery. Mr. James Potts who was the certificated manager and had been at the colliery for six years. He was also the certificated manager of two other pits belonging to the same owners which were being re-opened. William Barker, the underlooker in the Hardmine and William Fletcher, underlooker in the Banbury and Cockshead seams. Both Barker and Fletcher held certificates as under-managers but neither of them had been appointed in writing as was required by the Coal Mines Act. William Fletcher fulfilled exactly the same duties in the Banbury and the Cockshead seams as he would have had he been the undermanager in writing. Thomas Lane and Joseph Green were the firemen in the Hardmine and Arthur Fletcher, William Boon and Isaac Cooper were the firemen in the Banbury and Cockshead seams.

The colliery was worked in two shifts, the day shift of two hundred men and boys went down at 7 a.m. and came up at 3.30 p.m. The night shift employed one hundred persons and went down before 9 p.m. and came up at 5.30 am. The numbers mentioned also included those who worked in the Hardmine. A shift of contractors and datallers went down at 3.30 p.m. and came up at 12.30 am. and the night shift on Friday and both the shifts on Saturday went down and came up an hour earlier than weekdays. The colliers and loaders were employed directly by contractors and each contractor employed about six men who had a particular face to work or 'drift' that was assigned to him. About seven hundred and fifty tons of coal were got from the Banbury and about 1,000 tons from the Cockshead seam per week.

There was drop in the atmospheric pressure which started about sixteen hours before the explosion and this was accompanied by an increase in the temperature but there was no reason to believe that this had any effect in the cause of the explosion.

Over the years, considerable portions of the workings had been sealed off due to gob fires. The Inspector's Report lists the numerous occasions that gob fires had been dealt with at the colliery in the past and there were signs in the pit that another gob fire was immanent before the explosion. At the inquiry, it was thought that this was a likely cause of the explosion. Signs of the fire were noted in the drift by the workmen on the 14th. October between 2 and 3 p.m. when they smelled the characteristic smell that indicated that the gob was heating. It was observed by Arthur Fletcher, the night shift fireman and reported by him to his father William Fletcher, the underlooker, the next morning. William went to the place at 8 a.m. on the 15th. October and satisfied himself that there was a 'gob stink'. The men working in the place complained of the smell to him. The next day Potts ordered stoppings to be made at points nearest to the fire but it was impossible to erect air-tight stoppings because of the crush between the broken strata.

At the inquest the accounts of the events at the colliery differed between those given by Potts and those given by Fletcher and it emerged that there had been problems between James Potts and William Fletcher for some months before the explosion. Her Majesty's Inspector for Mines for the Staffordshire District, Mr Atkinson, did not go into great detail but he pointed out-

"That a grave misunderstanding or want of confidence and mutual reliance between the officials of the colliery may be a serious source of danger and should not be allowed to exist."

About a month before the explosion, Potts had an accident, when he was thrown out of a conveyance, injured himself and was unable to go down the pit as often as usual. He had been down the pit once or twice only since the accident but he was able to go down when the gob fire was reported. Mr. Atkinson thought that he did not make proper arrangements to deal with the gob fire and thought it was grave error to put in a stopping while the men were still working in the mine. He also believed that there were serious faults in the supervision of the colliery.

At the time of the explosion there was only one fireman on duty at night, Arthur Fletcher, for both the Banbury and the Cockshead seams. This was a temporary measure for a week only until another fireman had been appointed. He had both seams to examine before the morning shift came down but he was dealing with the gob fire and did not proceed with the inspection. Clearly there was too much work for one man to do.

The repeated accumulation of gas should have been removed. William Fletcher said he had made preparations to restore the ventilation and he had asked Potts to allow him to remove the gas but it was still there at the time of the explosion.

The ventilation of the Cockshead seam was not good and should have been divided and taken from one district to the next. Some of the airways were in a bad state and were too small so that when the stoppings were made, not enough air would pass through. The ventilation was also interrupted by the passage of the cage. As the cage in the downcast shaft rose, hen water was being wound, it went directly above the top of the upcast shaft and the ventilation was interrupted for a short time.

With these problems the explosion was probably inevitable and it took place about 3.50 a.m. There was little damage to the top of the shafts and the officials were informed as soon as possible and the work of exploring the mine was started. The thirteen men in the Hardmine were got out alive and assistance from neighbouring collieries came quickly. The work worked round the clock at the tremendous task of clearing the damage and great care had to be taken to avoid further loss of life. The explorers found that the timber was displaced near the downcast shaft and the doors on the road leading to the upcast shaft were blown towards the shaft. The Banbury seam was quickly explored through out but the Cockshead was only partially explored and five bodies were recovered and taken to the pit bottom.

It was thought that there were probably bodies in the upper workings but it was not considered safe to enter these workings as this was the seat of the gob fire and it was thought that it would be too dangerous if air was admitted to the fire. The blast affected the both the Banbury and the Cockshead seams. In the Banbury the blast had extended right up to the face and in the Cockshead seam, all the workings were explored and they had been damaged by the explosion.

At the time of the explosion there were seventy seven men in both seams and sixty four were killed and the sixteen horses in the mines were also killed. Tubs of stone on the horse-roads into the Banbury seam were badly damaged and near the end of the Banbury horse-level and a winch used for hauling up tubs the new engine-plane was blown sixteen yards inbye. In the Cockshead seam the air-crossing the horse-level was destroyed and nearly all the timber was blown out. There were numerous falls and the Cockshead seam and the explores could get only twenty-five yards beyond the jig due to fall and the level was full of gas beyond the fall.

The bodies of the men found on the horse-level looked as though they had been at work when they died. Of the six bodies were found on the other jig, three were found on the jig-landing and of these D. Hulme was a loader who worked on both side of the level and jiggged the tubs down the horse-level. J Steele was taking the coal down the thurlings and William Birchwood, who was a collier in the upper south level where his clothing was found. Evan Price, collier was found six to seven yards from the face in the south level where he was working. His body was divested of clothes and his belt was found four yards further on from his body. H. Sellars and B.L. Smith, both colliers were found near their workplaces and six lamps were found on the jig.

A considerable part of the Cockshead seam took some time to explore and the operations were confined for the recovery of the bodies. The exploration lasted over three months and five bodies could not be recovered.

The victims who were found in the Banbury Seam.

William Smith, aged 16 years a horse driver who worked the Banbury Crut to the main jig. He was slightly burnt,

Noah Ball, aged 39 years who was a horse driver in the Banbury Crut,

Thomas Brough. He was a holer and was sightly burnt,

Isaac Derricott, aged 60 years who was a holer and was badly burnt,

John Shenton, aged 15 years a horse driver who was badly burnt,

John Tomlinson, aged 32 years a collier who was asphyxiated,

William Hulme, aged 24 years the taker off in the Main Jig who was slightly burnt,

Joseph Cotton, aged 26 years a holer who was asphyxiated,

Thomas Walker, aged 25 years a waggoner to the Main Jig who was asphyxiated,

William Farrell, aged 23 years a loader who was asphyxiated,

Thomas Brough, aged 20 years a collier who was slightly burnt,

William Horleston., aged 35 years a contractor who was asphyxiated,

John Ball, aged 36 years a contractor who was asphyxiated,

Francis Malbon Shaw, aged 21 years a loader who was slightly burnt,

Jacob Bath, aged 23 years a contractor who was asphyxiated,

John Smith, aged 18 years a jigger in the Main Jig who was badly burnt,  
James Bettany James, aged 23 years a loader who was asphyxiated,  
Thomas James, aged 18 years a loader who was badly burnt,  
James Bradbury, aged 20 years a horse driver who was very badly burnt,  
William Salter, aged 50 years a collier who was asphyxiated,  
David Hughes, aged 65 years a collier who was asphyxiated,  
Thomas Sherwin, aged 25 years a loader who was asphyxiated,  
Henry Wood, aged 20 years a loader who was asphyxiated,  
Samuel Wedgewood, aged 28 years a loader who was asphyxiated,  
Richard Jones, aged 24 years a jigger on the Main Jig who was very badly burnt,  
Henry Calcott, aged 25 years a collier who was asphyxiated,  
John Moffatt. A contractor who was asphyxiated,  
John Hall, aged 16 years a taker-off who was slightly burnt,  
Francis Enery, aged 50 years a loader who was badly burnt,  
Edward Jones, aged 30 years a loader who was asphyxiated,  
James Hulse, aged 26 years a loader who was asphyxiated,  
John Bailey Moore, aged 31 years a contractor who was badly burnt,  
William Hurst, aged 49 years a collier who was asphyxiated,  
Sydney Rutter, aged 37 years a loader who was slightly burnt,  
Edward Townshend, aged 30 years a horse driver who was asphyxiated,  
William Burgess, aged 40 years a colliery who was asphyxiated,  
Johnathan Harding, aged 25 years a collier who was asphyxiated.

The victims who were found in the Banbury Seam.

George Salt, aged 42 years a horsekeeper who was badly burnt,  
George Radcliffe, aged 32 years a roadman who was badly burnt,  
Samuel Sherwin, aged 18 years a horsedriver who was slightly burnt,  
George Steele, aged 14 years a horsedriver who was slightly burnt,  
James Henry Bailey, aged 18 years a horsedriver who was slightly burnt,  
John Williams, aged 16 years a horsedriver who was slightly burnt,  
George Bradshaw, aged 18 years a taker-off,  
Charles Sherwin, aged 21 years a taker-off in the Main Jig,  
William Lawton, aged 18 years a taker-off,  
Albert J. Edwards, aged 28 years a collier,  
George Edwards, aged 42 years a collier,  
Joseph Edwards, aged 57 years a collier,  
David Hulme, aged 22 years a loader,  
William Breewood, aged 29 years a collier who was badly burnt,  
John Steele, aged 16 years a raker down who was badly burnt,  
Evan Price, aged 27 years a collier who was very badly burnt,  
Herbert Sellars, aged 37 years a collier who was badly burnt,  
Ben L. Smith, aged 33 years a collier who was badly burnt,  
Charles Jenkins, aged 19 years who was asphyxiated at a stopping in the upper level,  
Fred Ayres, aged 21 years who was asphyxiated while working at a stopping in the upper seam,  
Joseph Bull, aged 60 years who was asphyxiated while working near the top of the main jig and Job Bull, aged 26 years who was asphyxiated while working near the top on the Main Jig.

There were five bodies that were not recovered-

Arthur Fletcher, a fireman aged 26 years,  
George Wilson aged 27 years, Spencer Whitehurst aged 24 years,  
Joseph Bull aged 25 years and William Bull aged 19 years.

Some of the bodies were burnt black probably from the effects of burning coal dust but no charred coal dust was found on the props. There were some who got out of the pit with their lives and of these only one was injured.

William Bracegirdle, hooker-on at the bottom of the downcast shaft,  
George Timmins who worked with William Bracegirdle,  
Jesse Smith a driver who was severely burnt,  
George Hewitt a roadman at the door nearest the face of the Banbury horse level,  
Jesse Dennis a contractor who was at the far end of the Banbury drift,  
R. Edwards a collier who was at the bottom head,  
John Doxy a loader at the top head,  
Ralph Rogers a collier at the top head,  
W. Ingle, a loader in the drift,  
Richard Breeze a loader in the drift,  
George Green a loader at the bottom head,  
Ralph Edge. a taker off in the drift,  
John Tompkinson. a collier in the drift.

Sixteen horses also perished in the disaster.

The inquest into the deaths of the men was held by Mr. A.A. Flint, the Coroner for the Uttoxeter Division of Staffordshire. The Inspector thought that there were four possibilities as the cause of the ignition of the gas. First, the gob fire, second, an open lamp, third, a match, and fourth, a pick striking against pyrites in the coal. It was known from experiments that had been conducted that this could cause a spark that could ignite gas.

He attributed the explosion in the Banbury seam to coal dust and the inspector thought that the explosion originated in the Cockshead seam and all the lamps that were found there were carefully examined. They were all Meusler types and all were found locked. Coal dust was recognised as a factor and the safety lamps were also suspect and the Inspector said it would be desirable to look into the coal dust and lamps in connection with explosions in coal mines.

At the inquest there was a basic disagreement of the events at the colliery prior to the explosion. Mr. James Potts, manager, gave his version of the events leading up to the explosion, was that on 15th. October he received a verbal report from William Fletcher of a gob stink. This was between 10 and 11 a.m. He asked Fletcher if it was like the previous fires and Fletcher said that it was. He went on to ask if there was an immediate hurry and Fletcher replied that there was not.

Potts then gave him instructions to fetch all the working materials out of the drift where they were stored and put in a stopping the next day. He then looked at the plan to locate the best position for the stoppings. At the inquest he made a point of saying that he did not say that he would follow in two or three minutes.

Potts said he saw Fletcher the same day about 5 p.m. when he was told that the materials had been brought from the drift and that Fletcher had removed some doors on the upper levels. Potts thought that this was right. He also told him that the stink was worse and Potts proposed to go down but Fletcher said there was no danger and no immediate hurry so Potts did not go down. He said that if he had known it had been as bad as that he would have come down the pit to Fletcher.

James Potts said he saw Arthur Fletcher at 8 p.m. He asked him to see his father and tell him what arrangements had been made about the gob fire and if he approved them. He told him that if he disapproved then he must come and see Potts that night with a view to putting in another stopping.

William was not at home when Arthur went to see him and so he was not told of the altered arrangements. Potts saw Arthur again at 9 p.m. as he was going to the pit and told him to come and see him at 12 p.m. to report to him about the gas was in the drift.

Arthur came at 12.30 and told Potts that the gas was in the jig of the drift 25 yards from the upper level. Potts asked about the gob stink and Arthur replied that there was not one and it was '*as sweet as a not.*'

According to Potts account said Arthur said nothing to allow him to think that the situation was dangerous. Potts gave Arthur instructions about the doors in the upper level to the north of the stable jig before he closed the stopping. At 12.30 Arthur reported he had done this but did not say how by how much he had opened the doors.

William Fletcher, the underlooker at the colliery, told the court that Arthur, his son, told him of the gob stink before he went down the pit on the 15th. October. Both of them went to the place but they found it was not bad. He came out of the pit between 10 and 11 am and reported to Mr Potts. Potts told him to get materials out of the drift and marked the place for the stoppings on a plan. He said that he would follow Fletcher down in two or three minutes when he was satisfied about the position of the stoppings. When he got down again he met men coming out of the drift and they told him that the smell had given them headaches. Two of the men went back into the workings with him and he saw that the fire had increased and there was strong smell of smoke.

Fletcher got out of the pit about 5 p.m. and went straight to Potts and told him that it was getting serious. Potts told him that he had had an engagement otherwise he would have come down the pit and Fletcher told him that he had been expecting him to come down all afternoon. Fletcher saw his brother, Arthur about 7 p.m. and told him it had got serious and he had lifted the doors off to cut off the air and told him to send for Potts or himself in the situation got any worse.

William Bracegirdle, the hooker-on at the bottom of the pit, and was blown across the bottom of the pit when the explosion occurred. He told the court that he saw Arthur Fletcher after he had seen Potts and asked him how he got on. Fletcher said that all Potts wanted was coal and that the men had to get it out of the pit. Arthur told Bracegirdle that he had asked Potts to let him have some men out of the Banbury seam and stop the drawing of coal there. Potts had told him to take the lads in the Cockshead level to construct the required stoppings and he had told Potts that the lads were no use to him. This occurred about 2.10 p.m.. When Arthur came out of the pit at 12 p.m. he said that things were getting worse in the mine.

At the inquiry, Bracegirdle said that he had not related these facts in his original statement and he had willingly suppressed the facts which he did not want to go before the jury. He was William Fletcher's son-in-law and Arthur's brother-in-law.

The Inspector stated-

"I am of the opinion that he (Potts) made a grave error in ordering a stopping to be put in the main airway of the pit while the men were working in other parts. Such an act would have been wrong if there had been no gob fire and no accumulations of gas and no obstructions in the airways because it is not possible to foresee all the consequences which may be caused by such an interference with the ventilation."

Mr. Atkinson said-

"This disaster is another example of how a colliery explosion is extended by coal dust and the loss of life is greatly increased in consequence. The normal condition of a dry and dusty colliery in which the roads connecting the different districts are dusty, is such that a terrible explosion is possible at any moment. However much the number of such explosions may be reduced by enforcing the use of safety lamps and restricting the use of explosives, they are likely to continue to occur so long as the mines remain in their present dusty state."

The inquiry was searching and lasted over seven days and the jury returned the following verdict.:-

1. That the deaths were caused by an explosion.
2. That the evidence did not show how the explosion was caused.
3. That the manager was not guilty of culpable negligence in not withdrawing the men from the pit on the night of the 15th October.

4. That we are unanimously of the opinion that the manager (Mr. Potts) is deserving of severe censure in not personally inspecting the mine previous to the explosion.”

Mr. Potts was publicly censured by the coroner and later he resigned his post at the colliery.

For some months before the explosion, Mr. Potts the manager, and William Fletcher, the underlooker had not been on good terms and this difference of opinion had a serious effect on the safe working of the colliery. About a month before the disaster, Mr Potts had been thrown out of a carriage and was unable to go down the pit as often as usual. In fact he had only been down twice since his accident. He was able to go down when the gob fire was reported but he did not do so and the gob fire was not dealt with efficiently.

#### **HEBBURN. ‘A’ Pit. Hebburn, Northumberland. 4th. November, 1889.**

The colliery was owned by the Tyne Coal Company and was on the south bank of the Tyne. Mr. R.T. Swallow was the chief manager with Mr. Joseph Elwen as the certificated manager of the colliery. There were two shafts at the colliery, the ‘A’ pit which was the downcast which was 12 feet in diameter and the C Pit which was the upcast and was also 12 feet in diameter at the top of which was 36 feet diameter Guibal fan which exhausted the air from the mine.

The shafts were connected to the Hutton Seam. At the ‘A’ Pit which was the one affected by the explosion there were three seam worked, the Bensham at 160 fathoms, the Hutton at 188 fathoms and the Beaumont at 210 fathoms. The Beaumont was reached by a drift a considerable distance to the north of the ‘A’ Pit shaft which dipped at the rate of 12 inches to the yard. The explosion originated and the effects of it were solely in the Beaumont seam.

The seam had a section of 2 feet 4 inches of coal, 2 feet 6 inches of stone and 7 inches of coal. The top coal was worked on the longwall system with gateways about 10 yards apart and cross-gates at intervals of about 40 yards. The stone or band and the thin coal was worked in the ordinary gateways for a width of about four feet. The stone was used to build pack walls to support the roof.

The ventilation current entered the A Pit and passed along the Hutton seam on the top part of the 12-inch per yard drift where part of it went to the Hutton seam and part to the Beaumont seam workings. According to the record in the ventilation book there were 11,000 cubic feet of air per minute going into the Beaumont seam.

The Beaumont workings were divided into three districts the 1st. 2nd. and 3rd. West. The effects of the explosion were confined to the 1st. west district. On the morning of the disaster Mr. Bell, the Assistant Inspector measure the air at the a distance of about 300 yards from the headways where a shot had been fired and found that it was entering the district at a rate of 3,900 cubic feet per minute which was understood to be the usual quantity. The air passed in one current near the face of the coal by means of canvas doors hung in the gateways and then to the return. It was known that the seam gave off firedamp and at the inquest it emerged that gas had been detected a month before the disaster but not in large quantities. The seam was not considered to be dusty.

The explosion occurred about 1.30 a.m. when only shotfirers, stonemen and shifters were at work in the mine. There were 20 men in the mine but only eight of these were in the 1st. West district. All them men who could have thrown some light on what happened were either killed or died later and two others were too far away.

The area was fully inspected after the event and a shothole was found to have been drilled in the lower part of the stone band close to the thin top coal. The hole had been drilled by machine and was one and half inches in diameter and 3 feet 10 inches deep. The hole was not well placed and had not done it’s work. The stone appeared to have



been lifted and shaken. There was also no stemming in the hole which led to the conclusion that the shot had blown out and caused the explosion.

The men who lost their lives were-  
Andrew Miller aged 36 years, shotfirer,  
James McQuid aged 52 years, shifter,  
Robert Hopps aged 33 years, shifter,  
John Bones aged 23 years, stoneman,  
William Welsh aged 23 years, stoneman and  
Henry Stuart aged 19 years, putter.

The inquest was held by Mr. R.W. Cooper on the 14th., 20th. and 28th. November. Mr. R.W. Cooper, solicitor of Newcastle represented the owners and the Durham Miner's Association was represented by Mr. H. Forrest of Durham. After hearing the evidence the jury brought in a verdict of 'Accidental Death.'

#### **BARRWOOD No.1. Kilsyth, Lanarkshire. 20th. December 1889.**

The colliery was owned by William Baird and Company which worked the Kilsyth coking coal seam which was worked by the longwall system in which the explosion took place. The south level off the pit bottom ran parallel with and close to a large fault. Firedamp was given off freely in this level and on the day of the explosion as well as the day previous men had been provided with safety lamps as well as the fireman but the miners in the adjoining places to which the air current went were allowed to work with naked lights which was contrary to General Rule No. 8.

About 10.30 a.m., just as two surveyors, accompanied by the overman and the fireman approached the face level, a sudden outburst of gas took place at the face. The fireman was sent to withdraw the miners in the adjoining workings but before he could do this the gas was carried onto the naked lights with the result that the fireman and a boy lost their lives.

All the victims were listed as brushers-  
David Connor.  
Thomas Munro.  
Thomas Reynolds.  
Robert Barrie.  
Andrew Coyle.

#### **GLYN. Pontypool, Monmouthshire. 22nd. January, 1890.**

The colliery was the property of the Ebbw Vale Steel, Iron and Coal Company, Limited and five lives were lost in an explosion of firedamp. The explosion occurred at about 1 a.m. The mine was worked exclusively with safety lamps except on the engine plane which was the main intake road along which a large volume of air travelled. The gas was ignited on the engine plane near the top portion which was known as the Jubilee Dip and was about 1,200 yards from the shaft where an abandoned level branched off to the old workings in the Black Vein. This old level was 'bashed' or 'stowed up' for about 40 yards from the engine plane and a brick stopping was built at both ends of the bashing. Pipes were laid along the floor to allow the water to run off.

Two repairers were working with naked lights at this point, raising the timber couplings. One of the repairers ignited the gas from his naked lamp and it continued to burn in a large jet, setting fire to the timbers. There was no accumulation of gas and no person was injured by this ignition

The gas was prevented from accumulating by that large flow of air down the engine plane and the repairers were at first a great deal frightened and did not appear to have attempted to put out the flames. As soon as they had recovered themselves they went to warn others and later found the flame too large for them to deal with. The smoke and the products of combustion were carried by the air current into the Black Vein (Jubilee) workings beyond in which there were 80 men at work. These men found it impractical to make their way out through the smoke and all but five came out by the return air road.

William Dowell, a repairer, who was working that night with his brother and one of the deceased at the far end of the Black Vein workings was about 2,100 yards from the pit said-

“I went to work on the at night in the back of the Rock or Black Vein workings in James Cross’s heading. The heading had recently been cut through to Enoch George’s heading at the extra end of the workings. I got to work about 11 p.m. and I commenced framing a parting or timbering of a stall of this cross heading. It about 1 a.m. David Lloyd one of the deceased was besides me having just eaten his supper and was talking to me. Lloyd noticed the smoke before I did as I was working with a hatchet, and he asked me what the smoke was. On looking up I saw the smoke near the roof about a foot thick coming with the air. I replied that I did not know what it was but that I would go and find out as I felt there must be something wrong. On getting to the parting to which the ropes of the engine plane worked, I saw two hauliers with William Evans the dukey or bank rider. They did not know the cause of the smoke and we went further on the Jubilee dip to the road by which the empty trams were taken into the workings. The smoke continued to increase. We were joined by four other men who were working further out in the dukey road and had come inwards. In reply to me they said that they were going out by the return and asked us to come along as quickly as we could, as they could not get back. I said that I would go back round and let the other men know. I went in the same way as I came out and met one man and told him to make haste and go out by the return. He said to take time and he would let the men up his heading know and get them to come out. I went into the back or far end, and on the way met John Crane and his boy, they followed me. Next we met Charles Reed and boy and they came with me. I next reached my working place where my brother was along with Henry Spier, one of the deceased, who was working with us that night. David Lloyd and Henry Price were also there. They were waiting and the smoke was so thick that they could not see to work. I told them to make haste and go out by the return. I put my waistcoat on and put my shirt under my arm and started through the face of Enoch George’s heading when I saw Francis Turner and Nicholls who worked with him. I told them to get out. I with others continued my way up through the return and on the way met Charles Legg and Thomas Williams who were going inwards. I told Legg that all was right and I had let the men know. Someone behind said that Francis Turner and ‘Old’ Spiers were behind. Legg and Williams continued into the workings. I met Alfred Brain at the separation doors turning the men into the return and over the crossing. Thomas Miles was further put directing them and then we got to the Dukey road or engine plane through the Meadow Vein and I went out of the pit. I afterwards went back to assist Mr. Jones and others with the pipes. I spoke to four out of the five deceased and warned them to come out. Three out of the four were together. I thought they were following me. Lloyd had been working in the return and should have known it well. There was no difficulty in finding the way out. I think they must have remained too long and been overcome by the smoke.”

The manager, Mr. John Jones and his son the undermanager were sent for and they reached the place where ignition had taken place within two hours of the event. They found that the return airway so charged with fumes the lamps were extinguished. He took prompt measure by driving roads on each side of the blaze to get water to the fire

but unfortunately this was without avail. It was decided on Monday 27th. January that it was no longer justifiable to take risks and arrangements were made to flood the mine. This was completed on 12th. April and pumping work then commenced and at the time of Mr. Martin writing the report, the work was going well with 1,000 yards of the pit cleared.

The men who died were-

George Spiers or Spear, aged 41 years labourer,  
Francis Turner aged 39 years, collier,  
David Lloyd aged 29 years, collier,  
Arthur Mills aged 18 years, collier and  
Henry Price or Preece aged 17 years, collier.

At the inquest there were several first-hand accounts of the events in the mine leading up to the disaster. William Henry James stated-

“I went into the mine at about 6 p.m. with Robert Newberry who had been working with him for about a week. We were raising the timbers in the Jubilee dip and began work about 7 p.m. By 12.30 a.m. we had put in two new pairs of timber and were going to fill the rubbish that had fallen. In examining the place to see that all was secure, before tightening up the last pair of timbers, I noticed an old bar two or three yards further in which had freshly broken and was showing white. I went to examine it. On raising my naked lamp close to the timber, gas was ignited and I reeled back a few yards. The gas continued to burn below the old collars which was the lower part of the new ones. I then went back further and took Newberry with me. It continued to burn and we went back together about 150 yards to where the knocker for signalling on the engine plane was and sent a boy from there into the Meadow Vein for Thomas Mayers, a repairer and others if he saw them. Mayers came to us in a few minutes and we returned to see if we could extinguish the fire. On reaching the place we found that the flames were higher than when we left and that the timbers were on fire. Some of the timbers and debris then began to fall. Seeing that we could do nothing to extinguish the fire we went by the Meadow Vein to the return to try and let the men know what had occurred. We took safety lamps which we had borrowed and in the return found the smoke coming very strong. We went forward a distance and met men coming out. We were told by George Thompson and others that all knew of the smoke and they were coming from the Jubilee workings by return. They said Charles Legg the examiner or fireman had gone back to get the all out. On Legg's return he told us that he had gone as far as he could and hear no men. We returned to the mouth of the Meadow Pit and stayed there for some time. Legg, Brain and I went back to the fire and found it still burning. As soon as we met Alfred Brain we sent a man to go and tell the manager. Charles Legg went out to meet Mr. Jones and I met Mr. Jones son. About one and half hour elapsed before Mr. Jones reached the place and up to that time nothing had been done to extinguish the fire. Mr. Jones started all hands to get the pipes ready to use to get a jet of water on the fire.”

Charles Legg, the fireman said that he had taken over from Walter Cunningham and everything was reported as all right in the pit and Alfred Brain gave much the same story as the others who had given evidence.

Mr. Martin concluded his report thus-

“I have pleasure in recording my appreciation of the admirable manner in which the Company's officials and workmen acted throughout the very trying four or five days during which it was attempted to overcome the fire, and likewise the valuable assistance rendered by owners, officials and workmen of neighbouring collieries. They seemed to vie with each other in their exertions. Notwithstanding the very inclement winter weather and the very well known and recognised risk which existed, there was no shirking of work or responsibility. I have never known greater

reliance exhibited in the conduct of operations than in this case, and the universal sympathy and good feelings extended by all parties to the responsible officers must I am sure, have been very gratified during the great anxiety attending the work."

**LLANERCH. Pontypool, Monmouthshire. 6th. February, 1890.**

The colliery was the property of Partridge, Jones and Company, Limited and the explosion claimed 176 lives. The shafts at the colliery were 253 yards deep and passed through a seam of coal that was not named at 74 yards 2 feet, the Big Vein at 155 yards 2 feet and the Three Quarters Vein at 167 yards 1 foot, the Yard Vein at 174 yards 1 foot and the Rock or Black vein at 188 yards 1 foot, the Meadow Vein at 237 yards, the Old Coal at 245 yards, The Farewell Rock was reached at 258 yards 1 foot. The Three Quarters, Rock and Meadow Vein were being worked at the colliery and were cut in the tunnel or stone drift from the bottom of the shafts at 517 yards, 363 yards and 44 yards respectively. The workings on the Three Quarters and Yard Veins were to the rise of the tunnel and were not extensive. The Meadow Vein had been exhausted above this level and the whole of the workings at this time were in the dip.

The Long Straight Slope was driven to the south west to the north side of the shaft and 110 yards from the downcast shaft Cook's slope branched off to the west and extended for 1,000 yards. There were four level driven from Cook's slope and from the cross headings and working stalls were driven.

Blasting was allowed in the mine but was not often used as the coal seemed to work well without it except in a few narrow leading places. There was no indication that a shot had been fired in any part of the workings and from the start of the investigation there was no thought that it was caused by a shot. The workings were not strictly defined a dry and dusty but there was coal dust in the mine and the Inspector thought that it was coal dust that spread the devastation through the mine.

The district in which the explosion took place was known as Cook's slope and was in the Meadow vein. There working had been only opened three yards before and were being extended. Naked lights were used through out the mine with the exception of the examiner or fireman. It was known that firedamp was given off but the ventilation which amounted to 20,000 cubic feet per minute in this district appeared to have prevented any danger.

When the explosion occurred the blast was heard two miles away and the blast devastated the headgears. Immediate efforts were made to effect repairs and about 10.30 a cage was sent down the downcast shaft. on eof the first men to be brought to the surface was Mr. Joseph Morgan the certificated manager of the mine. He was in the mine at the time of the explosion and on feeling the concussion he went to see what had happened and immediately found three or four men overcome by the afterdamp which he sent to fresh air and saved their lives. He also got the cage at the bottom of the shaft onto the guides which were broken and the survivors were sent to the surface. As soon as the disaster was known willing hands came from neighbouring and distant mines but there were few survivors. Of the men working in the district only ten escaped and they were injured and the remainder lost their lives. The ventilation was severely damaged and there were large falls which impeded the rescuers.

Those who died were-  
Edward Jones aged 60 years, undermanager.

Colliers or persons engaged at the face.  
James Adams aged 36 years.  
Thomas Ashman aged 21 years.  
William Ashman aged 17 years.  
George Ashman aged 19 years.

William John Bayliss aged 21 years.  
Lewis Bridges aged 29 years.  
William Brimble aged 17 years.  
Oliver Brimble aged 15 years.  
William Bridges aged 19 years.  
Joseph Bevan aged 37 years.  
Mark Bridges aged 55 years.  
David Brimble aged 12 years.  
James Bright aged 14 years.  
Arthur W. Bingham aged 15 years.  
Frederick Bridges aged 17 years.  
Samuel Francis Bright aged 12 years.  
John Cook aged 37 years.  
James Cook aged 31 years.  
John Carey aged 31 years.  
Gabriel Carpenter aged 47 years.  
Jesse Carpenter aged 15 years.  
Daniel Davies aged 24 years.  
George Davies aged 37 years.  
William Dobbs aged 24 years.  
John Davies aged 34 years.  
Edward Davies aged 54 years.  
Edward Charles Davies aged 14 years.  
William Davies aged 45 years.  
Edward Roberts aged 15 years.  
John Edwards aged 20 years.  
John Evans aged 12 years.  
William Finn aged 17 years.  
James Greasley aged 23 years.  
William George aged 34 years.  
Joseph George aged 13 years.  
John Gauntlett aged 55 years.  
Richard Gough aged 60 years.  
William, J. Godwin aged 13 years.  
Samuel Greasley aged 37 years.  
Thomas Greasley aged 19 years.  
William Gullick aged 25 years.  
Henry Hillier aged 31 years.  
William Harper aged 28 years.  
William Hayes aged 19 years.  
Joseph Howells aged 35 years.  
Henry Howells aged 15 years.  
John Hoskins aged 39 years.  
David Hughes aged 14 years.  
David Howell aged 13 years.  
Joseph Howells aged 12 years.  
John Howells aged 17 years.  
Henry Hoare aged 17 years.  
Robert Ivory aged 26 years.  
Daniel Ivory aged 21 years.  
Albert Jones aged 14 years.  
William Jones aged 17 years.  
Samuel Jones aged 19 years.  
Thomas James aged 14 years.

James James aged 13 years.  
Edward Jones aged 33 years.  
James Jones aged 31 years.  
John Jones aged 20 years.  
John James aged 44 years.  
David Jones aged 14 years.  
Thomas James aged 20 years.  
John Jones aged 41 years.  
William John Jones aged 41 years.  
Joseph Lewis aged 24 years.  
Alfred Langley aged 15 years.  
Thomas Lewis aged 36 years.  
Thomas Lewis aged 15 years.  
Elias Lewis aged 13 years.  
Lewis Lewis aged 25 years.  
Thomas Lewis aged 36 years.  
James Meadows aged 31 years.  
Frederick Martin aged 20 years.  
William Morris aged 15 years.  
Benjamin Meadows aged 58 years.  
Henry Morgan aged 49 years.  
William John Morgan aged 21 years.  
Edwin Matthew aged 42 years.  
John Morgan aged 17 years.  
Thomas Morgan aged 24 years.  
Thomas Oram aged 18 years.  
Edmund Price aged 15 years.  
Mark Parfitt aged 21 years.  
William Plenty aged 35 years.  
Frederick Parfitt aged 41 years.  
George Parfitt aged 13 years.  
Albert Powell aged 14 years.  
Phillip Powell aged 29 years.  
Thomas Phillips aged 24 years.  
Rosser Pritchard aged 37 years.  
James Pritchard aged 13 years.  
Ebenezer Phelps aged 22 years.  
David Rees aged 19  
William Regan aged 14 years.  
George Rossetter aged 31 years.  
Lewis Rogers aged 29 years.  
John Regan aged 16 years.  
Thomas Ruck aged 21 years.  
Joseph Rees aged 13 years.  
William Reed aged 32 years.  
Edgar Robertson aged 14 years.  
Leonard Silcock aged 32 years.  
Alfred Shaw aged 13 years.  
Charles Shaw aged 14 years.  
Matthew Smith aged 29 years.  
John Samuel aged 22 years.  
Jeremiah Sullivan aged 14 years.  
James Thomas aged 39 years.  
Alfred Thomas aged 21 years.

Joseph Tudgay aged 22 years.  
James Tudgay aged 46 years.  
Charles Thomas aged 26 years.  
Frank Trollope aged 40 years.  
William Thomas aged 18 years.  
George Trollope aged 29 years.  
David Vater aged 61 years.  
Thomas Williams aged 34 years.  
William Williams aged 16 years.  
William Williams aged 64 years.  
William Woods aged 15 years.  
James Webb aged 22 years.  
Samuel Wilcox aged 21 years.  
Charles Wilcox aged 17 years.  
John Wilcox aged 54 years.  
John Williams aged 16 years.  
Daniel Webb aged 21 years.  
William Williams aged 15 years.  
William Williams aged 35 years.  
William Williams aged 12 years.  
William Henry Williams aged 18 years.  
Albert Weaver aged 18 years.  
John Webber aged 19 years.  
John Lewis aged 17 years.  
Oliver Langley aged 41 years.  
Thomas Lacey aged 19 years.  
Nephi Loveridge aged 27 years.  
James Llewellyn aged 36 years.  
James Lewis aged 31 years.

The hauliers who died-

Albert Bryant aged 34 years,  
James Driscoll aged 52 years,  
Thomas Filer aged 28 years,  
Samuel Jones aged 43 years,  
Edwin Jones aged 34 years,  
Thomas Morgan aged 27 years,  
Joseph Pritchard aged 19 years,  
George Rudge aged 27 years,  
David Rees aged 25 years,  
Sydney Shaw aged 37 years,  
John Thomas aged 24 years,  
Joseph Thomas aged 29 years and  
Thomas Walbey aged 28 years.

The repairers who died

Robert Furber aged 18 years,  
John Giles Jones aged 64 years,  
Azariah Jeremiah aged 57 years,  
James 'Largo' James aged 60 years,  
George James aged 53 years,  
Thomas Morgan aged 41 years,  
Richard Skye aged 28 years,  
John White aged 28 years and

Thomas Williams aged 63 years.

The door-boys who died-  
William Bailey aged 15 years,  
Charles Gwilym aged 14 years,  
Thomas Pritchard aged 12 years,  
William Davies aged 14 years and  
John Price aged 13 years.

The others were died-  
John Beard aged 63 years, hitcher,  
Watkin Rogers aged 36 years, glandman,  
William Tudgay aged 32 years, hitchers,  
John Downas aged 32 years, engineman,  
William Williams aged 34 years bratticeman and  
William Rogers aged 13 years knocker-boy.

The inquest into the disaster was conducted at the Pontypool Town Hall by Coroner Mr. J.B. Walford and extended over seven days. There was no difficulty in fixing the point of the explosion. It was in the horse windway of No.4 Level and the gas was ignited by the naked lights of the men who were working there. The examiner reported that he had not found gas on the morning of the explosion but admitted that there were some finished stalls on the No.1 Level that he did not examine and he had not examined these for some days before as he thought they did not require examination.

The day before the explosion there was a fault in the ventilation which was put right and these old stalls were found to be clear and the examiner said that he could not examine the cavity as it was so large. The cavity seemed the place where the gas accumulated and fired at the naked light of one of the men.

The jury added a rider that there should be stricter compliance with the 4th. General Rule and the 8th. and 23rd. Special Rules and further strong recommendations as to the use of safety lamps.

#### **MORFA. Port Talbot, Glamorganshire. 10th. March , 1890.**

The colliery was the property of Messrs. Vivian and Sons who had worked it for forty years. It employed about three hundred men and boys underground and had a daily output of about 460 tons. Mr. Thomas Gray, mining and civil engineer, was the resident manager and agent. Mr. William Barras, the undermanager, John Morris, the overman, Richard Maddox, the overman and here were two fireman on the day shift, two on the night shift and Thomas Barras, the son of the undermanager, acted as assistant undermanager.

There were two shafts 297 yards apart. One of these was called the Grange pit, sunk to 410 yards and passing through all the seams from the North Fawr to the Cribbwr Fach who was the lowest workable seam and was used for winding and pumping and there was also the downcast shaft. The Nine feet Seam was passed at 226 yards and the Cribbwr at 306 yards. The other was to the rise and called the Albert pit and was used exclusively as an upcast shaft and was sunk to the Cribbwr at a depth of 193 yards passing through the Nine Feet Seam at 127 yards. The size of the Grange pit varied from 10 feet by 8 feet with a minimum of 9 feet 1 inch by 8 feet. The upcast also varied and the smallest diameter of 8 feet.

In descending order the seam that were worked were the Four Feet, the Nine Feet, the Cribbwr and the Cribbwr Fach. Two months before the explosion, the Four Feet was discontinued on account of numerous faults having been encountered after about nine acres had been worked by the longwall method. In the Cribbwr Fach vein, two headings



had been driven 350 yards to a fault on the west side were being re-opened. The Nine Feet and the Cribbwr veins were being worked at the time of the disaster. These two seams had originally been worked to the rise of the upcast shaft towards the outcrop which was under the sea but for many years the workings in both seams had been confined to the dip of the downcast shaft and approached by cross measure drifts from the same level at a depth of 400 yards from the surface. The Nine Feet had been worked farthest to the dip so that all the workings in the Cribbwr vein were below those in the Nine Feet vein.

The explosion and its results so far as loss of life was concerned were confined to the Cribbwr Seam workings and the drift leading from the downcast shaft to both seams. The cross measure drift referred to was the main road into the Cribbwr seam, started at a point about 20 yards to the east of the downcast shaft and was driven in a north easterly direction for 210 yards where it reached the seam. The first 63 yards were level and the remainder dipped at a rate of about 1 in 5. From this point the main road was continued in the seam in the same distance for 230 yards dipping at 1 in 4.2. From there it went due north for a further 435 yards dipping at 1 in 5. The road was called the engine plane and had reached a point 875 yards from the downcast shaft,

The coal was worked on the pillar and stall method by driving headings level from the engine plane and stalls from these to the rise until they reached the heading above, forming pillars which were left to be worked later. The pillars to the east of the engine plane had been worked back and finished at about 90 yards from the engine plane above No.8. The last pillar was being worked back and finished to within about 90 yards down No.5 heading about 495 yards from the shaft. Below this point there were five headings at work in the uppermost of these, No.6 pillar was being worked about 200 yards in. In the next, No. Six and a half, the pillar working was about 200 yards in. In No.7 the workings were 893 yards from the engine plane also taking out pillars. Nos. 8 and Eight and a half were headings that were advancing through solid coal and were 825 and 809 yards in respectively. Another heading had also been started at a point 57 yards below No. Eight-and-a-half. This heading, 'Eley's Heading', had been driven 25 yards in, but was not working on the day of the explosion. The main road to the dip, a continuation of the engine plane, was also being extended.

The headings were about 9 feet wide and 8 feet high, which was the thickness of the seam, with the exception of Nos. 8 and Eight and a half which were 10 to 20 yards wide for 528 yards with the lower side being stowed with rubbish and stones for 7 to 9 yards. The stalls were from 9 to 12 feet wide, according to the condition of the roof, the first being only 6 feet wide. These were also 8 feet high and were driven to the full rise at distances varying from 30 to 40 yards at about 1 in 4.

In working the pillars, the usual practice was to drive a '*jerkin*' through the middle of the pillar to the rise and then to drive '*lifts*', 9 to 12 feet wide, right and left, beginning at the top end and working downwards. The roof was supported by double timbers over the roadways and props set singly at the sides until the lift was finished after which the timber was withdrawn and the roof allowed to fall, forming a goaf behind.

The Cribbwr Vein was a bituminous coal with the roof made of 15 feet of dark argillaceous shale, 9 inches of band sandstone and 8 feet of argillaceous shale and iron stone. The Cribbwr Vein itself was composed of 7 feet 6 inches of coal, a parting and another 6 inches of coal and the floor was 2 feet 3 inches of fireclay, 3 inches of black shale, 2 feet of fireclay and 10 feet of argillaceous shale and iron stone.

The ventilation was produced by a Waddle fan, 40 feet in diameter at the top of the upcast shaft, which ran at 50 to 53 r.p.m. and was well maintained. It produced a total current of about 80,000 cubic feet per minute at a water gauge of 2.5 inches. There were 30,000 cubic feet going to the Cribbwr workings where 100 persons were usually employed during the day shift. A much smaller number were employed at night with a few colliers working the leading places and labourers doing repair work.

The ventilating current to seam passed down the engine plane to No. Eight-and-a-half west heading, where it was split, about 5,000 cubic feet passing down to ventilate the main dip, Eley's Heading, and the workings on the east side of the engine plane and returned by an air course on that side. About 20,000 cubic feet of air passed to the west by the No. Eight-and-a-half heading, ventilating workings in heading, passing up to those in No.8 heading and from there to No.7 heading, returning to a point within 90 yards of engine plane. From there passed up to No. Six-and-a-half and then to No.6, entering a separate return near No.5 abandoned heading and from there to a point where it was joined by east split and finally by the Nine Feet and Four Feet return currents into the main return direct to upcast shaft.

The main dip below No.9 west level had no separate return airway and was not bratticed or provided with any means of effective ventilation. An attempt had been made to ventilate Eley's Heading by a hand fan fixed at the entrance and air pipes leading from the fan to the face. The method had been adopted as no difficulty had been experienced in the ventilation of the main dip even though this had no return for 27 yards. The main dip, dipping one in five, was in line with the intake current.

The current was taken into the face of each heading and stall to the rise by canvas brattice and in the stalls the brattice was kept within 5 or 6 yards of the face. Canvas doors on the headings were hung at the entrance to each stall. There were double doors made of wood, on each of the headings from No.6 to No.8 west and at the doors on No.8 west a considerable leakage of air was allowed in order to ventilate that heading and three stalls which were at work on the put half of it. This leakage air joined the main current after it had ventilated Nos. 8 and No. Eight-and-a-half and some stalls to the rise of No.8, 233 yards from the No.8 face. A total of 329 yards were bratticed taking air to 15 places and there were 25 places occupied by colliers with 10 places at the side of the air course or stalls that turned away to places drive to the dip where brattice was not deemed necessary.

The seams were all deemed fiery but the Nine Feet had a reputation of being the most fiery. In the Cribbwr Vein, firedamp had not been found frequently either as accumulations or flowing from blowers. Some accumulations had been found, mainly in the stalls where the brattice had broken down or from a fall of roof. Since the beginning of the year four such cases had been encountered and these were reported. They were on 14th. January in T. Miles' place, on the 16th. January in W. Rigby's stall, on the 22nd. January in W. Vanstone's stall and on 24th February in Thomas Hopkin's stall. The amounts were small in each case and had been cleared when the brattice was repaired. The only other place where gas had been reported was in Eley's heading, in the place ventilated by the hand fan. Gas was reported there on the 21st. February and on the 6th. and 7th of March.

In February the place was about 15 yards in and gas was found by the night fireman, James Nettle while he was making his inspections. The gas extended about 3 yards back on the rise side, 1 yards across and 6 to 7 inches deep. The hand fan was put to work and the gas removed the following day. The place continued to work until the 6th. March, when gas was again found by two colliers who had been appointed by the workmen under the 38th. General Rule. It was found that the air pipes had become disconnected but when they were adjusted, the gas cleared and the place started to work again after it had been fenced off. The hand fan was kept working except on Saturday night, Sunday and Sunday night. It was working on the day of the explosion and the ventilation of the whole colliery seemed to be satisfactory.

The working places were generally dry and dust accumulated in parts of the headings. In some places the roadway was damp and in some places, wet. The engine plane was rather damp and the flow and a small quantity of water ran down it. In places to the dip of the lowest headings, water was encountered and at the date of the explosion, it was pumped by a compressed air from the place parallel to the main deep, and from two other places by hand pumps. A feeder of water from the abandoned rise

workings found its way to the dip, passing Nos. 7 and 8 headings and it reached No. Eight-and-a-half not far from the face. This water made the floor of the No.7 heading wet or damp of the inbye half of its length and Nos. 8 and Eight-and-a-half headings, damp for about 140 yards, beginning about 70 yards from the face.

The trams were called box-trams and were not loaded above the top and little dust was blown from the tubs as they were slowly drawn up the engine plane, certainly less than in other collieries in South Wales. There was dust which was cleared from the roadways with the rubbish from time to time and some part of the heading was cleared every night. There was no attempt to water the roadways and they were dry and dusty.

Blasting was not generally allowed in the colliery as the manager was against shot firing and it had not been used for coal getting for a great number of years. In driving the Nos. 8 and Eight-and-a-half headings, the coal was found to be much harder than usual and about the 30th. January, permission was given by the manager to fire shots in these headings and the stalls driven from them into the hard coal. Before this, the colliers were paid more for working the hard coal and the permission to use shots was given reluctantly. There was seldom any need for shot firing in the stone work and the last occasion that this was used was in No.7 heading in 1886 when it was crossing a fault.

Shot firing was thus restricted to a very limited area in the Cribbwr Seam where three or four shots had been fired in each of three places each week for about six weeks. The explosive used was gunpowder supplied to the colliers by the Company for which the colliers were not charged. It was made up into charges before it was taken down the mine and the only persons authorised to fire shots were the overman and the fireman in the Cribbwr Seam.

Open lights were permitted at the bottom of the downcast shaft and on the landing between the shaft and the top of the engine plane and at 'station' appointed under General Rule 4. The station for the Cribbwr Seam was at the No.8 stage on the main engine plane and intake airway.

With these exceptions, the colliery was worked exclusively by safety lamps. The firemen used Hepplewhite-Gray lamps, a modified lamp invented by the manager and selected by the Royal Commission on Accidents in Mines as one of the four recommended lamps to replace the Davy and Clanny lamps. Everyone else used a Marsaut type lamp with only one gauze instead of two. They were bonneted and locked by a lead plug.

The depth of the lower workings of the Cribbwr vein varied from 490 yards at No.6 heading to 530 yards at the No. Eight-and-a-half heading and the pressure was considerable which damaged the roadways and air courses which required continual repairing and enlarging which made a great amount of debris. This was stowed in two headings between Nos. 7 and 8 which were not numbered which had been stowed for the greater part of their lengths.

The inspectors, Mr. Gray, Robson and Randall had inspected the colliery at different times and the methods used at the colliery and the procedures were well known to the inspectors but until the explosion occurred, Mr. Robson was not aware that there was lasting in the Cribbwr vein.

The explosion occurred at 12.30 p.m. on Monday, 10th. March and was distinctly heard at the surface and the immediate neighbourhood. The manager was in the office and he and all employed at the surface saw a cloud of smoke and dust rising from the mouth of the downcast shaft at a height of about 20 feet. The fan was working and the manager and five men got a stage ready and went down the downcast shaft with the object of repairing any damage that had been caused. They found that only two guides broken near the bottom and they soon got the cages to work to bring up the men as soon as possible.

Out of the nine people who had been at the bottom of the shaft, or within 60 yards of it, four were found dead or dying. One hitcher was found fast among the woodwork in the shaft bottom, another hitcher was slightly injured, an old man slightly burned and two

escaped unscathed. In the course of two hours every man and boy, about 150 in all, who had been in the Nine Feet Seam, were safely got out.

It was apparent from the first, that the explosion had happened in the Cribbwr workings the engine plane was blocked by falls while in the Nine Feet nothing had been seen except for some afterdamp on the main dip which was carried in by the fresh air immediately after the explosion.

Mr. Robson received a telegram from Mr. Gray at 3.30 p.m. and he arrived at the colliery about 5 o'clock and went down immediately. Every possible effort was made to clear the large falls so that they could be bypassed and penetrate the workings. During the same night three men and a boy, who were making their way over the falls on the engine plane were found and brought to safety, uninjured.

One of the explorers, Daniel Brownsil, who went down soon after the explosion, ventured too far into the return airway where it was heavily charged with afterdamp and it was not until the following morning that he was rescued and brought to the surface. The medical staff did what they could but he never rallied and died on Tuesday evening. Two other explorers who had been with the same party had near escapes.

On Tuesday morning another man, John Francis, who was in the Cribbwr Seam when the explosion occurred was rescued from No. Six-and-a-half west. He was accompanied by three men and a boy named Olds, who were recovered alive from their working places in No.7 west as far as the return airway but were affected by the afterdamp and could not reach the engine plane and creep over the falls and so had been left in the belief that he would succumb. These five were the only ones that were recovered alive from the Cribbwr workings.

On Tuesday a fire was discovered in a stall to the rise of the No.6 heading. This was extinguished with great difficulty on Wednesday evening. A second fire was found by Mr. Gray, the manager and others on Saturday evening. This was in a position 1,200 yards from the shaft where it could not easily be dealt with without exposing everyone in the pit to great danger. After a consultation with the owners, the manager decided to flood the dip workings to a point between the Nos. 7 and 8 west headings. This was done during the week and all other operations were suspended.

No one was allowed to descend the shaft for nine days as another explosion might have occurred at any moment. When operations commenced, ten horses which had been in the Nine Feet Seam were brought out. They had been without food for ten days. The water which was sent flood the lower workings had reached the stables in the drift approaching the Nine Feet and this water had kept them alive and well. Frequent visits and inspections were made, day and night and the work of exploration went on. until 15th. March when very part of the workings had been examined.

Those who died and were recovered were-

Bethuel Heycock aged 19 years, haulier.

William Henry Claturthy aged 18 years, pumper.

Joseph Weeks aged 26 years, hitcher.

Evan Morgan aged 20 years, signalman.

William Curnick aged 50 years, plugman.

Thomas David aged 47 years, repairer.

William Scott aged 29 years, collier.

John Morris aged 46 years, overman.

Thomas Mainwaring aged 45 years, repairer.

Simeon Lewis, collier.

William Francis aged 28 years, collier.

James Tippott aged 17 years, haulier.

John Henry Nicholls jnr. aged 29 years, collier.

Joseph Thomas aged 50 years, collier.

Daniel John aged 57 years, collier.

Thomas Henry Williams aged 31 years, collier.  
Frederick Jenkins aged 16 years, greaser.  
William Jones aged 18 years, hitcher.  
Thomas Oates jnr. aged 20 years, collier.  
David Hopkins aged 48 years, haulier.  
Thomas Davies aged 19 years, hitcher.  
David Rees aged 40 years, ostler.  
David Williams aged 19 years, hitcher.  
Thomas Kemp aged 19 years, haulier.  
William Lewis aged 34 years, collier.  
Samuel Griffiths aged 50 years, collier.  
Edward Ellis aged 51 years, collier.  
David Wyld aged 40 years, roadman.  
Daniel Buckley aged 29 years, pumper.  
John Buckley aged 35 years, pumper.  
Isaac Walters aged 23 years, fan driver.  
Joseph Williams aged 32 years, repairer.  
William Taylor jnr. aged 15 years, haulier.  
John Leyshon aged 35 years, repairer.  
Evan Eley aged 37 years, collier.  
John Morris aged 46 years, collier.  
Patrick Kennedy aged 46 years, pumper.  
Richard Lucas aged 36 years, hauler.  
Daniel Brownsell aged 36 years, explorer.

The bodies that were not recovered were-  
John Nichols, airway man.  
Thomas Daniel, airway man.  
Evan Thomas, collier.  
Thomas Thomas, collier.  
David Davies, repairer.  
Evan Hedley, repairer.  
Thomas Yorwerth, haulier.  
Thomas Leyshon, collier.  
Daniel Griffiths, collier.  
W. Vanstone, collier.  
John Pippin, collier.  
David King, collier.  
William James jnr., collier.  
Noah Mandry or Mainwairing, collier.  
Alfred Phillips, collier.  
Henry Williams, repairer.  
Thomas Hopkins, collier.  
David Matthew, collier.  
William Jones, collier.  
Griffith Bevan, collier.  
Isaac Williams, collier.  
Edward Floyd, collier.  
Joseph Jones, collier.  
Thomas Lewis, collier.  
John Lewis, collier.  
William Lewis, collier.  
John Ready, repairer.  
Henry Parker, labourer.

Samuel Howells, collier.  
John Jones, collier.  
Evan Morgan, collier.  
William James, collier.  
John Griffiths, collier.  
James David, collier.  
John Hopton, haulier.  
David Williams, collier.  
Meredith Davies, collier.  
Ebenezer Davies, collier.  
David Richards, collier.  
Benjamin Lewis, collier.  
William Barras, manager.  
William Leyshon, collier.

In his Report for 1890 Mr. Robson reported that there had been an explosion with the loss of 87 lives and stated that-

“No new light has been thrown on the explosion and that the reopening of the colliery has proceeded with without intermission but the difficulties have been so great at the extreme points of the workings where the remaining bodies are supposed to be have not yet been reached and there are still 40 bodies that have not been recovered.”

The inquest and inquiry into the disaster was held at Aberavon before Mr. Howell Cuthbertson, Coroner for Neath in April when all interested parties were represented. Of the colliery officials, the undermanager, William Barras and John Morris, the overman of the Cribbwr Seam were lost in the explosion. David Aubery, the day fireman had obtained leave of absence to attend a funeral and had left his place at 10 a.m. and so escaped but William Leyshon, the man appointed in his place was lost.

There was no positive evidence that a shot had been fired buy Mr. Robson thought that there was little doubt that one had He said-

“My reasons for arriving at this conclusion are-

1. It was a fact that shots were fired almost daily in three or four places and the ordinary time for firing was coincident with the time of the explosion.
2. On that morning, Aubery, the day fireman, had been asked by John Griffiths, one of the colliers in his place, when he (Aubery) would be coming in and on Aubery replying that he was not coming in, Griffiths said, “*Tell John Morris (the overman) that I want someone to come in.*” Aubery understood this to mean that Griffiths expected to have a shot ready to fire during the shift.
3. Aubery gave William Leyshon, the man appointed in his place, his safety lamp, and the key for opening it in case he had to fire a shot.
4. Leyshon was not seen in No.7 that day by any survivor and as his body has not been found it is probably in No.8 or Eight-and-a-half west, where he had been at the time of the explosion.
5. The colliery had been for many years worked with safety lamps and that discipline as to their use was such that I do not think any of the workmen would surreptitiously use a naked light, or smoke in the workings.
6. A safety lamp damaged and left burning, a lamp in an unsafe condition being passed by an examiner on the surface and by the fireman or other examiner at the lamp station underground, the passage of the flame through the gauze of a safety lamp by an abnormal velocity of current, and a spar striking some flinty stone, are each possible means of igniting an inflammable mixture of gas and air but the probability of such a contingency where gas happened to be present is too remote to be entertained as the cause of this explosion.”

The following verdict was given by the jury-

- “1. The cause of death was afterdamp and burns caused by the explosion.
  2. There is a strong probability, from the evidence, that the explosion took place at the face of No. Eight-and-a-half range.
  3. We are of the opinion that the explosion was due to shot firing. We are also of the opinion that shot firing was carried on in accordance with the rules laid down by the Mines Regulation Act.
  4. We are of the opinion that the explosion was due to accidental causes.
- The jury recommend that the firemen should report the presence of gas on all occasions, wherever found.”

Mr. Robson commenting on the recommendation of the jury said-

“I fully concur with the recommendation. It seems to have been thought that when gas had been found and reported in the book kept for the purpose, it was unnecessary to report the same gas on subsequent days in cases where the working had been discontinued, and the place itself fenced off.”