

BIGNALL HILL. Jamage Pit. Audley, Staffordshire. 25th. November, 1911.

The colliery was the property of the Bignall Hill Colliery Company and consisted of a group of three pits, the Jamage Main, the Jamage and the Rookery mines. Before the accident these three were connected below ground but since the disaster the Rookery Pits have been shut off from the other workings by a stopping. The Jamage and the Jamage Main were still connected but the No.1 District in the Bullhurst seam, at the Jamage mine was also shut off from the workings by a stopping.

The manager, Mr. Amos Daniels, was appointed in March 1910 and he had an undermanager and an overman of the Jamage mine only. They were, Mr. James Boon, undermanager who was appointed in July 1908, and the overman, Mr. William Swingewood who was appointed in April 1910.

The seams that were encountered at the Jamage mine were the Seven Feet, at 75 yards, the Eight Feet at 145 yards, the Bullhurst at 250 feet and the Ten Feet at 280 yards. The shaft was sunk in 1872 and a section of the shaft had to be prepared for the inquiry as up to that date there had not been one. The ventilation of the mine was provided by a Waddell fan placed on the surface at the top of the upcast shaft.

The explosion took place in the Bullhurst seam which varied in thickness and inclination from as much as 6 feet to 20 feet and from flat to an inclination of 60 degrees. The seam was divided by bands of shale into four layers of coal the 'Bottoms' was the most important part of the seam and that in which the roads were driven and there was also the 'Middles', the 'Little Tops' and the 'Big Bottoms.' The bands of shale varied in thickness but the '*hussle*' which separated the Middles from the Little Tops was on note. It contained a highly carbonaceous shale and was from three inches to five feet thick.

Throughout Staffordshire the seam had a notorious reputation for spontaneous combustion and for gas. The seam therefore, presented and demanded the greatest skill and the exercise of the greatest care in mining it, if it was to be worked safely.

The manager stated that the part of the seam that gave the most trouble from heating was the Bottom coal. When there was 'warmth in the coal' there was also present a band of soft substance almost like black lead from 3 to 5 inches thick. When this happened and heating took place the practice was to cut down the band and fill it away. The *Hussle* in North Staffordshire was also considered troublesome in this respect but the manager said he had never seen it heating in the Jamage mine.

The coal was worked on a modification of the bord and pillar system and consisted of driving roads in the Bottom coal to form roughly rectangular pillars of various dimensions. These roads were driven about eight feet wide but owing to the coal crushing at the sides they were frequently 12 feet wide. The coal in these roads or 'openings' was taken down to the Little Tops as it was found that this usually made a good roof.

The mine was not laid out in a definite, planned system. The roads were irregular and the districts large and straggling and this made the fighting of possible gob fires, more difficult and this was the main area of investigation at the inquiry. The manager at the time of the disaster was not responsible for the laying out of the part of the mine where the disaster took place as he had been on his post only since March 1910.

The pillars were worked on the retreating system and slices, 12 yards wide were taken for the full length. When the slice had been taken, the timber supporting the roof as set to the Little Tops and would be from 6 to 20 feet in length. This was withdrawn and the Little Tops allowed to fall, or was taken down and as much of the coal as possible was recovered with supports being set up at the same time to the Big Tops. Finally, the Big Tops were taken down and loaded. The manager stated that this system was successful in extracting the coal and colliers were paid to search among the fallen Little Tops and dirt to recover the fallen coal. He did not think the amount of coal that was lost exceeded five percent of the total.

The ventilation system of the Bignall Hill Colliery was complicated. At the Rookery Mine there was a exhausting Schiele fan, 10 feet in diameter which ventilated the Rookery mine independently of the Jamage mine. A small portion of the Jamage workings were ventilated by leakage through the Eight Feet goaf from the Rookery intake and a portion of the return air from the Rookery went to the Jamage upcast shaft. The Inspector commented that all the ventilation roads should be capable of being travelled for inspections and they were not in this case. This was not a very satisfactory way of ventilation.

The total quantity of air passing into the Jamage mine was 74,126 cubic feet per minute and was made up as follows, 49,960 cubic feet passed down the Jamage downcast shaft, 3,520 cubic feet entered the Rookery mine and 20,646 cubic feet entered from the Jamage mine. From the records of the ventilation for 10th. October there seemed to have been ample air for the ventilation of the Jamage mine. The safety lamps that were used at the colliery were single gauze bonneted Clanny types manufactured by Messrs. Johnson, Clapman and Morris.

Except in the No.3 Bullhurst, there was one coal getting shift. The colliers descended about 5.20 a.m. and the day shift firemen going down in the first cage. With the colliers, repairers, lads and others, there were about 124 people employed in the Bullhurst during the 24 hours and they were supervised by a day and a night fireman.

Coal tubs were filled day and night in the No.3 Bullhurst and the night firemen, or examiners as they were known locally, made their statutory examination of the workings before the start of work. This examination was carried out towards the end of their shift and they reached the surface in time to report to the day firemen. The Report Book for the No.1 Bullhurst was kept in a cabin which was a recess in the road not far from the bottom of the shaft. The other books were kept in the office at the pit bottom. The disaster occurred in the No.1 Bullhurst and the book was not available at the inquiry. Evidence was called to show that it must have been washed away by the flooding operations which were carried out after the explosion. A search was made and eventually it was found under several inches of dust at the site of the cabin.

The information in the book proved to be meagre but there were a number of reports that indicated the presence of gas. That of Charles Smith for December 18th. reported gas at the top end of the Eight Feet and the general safety as 'not safe'. On the morning of the explosion, Brindley, the fireman of the No.1 Bullhurst reported the district as 'safe' when they were engaged in sealing off a portion of it, something the Inquiry found strange to say the least.

The fire started near Taylor's place in the No.1 Bullhurst district where the pillars were being stripped. The seam at this point was 350 yards from the surface and was very thick, being about 22 feet 9 inches high. The inclination was about 1 in 5 but it had begun to flatten out where the fire was supposed to have existed. The pillars had been removed to the dip and leaving a rising goaf behind.

There were five roads leading to the place, two of which had been stopped off and there were three partially built stoppings had been put in three of the other roads but they had allowed sufficient room for the passage for horses, tubs and workmen. The preparations of the stoppings was the usual practice when working this seam in North Staffordshire owing to the liability of spontaneous combustion. These permanent stoppings were 3 feet thick and were recessed into the sides for two or three yards, that is, until the coal was found as the coal at the side was very broken up and recessed into the floor. The roof was hard and firm and the stoppings were not cut into this. At this colliery it was the practice to first put in a stone pack, 8 to 10 yards thick and then face the stopping with bricks and mortar to make it stronger. The reason that three roads were left open was that one could act as an intake, the middle one the haulage road and the third as a return.

The first indication that all was not well at Taylor's place was on Thursday morning, 23rd. November. The manager was making an inspection of the Jamage mine when he

received a note from Swingewood, the overman asking him to come down to Smith's district and Taylor's place where there was a peculiar smell.

He arrived there about 11 a.m. but could not detect the smell but he found that the coal was warm. He examined the goaf and could detect no gob stink but others, notably George Taylor, a coal hewer who was working in the place and had observed the smell at intervals. Alfred Taylor, who was also working there and Brindley, the fireman who inspected the place on Thursday morning reported that it gave off 'a little smell' but, although there were signs that something was wrong, neither he nor Smith, the day fireman reported the heating of the coal on Thursday. Reuben Riley, a roadman, was working in the return airway on Friday and noticed the gob stink as he went to work at 6 a.m. on Friday and thought that it was coming from a stopping.

There was a small fault at Taylor's place which had a down throw towards the goaf 1 foot 6 inches. Daniels and Swingewood discussed the matter and came to the conclusion that whatever heating here was, was due to the pressure or crush on the coal pillar and that the best thing to do would be to take out the warm coal as quickly as possible and work was commenced immediately. On Friday morning the coal at this point was considerably cooler than it was the day before but the manager had detected gob stink at the edge of the goaf.

He arranged for the stoppings to be closed and ordered the men out of the pit with the exception of those engaged in building the stoppings and conveying materials for their construction. There were twenty two people in all. He also arranged for the necessary changes to the ventilation. Curiously, when he visited the edge of the goaf on Friday at 6 p.m., the Manager could not detect a smell and the coal was cooler. At 7 p.m., he heard loud bumps or 'goths' as they were called locally which he accounted for by the weighting of the roof and he noticed that the timber was bending and cracking. The closing of the stoppings was commenced at about 7 a.m. On Friday morning and continuous work went on until the explosion which took place on the 25th. November at about 10 a.m.

Harry Meyer was working with others close to the dirt pack which they had carried up to the roof and were strengthening it when the blast occurred. He heard a roar which came from the inbye side of the pack and he was struck by debris and knocked out. He was also slightly burned. Reuben Riley gave a similar story. Kelsall was about 30 yards from the stopping and was also knocked out and burnt a little.

At stoppings Nos. 7 and 8, George Billington, a fireman observed nothing unusual except that the gob stink was coming through the stopping No.7 until 10.15 a.m., when he felt a rush of wind followed by clouds of dust and he turned to Henry Shaw who was working with him and told him that he thought they ought to get out. John Robinson, a fireman working on the No.3 stopping noticed a reversal of the air seconds before the blast and shouted a warning to the men. He sent off to get out but lost consciousness. Charles Smith, the day fireman, was also rendered unconscious as he was trying to get out.

Boon, the undermanager, who had been making an inspection of the stoppings, had just returned from No.4 and was standing about four yards from No.5 when he felt a rush of wind carrying a cloud of dust. Boon had seen gas coming from No.4 stopping and this was blown out in the explosion.

The rescue operations were carried out speedily and with a manner that gave great credit to all concerned. The manager had just reached his home when he was summoned by Robert Brough, the onsetter. When he got to the pit he telephoned Mr. Henshaw asking him to provide two rescue brigades equipped with breathing apparatus and gave Daniel Gater the names of the men who were well acquainted with the district. He told him to find these men and send them down the pit after him. He then went down the mine and made his way to the workings.

There he found Mr. Latham, the surveyor, at the pit bottom just conscious and in charge of two men. He instructed the two men to take Latham up and send for doctors.

He made his way inbye and found Roberts and Smith. Both these men were able to get out of the pit unaided. Later he met James Boon, the undermanager and his own son, Amos Dnailes, pushing a tub which contained three men

Those who lost their lives were-

F. Leese aged 58 years.

T. Chadwick aged 45 years.

Enoch Edwards aged 51 years, fireman.

Joseph Singlewood aged 20 years dataller.

G. Cork aged 22 years, dataller.

Henry Shaw aged 21 years, dataller.

The inquiry was opened at the Wesleyan Schools, Audley on 4th. January 1912 and the evidence was heard by the Coroner for North West Staffordshire, Mr. Adam Hughes. All interested parties were represented and the official report was present to the Secretary of State on 6th. March 1912.

The Report books and the information contained in them was considered by he inquiry who came to the conclusion that-

“There was a want of system in carrying out the reporting required under General Rule 7 inasmuch as reports had been made on several occasions by firemen in the books under General Rule 4 to the effect that places had been fenced off on account of the presence of firedamp but the workmen had not been withdrawn or the ‘gob sink had been discovered’ which reports should have been recorded under General Rule 7 in the Withdrawl Book, but this had not been done. The manager admitted hat head not examined the latter book.”

The Coroner submitted three question for he consideration of the jury-

“1. The cause of death.

2. was the mine worked according to the accepted practice of the district?

3. Were the stoppings put in with reasonable care and rapidity, and with due precaution to keep them air tight?”

The jury found-

“1. The cause of death was asphyxia due to carbon monoxide poisoning.

2. That the mine was worked according to the accepted practice.

3. That the stoppings were put in with reasonable care &c. but the jury where of the opinion that the preparatory stoppings should have first been bricked in.”

The jury also added a rider-

“That where a gob fire has taken place, a rescue brigade should be at the colliery in case of an emergency.”

HEDNESFORD. Cannock, Chase Staffordshire. 14th. December, 1911.

The colliery was the property of the Cannock Chase Colliery Company Limited and the accident occurred in the No.9 Pit, Hednesford Mine at about 12.10 p.m. There were two shafts about 48 yards apart which were 258 yards deep to the Bass Seam in which the accident took place.

The workings were ventilated by a 24 foot diameter Guibal Fan, 10 feet wide which at the time of the accidnet was running at 55 r.p.m. The bottom of the downcast shaft was lit with paraffin lamps and there were boys who were employed at the shaft bottom who carried ordinary ‘shukey’ lamps. A few gallons of oil for re-filling the lamps was kept in sheet iron bottles or in cans in a small cabin in one of the main air intakes and the boys were permitted to re-fill their cans when it was required. A spout was provided but this was not regularly used and a pail was placed under the cans to catch any drops of oil but the boys usually filled their lamps by dipping them into the pail. fag ends of lamp

wicks were occasionally thrown about and the floor in the immediate vicinity of the cabin was saturated with the oil.

A heave-up doggy was employed at the shaft bottom with instructions to clean up the place daily and it was stated that this had been done at 11 a.m. on the day of the accident. When the man returned after snap time, when noticed flames which had spread along the floor and ignited the wood work. He ran in and removed the pit bucket and attempted to stamp out the flames. He tried to overturn some tubs butt but they were too closely buffered and he was unable to do so. The alarm was raised and the manager and overman sent for. The overman reached the bottom of the shaft about 12.30 p.m. and immediately took steps to withdraw the men. There were 161 in the pit at the time. He also gave orders for the separation doors between the shafts to be opened in order to short circuit the air but unfortunately never thought of stopping the fan. By 12.30 p.m. nearly all the men had been withdrawn with he exception of four who were working in Nos. 2 and 3 stalls.

Henry Merritt, an examiner who had been shot firing in the No.1 stall when the alarm reached him, made his escape to the shaft bottom by way of the return air way. He was then asked by the overman to go into the Nos. 2 and 3 and fetch the men out. He immediately consented.

Tom Stokes, a stallman who had come out of the No. 109 stall volunteered to go with him. They went through the separation doors and up an incline, to No.2 stall, a distance of over 800 yards an told the men to come out at once. up to this time the air in the return airway carried some smoke and the products of combustion but was breathable.

Meanwhile, the manager and undermanager had been summoned from an upper seam. The messenger told them they were wanted at once in the Bass seam but was not told the reason. The undermanager returned with the messenger to the shaft, but the manager, not knowing how serious was the situation, continued his travels round the workings. When the undermanager reached the bottom of the downcast shaft, he found that the fire, fanned by the full air current, had developed alarmingly and was creeping out bye along the roof and against the air towards the shafts. Fearing that it would reach the upcast shaft and cut off their retreat, he ordered the separation doors to be closed the effect of which was to drive the smoke through the workings.

When Merritt, Stokes and the four men who they had gone to fetch from No.2, they found large quantities of smoke was leaking through the double doors which separated the intake from the return and that the air way o the return side was badly fouled.

Some of the men were reluctant to enter it but Merritt told them it was the only way out and led the way, closely followed by a miner named Payne who held on to Merritt's waistcoat. Bradbury followed, but the others appeared to have remained where they were and dies from the smoke and poisonous fumes from the fire.

On reaching a point where the air was comparatively clear, Merritt sent Payne outbye and returned through the double doors and shouted to find out if the others wee following. Bradbury had reached a pint where he had succumbed to the smoke so Merritt got no reply and, finding that it was impossible to proceed along the return, he went towards the upcast shaft and met some other men who had come form sections of the workings which had been less affected. He sent these men to the surface and then, retaining the cage at the bottom of the upcast shaft he went to the doors accompanied by some other men but when he opened the doors, the smoke was so dense that they could not go forward. he went up the shaft and arrived at the surface in a very exhausted state.

Meanwhile a donkey pump on the surface had been connected to a pump which was led down the shaft and the fire was gradually driven back and extinguished. It was three days later that Bradbury's body could be brought to the surface and six days before the bodies of the other men could be recovered.

Very valuable work was done by the local Fire Brigade and a rescue team from North Staffordshire led by Professor Cadman wearing breathing apparatus was at the scene but their efforts were useful only on combating the fire.

Those who lost their lives were-
William Reeves aged 48 years, stallman.
Thomas Stokes aged 41 years, stallman.
Jacob Ward aged 49 years, holer.
William Baugh aged 28 years, loader.
William E. Bradbury aged 19 years, loader.

The actual cause of ignition was not determined but it was thought that it had been caused by a smouldering lamp wick or snuffer from the lamp of one of the lads employed at the pit bottom having fallen on the saturated floor. The cabin had been built with considerable care with brick walls and iron plates on which to stand the oil cans but the inspector thought that it was inadvisable to position it where it was. Mr. Hugh Johnstone also commented-

“I am also of the opinion that if the fan had been stopped and the separation doors opened immediately the alarm had been raised, the fire would not have assumed the proportions that it did it could have been dealt with before it reached either of the shafts and that the men in the pit could have been brought out without loss of life.”

MARKHAM. Markham, Monmouthshire. 18th. May, 1912.

The colliery was owned by the Markham Steam Coal Company and they were sinking two shafts, 40 yards apart and both 18 feet in diameter. At about 1.40 p.m. an explosion of firedamp in the north Sinking Shaft caused the deaths of five men, four of who were on the surface and injuries to two others, one of whom was on the surface.

Both shafts had reached a depth of 380 yards and a scaffold was hung in the shaft a few feet below the bottom of the lodge room. The shafts were ventilated by a sirocco fan forcing air through 18 inch pipes which stopped at the scaffold with the air current being directed downwards through an opening in the side. No naked lights were allowed in the shaft. There was a notice to that effect and smoking was prohibited. It was not known that there was firedamp in the shaft and up to the time of the accident, none had been encountered.

About three months previously, a chargeman reported that he had seen firedamp in his lamp but when the manager examined directly afterwards, he could detect none. The Inspector, Dr. W.N. Atkinson, commented that it was difficult to test for gas in bright electric light. During the fixing of pump pipes shortly before the explosion, the lamps kept going out. This was thought to have been caused by water or the fact that the lamps were short of oil but in retrospect, it was caused by the presence of gas and in the light of subsequent events, probably they were extinguished by firedamp. The bottom of the shaft was at the same horizon above the Elled Seam, where, in other sinkings, much gas was given off. At Bedwelty pits, three and a half miles to the north, a lot of gas was produced in the ground and was piped to the surface and burned. After many years it was still burning.

At the time of the explosion there were only two men in the shaft, one working on the scaffold and one in the lodge pump. The bottom of the shaft was lit by a cluster of electric lamps suspended about 14 feet above the scaffold and a portable 'Fors' electric lamp with a flexible cable which was on the scaffold. Up to one and a quarter hours before the disaster, water was being drawn in a tank which passed through an 8 foot square opening in the scaffold. The tank was on a runner over the top of the pit and at

the time of the explosion, three of the victims were on the runner. Another of those killed and some other men, were within a few feet of the top of the shaft.

When the explosion occurred, a violent blast came up the shaft which demolished the runner and an adjacent cabin that was near and damaged the iron lattice headgear. The body of one of the victims at the surface was hurled 60 to 70 yards and was badly mutilated. Another was blown 40 yards and one was blown into the headgear and one fell down the shaft. The water tank also fell down the shaft as well as a beam of timber 34 feet long and 18 inches square which had formed part of the framework at the top of the shaft.

Soon after the blast, a chargeman sinker shouted down the shaft and received a reply from one of the men below down the shaft. Steps were taken at once to rescue the men in the shaft. Mr. Wooley, the manger was soon on the scene, and as soon as a rope a bowk were available and after safety lamp had been lowered 80 yards down the shaft and had come up still burning, Mr. Wooley and two sinkers, Bainbridge and Davies, made two attempts to get down the shaft. They were unable to get more than 100 yards As the air was unbreathable and extinguished their lamps. Air pipes in the shaft were also in a dangerous position.

In the meantime, compressed air pipes were sent down which stopped about 9 feet above the lodge room and water sprays had been set to clear the air. A rescue brigade had been sent for and arrived at about 5.30 p.m. with Draeger breathing apparatus under the charge of Mr. A.T. Winborn, the Inspector at Crumlin Rescue Station, .

Messrs. Wooley, Winborn, James Leach and Llewellyn Howells donned breathing apparatus and went down in the bowk, taking with the safety lamps and electric lamps. All the safety lamps went out at a depth of about 120 yards and it took them an hour to get down to the pump lodge owing to dangerous obstruction. The scaffold had been completely demolished except for a beam that was swinging dangerously. In the lodge room they found John Snashall who had been there when the explosion occurred. He was alive but burnt and dazed. The other man had been on the scaffold and had fallen down the shaft. There was some difficulty in getting Snashall into the bowk but the air was quite good due to the compressed air that was being forced down the shaft. For greater freedom, Mr. Wooley took off he helmet and returned to the surface without it. Later another attempt was made but at a depth of 100 yards, the air was found highly charged with firedamp an the descent was abandoned.

Those who lost their lives were-
George Jones aged 25 years, mechanic,
Michael Carroll aged 33 years, fitter,
Albert Leggett aged 24 years, fitter,
Thomas Patrick aged 44 years, banksman and
George Guntrip aged 27 years, sinker.

When the shaft was examined two days later, it was found clear of firedamp nor was there any in the lodge room but later there was a considerable gas problem in the shaft. It seemed probable that the gas came from a sudden inrush. The means by which it was ignited could only be surmised. a spent match was fond on the floor of the lodge room which appeared to be the most probable course but Snashall denied that there was any smoking or striking of matches. The only other possible means of ignition could have been an electric spark. The Fors portable lamp worked off a battery. The cable to the lamps was connected by three pins which could have made a spark if they had accidentally been pulled out. but it was stated that the battery was run down at the time of the explosion.

Messrs. Wooley, Winborn, Leach and Howells were granted Edward Medals for their bravery in rescuing Snashall.

CADBEY MAIN. Denaby, Yorkshire. 9th. July, 1912.

The colliery was the property of the Denaby and Cadeby Main Collieries, Limited and were in the Don Valley in South Yorkshire, almost midway between Doncaster and Rotherham and the collieries were about 2,000 yards apart. The area of mineral tract worked by the Colliery Company was about ten thousand acres.

The Denaby and Cadeby Main Collieries were under the general control of a Managing Director, Mr. W.H. Chambers, who was well known throughout Yorkshire and the Midlands as a Mining Engineer of a high standing and experience. He lived near the collieries and took a more active part in the management of the mines than was usual for a Managing Director. Mr. H.S. Witty was the Agent over the two collieries and previous to this appointment in September, 1911, he had been manager of the Cadeby Main Colliery. Under Mr. Witty, as manager of Cadeby Main alone, was Mr. C. Bury who was seriously injured in the second explosion and died a few days afterwards. There was one undermanager at the mine. Mr. Bridges, an assistant undermanager, Mr. Cusworth, killed in the second explosion and Mr. Eli Croxhall, who also lost his life in the second explosion, acted as undermanager on the afternoon shift.

There were two shafts at the Cadeby Main Mine which was close to Conisborough Railway Station and were sunk to the Barnsley bed which was the only seam that was worked at the mine at a depth of 763 yards on the dip side of a large fault which had a throw to the south of 126 yards. The coal on the north side of the fault was won by a pair of headings which were driven through the fault. The mine produced about 3,000 tons per day and the coal was wound at both shafts. The No.1 was the downcast and the No.2 was the upcast both 16 feet in diameter and 752 and 738 yards deep respectively. The coal was wound from the bottom of the No.1 shaft and the coal was brought to the a temporary inset on a level with the seam on the north side of the fault at the No.2 shaft. an inset was being made at the bottom of this shaft but had not been completed. Some of the coal worked on the north side was brought to the No.1 shaft and this was lowered down by a staple pit sunk from the north side level to the south side level.

The Barnsley Bed had Bind roof and floor of fireclay or shale and about 7 feet 3 inches thick of coal was worked About 49 feet above the Barnsley Bed was a seam of coal 2 feet 2 inches thick and the top coal of the Barnsley Bed was of an inferior quality and mixed with dirt. The Barnsley Bed was known to be a gassy seam but at Cadeby it was not subject to blowers or sudden interruptions of gas. The undermanager, Mr. Bridges, told the inquiry that after a weighting in the No.2 Pit, about two years before the accident, it was necessary to withdraw the whole of the workforce from the mine on account of the gas.

In South Yorkshire the seam was liable to spontaneous combustion and the colliery had suffered no less than 35 fires and to work it, it required great care and vigilance of the part of the management. The seam dipped at 1 in 14 to 1 in 12 to the south west and the workings were divided into five man districts, the First North, the Second North, the East, the South and the West Districts. The coal was worked on the longwall system and the distance between the gateroads was usually 40 yards. Packs were built on either sides of the roads for a width of 7 feet 6 inches, and every seven yards a gob pack was built, 6 feet wide. The material used to build the packs was stone got from the wastes and from the rippings in the gates. In the main roads, a good deal of ripping had to be carried out in the bind roof which had the effect of forming stone dust. This had a great limiting effect on the propagation of the resulting explosions. All the coal was got by hand and there were no mechanical coalcutting machines nor conveyors used to transport the coal along the faces. The coal was friable and there were quantities of coaldust made at the face.

No shots were fired except in the stone drifts and then only at weekends when there were few persons in the pit. as an additional safeguard only the manager was permitted to fire the shots. The mechanical haulage of the coal was in the main intakes and the

haulage system used an endless rope which was electrically driven from the bottom of the shaft. The secondary haulage was done by horses and ponies. The ventilation of the mine was by a Schiele fan, 21 feet in diameter which ran at 119 r.p.m. at a water gauge of about three and half inches. A Waddle fan, 9 feet in diameter and electrically driven, was kept as a standby was being replaced by a reversible Sirocco fan. Although the Cadeby Main mine is connected to the Denaby mine by means of an emergency outlet, the ventilation system of the two mines was quite separate and the iron doors at the outlet were kept locked.

With the exception of some of the lamps carried by officials and a number of electric lamps used when working at fire holes, the colliery used Marsaut lamps. After the accident, safety lamps were found in the explosion area and found to be intact but several found on the 14 level were broken and one in 19's crossgate had been broken from the outside.

The surface arrangements were designed to prevent the coal dust from tipplers, screens, conveyor belts and hoppers from being carried down the downcast shaft. The dust was collected by funnels attached to pipes which were in turn connected to an exhaust fan which created a two and a half inches water gauge pressure. The dust laden air was passed from the fan into a cyclone where it entered a steamy atmosphere maintained by a steam jet from the boilers. This arrangement, which had been in operation for about five years, had proved most effective in clearing the air about the hempstead from dust and practically none was carried down the downcast shaft into the workings.

In each district there was a senior '*charge*' deputy who worked with an afternoon and night shift charge deputy. The senior, and more experienced of the charge deputies, were on the morning shift which was the most important shift of the three. The afternoon and night shift deputies were considered inferior to the morning deputies only in that they received their instructions from the undermanager through the senior deputies. They had the same duties and responsibilities as the morning deputies. Besides these there were assistant deputies, two to a large district and one to a small district. These men assisted the charge deputies and examined and reported as if they were full deputies.

The examination before the commencement of work in the morning shift was made by the night deputy and his juniors and they each reported the results of their examinations. All the deputies and their assistants were carefully and wells selected. Generally speaking the charge deputies were drawn from the assistant deputies.

The mine was worked on three shifts, two coal getting shifts and one repairing shift. The first coal getting shift was from 6 a.m. to 2 p.m., the second from 2 p.m. to 10 p.m. and the repairing shift from 10 p.m. to 6 a.m.. and the deputies went down with the men in the first cages.

The number of men working underground on the 8th July were 10 p.m., 7th. July, to 6 a.m., 8th. July, 505. 6 a.m. to 2 p.m. 938, 2 p.m. to 10 p.m. 52 and 10 p.m. to 6 a.m., 9th. July, 11. The numbers working on the corresponding days of the previous week were 10 p.m., 30th. June to 6 a.m., 1st. July, 489. 6 a.m. to 2 p.m., 853 and 2 p.m. to 10 p.m. 238. The difference in the numbers on the 2 till 10 shift was accounted for by the fact that H.M. the King visited the neighbourhood on the 8th and 9th and many people made it an occasion for a holiday.

The explosion took place in the East District which was dry and moderately dusty. The coal was filled into tubs at the face with shovels, not forks as was common in collieries in South Yorkshire. As a result, there was not as much fine coal dust at the face. The endless rope worked as far as the 14 level. The tubs were hooked on by a tail rope and a clip and travelled for 150 yards down the level. After this the haulage was by horses each horse drawing tubs of 10 cwts.

The South district was not expected to be worked for long for to the south it was not far from the boundary between Cadeby Main and Dalton Main Collieries and to the east

it was approaching the pillar of coal which had been left to support the Dearne Valley Railway Viaduct. There were several faults cutting the area of coal that was being worked. Gob fires had been known in the neighbourhood. The first occurred at the face in August, 1906 and the fire was dug out. The second fire occurred not far from the first where some timber had been left. A third fire occurred in old 121's stall against the fault. The fire was first discovered on 20th. November, 1911 and when scouring roads were driven to it was found that the fore had backed from the fault for about eight yards into the gob. On 20th. January, 1912, a small explosion of gas occurred at this fire, slightly burning four men who were working at the face. The effect of this was felt by men 150 yards away and frightened them so they all came out.

The deputy, Springthorpe said he saw fire on 2nd. February which 'broke out over the top of the bars that had been set to scour forward towards the fault' This was about two yards back from the fault and it was the top coal which caught fire. This was very small fire and Springthorpe soon put it out.

The chageman at the spot, Saunders, who was killed in the explosion, stated on 10th. April that he had seen 'a flash over the pack', about 20 yards away from where Springthorpe had seen the fire. At the time the management were under the impression that the fire was out and Saunders was in charge of the operations of '*drawing off*' and stowing up the scouring roads in the area. During these operations, no signs of fire were found.

On the morning of Tuesday, 9th. July between 1 and 2 o'clock, William Humphries, a road layer was at work at a spot about 260 yards along the South Level when he noticed '*a sudden stoppage of air followed by a warm heat which travelled past me. Presently it came back, there being electric lights, I could see it picked up the dust and came up the landing, coming from the pit bottom picking up all the distance from this level and filling it full of dust.*' Seeing that something was wrong, he went to the pit bottom where he knew two men were working. he explained to these men what he had seen but in his own words, '*could not get anything out of them*' and went back to the level again but could not settle down to work as he thought there was something wrong with the pit. he went to the top of the pane and found the ventilation normal so returned to his work. Shortly after he was joined by J. Farmer, who had come out of another district. It was the 2.15 a.m. Farmer heard Humphries story and came to the conclusion that there had been an explosion and he went further along the level. When he had got 200 or 300 yards he found signs of violence. saw dust he had place on greaser was blackened and dust had been blow from girders. He went through the doors at 33 level where he found the atmosphere foul so he hurried out and found the separation doors intact. further down he found five tubs disturbed by the explosion. At a point 100 to 150 yards outbye of the 14 level he shouted two or three times but got no answer. At this stage he felt a little strange and retraced his steps intending to get assistance.

At the top of the plane, he met a man named Senior and sent him to fetch another man named Bullock. Humphries and Farmer went down the plane again and they were later joined by Senior somewhere beyond the 33 level who told them that Bullock, Sylvester and Nicholson were coming. On opening the doors at 33 level they saw these three men coming out '*all of a lather*'. They had been about 200 yards along the level and were then joined by Wildman and the while party proceeded down the plane. When they got as far as 14's landing they found 50 or 60 tubs blown out by the force of the blast. It was then that they agreed to send Nicholson and Wildman to fetch Fisher, the deputy in the West district and Cusworth, the undermanager. Those who remained out over the broken tubs and went about 100 yards inbye when they found the air bad and had to retrace their steps where they waited for the arrival of an official. Fisher joined them there and it 4.55 a.m., when Nicholson found Fisher.

Fisher went to the South district as so as he heard the news and went through the doors at 23 where he found the air was foul. he came out and closed the doors and went to 33 where the doors were closed. He then joined Humphries and the others, examined

their lamps and set out with them along 19's crossgate. They found a door open and arranged for it to remain so and a little further along they found a fall. Just over the fall they found the body of Mulrooney. Fisher continued and then stopped to think. He came back and closed the 19's cross gate door and, coming to the bottom of the crossgate, sent Humphries out to the pit bottom for assistance and then set off on a tour of inspection. He got as far as 64' but then lost his light while testing for gas. This was the first time he found gas but before this he knew he was in afterdamp because of the effects on him. He fenced off 64's, warning anyone who came that it was dangerous place. Then with Bullock's light the two men came out and met Cusworth and Springthorpe.

On his way out to summon the rescue party who were trained in the use of breathing apparatus, Humphries met Cusworth and Springthorpe coming down the South Plane just below 33 level and he told them that he knew where Bullock and Fisher were. Cusworth told him to bring back the Report Book which was kept in the 'box-hole' near the shaft. In the book, the deputy recorded the position of the workmen during the shift and this record was in addition to the statutory report book.

Humphries found, Hulley, a deputy, at about 5.30 a.m. and they collected a rescue team of Murgatroyd, a deputy named Humphries, Carlton and Stribley. The team went to the enquiry office and telephoned Mr. Witty and Mr. Bury and the Wath Rescue Station. They set off with four sets of rescue apparatus and some spare oxygen cylinders. By the time they were ready and descended the pit it was 5.55 a.m.

Fisher, Cusworth and Humphries, the deputy, went along 19's crossgate and found an electric lamp against an old stopping in old 121's. Springthorpe and Hulley went back along the 19's crossgate with a message about rescue apparatus and Fisher and Humphries came out along 33's level and back to 19's crossgate. Mr Bury, the manager, had come into the workings. Fisher followed and caught up with him and they went to the low side face, where they found a fall in 131's. In evidence Fisher said that he had no conversation about anyone about a gob fire but thought that the explosion had originated somewhere between 121's and 7's. He went to the surface at 9 a.m. and went home.

At the inquiry, Hulley said that after Fisher and Humphries had gone out of the 33 level, Cusworth, Hulley and Murgatroyd inspected the slits. Hulley suggested that everything should be left as it was until the Inspectors arrived and Cusworth stopped the bodies being taken out. On his arrival at the scene, Mr. Bury said that it would be all right and he would put a mark on the sides where the bodies had been found. After that Mr. Bury asked them to go with him on an inspection of the district and Hulley, Murgatroyd, Farmer and Carlton went with him. They found two bodies in 64's on the low side of the crossgate where there were signs of burning, another at 7's gate where a stopping was being built, which was not burnt. At the suggestion of Bury, Hulley and Carlton went back down 64's gate and on to 19's level where they met Bury, Springthorpe and Murgatroyd at 19's gate.

About 8.45 a.m., Mr. Bury suggested to Hulley and the others that they should go home as they had been up all night and there was plenty of help. When Hulley got to the surface at about 9.20 a.m. He met Mr. Witty, and Messrs. Pickering and Hewitt in the inquiry office and Hulley told him of the situation underground and had no idea that there had been a gob fire. Word was sent to the rescue party at 14's level that the breathing apparatus would not be needed as the air was good and the party took off their suits and placed them in a manhole and Humphries, the road layer, stayed to look after them. Percy Murgatroyd, one of the rescue brigade, kept his apparatus. Cusworth sent for Humphries who wanted the work book he had brought in. The agent, Mr. Witty, arrived at the mine at 6.45 a.m. and learned that a party of trained rescuers made up of men already at work in the pit, had gone inbye and that Mr. Bury and Cusworth had gone down the pit. Mr. Witty did not go down and the report from the pit bottom was that the

South District had been travelled and the ventilation restored. The position of the bodies had been located but that help was required to get them out.

Mr. Witty had the pay shed prepared for the reception of the bodies, placed a man in charge and sent for a lot more stretchers. He also asked the crowd that had gathered for volunteers to carry out the bodies. He asked for 20 men and 20 took up their lamps and went down the pit. The Mines Inspectors, Messrs. Pickering, Hewitt and Tickle arrived at the colliery between 9 and 10 a.m. and went down the mine. Two other Inspectors Messrs. Wilson and Hudspeth arrived later and they delayed going down while they studied the plans of the district. This delay probably saved their lives.

From the time that Fisher left the pit at 8.30 a.m. and the news of the second explosion between 11 and 12 o'clock, Humphries went out at the shaft bottom and telephoned for Mr. Bury, at Springthorpe's request. Fisher and Bullock went out by 33 level, Cusworth and Springthorpe went straight along 14 level, passing the bodies of the men and horses on the way and then along the 121's crossgate, into 19's level down the crossgate in to 14 level again. When he arrived at 14 level Springthorpe was suffering from the effects of afterdamp so sat down for a while.

Somewhere in 19's crossgate Mr. Bury joined Cusworth and Springthorpe was nearly overcome by afterdamp so that when they got to new 131's crossgate, Bury and Murgatroyd came out by the crossgate. On the way out Bury and Murgatroyd went in to 143's. On 14 level Bury sent Murgatroyd out with Springthorpe to the level where he arranged to stop and assist in getting the bodies up the plane. Eighteen or nineteen bodies were sent out while he was there. A few had already been sent out. A man named Littlewood stayed with him. Between the two explosions samples of the atmosphere were taken in various part of the pit and the sample at the 7's gate showed that there was nearly 3% of methane.

Shortly after Springthorpe had got into the 14 level end the Inspectors arrived and he asked Prince, the assistant deputy, to take him to Mr. Bury, which he did, and returned for something. Springthorpe could not remember what.

An hour and a half or two hours after the Inspectors passed him, the second explosion occurred. Springthorpe was standing about 8 to 10 yards topside of 14's level end and Littlewood was 10 yards from the topside where he was waiting while another stretcher party brought put a body. Suddenly he heard a rushing noise and had just time to shout "*Look out Herbert*", when he was knocked about and his lamp knocked out of his hand. He the struggled out in the dark in very bad air and an atmosphere that was clogged with dust.

Shortly after 11 o'clock, Mr. Witty received a telephone message from Captain Brook at Wentworth to ask Mr. Pickering something so he telephones down the pit to get in touch with Mr. Pickering. The reply he received was -

"I cannot get Mr. Pickering, and it had gone off again, and the men are all imprisoned behind a fall."

Mr. Witty went down the pit at once with another man. He said-

"I met several men who had been slightly injured, Springthorpe was one of these and Harold Booth. The others were only slightly touched. I met others coming from where the explosion had been. I met Mr. Hudspeth first and we examined the return and found the stuff coming from there very foul. It smelt strongly of gasoline or benzoline or something of that sort. I saw the doors were uninjured. we went lower down and found a road had been made over the fall. I went through there, and found Mr. Wilson paying attention to some of the injured who were beyond the fall. I went then on 14's level, and part of the way on there I found Mr. Edwin Chambers who had just come off, and he told me where he had found his son. he said 'straight on there' so I went to 121's crossgate and then went up to the crossgate through the door. The door was slightly ajar. I went higher up, nearly to 19's landing, and I found bodies in a cluster I should think twenty yards below the landing on the cross gate. I saw Mr. Douglas Chambers, and then in front of him

was Mr. Pickering and on his right Mr. Hewitt and Mr. Tickle. In front of Mr Pickering with his feet under Mr. Pickering's head, was Mr. Bury and two bodies in front of Mr. Bury who I did not recognise. All the bodies were facing inbye. The only signs of force in the neighbourhood was a tub on end a slight fall. The bodies were somewhat discoloured by dust but there was no signs of burning about them. Bury and Farmer were both found alive but breathing badly."

Birch was also alive but this was not mentioned in the evidence to the inquiry by Mr. Witty.

"The atmosphere had the appearance of 'not exactly smoke' but of 'white steam' and this caused the eyes to smart. Bury and Farmery were carried out into fresh air, and were attended by Sergeant Winch, who had a pulmotor with him, and the carriers."

Messrs Wilson and Witty rested at the junction between 19's crossgate and 14 level and after a while, came out of the pit. When Mr. Witty was up the straight-on road in 14 level he had found a waistcoat on fire and he extinguished the fire. A prop was also on fire somewhere near the same place. At the point where 14 level and the 19's crossgate there were signs of considerable violence and bodies were 'in all sorts of positions' and badly injured.

Murgatroyd now takes up the story from the point after Hulley had left the workings and the rescue men had left their apparatus behind in a manhole-

"There were several of us, I believe, stayed at the bottom of 19's crossgate waiting orders and I believe we were sent for, I am not quite sure, and we must have been sent for to go up 19's crossgate with the apparatus to examine where the electric light was because nobody knew what was there."

Murgatroyd was told that someone with apparatus was required and he donned his apparatus and examined the stoppings in these three roads and met Mr. Bury at the bottom of 19's crossgate at about 7.10 a.m. He went on the route suggested by Mr. Bury but he did not know this part of the mine. he returned to the bottom of 19's crossgate about 9.30 and took off his apparatus. Bury Chambers and Cusworth consulted for about half an hour. Murgatroyd, Famery and man named Thomas Flick were sent to remove the fall just inside the door in 19's crossgate. While they were carrying out this work, Mr. Bury summoned Murgatroyd as he wanted to go round with the apparatus. The three Inspectors had arrived and Mr. Pickering asked Mr. Bury what he had done. Mr. Bury asked Mr. Pickering, *'if he was right in removing the bodies'* and Mr. Pickering said it was quite right.

Mr. Pickering and the party then went to make an inspection at 19's landing and to 64's cross gate. While they were there, Mr. Hewitt to a temperature reading. It was too hot for Mr. Hewitt and Murgatroyd took the temperature and brought the thermometer back to Mr. Hewitt who was fifty yards way. when they were coming down 19's, Murgatroyd heard Bury remark to Mr. Pickering that he thought there was a fire somewhere.

They had just gone into the crossgate, Bury leading followed by Pickering, Murgatroyd, Hewitt, Tickle and Douglas Chambers in the rear when the second explosion occurred. Murgatroyd described it-

"It was like a door shutting with great amount of pressure behind it and then the roar came afterwards. Several shouted, I think it was Mr. Chambers. Mr. Bury shouted, *"Down on your faces, lads."* I think they knew what it was, I think everyone obeyed them and afterwards I think everybody would be stunned for a moment. When I came to my senses, I turned the oxygen on and got the tubes in my mouth and I suppose I went straight to the crossgate. I think everybody had not the slightest idea where to go when it happened.

After I came to I hear someone say something, Ben Ward, Albert Farmery and Tom Stribley. They said. *"Let's get hold of each other's hands, we will die together,"* I struggled on and hit my head on a girder And I think I realised what was going on.

i turned about and came out the other way, breathing oxygen all the time. I did not meet anybody and when I got to the bottom door of 19's crossgate, I could not open it, only with some difficulty, whether it was off the hinges or not I could not say. Perhaps i would be struggling for ten minutes with the door before I got it open, I had to clear some dirt on the other side before I got it opened any further. I thought if I got it opened it would clear the air in the crossgate. When I got to the bottom of the crossgate I fell. I suppose it was some bodies I fell over. I could not see with the lamp. It was an electric lamp. I suppose there would be smoke, I had lost my goggles and I had to cover my eyes with my hand. it was not very hot. I supposed the ventilation had asserted itself but the atmosphere was thick. I went to the telephone at the bottom to telephone up and I got a ring back, but could not get an answer. The next thing I knew someone was coming over the fall. I did not know then who it was at the time but it was Mr. Wilson and another I did not know. They told me the air was good and I could takeoff my apparatus. I took it off and I think put the tubes into someone else's mouth that was injured near by. After they made a road so that I could go through. I got over the fall at 200 yards out and I saw Mr. Witty an told him about Mr. Pickering and the other, where they were."

Mr. Basil Pickering, Mr. Pickering's son, arrived at the pit and he heard Mr. Wilson ask Mr. Witty of there was anyone who would go down with him. Mr. Witty offered to go, but he was the only official available and his proper place was on the surface. Basil Pickering said that he knew the district as he was a former official at the colliery, so Mr. Wilson and Mr. Hudspeth accompanied by Basil Pickering and Mr. Ashwin of the Wath Main Colliery and two workmen went inbye.

They had just passed the old 37's at the top of the plane, almost two miles from the shaft when they were met by the blast of the second explosion. The blast reversed the ventilation and they were covered with a cloud of white dust so they could not see what they were doing. They turned to go out as quickly as possible but had not gone far when Mr. Wilson observed that the ventilation was taking its normal course again, so they turned and went in again.

Mr. Ashwin went out to get help an summon the Wath Rescue Brigade and Pickering, Wilson and Hudspeth pushed on to the end of 14 level meeting men coming from the explosion area in the dark. They arrived at a large fall at the 14 level end and Basil Pickering was sent out to report at the pit bottom and say that help was urgently needed. Mr. Wilson clambered over the fall and while on the top of it, detected gas at his lamps. Mr Hudspeth found a hole through the fall underneath a girder and managed to squeeze through where he heard Murgatroyd. Mr. Wilson followed Mr. Hudspeth and while they were there they were joined by Mr. Edwin Chambers, father of Douglas. Mr. Chambers asked Mr. Wilson to keep in touch with him. He did so for a little while, but he was becoming affected by afterdamp so he went back to Mr. Hudspeth and said that he had lost touch with Mr. Chambers.

Three men besides Murgatroyd were rescued alive from Mr. Pickering's party. Birch and Famery could remember little and Famery when he was rescued was unconscious even so he got off the stretcher three times while being carried out of the pit and on one occasion, he even broke the straps that were retaining him. It was reported, *'his legs were going, apparently he was running, trying to get away.'* Later Mr. E. Chambers returned, having found his son's body.

Mr. Wilson remained underground until 4 p.m. directing operations. Fisher and Hulley but he returned to the mine after they heard of the second explosion and searched the workings for any one who might be alive. This was accompanied with considerable danger and as they were experienced pitmen, they must have realised the very real danger of another explosion. the Inspector consider their conduct, *'worthy of the highest recommendation.'* Hulley remained down the pit and was present when there was third explosion at about 3 a.m. Fisher heard of the second explosion and went down the pit

about 1.30 a.m. and went straight to the fall at the end of 14 level and helped with the recovery of the bodies.

Those who lost their lives were-

William Henry Pickering aged 53 years, H.M. Divisional Inspector of Mines.

Henry Richardson Hewitt aged 45 years, H.M. Senior Inspector of Mines.

Gilbert Young Tickle aged 34 years, H.M. Junior Inspector of Mines.

Douglas Chambers aged 28 years, manager.

Charles Bury aged 35 years, manager.

Herbert Cusworth aged 39 years, assistant undermanager.

Eli Croxall aged 49 years, undermanager.

Emrys Evans aged 22 years mining student.

Sydney Ellis aged 32 years, surveyor.

W. Berry aged 47 years, deputy.

William Humphries aged 33 years, deputy.

Charles E. Prince aged 32 years, assistant deputy.

Samuel G. Jackson aged 32 years, assistant deputy.

John William Carlton aged 38 years, deputy.

Richard Winnepenny aged 56 years, deputy.

Sam Webster aged 41 years, deputy.

W. Summerscales aged 37 years, deputy.

George Whitton aged 32 years, deputy.

Jarrett Philips aged 44 years, deputy.

F. Richardson aged 50 years, deputy.

Frank Walton aged 39 years, assistant deputy.

John W. Kelsall aged 26 years, assistant deputy.

Thomas S. Williams aged 36 years, assistant deputy.

J. Springthorpe aged 19 years, surveyor.

F. William Horsfall aged 21 years, surveyor.

J. Boycott aged 67 years, dataller.

William Frankland aged 43 years, dataller.

Edward Henderson aged 41 years, collier.

C.W.P. Radley aged 22 years, filler.

George Denton aged 21 years, dataller.

Cyrus Rodgers aged 29 years, collier.

M. Jordan aged 52 years, dataller.

Joseph Turner aged 27 years, dataller.

Thomas Sanders aged 51 years, dataller.

John Smith aged 58 years, collier.

John Fletcher aged 66 years, dataller.

John Mulhearn aged 27 years, collier.

John Marron (alias Marsden), aged 30 years, dataller.

Thomas Cody aged 32 years, collier.

William Green aged 26 years, filler.

Henry Thompson aged 21 years, filler.

Charles Alderson aged 23 years, dataller.

J. Thompson aged 54 years, dataller.

M. Mulrooney aged 35 years, dataller.

Joseph Roodhouse aged 39 years, dataller.

R.W. Chapman aged 37 years, dataller.

A. Dungworth aged 24 years, dataller.

A. Carroll aged 26 years, dataller.

P.E. Nicholson aged 18 years, driver.

Thomas Walsh aged 41 years, dataller.

Charles A. Hunt aged 28 years, dataller.
J.B. Fox aged 24 years, driver.
Thomas Byrne aged 48 years, dataller.
William Ackroyd aged 49 years, dataller.
William Henry Wallace aged 56 years, dataller.
J. Shuttleworth aged 47 years, corporal.
Charles Edward Tuffrey aged 20 years, driver.
Thomas Stribley aged 35 years, dataller.
Thomas Wraithmell aged 53 years, onsetter.
Thomas B. Talbott aged 28 years, filler.
John William Tarbrook aged 23 years, contractor.
William D. Walters (alias Walker) aged 31 years, driver.
J. Burdekin aged 24 years, dataller.
George Heppinstall aged 28 years, corporal.
Thomas Fleck aged 24 years, dataller.
George P. Evans aged 48 years, dataller.
Richard Gascoyne aged 22 years, driver.
Herbert Neil aged 38 years, onsetter.
Ben Ward aged 30 years, collier.
J. McDonagh aged 49 years, collier.
Tobias Hancock aged 29 years, onsetter.
Robert Neill Edington aged 24 years, dataller.
William Lambert aged 29 years, dataller.
Joseph Ross aged 37 years, collier.
Michael Hayden aged 30 years, dataller.
William Charles Davis aged 26 years, filler.
Arthur Flynn aged 21 years, driver.
Edmund J. Tuffey aged 22 years, corporal.
Charles Johnson aged 34 years, contractor.
A.E. Rowell aged 33 years, dataller.
James Breech aged 44 years, dataller.
W.H. Godsmark aged 28 years, dataller.
C.W. Fletcher aged 29 years, dataller.
George Hindson aged 25 years, dataller.
George Steadman (alias Young) 31 years, dataller.
W. Dove aged 42 years, dataller.
Frederick Stones aged 34 years, collier.
Robert P. Bunyard aged 21 years, filler.

Manchester Guardian July 10 1912

ROYALTY SEES THE TRUE LIFE OF MINERS.

Conisborough, Tuesday Night.

The King's visit to the West Riding has been accompanied by a terrible calamity. Today it was appointed that the Royal visitors should see something of the coal industry of the county, should see the miners at their normal workaday life. Yesterday the king was taking tea in the ancient keep of Conisborough which is known and celebrated in the literature of romance. Many of the miners saw him and cheered when he came into view on the topmost stone of the grey weathered ruin. Even in these rejoicings, the village was on the eve of a dreadful disaster. Men must work, and when the King had left, some 500 men went down the mine for the night shift.

The explosion occurred at five this morning. About 35 men were in the south district, some 850 yards deep and a mile away from the pit mouth. All the morning and afternoon they were bringing out their bodies.

Worse still, a second explosion occurred at noon, shortly after 12 o'clock and in this the members of a heroic rescue party perished.

Before evening over 50 bodies had been laid n the office where the men are paid, and more were being brought up. Some men had been taken to the hospital, blackened, unrecognisable, but drawing breath of life.

The Watchers.

The Cadeby mine is in the beautiful valley of the Dearne. The colliery itself is an ugly object but it does not spoil either the colour of the sweeping configuration of the country around.

All day today rooks have been flying over the colliery yard, clawing down on the heaps of shale, the sailing off to the elms across the valley.

The two winding wheel revolved steadily and by and by on the gangway emerged a little group, six men feeling their way down among them a little smear of colour - a blue bed spread on a stretcher.

Then the crowd on the road lost them, recovering them to sight in the colliery yard below as they passed behind a brick building with the smear of colour still amid them. this was repeated again and again.

The King and Queen have paid a visit to Conisborough tonight. Some f the leaders of the second rescue party came all begrimed and toilworn and told of the dreadful happenings and the things which rescuers must do and endure.

The Queen broke down completely, in able to control the emotion called up. She was still weeping when she left the colliery offices.

The managing director, Mr. Chambers, was in Sunderland when he head of the disaster and he reached the colliery at about 3.20 p.m. As he was convinced there was no one left alive in the workings of the South District he discussed the situation with Messrs. Ashwin, E. Chambers, Laverick, an experience mining engineer from the Midlands, Wilson, Witty and came to the final conclusion that the proper course of action was to build stoppings shutting off the 14 and 23 levels. This was agreed by all and arrangements put into effect.

Mr. Chambers , his brother and Mr. Witty went down the pit and marked off the places for the stoppings. A dry brick stopping, 9 inches thick in the 33 level and another to be built in front of it and in 14's level, which was wider, a 14 inch dry brick stopping to be plastered over and when it was finished, another stopping 2 feet thick, constructed of bricks and mortar in front of it. The first stopping built was the one in 14 level.

Mr. Chambers himself, took pains to see that all living persons were withdrawn from workings. He then went to pit bottom and gave instructions that only twenty men were required in mine and work was started. When Mr. Redmayne arrived at colliery, Mr. Chambers went to surface to meet him and the underground work was supervised by Mr. Laverick. The stopping in 14 level was completed about 7 a.m. and when all work was completed, all men were brought put of mine. The stoppings were then strengthened.

The inquiry into loss of 35 lives in first explosion and 53 in second was opened by Mr. Redmayne in the Guildhall, Doncaster. After the sealing off of the district a partial recover of workings was effected and an inspection of the the explosion area was made. The inquiry came to the conclusion that first explosion originated above 64's gate and travelled along the face of 121's gate with little force but great heat. It split at 121's and passed partly down 121's cross gate developing force and partly along the face to 12's

gate. The other direction pursued by blast was down 64's gate with force and flame along 19's landing and to 19s' cross gate.

As to cause of explosion Mr. Redmayne said-

"I think the fire originated some years ago in the neighbourhood of the fault which had never been completely eradicated but gave occasional evidence of its existence and as coal was worked off the fault, a great cavity formed, both fire and cavity keeping pace with the extraction of coal, that an incipient explosion had occurred previously, viz., on January 20th, 1912 and that the condition of affairs on Monday night provided just combination of circumstances necessary to cause an explosion on a more extended scale, viz., the effective sealing off of exit from fire area, but the failure to seal off the inlet, allowing the accumulation of an explosive mixture, and a vent for consequent explosion. That Mr. Chambers' instructions were well conceived for effectively sealing off affected area and were of the nature set out in an earlier part of report, I believe to be the case, but I not believe these instructions were carried out in their entirety. Who blundered in do not know. Mr. Bury, being dead, cannot appear in his defence. I refrain from attaching blame to anyone in particular."

The second explosion seemed to have travelled wholly along the face and not to have divided. Mr. Redmayne said-

"It may be that there was a large accumulation of gas on the rise side of the district after the first explosion, which igniting at the fire, burnt more or less quietly up and down the face until an explosive mixture was formed at the 14's level, when it detonated. The force of 14 level was very much greater than in the first explosion. The greatest evidence of burning was along the face also. The flame of the second explosion extended nearly to the end of 14 level or it may be that, seeing that the purest and consequently the most dangerous coal dust undoubtedly existed at the face, the explosion followed that route in consequence,.

I consider that the facts which I have stated above are eloquent testimony to the value of an inert dust, acting, as it does, as an adulterant to the coal dust, as a preventative to the spread of a colliery explosion.

I have arrived at the conclusion that lending the complete isolation by stowage and stoppings, all the men not engaged in combating the fire should have been withdrawn from the district in which it occurred. It was stated that to do this would be dangerous, for, it was stated, if the face is allowed to stand fires break out. I cannot accept this, and, in my opinion, no reason which will bear investigation had been advanced in support of this contention."

With regard to the rescue operations, the report stated-

"Whilst there was provided at the colliery as fine a body of men trained in rescue work as one could wish to see, the organisation at the mine on the occasion of these explosion was most defective. When Mr. Witty made the arrangements at the surface he should have issued instructions prohibiting the descent into the mine of all persons unprovided with a written authorisation to do so. He should also have placed a guard at the outbye end of the south plane to prevent the entry into that district of unauthorised persons from other parts of the mine. Had this been done the loss of life occasioned by the second explosion would, I am sure, have been much less heavy.

The further question as to whether the work of recovering and bringing out the bodies should have been undertaken at this stage is one respect of which there will doubtless be differences of opinion. I have no doubt on the point. I know that sentiment weighs heavily in the consideration of a problem of this nature, and that there is an intense desire on the part of relatives of the dead to see and bury the bodies. I do not think, however, that the management of a colliery is justified in allowing persons to risk their lives in order to recover and bring out dead bodies, for that such a procedure is always attended with the great risk of a second explosion

when a fire is known to exist underground after an explosion is evidenced by case after case. Instances may be cited in which the bodies have been recovered after an explosion of this nature, e.g. Jamage Colliery. I agree, but it is a race with death. It is hard, however, to make people realise this, and so strong may feeling run on these occasions that it sometimes requires a higher moral courage to resist the impulse and prohibit persons from undertaking, and undertaking oneself, a risk of this nature, that to allow the risk to be undertaken.

I should also remark that great difficulty was experienced in obtaining a correct number of the casualties. this was not definitely ascertained for three days after the disaster owing to the indiscriminate issue of lamps after the first explosion., This was a very regrettable incident and one which emphasises the necessity of strict discipline on these occasions.”

RUFFORD. Mansfield, Nottingham. 7th. February, 1913.

The colliery was about five miles to the N.E. of Mansfield, Nottingham and was owned by the Bolsover Colliery Company, Limited. Fourteen men were killed and four others injured when a water barrel fell down the sinking shaft.

There were two shafts at the colliery, No.1, 21 feet in diameter and No.2, 18 feet in diameter which were being sunk of Lord Savile's estate of which an area of 5,000 acres of the well-known Top Hard and other seams had been leased to the Company.

The No.1 shaft, in which the accident occurred, was sunk by a steam crane to a depth of 80 feet in the New Red Sandstone Measures when the operations encountered a problem with water. Sinking was then stopped. Permanent headgear pillars, headgear, winding engines and winding houses were erected. Both the winding engines were of the same size, consisting of a pair of 36 inch diameter cylinders with a 7 foot stroke with a flat winding drum 20 feet in diameter. They worked at a steam pressure of 160 lbs. per square inch and the steam was supplied from four Lancashire boilers, each 30 feet long and 9 feet in diameter.

When the work of erecting the plant and machinery was completed, work on sinking the pit was resumed on 5th. June, 1912. Considerable trouble was encountered owing to the quantity of water found in the sandstone but it was dealt with by tubbing off with cast iron tubbing. At the end of 1912, the bottom of the New Red Sandstone Measures was reached at 145 yards from the surface. The whole of the water met with was dealt with by means of pumps and a suction barrel, and was tubbed off by eight lengths of tubbing. by these means the maximum quantity of water dealt with at any one time did not exceed 1,600 gallons per minute, whereas if it had bent been tubbed the quantity would have been nearly 5,000 gallons per minute. The total length of tubbing in the pit up to this depth was 116 yards 2 feet 9 inches.

The sinking was then continued in the Magnesian Limestone. It was anticipated that water would be encountered in this strata and for the first 12 yards it was found to be perfectly dry. a feeder of water delivering 260 to 300 gallons per minute was the encountered which was dealt with by means of a suction barrel. After sinking a few more yards to 162 yards, a crib was put in the limestone and a length of tubbing of between 20 and 21 yards was being put in. all except two the two rings at the top had been placed in position when the accident occurred.

A scaffold was suspended about 18 yards from the bottom of the shaft and 3 feet above the water by means of six chains and two ropes, and was raised and lowered by strong capstan engine. The ropes were used a guides for the water barrel and hoppits. There was an opening about 6 feet 4 inches square in the centre of the scaffold through which the hoppit or suction water barrel passed from the drawing of dirt or water. The scaffold had been raised to where the segments of the tubbing were being placed in position about 18 yards above the bottom of the shaft and water was being raised through the opening in the scaffold.

Eighteen men were on the scaffold, some moving segments and some cutting the side of the shaft back to make room for the tubing. The shift had been at work for five hours, and up to that time nothing unusual had happened and the manager and master sinker had been down the shaft about half an hour before.

About 7.30 p.m., the suction barrel, full of water and weighing about 5 tons 1 cwt., fell down the shaft, smashed the whole of the timber work of the scaffold to fragments and thirteen of the men either stunned or injured were thrown into the water which was 49 feet deep at that time. They probably drowned before they recovered consciousness. The remaining five men were severely injured but managed to cling to remnants of the scaffold and were rescued about an hour later. One man who was very severely injured died five days later as the result of his injuries.

Thomas Bradley was seriously injured but told the local paper of his experiences from his sick bed. He said:-

“I was with my mates at the bottom of the scaffold. We had been pumping water and I and Kemp and one or two of the others standing nearer to the wall than the rest. All of a sudden we heard a terrific roaring noise and before we could realise what had happened this awful thong burst among us. Several of my mates were smashed clean through the scaffold and even in that flash of time I realised that they had been terribly smashed up. We were all shot into the water, every one of us, and I tell you it was terrible in the pitch darkness. I managed to seize hold of the communication cord and although I was fearfully shaken, I managed to scramble up on to the wrecked scaffold. It was all in fragments, smashed just like matchwood. The scaffold was not far above the water and I was able to help up one or two others. Poor George Kemp was in terrible agony but he managed to get up with a broken leg.”

The reporter commented that Bradley was terribly shaken by the experience and was visibly trembling all the time.

Frederick Paddon Sinker 36
James Wigman Sinker 43
Frank Dagnall Sinker 27
Andrew Dagnall Sinker 37
Herbert Woodward Sinker 25
John Knowles Sinker 33
William Hollings Sinker 22
Wallter Storey Sinker 38
Henry Scott Sinker 47
Jesse Hart Sinker 26
John Tomlinson Sinker 40
Joseph Bettney Sinker 41
Thomas Gordon Sinker 32
Patrick Mulligan Sinker 33

The men who died were:-

John Smith (Tandbrose) aged 42 years, married with a grown up family, William Hollins aged 15 years, Harry Scott, Jesse Hart aged 26 years, William Storey married with four children, Harry Woodward married with two children, Andy and Frank Dagnall, James Wigman who had a grown up family, Peter Mulligan, T. Jordan, Joseph Petit, Joseph Knowles and Frederick Padden who died on Monday night.

The injured were:-

George Kemp, Samuel Overton, Ton Tennant and Tom Bradley.

On Friday night, 7th. February, there had been violent gale and a lot of rain and this caused the rain to blow under the slates of the roof in the winding engine house or through the ventilator in the centre of the roof. The water ran down the slates to a purlin above the engineman's head and dripped on him. The same thing had happened during similar storms about a week and six months before.

One of the enginemen, John Hollingsworth, had improvised shelter over the chair in which he sat while working the engine, about nine days prior to the accident. It was constructed by nailing two laths, each 3 feet 6 inches long and two and a quarter inches wide by three eighths thick, one on each side of the chair. They were secured by one and half inch nails spaced 9 inches apart and the laths projected beyond the chair without any other support. Across these were placed two or three light pieces of wood and at the time of the accident, a horse rug, weighing about 9 lbs. was in position over them and a piece of wood about 4 feet 4 inches long and six and a half inches wide by 1 inch thick was placed by another engineman, Sydney Brown, under it to prevent it from sagging and falling on his head. The accident occurred during Brown's shift and he had been on duty three hours when it happened.

A similar canopy had been constructed some time before but the leak in the roof had been repaired and the structure done away with. This structure was made with brattice cloth and not a horse rug.

Shortly before the accident occurred the banksman had gone into the enginehouse to speak to the winding engineman about the electric light. The engineman had complained about it a few minutes before and at the time of the disaster the banksman was standing besides the chair and the engineman was winding the water barrel. When he had raised it about half way, one of the nails in the lath carrying the improvised canopy, appeared to have drawn out, either by the weight of the rug or the wind lifting it, causing it to fall back and free the nail. The rug fell down and enveloped the engineman's head, and the board which he had placed under the rug slid down the lath and fell between the levers by which the steam brake and throttle worked. To check the speed of the engine and finally stop it, it was necessary to push one lever forward and pull the other back but owing to the piece of wood between them it was impossible to do this. The banksman and the engineman attempted to get the piece of wood from between the levers and, according to the evidence of both men, they managed to do this.

The engineman, Brown, shut off the steam and applied the brake and appeared to have partially checked the speed and the rope end did not go into the enginehouse, however, this was not sufficient to prevent a rapid overwind. The 'Ormerod' hook acted satisfactorily in detaching the rope and suspending the water barrel. The momentum was so great that the barrel flew up and the piston rod with which it was fitted struck the beams carrying the bell of the detaching hook and it fell back with such force that the 'clivy', or spring hook, was pulled open. The water barrel then fell down the shaft. From the marks that were visible after the accident on the headgears and doors at the top of the pit, it appeared to have struck one of the cross beams of the head gear nearest to the winding engine house and was deflected to the other side where it struck the top of one of the doors on the top landing, rebounded to the other side and struck the opposite door of the bottom landing, and after the bottom door was cleared, fell down the shaft onto the scaffold 156 yards below.

One of the lugs by which the chain was attached to the water barrel was ripped off, all the rivets being shorn. From this moment it was held by one chain and this caused the 'clivy' to fail. The 'clivy' was made of Lowmoor Iron in the rough at Mansfield Colliery which belonged to the Bolsover Colliery Co. Ltd., and was finished at the Rufford colliery. There was no latent sign of flaws in the metal and it was considered that there was a great safety margin before it should have failed.

Sir Arthur B. Markham, in his evidence to the inquiry, advocated the use of ladders in all shafts when they were in the process of being sunk through water bearing strata but

Mr. J.P. Houfton of the Bolsover Co, Ltd., expressed the view that if there had been ladders in this accident, no lives would have been saved. Mr. F. Coulson said that he had used ladders while sinking through quicksand in County Durham. He said-

“I think it would be of advantage to have ladders in some cases. It is probably true in this case, that no more than one or two men would have got on to ladders from the scaffold when they heard the barrel coming, but it would have given the men in the water a good chance to get hold of something to support them. I applied ladders in the East of the County of Durham when sinking through quicksand. On one occasion there was some alarm and one of the men came all the way to bank, a distance of 155 yards by one of the ladders.”

Mr. Coulson suggested the erection of ‘kep’ beams in the headgear to prevent a hoppit or water barrel falling down the shaft if it became free, should be seriously considered. This was not considered to be an easy matter but the matter should be given serious consideration.

CARR HOUSE. Rotherham, Yorkshire. 16th. June, 1913.

The accident happened at about 8 p.m. at the colliery owned by Messrs. John Brown and Company, Limited. There was an inrush of water from the neighbouring Aldwarke Main Colliery and eight men lost their lives.

The night shift started work and 16 men were working in the part of the mine that was affected. The water rose so rapidly that only eight escaped. Mr. C.L. Robinson, H.M. Senior Inspector of Mines along with Mr. C.D. Mottram and Herbert Danby, H.M. Junior Inspectors went at once to the colliery and took part in a thorough inspection of the mine with Mr. Whalley, Mr. Finken and others to see if there was any hope of rescuing those men known to be in the workings. When it was found that there was no chance, operations were started immediately to recover the bodies. As the workings were considerably to the dip of the Car House shaft and the pumping arrangements were inadequate to get rid of the water quickly, additional machinery was necessary. This was obtained and installed but owing to difficulties encountered in re-opening the roadways which had collapsed, the work, with great danger to all who took part, was prolonged and it was not until 30th. July, about six weeks after the accident that the last of the eight bodies were recovered.

The Parkgate Coal, 4 feet 6 inches thick was worked at the colliery at 410 yards deep. The seam dipped about one in four and a half. It had a bond roof of varying thickness from, 1 to 4 feet with rock above it but this bind disappeared about 70 yards back from where the water came in. The flooded section of the workings at the bottom of the main dip haulage road was 1,000 yards from the Car House shaft and was opened up on the low or bottom side of old workings about three years before by means of a dip called the No. 6 Plane and two levels known as the Minimum Level No.1 and the Minimum Level No. 2. No. 1 led and was being driven with boreholes in advance to tap accumulated water known to exist in two dip headings which had been driven in the seam from the Aldwarke Main Pit belonging to the same Company.

At Aldwarke the coal was 450 yards deep and 20 years before the dip heading referred to were driven 12 feet wide, 22 yards apart and connected by slits at intervals of 44 yards. These headings later filled with water for a length of 330 yards, the water level extending at the top end into an old waste which gave the water a head of 319 feet which produced a pressure at the bottom end of the headings of 138lbs. per square inch.

It was intended to tap the water near the bottom of these headings and the management adopted the following plan. From the No.1 Minimum Level driven 280 yards from the No.6 Plane and at a supposed distance of 56 yards from the water, a narrow heading 5 feet 6 inches wide was started from the level end and driven slightly to

the rise at right angles to the cleat of the coal, approaching almost the lowest point of the nearest heading at an angle of 140 degrees.

Boreholes were put in soon after this narrow heading was started. It was intended to keep at least one borehole immediately in advance of the place for a distance of not less than 18 feet. Flank holes, 12 feet apart on the low side and 15 feet apart on the rise side, at an angle of 45 degrees were bored to a depth of about 15 feet. These holes complied with Section 68 of the Coal Mines Act, 1911 with regard to distance apart but they failed to protect the narrow heading from a sudden inrush of water. This was caused by the angle of the flank bores on the rise side being parallel to the line of the heading being approached. Mr. C.W.T. Finken supervised this work.

The day before the accident, the deputy, Albert Moxon, inspected the to of the narrow heading about 6.30 a.m. he found three boreholes in the coal. One of these, in advance of the face, was too big to plug or to hold a pipe satisfactorily, so he had another drilled straight forward for 21 feet, about 4 inches from the former one. In addition to this, he found a 15 feet flank hole on the rise side, 9 feet 6 inches from the top cutting. After seeing that the leading holes were in 21 feet, he allowed the colliers to fill coal and advance the face another 4 feet. He then put in additional flank holes a distance of 15 feet on the rise side, the other on the top side, both close against the face. These flank holes were the last one drilled before the disaster.

On Sunday night, the centre hole was extended 9 feet 6 inches by boring, and at about 5.30 p.m. on Monday, when another deputy, Sam Lee, who had been on duty since 10 a.m., left the place. he reported the front borehole to be 19 feet in front of the face and that the coal had been advanced 8 feet beyond the low side flank hole and 12 feet beyond the high side flank hole.

The roof was timbered right up to the face which was dry and Lee instructed John Banns, miner, who was then working in the place along with a filler, Charles Palmer, that he was not to extend the face further than 2 feet on the rise side and 3 or 4 feet on the low side. What occurred after Lee's departure is told in Bann's words-

"The deputy, Sam Lee, who was on the 10 to 6, gave me instructions to work to. I set a bar within 3 or 4 inches of the face. I pinned it up and dented from my top side along. I drove it tight, using a 14lb. hammer and when I dented in the soft muck it was as dry as muck. This was in the left side. We then filled another tub from the low side and then I got my pick and got some more, say about 6 inches, on the top side in the bottoms. I noticed a trickling of water there, though the holes were as dry as snuff. I looked at it and said, "We've found some water."

We then filled another tub, and then I stopped and went to Ackroyd. he came down and then went and telephoned Mr. Finken. He came back and said, "Mr. Finken says we have to stop here and watch the water, and if it increases any to clear out." We got back. It had increased a shade but not much. We watched it and it started running a little faster. There was me and Ackroyd and Palmer and Walter Morley was at the back of the gate. I said. "It does not look right," and Ackroyd says, "You have done?" and I said, "Yes, I would not touch it again for life or death. We had better go." I then heard a clucking noise and I said, "That sounds funny." We waited and then we heard it again, not very loud but a bit louder than before. I said, "Let's get out," and before we got started, I heard it again. We set off away and were within 4 or 5 yards of the flat sheet when we heard a knocking, not a proper bump and before we get on to the flat sheet it was on us. I shouted, "Run for your lives!" and ran as quickly as I could with the pump lad, Morley in front of me and I passed Lidster at 61' s turn and Albert Ramshaw with a full run on the move, I shouted to them as well. I got to the engine house and spoke to Stacey there. When I got to the train of tubs it was standing. The pump lad was in front of me and the deputy and my mate were running behind me when we started. I expect they lost their lives with the tubs being here. Sam Lee, the deputy, had been with us all afternoon. It would be between 5.30 and 6 o'clock when he left us. he said

his time for away was due and we took measurements as to how we were going on before he left. He said, "You have two feet to work on the top side and four feet on the low side." He measured the boreholes."

George Ackroyd, the deputy descended the pit about four hours before Lee's shift ended. His duty was to inspect and supervise another part of the district until Lee went off and then take Bann's place in the heading. according to Bann's a trickling of water was seen about 6 o'clock and soon afterwards went into the main road and telephoned Ackroyd, When Ackroyd arrived, he took Bann's back to the place to inspect it and when there, the water burst through the heading. Ackroyd and Palmer along with six others were drowned by the inrush but Bann's managed to escape.

The men who lost their lives were
George Ackroyd aged 30 years, deputy,
Robert Rogers aged 49 years, miner,
G.W. Cooke aged 33 years, miner,
J.E. Stacey aged 25 years, trammer,
Charles Palmer aged 32 years, trammer,
Peter Nightingale aged 21 years, trammer,
Alfred Preston aged 39 years, trammer and
Samson Nightingale aged 23 years, trammer.

The inquest opened when seven of the bodies had been recovered and was held at the West Riding Court, Rotherham by Coroner, Mr. J. Kenyon. the proceedings lasted two days. On the 26th. July, about six weeks after the disaster, Mr. Mottram along with Mr. Robinson and Mr. Hudspeth, Inspectors gained access to the heading and found that there was a slight discrepancy in the colliery plans. The bottom of the Aldwarke dips were about three feet above the Car House heading instead of a few feet below it. This meant that the barrier was only three feet and this had given way due to the water pressure. The inside flank hole to the rise, though drilled within 14 feet of the face at an approximate angle of 37 percent and the centre hole, though 19 feet in advance, had missed the Aldwarke dips by inches. Mr. Mottram commented in his report-

"It was no doubt a mistake on the part of the management to allow the heading to be driven so near to the old Aldwarke dips when they were known to contain a dangerous accumulation of water. The plans of the colliery showed the heading to be quite close to the dips and the prudent course at that stage, would have to place boreholes in such a position as to make it impossible for a road 12 feet wide to come in between the flank borehole and the coal face without the bores tapping the water, or, better still, to have approached the old dips from a road at right angles, in which case a single borehole, driven from a considerable distance, could have tapped the water entirely without risk to anyone."

After hearing the evidence the jury brought in the verdict that the deaths were due to drowning by an inrush of water from the Aldwarke workings due to the fact that the boreholes missed such workings. They further found, that in their opinion, the system of boreholes was not sufficient and that this was due to an error of judgement and not negligence on the part of the management of the colliery.

CADDER. Glasgow, Lanarkshire. 3rd. August, 1913.

The colliery was owned by Carron and Company and was about four miles to the north of Glasgow. The entrance to the mine was the downcast shaft called No.15 and was used to wind men and coal. the shaft was about 169 fathoms deep. At the shaft bottom, the main haulage road or 'Main Dook Brae', served as the air intake went 45 yards to the east, then turned N.N.E. to run in that direction, dipping for about 1,500 yards. About 125 yards from the pit bottom there was a cabin which was used by several

of the firemen and where the books were kept. The cabin was partly built of brick and was formed from an old bricked and arched roadway which led to the north into the mine.

The district general manager was Mr. James Bonar. The manager of the No.15 pit was Mr. Archibald Spiers, who had been down the pit from between 7 and 8 a.m. on Saturday, 2nd. August till about 11 a.m. he was there on Sunday for two hours and was always within call. he received news of the accident at 8.30 on Sunday. William James Owens, the undermanager was sat the colliery on 3rd. August. The manager of the No.17 pit was Mr. James McWinnie. The head electrician was M.r A. Hughes and under him at No.15 pit was Mr. Edward Flynn. The colliery employed about 290 men underground and produced about 400 tons a day.

When this roadway was abandoned and a new one driven, the corner became dangerous and a fall of roof occurred so as a result the roof of the new roadway was strengthened by means of iron girders and on top of the some timber was laid. The roof was 'lofted'. The timber props were placed and laid across one another to a depth of 10 to 13 feet. Next to the cabin there was a telephone space and next to this there was an electric switch board room which was roofed with I-girders upon the lower flanges of which were placed plates and a top packing of timber similar to that over the cabin. The main cables came down the shaft to the switch room as single armoured cables. From the switch board, two unarmoured cables led back to al lighting switch 70 feet from the pit bottom. The cables were seven stranded, rubber insulated, taped and braided and were supported on porcelain insulators as far as the haulage-switch and after that they were supported by flexible cords fixed by nails to the timber of the roof.

Direct current at 500 volts was supplied and the lamps were placed in groups in series on this cable. Some were 120 volts and some 250 volt. Electricity had been installed at the pit in 1906, but in June, 1913, it was reconstructed and remodelled. Six armoured cables led inbye from the switchboard into the mine for the coalcutters and the pumps. The fact that the lighting cables were not armoured was significant in the resulting accident.

The main haulage road had branches into side levels. The first, No.1 was at 750 yards from the pit bottom then followed the No.2 level leading on the east side of the communication road to No.17 pit, Conner's level, No.3 level and Stewart's level and No.1 machine level all crossed the main haulage.

The face lay in a large, irregular circle of about 700 yards in diameter with its centre in the main airway about 1,000 yards from the pit bottom. The parts worked on Sunday, 3rd. August, 1913, when the accident happened, were the No.1 machine section at the extreme north east of the mine and the No.2 machine section at the north west of it. Repairs to the roof were also being done but no coal was being drawn to the surface. These parts were fed with air from the intake which split right and left at various parts of the haulage road. The main return led from the No2. machine section from west to east, right across the mine crossing the main intake about 1,000 yards from the pit bottom It then turned south- east and then south ending up in an upcast shaft called Nop.17 shaft about half a mile from No.15 shaft. This return airway was called the communication road.

Is was obvious that if a fire broke out in the cabin, the smoke would be carried and distributed in all the airways of the mine and finally emerge up the upcast shaft of No.17 pit. One way of preventing the smoke going in to reach the men working at Nos. 1 or 2 machine level would have been to leave a door open somewhere in either the communication road or into one of the levels. The other way, when once it was known that there was a fire near No.15 pit would have been to reverse the air and send the smoke up No.15 pit.

Under Section 36 93) of the Coal Mines Act, 1911 it was compulsory to have two means of egress to every mine. This provision was complied with at the mine. It was also required under the Act that the air current could be reversed. To do this the mine

had a steam jet which led 40 fathoms down the shaft and then upwards. The quantity of air sent down the mine was usually 20,000 cubic feet per minute and it was considered a well managed mine.

The seams of coal that were worked were slightly inclined and there were several faults and a dyke of whinstone. between the seams there was a considerable quantity of shale lay, oily, but not sufficiently rich in oil to warrant working. There was also sandstone, fireclay and some ironstone. The pit was lit by naked lights. The fireman had safety lamps and the miners carried the small tin oil lamps usually employed by Scottish miners.

At about 3 p.m. of Sunday, 3rd. August a back shift of 25 men under the charge of fireman Reilly went down the no.15 pit. J. Owens, the undermanager saw them down the pit. They all had naked lights except Reilly and McCann. The latter was going to explore a place at the extreme north of the mine. The men were divided into three groups. One group of eight men went to work in the No.2 machine section, two men, Alexander Brown and Hugh McCann were working at the pumps at the extreme north of the mine and the remaining fifteen went to work a coalcutter and do other work in the No.1 machine section on the eastern side. Charles Reilly, the fireman, was to supervise them all.

As it was a Sunday, the usual pit headman, was not at work but John Lees, a boiler furnaceman, acted at the pit head and took the names as was required under the Eight Hours Act. No coal was to be drawn and the checkweighman was not present. Prior to the coming into force of the Act in July, 1912, it seemed usual in the mines of Great Britain not to have a bottomer if men and coal were not being raised. The Royal Commission of Coal Mines recommended that in all cases a bottomer should be stationed at the pit bottom as long as there was no one in the mine. The Act came into force on 1st. July, 1912 and required that, so long as there were no men underground, other than mine officials or persons authorised to give signals, a bottomer shall be in constant attendance for the purpose of receiving and transmitting signals. Under the Coal Mines Regulation Act, 1887 provided that in the absence of a bottomer, that signals might be given by the fireman is duly appointed. These rules remained in force until they were replaced by the new regulations which came into force on the 10th. September, 1913, after the date of the accident. These new regulations did not allow the fireman to act as bottomer. It was usual to have a regular bottomer on week days. On Sundays it was usual if the week day bottomer, Etherson, went down, to send him to work away from the pit bottom. The fireman usually acted as bottomer on Sundays. On the day of the accident, Etherson did not go down the mine, but Reilly, the fireman, rang the men down and then went to his duties examing the mine which left the shaft bottom unattended until he returned.

The back shift proceed to the cabin at the top of the brae, 125 yards from the pit bottom. Some of the men took off their coats and left them hanging near the cabin and some in the telephone space. Most likely some of the coats held matches and perhaps pipes but they generally took these to their working places. Others carried their coats further inbye. They then all proceeded down the Main Dook Brae to the lamp station where they waited until Reilly had inspected the workings.

The lamps used by Scottish miners were different for the candles used by the English men. They consisted of a small tin something like a coffee pot with a lid that snapped down and a wick about a quarter of an inch in diameter. The men provided their own oil for which they ad to pay 2s. 3d. (11p.) per gallon. This oil was called 'seal oil' but was composed of fish and cheap mineral oil with about fifty percent of heavy Scottish paraffin mixed in with it. The flash point of the compound was high and it was not specially dangerous or inflammable. The lamps wee hooked to the miner's caps and with movement, his cap and clothes became more or less impregnated with the oil which sometimes had caused them to be set alight. In named light pits the miners carried their pipes and matches and smoked where and when they pleased. This custom had existed

for many years and was not considered dangerous as there had been very few accidents. The oil was carried down the pit in small tin flasks and most of the men had one in their pocket. When they went into the mine, each man would see that his lamp is trimmed and full of oil and would throw away the exhausted wick. While still burning he would often cast the old wick on the floor still burning and tread it out after he had lit the new one. There was no evidence from the officials that the men were careless with their lamps.

The men in the No.1 machine section appeared to have reached their station at about 4.30 p.m. and started work. Soon afterwards a fire broke out at or close to the cabin and no doubt extended to the timber which lay over it. The smoke was carried at once to the Main Dook Brae and rapidly into the workings. At some time, probably about 6 p.m., Reilly smelt it and concluded that there was something wrong. He appeared to have warned the men on the No.2 machine section and then gone across to No.1 section by way of the No.1 machine level and turned southwards into the main airway down which the smoke was coming and went straight into danger. The pumpman went the same way. In his report Sir Henry Cunninghame commented-

“If a communication door had been opened so as to short-circuit the air and smoke, and if the men had remained in their working paces, it is probable that the whole of them might have been saved. It must be remembered that Reilly did not know where the fire was. He had never seen a fire in a pit before consequently his omission was only what many men would have done in the circumstances.”

Among the men following this path was Robert Dunbar who was fully acquainted with the roads and workings. He was followed by Keenan and O’Neil. Dunbar had waited for and revived O’Neil and this party of three found the smoke very thick in the Main Brae so he turned eastwards in Stewart’s level went through a door and got into the return airway. They then went by McLaren’s and Harrogon’s headings into Connor’s heading, along a communication level and through two doors at No. 3 bench into the downcast air of No.17 pit. Dunbar’s coolness and courage saved his party. The Inspector commented-

“Had others followed him they might have been safe. His action illustrates the use of Rule 60 of the New Regulations which provides that where one of the two ways of egress from a mine is along a road not usually travelled, every fireman shall at least once a quarter traverse the whole of such a way in order to make himself thoroughly acquainted with the same.”

The rest of the men who had been working in the No.1 machine section went into the main airway and as they started work about 6.30 p.m. It seemed probable that by 7 to 7.30 p.m. they were dead. Of the men in the No.2 section, four went eastwards along the return and instead of continuing by passing along the crossover road, which seemed to be their only chance, they entered the main airway and lost their lives. Of those who stayed in the No.2 machine section, all lost their lives with the exception of Michael McDonald who got into a dead end of air and lived until the forenoon when he was rescued.

When Dunbar’s party got to the surface of No.17 shaft, they went to No.15 where they found the firemen of the night shift, William and Joseph Brown, had gone down. Dunbar waited until they came up and heard that during their descent, they saw nothing of the fire until they turned the corner of the main airway, William Brown thought that the cabin had caught fire but did not see anything that indicated that the fire had been caused by electricity, even though the cables were burning. He came to the surface and went down with a party to try to extinguish the fire but failed to do so.

William Owens then went to the No.17 pit, got the air current reversed and the rescue parties were able to go down the No.17 shaft. Two bodies were discovered at 11 p.m. There was no rescue apparatus at the pit. Preliminary steps had been taken to form a brigade. Canaries and other apparatus specified in section 5 (c) of the Rescue and Aid Order of 2nd. April, 1912 had been provided. By midnight, Mr. McLaren, Senior

Inspector of Mines for the Western part of the Scottish Division and went down the No.17 shaft. By this time the reversal of the air had cleared much of the smoke and gas and he was able to get to the road where it crossed Stewart's level. A rescue brigade had been telegraphed at Cowdenbeath, Fife, fifty miles away who arrived at the pit about 3 a.m.. They were informed that only smoke helmets were required and found that these were inadequate for the job and had to come to the surface for oxygen apparatus. It was rescue party that found and recovered a number of bodies. Michael McDonald was still alive and revived by Dr. Miller at the surface. The rest of victims were not recovered. The total number who lost their lives was twenty two.

Those who died were:

Partick Duffin, brusher aged 34 years.
Robert Ramsay, roadsman aged 30 years.
William Ramsay, roadsman aged 26 years.
George Davidson, roadsman aged 21 years.
Patrick Darroch, brusher aged 19 years.
Patrick Regan, brusher aged 32 years.
George Harvey, brusher aged 32 years.
Hugh McCann, hand pumper aged 37 years.
Owen McAloon, pony driver aged 17 years.
Hugh Anderson, bencher aged 17 years.
Cuthbert Bell, machineman aged 32 years.
Alexander Brown, pumper aged 15 years.
William Brown, hole borer aged 17 years.
Andrew Dunbar, drawer aged 20 years.
George McMillan, stapper aged 29 years.
Charles Armstrong, drawer aged 24 years.
John Worthington, reddman aged 28 years.
Charles Reilly, fireman aged 35 years.

List from local newspapers:-

Partick Duffin Brusher 34
Robert Ramsay Roadsman 30
William Ramsay Roadsman 26
George Davidson Roadsman 21
Patrick Darroch Brusher 19
Patrick Regan Brusher 32
George Harvey Brusher 32
Hugh McCann Hand pumper 37
Owen McAloon Pony driver 17
Hugh Anderson Bencher 17
Cuthbert Bell Machineman 32
Alexander McMillan 54 Machineman
Thomas Holland 28 Gummer
James Flynn 46 Machineman
John Brown 19 Hole borer
Alexander Brown Pumper 15
William Brown Hole borer 17
Andrew Dunbar Drawer 20
George McMillan Stapper 29
Charles Armstrong Drawer 24
John Worthington Reddsman 28
Charles Reilly Fireman 35

The inquiry into the disaster was held at the Justiciary Buildings, Jail Square, Glasgow from the 22nd. to the 29th. September by Sir Henry Cunynghame, K.C.B., when all interested parties were represented. Sir Henry concluded the Report with the following statement-

"I think that this case shows the desirability of making cabins as fireproof as possible, especially in mines where naked lights are employed. here, above the cabin there was a pile of timber exactly in the position most calculated to burn fiercely it lighted. It would have been better if there had been a stone packing instead.

I may add that the accident shows how desirable it is that not only fireman but that some men in at least in each group who are working independently should be acquainted with the roadways of the mine and should be instructed what to do in the case of danger. This pre-arrangement and organisation is desirable in factories and in ships, and it is especially necessary in mines where escape is usually only to be effected by one or two roads. I would also call attention to the need for teaching fireman the danger of smoke containing carbon monoxide. I do not think they all understand the differences between carbon monoxide and carbonic acid and other gases found in ordinary smoke, and it appears to me doubtful whether they are sufficiently acquainted with the best methods of dealing with the danger arising from it."

UNIVERSAL. Senghenydd, Glamorganshire. 14th. October, 1913.

The explosion was the worst in the history of British mining. Four hundred and thirty nine men and boys were killed in the explosion or died from the effects of the afterdamp and one man lost his life the following day by a fall of stone while he was fighting a fire on the Main West Level. The Universal Colliery was at the head of the Aber Valley, Glamorganshire and was about 12 miles as the crow flies from Cardiff. The colliery was owned by The Lewis Merthyr Consolidated Limited and Mr. Edward Shaw was the Agent and manager of the colliery. he had been manager for 12 years and agent for the last four. under him were two managers, one for the east Side and one for the West. On the West Side there were three overmen, one each for the Kimberley and Ladysmith districts, one for the Mafeking and one for the Pretoria. Under them there were 14 firemen. On the day shift Edward Jones was fireman in the Pretoria which had 27 working places and a total of 79 men, colliers, hauliers, wallers, repairers and others. D.T. Edwards was in the East Ladysmith with 20 working places and 23 men, Rees Thomas in the West Ladysmith with 28 working places and 89 men, Evan Jones in the Kimberley with 18 working places and 50 men, W.H. Childsley in the West Mafeking with 46 working places and 125 men, Fred William also in the West Mafeking with 11 working places and 31 men and John Jones in the Bottanic with 17 working places and 54 men.

On the night shift, Richard Davies was the fireman in the Pretoria district which had 6 working places and he had charge of 55 men, John Skym in the East Ladysmith with 13 working place and 29 men, Morris Roberts in the West Ladysmith with 3 working places and 46 men, Ben Thomas in the Kimberley with 4 working places and 37 men, Richard Davies in the West Mafeking with two working places and 18 men along with James Opie in the same district with 9 working places and 48 men and Nic Sands in the Bottanic with 7 working places and 36 men.

The day firemen went down at 3.30 a.m. and ascended at 1.0 p.m. while the colliers and others went down between 5.10 to 6 a.m. and came up at 2 p.m. Coal drawing was carried on from 6 a.m. to 2 p.m. and the firemen on the repairing shifts went down with their men and stayed with them. The day shift went down at 2 p.m. and came up at 10 p.m. and the night shift went down at 9 p.m. and ascended at 5 a.m. The firemen who went down at 3.30 a.m., went down two hours before the men and made their statutory examination of the working places. They then went to the pit bottom and met the men at the lamp locking stations. The Act stated that the workings had to be inspected not more than two hours before the commencement of the shift. At most collieries in the country, there were meeting stations in the district which were a short distance from the face but

at Senghenydd there was only one station from the whole of the west side and that was 440 yards from the shaft bottom. In the majority of cases the men then had to walk 1,300 yards to the first place.

William Chidsey, a fireman in the Mafeking District, said that it took him twenty minutes to get from the lamp station to the working face of his district, forty minutes to travel in and out again which left one hour twenty minutes for the inspection of the workings in his district. He had 44 stalls to examine and claimed that he could do this in the time. At the inquiry, the Commissioner, Mr. Redmayne, had serious doubts about this. A similar story was told by Morris Roberts, a night shift fireman, and John Skym, a fireman in the Ladysmith District, which led the Commissioner to the conclusion that the Rules were being breached.

The shafts had been sunk about 23 years previous to the accident and coal had been worked since 1896. There had been a serious explosion at the colliery on the 21st. May, 1901 and there was no firm conclusion as to the cause. Mr. S.T. Evans concluded in the report no hat disaster by pointing out the importance-

“That provisions should be made for the preventing the accumulation of coal dust and for the regular and efficient watering of the roads, roofs and sides in the main haulage and travelling ways in mines which are dry and dusty.”

The seams that were worked at the colliery were the Four Feet, the Universal and the Nine Feet. The underground workings were divided into two main divisions, the West Side and the East Side. The Four feet was worked on the West Side and the Four Feet and the Universal, and the Nine Feet were worked in the East Side and all these workings were connected to one level by drifts. There were two shafts, the Lancaster which was a downcast and the York which was the upcast. Both were 18 feet 6 inches in diameter and the depth from the surface to the Six Feet landing was 535 yards from which most of the coal was drawn. They were sunk to 650 yards and the York Pit also had a heading to the Nine Feet Seam. Coal was wound from both shafts with the Lancaster shaft winding the majority. The bottom of each shaft was arched with masonry and the arching on the west side in the Six Feet landing extended for 124 yards from the shaft. A block of coal had been left to support the shafts, 500 yards in diameter and spread over forty two and three quarter acres.

The coal was worked by the long wall system, the width of the stalls being eleven yards from centre to centre. very little timber was withdrawn and recovered as it was customary to leave the timber in the gob in South Wales. Mr Redmayne commented-

“Of course the best practice both from safety and the economic point of view, is to take out the timber from the gob, but under poor roofs where the gods are stowed with rubbish right across the face, it may be impossible to do this and Mr. Shaw stated that at Senghenydd the roof broke immediately behind the face, that the goaf close tight and there was always regular settlement and further that the character of the roof stone is such that little timber can be withdrawn. The even settlement of the goaf is desirable in the interests of safety, and the tighter the goaf is, the less unventilated space there is for accumulation of firedamp.”

No explosives were used in getting coal and for rippings in ground that was particularly hard, which was a rare occurrence in this mine, Robertite was used and the shots fired by authorised shot firers. No blasting was carried out on the day of the explosion and no shots had been fired since the previous Sunday, October 12th.

The colliery produced about 1,800 tons of coal per day which was filled into waggons which were of the common Welsh type, which were open at each end but for a bar and the coal piled well above the top of the trams. The main haulage from the Mafeking, west York, Bottanic and part of the No.2 South (Pretoria) Districts was carried out in the return airways. Only the main haulage from the Kimberley and Ladysmith Districts was entirely in the intake. Mines which were opened before the Coal Mines Act, 1911, were exempt from the requirements of Section 42 (4) which stated that, *‘where the air current in the main return airway was found normally to carry than half of one percent of*

inflammable gas, that airway shall not be used to haul coal.' Under the requirements of the Coal Mines act. 1911, 'no tram for the conveyance of coal can be introduced into amine after that date of the passing of the Act unless it is so constructed and maintained as to prevent as far as practicable coal dust escaping through the sides end or floor of the tram and after a period of five years from 16th. December, 1911, all trams whether old or new, have to conform to this requirement."

The management of the colliery were gradually putting this requirement into effect but before the act came into force and had already ordered a few hundred trams that were closed at both ends.

The trams ran on a track which was 3 feet gauge and each weight about 8 or 9 hundred weights, the average weight of coal transported in each was 26 hundredweight. the secondary haulage was performed by horses but in a few cases mechanical haulage was fed right up to the face in the Pretoria and Ladysmith Districts. The width of the secondary haulage was about seven feet and the main haulage was carried out by compressed air engines throughout the mine and there were a large number of these engines. In some places haulage was carried out by gravity as was the case in the Mafeking incline. the rate of haulage was from 4 to 8 miles per hour and a journey usually consisted of 24 trams.

An electrical system was used forth signalling and there were a number of sets of signalling equipment throughout the colliery, over a doze in all. each set consisted of a trembler bell which was protected by a cast iron cover but was not gas tight and a battery of six to nine dry cells of the 'Dania' pattern delivered about 1.5 volts per cell and two bare wires which were described as No.8 galvanised steel wires supported on insulators which in turn were secured to the side timbers. The wires were run 12 to 18 inches apart on the same side of the roadway. The bells and batteries were in the engine houses. Every time the wires separated after having been brought together or bridged across with a knife of file to give a short circuit to give short sharp rings on the bell, sparks would be formed and every time a bell was run there would be a succession of sparks at the make and brake contacts under the bell cover.

The mine was ventilated by a Walker 'Indestructible Fan' which was placed at the surface and driven by a steam engine. the fan was 24 feet in diameter and exhausted from the York shaft and was driven at a speed of 47 r.p.m. which sent 200,000 cubic feet per minute at a water gauge of 2.3 inches. of this, 152,000 cubic feet entered the West side. The manager said that the fan was capable of producing more air, 400,000 cubic feet at a water gauge of 4 inches. There were arrangements for reversing the air current as was required by the Act, but the work had not been completed. It would take about two hours to effect air reversal of the air. this requirement was to have been operative by 1st. January, 1913 but in April, the owners applied for an extension to allow them to make certain structural alterations and the Inspector extended the period which finished on the 16th. September. The termination was further postponed until 30th. September. This work had not been completed and the counsel for the owners and manager at the inquiry admitted that they were guilty of contravening Section 31 (3) of the Coal Mines Act, 1911.

The book in which the record of the air measurements were recorded was not in the form which the Secretary of Stare prescribed and was not signed or counter-signed by the manager and undermanager. The mine generated large volumes of inflammable gas and according to measurements taken by the Mines Insectors after the explosion, about 1,200 cubic feet per minute were being produced. There had been occasions when there had been large, sudden outbursts of gas when the men had had to be withdrawn. Cambrian safety lamps made by Messrs Thomas and Williams, with a lead rivet lock, were supplied for used throughout the mine. The manager was under the impression that this lamps were approved under the 1911 Act. In this he was mistaken, the lamp had been approved but the lamps were fitted with an unapproved glass. The lamps were lighted, locked and issued to the men at the surface and were again

examined underground at 'locking stations'. These were cabins on the West and East side, situated a little distance from the shaft and just off the main intake airway. The lamps were examined here by firemen when meeting the incoming shift. If anyone lost his lamp he would have to outbye to the lamp cabin to relight it. This was done by 'lamp lockers' who were authorised by the manager to perform this work. There was no written authority from the management as was required by the Act.

The screens were about 80 yards from the top of the downcast shaft and there was little coal dust carried down the shaft from the surface but some would have blown off the ascending full tubs. The open ends of the trams and the fact that they were piled high with coal were sources from which coal dust could arise and sets of tubs coming from the Kimberly, Ladysmith and No. 2 South (Pretoria) Districts were hauled against the air current thus allowing dust to be blown into the workings. There was only one wet stretch on the haulage road, which was outbye of the Ladysmith and the workings were generally dry and dusty. To deal with the dust problem, every afternoon and eight men were engaged in shovelling up the dust from the floor. As far as the manager could remember there were eight men engaged in this work, two in the Lancaster level from the shaft to the Kimberley face, and two in each of the Pretoria, Ladysmith and Mafeking districts. The whole length of the roads were not cleared every twenty four hours, only the floor and the roof sides were not touched. Efforts had been made to clean the roof and sides but it was found impractical to remove the dust. When it was got down, either by brushing or compressed air, it was blown away by the air current and deposited elsewhere. Mr. Redmayne did not think that there had been enough effort to overcome the problem and there was yet another breach of the Act.

There were arrangements to water the mine and water was conveyed down each of the shafts in two inch pipes. These were joined to one and a half inch pipes laid along the main haulage roads, fitted every 30 to 40 yards with a tap to which hose pipes were connected and the floors watered every night. The roof and sides were not watered and the watering of the floor beyond the end of the water pipes was done by water carts which were brought in on the haulage. The watering of the floors was well down and was inspected early in December, two months before the explosion.

As well as these efforts the tubs were sprinkled with water at the double parting in the Ladysmith, one at the entrance to the storage in Mafeking and one by the double parting in No.2 South. The sprinklers consisted of an upright pipe 5 to 6 feet high which was connected to the water pipes. At the top, there was a right angle piece which passed across the roadway. This was perforated to allow jets of water to play on the trams as they passed. In the Ladysmith trams had to pass 700 yards before they passed the water and, in the opinion of Mr. Redmayne, did little to suppress dust.

There was not a great deal of water available. The water was drawn from the Lancaster Pit at 60 gallons per hour, from the York Pit at 80 gallons per hour and from the sump at 558 gallons per hour. The latter was pumped to a wooden tank on the surface which also contained the water for the water jackets and the coolers for the air compressors. A pipe connected to the Caermoil Reservoir gave an additional 1,000 gallons an hour and the water along the roadways worked from the pressure of this water.

The last inspection of the mine to be made and reported by the representatives of the workmen was made on 18th. August, 1913. They reported as follows-

"We, the undersigned, examined the new 6 feet, York East. Found these districts free from gas and headings manholes in good order engines well fenced airways in good condition.

Ladysmith. We examined this district found Ladysmith in good order with the exception of a diluted blower in Martin's Road main wanted a little cleaning and watering. Airways in good condition, also manholes and engines well fenced main wants dusting and watering.

Kimberley. Diluted blower in Downe's Road 12 feet from rail airway and returns in good condition manholes and engines well fenced ventilation good.

Mafeking. Aberystwyth District. Diluted blower in William Thornton's Road and in William Jones's Road.

East Mafeking. Bottanic. Diluted blower in old road on right hand side, also in the road near Ben Davies Barry but we all stopped until Ben Hill gets hole from No.1 North, from there to York West. manholes of the above two districts in good order, also the engines well fenced. ventilation also good. returns in good condition.

York West. Examined this district all in perfect condition, airways and returns in good condition, also manholes and engines well fenced.

Glawnant and East Side. Examined this district found diluted blower in Dd. Griffith's Road, also in Richard Owen's Road and, also in Evan Jones Road, everything in good order with the exception of these three places. ventilation very good airways and returns in good condition, also manholes and engines well fenced.

Slope. Examined this district found everything in good order. ventilation not perfect roads and airways in good condition, also returns manholes in good condition also engines well fenced.

Lower 9 feet left hand. Found the district in very good condition, free from gas, also roads very good except one part of the straight wanted watering and cleaning.

Straight. Found this district very good with the exception of Pikes Road diluted blower on this road, also in dd. Holland's Road and Randall's Road, roads very dusty and sides wanted cleaning airways and returns in very good condition, also manholes.

Pretoria. District No.2, South 9 Feet. Examined this district found everything in perfect condition, airways and returns also manholes.

Pretoria 4 feet. We examined this district found every place free from gas, well ventilated airways, and returns in good condition.

(Signed)

THOMAS LEWIS.

REES REES."

When the explosion occurred on the morning of Tuesday the 14th. October, Mr. Shaw, the manager, was in the lamp room at the surface. At 8.10 he heard a report and at once went to the Lancaster Pit and saw that the surface around it was wrecked, the banksman was killed and the assistant banksman injured. Mr. Shaw found that the fan was still working and gave orders to a mechanic to set about taking the broken cage from the top of the downcast shaft and repairing the planking over the pit head. When this was done, Mr. Shaw and D.R. Thomas, the overman got into the cage n the upcast shaft. They examined the air for 50 yards and found that it was full of smoke and fumes.

Signals were coming from below ground and when others had arrived they went down the shaft. half way down they saw the body of a man in a tram in the ascending cage with his legs hanging over the cross bars. The man had been blown into the tub at the pit bottom. They signalled to stop the cage and crossed into the other, pulled the body with them and continued their perilous journey. At the Six Feet :Landing., the cage jammed on bent girders. They shouted down to the Nine Feet landing where they found that the men from the East Side were all right.

They eventually got the bottom and they found a lot of smoke coming out of the return. they tried to get through the first cross cut on the East side but the doors were burning fiercely so they went to the West side. There again there was arranging fire in the cross cut, the doors were blown towards the return and the timbering was burning but there was less woodwork on this side and the fire was not a fierce. They managed to put out the fire and got round to the Lancaster Pit where they found Ernest Moss, a shackler, alive behind some empty trams about four yards to the West of the shaft.

Crossing the pit, they found five or six men lying down full length, but all of them later died. these men were the hitchers and worked on the West side. Mr. Redmayne commented that it was odd that these men should have died and the banksman killed when Moses had lived. It was concluded that he must have been protected from the full

effect of the blast and the explosion would have gained momentum in going up the shaft from the considerable quantities of dust that would have been blowing off the tubs.

The overman, D.T. Thomas, gave a clear and graphic account of his movement to the inquiry. He said that when he got into the Main West Level and worked along to the east., 'It looked exactly like a furnace.' He was then told by the manager to go to the East side with a party of men whilst he and some others remained on the West side.

Shaw went along the Main West Level for about 40 yards to the hauling engine found the planking of the engine starting to blaze. He and others knocked down the planking and extinguished the fire. They went on to the crab engine and the timber there was on fire and every collar that I could see ahead was blazing. There had been no falls but the laggings just behind them were starting to give way. Mr. Shaw retraced his steps and joined Thomas and his party and helped them to put out the fire in the East side cross cut. He then tried to get into the Six feet seam but was stopped by a fall so he came back to the East York Level where he found some men from the East side who had not been effected by the explosion. The overman informed him that he had withdrawn all the men from the East side workings. Shaw said-

"I told him to keep them where they were and to bring them within 100 yards of the pit, and that as soon as I had the York Pit right for travelling in I would send for the men and let them up."

The ventilation was now shot circuiting and there was a strong current passing from the intake to the return through the West side cross cut. the shaft was cleared, all the injured men taken collected and taken to the cage and from there to the surface. The East side also sent men up in the cage, 28 at a time.

There was only one who survived the explosion, W.H. Lasbury, an assistant timberman. He went down the York shaft on the morning of the explosion at about 7.50 a.m. and went to the West York by the return. He then went to the about 20 to 30 yards below the engine on the York West incline when he heard a dull report. He was enveloped in a cloud of dust, which travelled from behind him and he lost his light. He fell forwards and he called to the engineman asking if he was all right to which he replied that he was. He turned back to the pit and groped his way out.

As he neared the cross cut he heard a 'sound as of air rushing through the doors in its ordinary way.' as he drew near 'the doors crashed open and i hear a splintering sound' and he staggered back just on the inbye side of the doors, collected himself and staggered to the bottom of the York shaft where he dropped. This gave an indication that there had been two explosions.

Meanwhile, Shaw had gone to the surface with his party to get further assistance. He had been down the pit for an hour before work started to repair the water pipes in the shaft with which to fight the fires in the West Main Level. The fire in the East side cross cut was controlled by breaking a pipe on the East side leading from the column in the upcast shaft although it was damaged. The column in the downcast was completely cut off. Shaw started work within the hour to connect the pipes in the downcast shaft and bring water through the first cross cut to the West side but he was greatly hindered with the fumes and smoke which affected his eyes very badly. there were many problems with the work and it took quite a time. It was not until the Porth Rescue Station arrived with breathing apparatus that a proper connection was made at . There was a mix up with the message that called them out and much valuable time had been lost. There was a trained Rescue brigade at the colliery but there was no breathing apparatus kept at the colliery.

The Commissioner commented-

"In my opinion the efficiency of the water supply was a most regrettable incident. Of course there is always the risk of broken pipes in shafts or underground being broken by the force of an explosion, but the time lost in repairing them would be much less than that absorbed by having to install a complete column."

When Dr. Atkinson and Mr. Redmayne arrived at the colliery on Tuesday afternoon at 5.30 p.m. the fires were being fought by water and fire extinguishers. There was no actual fire visible. It was buried under falls and it was arranged to fill and remove as much of the burning debris as possible with the object of advancing against the fire. Shifts were arranged to carry out the work. Each shift lasting six hours and acting under the direction of a colliery official or mining engineer.

The speed of the fan was slackened on the day of the explosion and a committee of mining engineers and others were appointed on Wednesday midday to control the rescue operations. It was suggested that sand would do the job but this was overruled as unnecessary. It was not until October, 17th. that sand bags were procured from Cardiff. At the Inquiry Mr. T. Greenland Davis, Junior Inspector of Mines was questioned about this point by Clement Edwards. He was asked-

"I think you were present at an earlier stage when the Chief Inspector considered the question of using sand, and Mr. Leonard Llewellyn said it was not a sandy district, and I said if it were a question of sand I could get a hundred volunteers, get the railway company to run a train, and we would have sand within a few hours from Penarth and Mr. Llewellyn said they would have the fire out before they could get back."

It was not until stoppings were constructed to control the fire, problems with gas had been overcome and the ventilation restored that the exploration of the workings was undertaken.

It was not until 10 p.m. on Tuesday night that an attempt was made to enter the Bottanic District. When the Inspector arrived at the at 5.30 p.m. on Tuesday he was informed that the air current on the East side was short circuiting near the pit bottom. it was realised that gas could come from that side of the pit and get to the fire and it was arranged that the West side should be carefully watched and the roads leading to the West side examined. Messrs. T.G. Davies and P.T. Jenkins, Inspectors of Mines and two others did this about 9 p.m. which resulted in the discovery that the air, instead of coming from the No.1 North was passing into the Bottanic from the East side. With this knowledge, an exploring party was sent into the Bottanic District at 10 p.m. It was 11.30 when the first man was discovered alive but unconscious. By the early hours of Wednesday morning 18 men had been rescued alive. Work continued until all the bodies were recovered from the mine.

The official report into the disaster refrains from listing the victims by name and gives only a number, job and the cause of death. Four hundred and twenty one were identified and eight were not. The larger number included seven who were brought from the pit alive and later died at home or in hospital. Eleven bodies were left in the mine buried under falls which brought the total death toll to 440.

Those who died were-

The single men-

W.T. Attewell.

G.D. Anthony.

Thomas H. Abraham.

Thomas Adams.

Henry Brookes.

Griffith Bowen.

Samuel Booth.

I.H. Benjamin.

Harold Button.

Walter Berry.

George Bastyn.

Charles Baker.

William Bennett.
Robert Bateman.
William Barnett.
Timothy Carroll.
John F. Carnell.
George W. Coombes.
Thomas Cotterell.
Thomas Cook.
John Carpenter.
James H. Delbridge.
William Davies.
Thomas Davies.
D.J. Davies.
Henry Francis Davies, widower.
Benjamin Davies.
John Davies.
R.J. Davies.
James Davies.
Stanley Dando.
George Downes.
Thomas Downes.
James Druhan.
Richard Davies.
Mathew Dorey.
Morgan Edwards.
W.D. Evans.
D.R. Evans.
George Edwards.
Henry Edwards.
Evan D. Evans.
William Eldridge.
Walter Edwards.
J.R. Edwards.
William J. Edwards.
Rhys J. Evans.
Charles Edwards.
James Etchells.
Fred Ford.
George Fred.
Joseph Hopkins, widower.
Fred French.
Edward Gilbert.
Edward Griffiths.
William Richard Fern.
Albert J. Griffiths.
Samuel Hoare.
Idris Humphries.
William Hughes.
William Henry.
Humphrey Hughes.
George Herritts.
Brindley Hyatt.
Reuben T. Hughes.
William Hughes.

Frank Hollister.
Walter Henley.
Reginald Harrison.
D. H. Hill.
Charles Hall.
George Hallett.
William Ingrham.
Henry Jones.
Gilbert Jones.
Reuben Jones.
Thomas Jones.
Thomas D. Jones.
Thomas Jones.
David Jones.
Samuel Jones.
W.J. Jones.
Hugh Jones.
Thomas Jones.
David Jenkins.
E.A. Jones.
Richard H. Jones.
William Jones.
R.O. Jones.
Samuel Jones.
William Jenkins.
Henry Kearle.
Thomas Kestell.
John Kenvin.
Thomas Kinsey.
Rowland Lewis.
Griffith Lewis.
C.W. Lewis.
Phillip Lower.
Frank Langmead.
Sidney Lasbury.
William Morgan.
Josiah Morgan.
Benjamin Morgan.
Alfred Milton.
Charles Moss.
W.H. Morgan.
John Maldoon.
Albert McDonald.
Edwin Morris.
Cadwalader Morris.
Thomas Maddocks.
Ernest Morgan.
Meyrick Morris.
E.E. Mulcock.
David Morgan.
Thomas Mendus.
William Morgan.
Charles Owen.
George Owen.

J.G. Owen.
Harold Price.
Charles Peters.
Ernest Petherick.
Benjamin Priest.
Hugh Parry.
Henry Pritchard.
Frank Pritchard.
Thomas V. Priest.
W.J. Phillips.
William Robson.
Oliver Rees.
Thomas Richards.
Idris Price.
Robert Ross.
Evan Rowlands.
Taliesen Roberts.
Griffith Roberts.
Thomas Rees.
I.J. Rosser.
John Small.
Thomas Stanley.
Thomas Saunders.
John Symes.
David Rees.
John Rowlands.
Griffith Roberts.
Fred Richards.
Samuel Rowlands.
Robert Rowlands.
William J. Ross.
E.G. Thorne.
Hugh Thomas.
E.R. Thomas.
Thomas Tucker.
Thomas Thomas.
Thomas P. Thomas.
Albert Thorne.
James Twining.
E.S. Twining
Levi Thomas.
William Thomas.
Rees Thomas.
Joseph Thomas.
William C. Thomas.
William Uphill.
Arthur Vbranch.
Ernest Vbranch.
William Williams.
W.O. Williams.
Arthur H. Williams.
Albert Williams.
John Williams.
William Taylor.

Emrys H. Williams.
Glynder Williams.
W.L. Wood.
Noah Williams.
Richard Williams.
Fred Williams.
Henry Walsh.
Job Williams.
Thomas Oliver.

Those with other commitments-

Charles Brown who had two illegitimate children
Albert Button who supported his old mother
George Davies who supported his old mother with his brother
John Davies who supported his old mother with his brother
George Davies who supported his old mother with his brother
Ellis Davies who supported his old mother with his brother
David J. Davies who supported his aged mother
William Davies who supported his old mother
William F. Davies who supported his old mother with his brother
Thomas J. Davies who supported an aged mother
Ernest Edwards who supported his old mother
Alfred Evans who supported his old mother
Thomas Fern who supported his old mother
Arthur Gregory who supported his old mother
Alfred Hadley who had two illegitimate children
Hugh Hughes who supported his old mother
Benjamin Jones who supported his old mother
William Jones who supported his old mother
Thomas J. Jones who supported his old mother
Drychan Jones who supported his old mother
Thomas Jenkins who supported his old mother with his brother
Daniel John who supported his old mother
Richard James who supported his old mother
W.S. Jones who supported an illegitimate child
John R. Kirkham who supported his old mother
James Lower who supported his old mother
T.J. Morris who supported his old mother with his brother
Alfred Martin who supported his mother
William Morgan who supported his old mother
John Jones who supported his old father
Frank Ferris, a widower
John Twining who supported his mother and a niece
S.J. Mansfield who supported his old mother
Garfield Roberts who supported his old mother
Patrick Sullivan who supported his old mother
Arthur M. Richards who supported his old mother
Alfred R. Tudor who supported his old mother
W.H. Watkins who supported his old mother
A. Williams who supported his old mother
John Edwards who supported his mother and father who were both in their 80's
Frederick Alderman who left a wife and two children
Charles F. Anderson who left a wife and six children
William Baish who left a wife

George Baker who left a wife and nine children
Henry Boswell who left a wife and seven children
James Beavan who left an adopted child
John L. Benyon who left a wife and two children
Samuel Bird who left a wife
Edwin Bullock who left a wife and three children
William Bishop who left a wife
Samuel Baker who left a wife and two children
William Beck
who left a wife and child
Frank Borinetti who left a wife who was pregnant
Denis Carroll
who left a wife who was pregnant and a child
George Chant who left a wife and three children
Frank Clarke who left a wife and two children
Peter Carr who left a wife and child
Thomas Collier who left a wife and three children
John Chapman who left a wife and two children
James Colley who left a wife and two illegitimate children
Henry Copeland who left a wife and five children
Charles Chard who left a wife and four children
Thomas Cronin who left a wife and child
William Davies who left a wife and four children
Jeffrey Davies who left a wife and four children
Thomas Deers who left a wife and four children
Henry F. Davies
who left a wife who remarried in March
1914 and two children
Albert E. Dean who left a wife and four children
James Davies who left a wife and three children
George Henry Downes married with one child
John Dillon who left a pregnant wife and a child
William Dew who left a wife and two children
Henry Davies who left a wife and three children
Henry William Dodge who left a wife and child
Morgan Evans who left a widow
Charles Evans who left a wife and four children
William Evans who left a wife and four children
David Evans who left a wife and two children
Thomas W. Edwards who left a pregnant wife
Richard Edwards who left a wife and two children
George Edwards who let wife and three children
James Edwards who left a wife and two children and who supported his old mother
Charles Emery who left a wife
R.J. Evans who left a widow
James Edwards who left a wife and two children
Evans Edwards who left a widow
Evan Evans who left a wife and child
George Henry Evans who left a wife and child
Robert W. Evans who left a wife and four children
William Evans who left a wife and six children
Henry Edwards who left a wife and five children
Henry Field who left a wife and three children
Henry Ford who left a wife and four children

Gomer Green who left a pregnant wife and a child
Llewellyn who left a wife and three children
Edward who left a widow
James Gwynne who left a widow and four children
Walther Grainger who left a wife and child
David Griffiths who left a pregnant wife and two children
John Howlett who left a wife and five children
David Hughes who left a wife and five children
King Samuel Humphries who left a pregnant wife and five children
Frank Humphries who left a wife and a child
John P. Humphries who left a wife and child
James Herrin who left a pregnant wife and a child
William Harvey who left a wife and child
Richard Hunt who left a wife and five children, one of whom died 8th. November, 1913
Harry Hall who left a wife and child
William Hemmings who left a wife and three children
John Hughes a widower who left two children
William J. Hyatt who left a wife and six children
Thomas Hearne who left a wife and three children
John Herrin who left a wife and four children
William Hilbourne who left a wife and two children
George Harrison who left a wife and four children
Charles F. Hill who left a wife and two children
Edward Jones who left a wife and six children
John Jones who left a widow. and a child
Evan Jones who left a widow
Thomas H. Jenkins who left a wife and two children
Humphrey Jones who left a wife and child
Richard Jones who left a widow
Evan Jones who left a widow
William Jones who left a wife and three children
Thomas Llewellyn Jones who left a pregnant wife and five children
Evan William Jones who left a pregnant wife and a child
John B. Jones who left a pregnant wife and three children
Evan Jones who left a pregnant wife and six children
William Jones who left a wife and seven children
David J. James who left a wife and three children
Evan P. Jones who left a widow and two children
David Jones who left a wife and three children one of who died 23rd. January, 1914
Owen M. John who left a wife and child
Morgan Jones who left a wife who remarried, 4th. July, 1914
John H. Jones who left a pregnant wife and a child
Edmund Jones who left a wife and two children
James Jones who left a wife and eight children the youngest died 4th. November, 1908.
Henry Jones who left a wife who remarried, 10th. June, 1914 and two children.
Thomas Jones who left a wife and seven children
Richard Jones who left a wife and child
Charles James Jones who left a widow
Christopher Jones who left a pregnant wife and a child
William Jones who left a widow
W.H. Jones who left a wife and two children
David Jones who left a wife and a child
William Samuel Jones who left a widow
William John who left a wife and two children

Daniel Kenvin who left a regnant wife and three children
William King who left a pregnant wife and two children.
Richard Kestell who left a wife and child, John G. Kelly who left a pregnant wife.
Edward R. Lewis who left a widow.
Rowland Lewis who left a wife and two children.
Daniel Lewis who left a wife and two children.
John Lynch who left a wife and two children.
Thomas Lewis who left a widow.
Rowland Lewis who left a widow.
E.S. Llewellyn who left a pregnant wife and a child.
Silas Lock who left a wife and child.
John Lewis who left a wife and three children.
David John Lewis who left a wife and three children.
John T. Lewis who left a pregnant wife and five children.
Edward Lewis who left a wife and five children.
Edward Lewis who left a widow.
Ivor Thomas Lewis who left a pregnant wife and seven children.
Richard Mathews who left a wife and a child.
Robert Manning who left a wife and two children.
John Morgan who left a wife and two children.
Thomas Meredith who left a wife and two children.
James Moran who left a pregnant wife and child.
William T.Morgan who left a wife and five children.
John Maddocks, widower who left a daughter.
John Morris widower who left a son.
Benjamin Morris who left a wife and three children.
Frank Lewis Morgan who left a wife and five children.
Joseph Morgan who left a pregnant wife and one child.
Lewis Musty who left a wife and child.
David Lewis Morgan who left a wife and three children.
John Mogridge who left a wife and child.
Richard Newell who left a wife.
George Pingree who left a wife and child.
Albert Pritchard who left a pregnant wife and five children.
Thomas Phillips who left a wife and two children.
William Payne who left a widow.
John Peters who left a widow.
George A. Price who left a wife and two children.
Charles Parry who left a widow.
Benjamin Priest who left a wife and four children.
Albert Pegler who left a pregnant wife and four children.
Albert Parrish who left a pregnant widow.
Henry Penny who left a wife and child.
W.J Rees who left a pregnant widow.
David T. Richards who left a wife and three children.
Gwilym Rees who left a pregnant wife and two children.
T.W. Roberts who left a wife and child.
John Radcliffe who left a widow.
John Roberts who left a pregnant wife and two children.
William Rowlands who left a widow.
William Ross who left a wife and two children.
Richard Rees who left a wife and three children.
Morgan Roberts who left a wife and child, Richard Rex who left a wife and child.
Robert Rock who left a widow.

John Richards who left a wife and three children.
John Robinson who left a wife and two children.
Richard Rees who left a widow.
Lewis Rees who left a widow.
Peter Ross who left a wife and child.
Edward Rowlands who left a pregnant wife and six children.
George E. Sreadbury who left a wife and three children.
Samuel Edwin Small who left six children.
James Smith who left a wife and three children.
James Scrivens who left a wife and three children.
John Scott who left a pregnant widow.
Edward Stephens who left a wife and four children.
Edward Stanton who left a pregnant wife and a child.
Richard Seagar who left a pregnant wife,
William Sullivan who left a wife and four children,
George Small who left a wife and child.
Ezra Twining who left a wife and two children.
David Thomas who left a wife and five children.
Rees Thomas who left a wife and child.
Thomas Thomas who left a wife and two children.
John Thomas who left a wife and three children.
William Thomas who left a wife and two children.
James Thomas who left a wife and seven children.
Henry Thomas who left a widow.
Isaac Taylor who left a widow.
Richard Thomas who left a wife.
Frank Tooze who left a wife and three children.
Howell Thomas who left a pregnant wife and four children.
Llewellyn Williams who left a pregnant widow
.Joseph Williams who left a wife and two children.
David Williams who left a widow.
Caleb Withers who left a widow.
John Williams who left a wife and two children.
Fred Williams who left a wife and three children.
Evan Weston who left a wife and child.
Simeon Woram who left a widow.
Gilbert Whitcombe who left a wife and two children.
William H. White who left a pregnant wife and two children.
John White who left a wife and two children.
David Williams who left a widow who supported his old mother.
W.H. Williams widower who left three children.
Fred Williams who left a wife and two children.
Joseph Wright who left a wife and two children.
Patrick Williams who left a wife and two children.
Frank William Waddon who left a wife and child.
John Witherall who left a wife and child, Gwilym Williams who left a widow.
Robert Yardley who left a wife and four children.
Thomas Hopkins who left a wife.
David John who left a wife and four children.
David Jones who left a wife and six children.
Henry Mainwaring who left a wife and two children.
Daniel Price who left a wife and
William Price who left a wife and three children.

On the 16th October, a rescue worker, William John, aged 31, lost his life as he was standing at the top of a fall handing timber forward when a stone fell fracturing his skull and he was killed.

A fund to relieve the suffering of the victims dependants was set up and captured the imagination of the public. The above list is taken from the document that details the payments to the people who had lost their breadwinners.

The inquest into the deaths of the men was held at Senghenydd on Monday 5th. January, 1914 before Coroner David Rees. the proceedings lasted seven days with the jury bringing in a verdict of "Accidental Death."

The inquiry into the causes and circumstances attending the explosion at the Universal Colliery was conducted by Mr. R.A.S. Redmayne, Chief Inspector of Mines. All interested parties were represented and the proceedings lasted almost a month. Two very large volumes of evidence resulted. The investigation was painstaking with Edward Shaw being examined for three whole days and some witnesses recalled again and again.

Mr. Redmayne wrote of the probable site of origin of the explosion and its probable cause-

"I have come to the conclusion that there is a strong probability of the explosion having originated in the Mafeking Incline and that it was preceded by a similar occurrence to that which took place further outbye of the Mafeking return in October, 1910, namely, by heavy falls liberating a large volume of gas.

These heavy falls exposed seams of coal and beds of hard rock, and an outburst of gas may have come away at one of them. the only apparent means of ignition would be sparks from the electrical signalling apparatus, or from rocks brought down by the fall, and we know that explosions have been by both causes.

The only other possible means of ignition were safety lamps or matches. The difficulty in regard to the former is that no lamp was found in the place, and even were a broken lamp found under a fall there would be the inference that it had been broken by the fall. There were, however, lamps lower down the hard heading, but there is no evidence pointing to any of them having been the igniting cause of the explosion. In respect of matches, a rigorous search of the persons descending the mine was carried out daily, and the possibility of a match being the igniting cause is, in my opinion, remote."

Exhaustive test had been carried out on the electrical signalling apparatus. The General Regulations gave precautions which should be taken to avoid 'open sparking' from electrical and wires in mines in which there was inflammable gas. Mr. Redmayne wrote-

"Undoubtedly electrical signalling wire was being used in a part of the mine in which there was likely to be inflammable gas in quantity sufficient to be indicative of danger.

it was argued by counsel appearing on behalf of the owners and management, and evidence was called to show, that the sparks caused by bringing the wires together, or in ringing the bells, were not of sufficient intensity to ignite gas. In effect there was no 'open sparking'. In this connection I can only regret that the safer plan of excluding sparks altogether was not adopted.

It is all the more astonishing that the management should have faced the risk that sparks *might* have ignited gas in view of the Bedwas Colliery explosion which occurred on March 27th., 1912, and was proved beyond all reasonable doubt to have been caused by the sparks from an electric ball. The attention of owners of mines throughout South Wales was called to this explosion in a circular letter sent out by Dr. Atkinson, dated 28th. August, 1912."

With reference to the rescue apparatus at the mine, Mr. Redmayne added some recommendations.

"I incline to the belief that if there had been rescue apparatus kept at the colliery, and men equipped with breathing apparatus and carrying with them a lighter form of apparatus, had at once penetrated the West York by the Return and the Bottanic District a few more lives would have been saved.

I am convinced that had there been available at the time an adequate water supply, and had the brigades of rescuers attacked the three fires, the fires might have been extinguished in a comparatively short time.

I should have thought, in view of the fact that the colliery was such a gassy one, and as it had already been devastated by an explosion, that the management would have made arrangements for a supply of water adequate to meet an emergency of that kind that had actually occurred."

With regard to the state of the mine prior to the explosion the Commissioner pointed out that it was breach of the Act not to have cleared coal dust from the roof and sides and he commented on the desirability of stone dusting.

"I know that apprehension exists in some quarters as to whether such a remedy would not be worse than the disease, the idea being that the introduction of stone dusting might be conducive to 'miners' phthisis' (pneumonokoniosis), but I would point to the fact that dust derived from argillaceous shale has existed naturally in mines in the United Kingdom for long past without, as far as I know, injurious effects resulting to the workmen employed therein."

The Report drew attention to the fact that there had been several breach of the Coal Mines act and in a general comment about the management of the mine. Mr. Redmayne said-

"Several of these breaches, may appear trivial, but taken in the aggregate they point to a disquieting laxity in the management of the mine.

I regret exceedingly having to say this because Mr. Shaw impressed me as an honest, industrious and in many respects, an active manager and he gave me his evidence in a clear and straightforward manner and assisted the Inquiry to the utmost of his power."

About the manager's behaviour on the day of the disaster he commented-

"It would be invidious, where all the mining engineers and miners engaged in attempted rescue operations worked so hard in endeavouring to get past the fire in the workings with the object of saving life, to commend individuals by name, but I think a particular meed of praise is due to Mr. Shaw and to the small band of workers which accompanied him underground immediately after the explosion."

GLYNEA. Glynea, Carmarthenshire. 18th. October, 1913.

The colliery was the property of The Glynea and Castle Coal and Brick Company, Limited. At about 10.30 a.m., an explosion of firedamp caused by a blown out shot of 'Swalite' burned nine men so severely that eight of them died from their injuries over the next two weeks.

The colliery consisted of two shafts sunk to the Bushey seam which lay at a depth of 130 yards. The ventilation was produced by a Waddle fan, 21 feet in diameter which ran at 45 r.p.m. and had a capacity of 50 to 60,000 cubic feet of air per minute at a water gauge of five eighths of an inch. Locked safety lamps were used throughout the mine. The seams that were worked were the Fiery, Bushey and Golden seams which dipped at 20 to 31 degrees to the horizontal to the north. The Bushey seam was worked from a slant at the level of the shaft bottom. The Golden seam was won by means of a cross measure drift to the north and the Fiery seam from cross measure drifts also to the north from the headings in the Golden seam. All the seams were more or less damp.

The explosion occurred in the Fiery seam which was 4 feet thick and worked at 1,200 yards from the shaft. The workings were on the pillar and stall system and consisted of two levels about 50 yards apart, connected at intervals at 10 to 12 yards by top holes to

the rise of the lower heading. The air current traversed the lower headings and top holes first and then entered the upper heading from a top hole which had been holed into it. The face of the upper heading was about 16 yards in advance of this connection.

The air was prevented from passing outbye along the upper heading which was a return airway, by a brattice sheet hung across the entire width of the roadway, a yard or two outbye of the top hole on the rise side of the heading about 5 to 6 feet inbye of the top hole airway and therefore the heading face and a top hole which had been commenced within 5 yards of the face, were not ventilated by any current of air.

The accident occurred at the new top hole, about 4 feet to the rise near the heading face. A shot hole, 3 feet to 3 feet 6 inches deep had been bored in the coal face about 6 inches below the roof and 6 inches away from the right hand coal rib. The hole was directed rather to the solid than over the holing beneath the coal which had been undercut about 3 feet 6 inches along the floor of the top hole for its entire width of 4 feet 7 inches. The hole was stated to have been charged with two or three cartridges of Swalite and stemmed, it was said, by clay. One of the deceased, a certificated fireman, and an authorised shotman, fired the shot electrically from outbye of the brattice near the airway top hole and the collier who worked in the top hole was at his side. The firing of the shot was immediately followed by an explosion of firedamp which burned nine men who were out of the heading. Seven were thought to have been eating their food and had left their work places for this purpose. Two em remained at work in the third top hole and were not injured. The explosion did not traverse any of the top holes and its effects were limited to about 150 yards of the heading. Coal dust did not appear to have played any part in the accident but there were some signs of blackening on the timbers.

The injured men were quickly taken to the surface and first aid was rendered and then they were either taken home or to Llanelli Hospital. Only one of them recovered.

The men who died were-

William Price aged 39 years, collier,
Oliver Thomas aged 21 years, trammer,
David John aged 38 years, fireman,
Daniel Price aged 53 years, collier,
Henry Mainwareing aged 52 years, collier,
Thomas Hopkins aged 43 years, collier and
John Edwards aged 32 years, trammer.

The explosion was caused by the bowing out of the shot and igniting firedamp which was present in the roof of the heading at the mouth of the top hole and also a train of gas which lay along the upper side of the roadway to the rippings near the face.