REPORT OF EXPLOSION

IN THE

CINCINNATI MINE

OF THE

PITTSBURGH COAL COMPANY

COURTNEY, PA.

APRIL 23, 1913.

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Compiled from notes

of

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by

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4/23/14
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PART II.

ADDENDA.

REPORT ON EXPLOSION OF CINCINNATI MINE

APRIL 23, 1913.

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INTRODUCTION

An explosion occurred in the Cincinnati mine, Wednesday, April 23, 1913, at about 12:00 o'clock noon, in which 97 men were killed, and subsequently one of the rescue party wearing breathing apparatus lost his life. Of the number killed, probably 20 or more of them were suffocated, the balance being killed by the force of the explosion. There were about 167 men in the mine at the time of the explosion. Of this number about 67 escaped uninjured through old workings, and three were rescued alive - one by the first rescue parties and two sixty hours after the explosion by exploring parties. Five mules were taken out alive on Sunday, April 27, four days after the explosion.

GENERAL INFORMATION

Location: The Cincinnati mine is situated in Washington County, Pennsylvania. The main opening is on the Monongahela River, on which all coal is shipped by boat. The nearest railroad station to this entrance is Huston Run, the shipping address. The post-office address is Courtney, Pa. The rescue work was conducted from the Mingo entrance which is a rock slope opening near the Mingo school house, on the Charleroi street car line midway between Finleyville and Riverview.

Ownership or operators: The Cincinnati is one of the oldest mines along the Monongahela River, having been opened about 1843. It continued as an independent operation until about the year 1900 when its ownership was

combined with that of other river mines in that district to form the Monongahela River Consolidated Coal & Coke Company. During the year 1912 control of this organization passed to the Pittsburgh Coal Company, under which head it now operates. Adjacent coal tracts are owned by the same company, the nearest independent operations being the Star mine, at Courtney, and the Huston Run mine, at Huston Run.

The Pittsburgh Coal Company was operated under the following organization:

W. K. Field,	President, Oliver Building, Pittsburgh, Pa.
G. W. Schluederberg,	General Manager, Oliver Building, Pittsburgh, Pa.
H. B. N. Louttit,	Manager River Mines, Oliver Building, Pittsburgh, Pa.
William Carter,	Superintendent Cincinnati Mine, Courtney, Pennsylvania.
Charles O'Neal (deceased),	Mine Foreman Cincinnati Mine, Courtney, Pennsylvania.

GEOLOGY AND CHARACTER OF COAL

Geology: The Cincinnati mine is in the Pittsburgh bituminous coal bed which is the base of the Monongahela series of the Carboniferous period. The coal bed lies nearly horizontal and outcrops at the Cincinnati mine at a convenient distance above the river for shipping by water. It ranges from 5 to 9 feet in thickness, is regular in structure and has a pronounced cubical fracture, the most pronounced being in a direction about N. 70° W. Occasionally spars or clay veins cross the seam. They are a source of methane and water.

Coal: The coal is bituminous and of an excellent quality for domestic and fuel purposes, being low in ash, moisture and sulphur.

TABLE I.

Standard Face Samples of Coal Bed in
the Cincinnati Mine. Analysis of Coal as Received.

Laboratory No.	Location	Moisture	Volatile Matter	Fixed Carbon	Ash
17082	6th Butt off 14th face	2.79	35.17	55.30	6.74
17083	10th Butt off 14th face	3.22	35.10	55.76	5.92
17084	12th Butt off 14th face	2.87	35.75	54.88	6.50
17085	Composit of above samples:	3.03	35.22	55.36	6.39

See Addenda for more complete analyses.

The seam is in the gas coal belt of the Pittsburgh district. In structure it contains the characteristic slate partings about three inches apart a few inches below the center of the bed. The coal is undercut by chain machines and usually two to six inches is left on the bottom.

TABLE II.

Sections of Coal Bed in Cincinnati Mine, 1/3 mile South of Huston Run and 2 miles Southeast of Finleyville.

Sections	A		B		C	
Laboratory Nos.	17082		17083		17084	
Roof: Draw slate	Ft.	in.	Ft.	in.	Ft.	in.
Coal	1	4-1/2	1	6-1/2	1	7-1/2
Bone coal	0	0-1/2	0	0-1/2	0	1
Coal	1	9-1/2	0	10	1	7
Mother coal and sulphur	0	0-3/8	0	0-1/2	--	---
Coal	0	3-1/4	1	0-1/2	--	---

	Ft.	In.		Ft.	in.	Ft.	in.
Slate binder	Streak		(a)	0	0-1/2	0	0-1/4
Coal	0	3-1/2	(a)	0	3-1/2	0	2-1/2
Slate binder	0	0-3/4	(a)	0	0-1/4	0	0-3/4
Sulphur ball on one side	--	---		--	---	0	3
Coal	0	7-1/4		0	2	0	3-3/4
Mother Coal	0	0-1/2		0	0-1/4	0	0-1/4
Coal	1	2		1	9	1	9
Bottom coal	--	---	(a)	0	4	0	4-1/2
Floor: Underclay	---	---		---	---	---	---
Thickness of coal bed	5	8-1/8		6	1-1/2	6	3-1/2
Thickness of coal sampled	5	8-1/8		5	5-1/4	6	3-1/2

(a) Not included in sample.

Roof: The immediate roof is a drawslate of poor quality (a usual condition of the district) which must be taken down after loading the coal from each cut. This gives a fairly uniform height of six feet. Over the slate is a more permanent roof of roof-coal and shale, which requires posting in the rooms and occasionally in the entries. Drawslate is a bad roof which requires the greatest care in mining. Roof-coal is laminated with shale. The coal is considered good top but once broken the slate above falls very readily to the next stratum of coal. Methane is sometimes liberated in falls of roof so that it is not uncommonly found in dangerous quantities in connection with pillar work.

Floor: A clay bottom of medium hardness is found under the coal. It has a smooth surface and gives a good cutting bed for the mining machines. Underneath it is a limestone bed.

Moisture: The coal and roof are naturally dry, except at points near clay veins where drippers are encountered.

Gas: This mine has always been considered a gaseous one, and at one time, probably 30 years ago, the accumulated gas from sealed off portions of the mine was piped to the upcast shaft and burned in a furnace for ventilating purposes. A report is current that an explosion occurred in this mine shortly after it was opened up, but verification as to the details is not possible at this time. An old employee states that at one time in the early history of the mine explosive gas was forced out on the main entry from abandoned workings due to interference of the ventilating current by the fan in an adjoining mine. The men would not light their lamps until in on the parting, and at night in going home they would put out their lights at a certain point where a safety lamp was hung, and go out in the dark, each man holding on to the man in front of him. All the work at that period was done with open lights. For occurrence of gas prior to the explosion, see Fire Bosses Report, page 12, and testimony before Coroner's Jury, in Part II; also mine air analyses in the body of this report.

DESCRIPTION OF MINE AND METHOD OF OPERATION.

Development and system of working: The main haulage opening is a drift which passes under the Monongahela Division of the Pennsylvania Railroad; thence by a trestle to the river tipple, over which all the coal is dumped. The general direction of the main entry is northwest toward Finleyville. About one and one-half miles from the mouth there is an intake air shaft and manway slope, the shaft having a vertical depth of 200 feet: these are called the Mingo slope and air shaft. The mule stable is located outside near the mouth of the Mingo manway. There is a high ridge between these and the main

opening at the river. About one-half mile further to the northwest there is an upcast air shaft, at the top of which is a 12-1/2 foot Capell fan well installed in concrete and steel and equipped with explosion doors. This fan furnishes the ventilation for the entire mine. Practically all the area between this upcast fan shaft and the main opening at the river is worked out and abandoned.

The present live workings are operated on the room and pillar system. Main and face entries are worked on the quadruple system and the butt entries on the double-entry system. The butt entries are driven to intersect the next set of face entries before any rooms are started. A skeleton map and detail maps showing live workings are attached to this report in the Addenda. The method of working is as follows:

The rooms are driven from only one side of a pair of butts at a time, room No. 1 being the outermost room on the return air current, the other rooms being driven in order. When sufficient rooms have been driven the pillars are started. This is continued until all the coal but the stumps on that side have been removed. After this butt entry is finished the operation is repeated in the reverse order on the parallel butt entry, room No. 1 being the innermost room, and the others following in order. In all cases the air current enters the live rooms first and passes finally over the pillar workings. Material used in working the one butt entry can be transferred to the parallel entry as needed. Gob rooms are driven in advance work as demanded, for the purpose of storing the gob in the mine instead of hauling it to the outside. This is also necessary because of lack of dumping ground near the drift mouth.

The great drawback to this cross-panelling is found in the connecting of the main face entry sections. It would have greatly lessened the extent of

butt entry side tracks, and mules delivered the cars from these to the working faces, the loads being handled in the reverse order. Wooden cars with open joints and end-gates were used. In loading, these were topped about 12 inches over the bed. The character of the coal, in addition to the open joints of the cars, caused the deposition of considerable coal dust along the haulage roads. This was reported to have been sprinkled at regular intervals by sprinkling wagons, supplemented by the use of calcium chloride.

Lighting: (a) The fixed lighting was with incandescent electric lamps at all partings, junctions and turns. The machine shop and mine foreman's shanty underground were lighted in a similar manner. The bulbs were not protected by wire guards.

(b) Mixed lights were used: approved bonneted safety lamps being used in the rib workings and, at times, in narrow workings; while open lights (oil and carbide lamps) were in general use in all the live entries and rooms.

Ventilation: The mine was ventilated by a Capell fan, used exhausting, and driven by an electric motor. The fan was 12-1/2 feet in diameter by 6 feet in width. It is situated at a separate upcast shaft about 1/2 mile northwest of the Mingo entrance. The exact course of the ventilating current inside the mine is unknown to the writers, even after several attempts to obtain same; however, the ventilation is given as nearly as possible on the accompanying map. The ventilating current was divided into several splits. The main haulage way, which opened on the river, and the Mingo slope and air shaft, were the main intakes. The air was directed throughout the mine by means of substantial stoppings of brick construction, and overcasts of brick sidewalls and concrete floors reenforced by old pipes and rails. Wooden doors were used to direct the air on the haulage ways.

The air was carried along the main entry to the 8th face where it split, part going up Nos. 2, 4 and 6 butts, and possibly 9, to ventilate the 11th, 12th, 13th and 14th face entries and the butts to the west of No. 14 face. The general practice was to carry the air in the opposite direction to that in which the rooms were advancing. In this manner the air passed from the live room workings on to the pillar work. It is the belief of the writers that the air traveled up No. 6 butt to 14th face, where it split; part following 14th face to No. 9 butt west, thence to Nos. 11 and 12 butts and to face of 14th face north, returning on a parallel entry; the other split going up Nos. 7 and 8 butts and returning down No. 5 butt to 14th face, thence across 13th and 12th faces to 11th face and out No. 5 butt to the fan; another split went up No. 2 butt to slant, where it split again, part going out 14th face south ventilating the face entries and Nos. 1 and 2 butts west, and returning through old workings on No. 1 butt to 7th face, thence crossing main entries to air shaft; the other split at the head of No. 2 butt goes north to No. 3 butt west off 14th face, ventilates the face of No. 3 butt, returning on No. 4 to 14th face, and thence out No. 3 or No. 5 butt to the fan. The butt entries inby No. 10 butt off 8th face were most likely ventilated by a current from 8th and 9th faces, traveling up the odd numbered entries and returning back the even numbered, 7th and 10th faces being the general return.

Humidity: Some parts of the mine were naturally wet. The State mine inspector, in his last examination, had found some dusty places in the mine. Two sprinkling wagons were being used to wet the entries. Calcium chloride was also being used to moisten the coal dust in the rooms. The dry dust in this mine arises from the character of the coal which, in the cutting, loading and hauling operations creates dusty conditions in working places and along

roadways, the large volume of air being a very active agent in drying the mine. (See table including humidity readings under "Summary of analyses of mine air samples").

Drainage: The seam of coal has no decided dip in any one direction in this mine, so that the local drainage had to be handled by secondary pumps near the working faces, to main pumps at the foot of the slope entrance. The dilly road held standing water in many spots outby the main parting. Electric current was used to operate the pumps.

Fire protection: No special means of fire protection were at hand either inside or outside the mine. The Pittsburgh Coal Company had trained rescue men and rescue apparatus at some of the operations, and one of their crews with breathing apparatus was called upon for rescue work at the time of this accident.

STORY OF THE EXPLOSION

Local conditions: The atmospheric condition prior to the explosion is shown by the following table and curve, as furnished by the Weather Bureau's station at Pittsburgh, Pa. These show that the previous atmospheric condition had no direct bearing on the explosion.

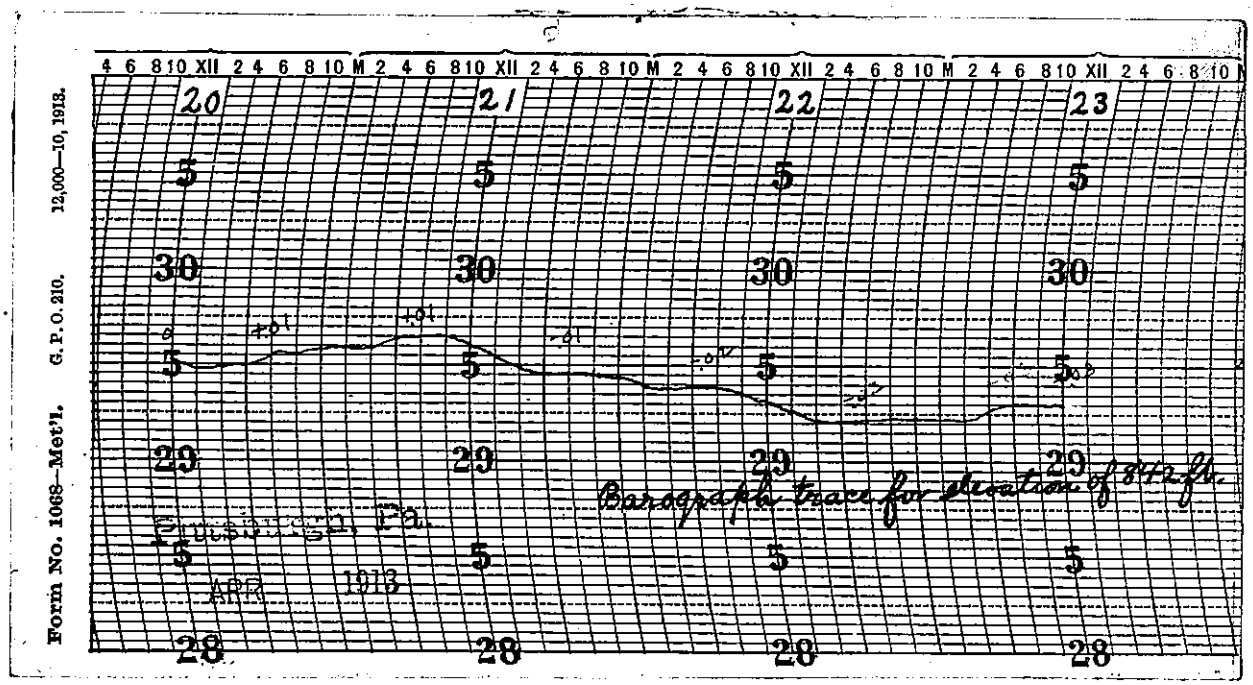
TABLE III

Weather Report Previous to the Cincinnati Mine Explosion.

Date April 1913	Elevation 842 feet Barometer Highest	Time	Lowest	Time	Weather Condition	Winds Av. mi. per hr. per day	Temperature Highest	Lowest
15	28.95	10:30 am	28.88	3:30 am	Cloudy. Rain	14	58	48
16	29.00	12:00mdt	28.86	3:00 pm.	Clear	14	64	46
17	29.14	10:00 am	29.01	1:00 am	Clear	5	68	42

18	29.10	7:00 am	28.93	5:00 pm	Clear	17	77	52
19	29.36	12:00mdt	29.00	1:00 am	Pt. cloudy	18	61	38
20	29.59	12:00mdt	29.35	12:01 am	Clear	16	46	30
21	29.67	9:00 am	29.42	12:00mdt	Clear	4	60	30
22	29.42	12:01 am	29.19	7:30 pm	Clear	9	77	44
23	29.27	12:00 m	29.19	2:00 am	Clear	10	80	62
24	29.32	8.00 am	29.20	6:45 pm	Clear	4	83	54
25	29.25	7:00 am	29.06	8:00 pm	Clear	5	84	54

Curve Chart showing Barometric
Pressures from April 20 to 23, incl., 1913.



Work was started at the mine as usual on the morning of April 23. The day shift started work at 7 a.m., after the fire-bosses had made their rounds and reported the mine safe. Work continued without any delay up to

the time of the explosion. The fan was running and had not been shut down since Easter Sunday, March 23, and at that time only while repairs were being made at the power house. The three fire-bosses had made their usual rounds on the morning of April 23 and reported.

Fire Bosses Report.

April 14.	Gas reported in	No. 9 butt.....	off No. 14 face
15.	"	" Nos. 4 and 6 butts...	" "
16.	"	" Nos. 4 and 6 butts	" "
17.	"	" Nos. 4 and 6 butts	" "
18.	"	" Nos. 4 and 6 butts	" "
19.	"	" Nos. 3, 4 and 6 butts	" "
21.	"	" Nos. 3, 4 and 6 butts	" "
22.	"	" Nos. 4 and 6 butts	" " (fenced off)
23.	"	" Nos. 4 and 6 butts	" "

The above report was copied from the Fire-Boss* Record. Henry Parker, the fire boss reporting this condition, made his second round of the working places at 9:15 a.m. The gas in Nos. 4 and 6 butts (fenced off) in above report had evidently been removed, as bodies were found at the faces. All the fire bosses left the mine at 11:15 a.m. The gas evidently had again accumulated in No. 6 butt after the fire boss made his second round as the entryman, Victor Aprimis, quit work at 11:15, being afraid to shoot on account of too much gas.

The explosion: Victor Aprimis came out to the mine foreman's shanty, at the main dilly parting, where he met mine foreman McNeil and assistant foreman Weldon. To them he reported that he was going home because he was afraid to shoot in No. 6 on account of too much gas. These three men then proceeded back the main entry, presumably to move the gas out of No. 6 butt entry in preparation for firing the shot. Their bodies (Nos. 20, 21 and 22) were afterward found at the face of that entry.

The aforementioned conversation was overheard by the dilly-rider , Guy Stokes, while he was picking up his loaded trip on the parting. He proceeded outside with this trip, picked up his empty trip and again started into the mine at 11:45 a.m. Standing in the second wagon, not over 300 feet from the pit-mouth, he was knocked down into the wagon and his cap and lamp blown into the wagon behind. He reached for the signal wire and rang for the engineer to stop, which was done, then after striking three matches he found his lamp and relighted it. Just then he was blinded for a few moments by a cloud of dust and smoke. After this had passed he signalled the engineer to start the trip inward. As he traveled inby he observed that the smoke cloud seemed to pull back again into the mine, and soon the moving trip caught up with it. Arriving at the parting, he heard the telephone ring in the old mine foreman's shanty. He went in and answered it; it was the fan man outside, who said that the doors were blown open at the fan and an explosion had occurred. Stokes told the fan man to do what he could to close the doors and get the fan started. He then went on back to the new shanty, or machine shop, and found it blown to pieces. Returning to the old shanty, he found the trip gatherer, Leroy, lying across the dilly line at the side of the track. Stokes then called the fan man again and said that the air seemed to be moving inward. He also called up the river opening and they told him that Superintendent Carter had started into the mine with a rescue party.

Outside indications of the occurrence of the explosion are best given by John Birkhamer and Lawrence Donnelly, the fan tender. The latter testified that at 12:20 p.m. the explosion jerked the fan and stopped it momentarilly; also blew the iron explosion doors open. He called two farm hands from Birkhamer's and they shut the explosion doors and stuffed up air

crevices with cloth and other material. Within eight minutes the fan was again operating effectively. The fan was driven by a constant speed motor at a rate of 157 r.p.m. and gave against the mine resistance at the time an air pressure of 2.6 inches water-gage, measured at the top of the shaft by a Bristol automatic recorder. The recorded speed at the time of the explosion was 153 r.p.m. The fan man only was at the fan house at the time of the explosion.

Statement of John Birkhamer: He lives a short distance from and in sight of the fan of the Cincinnati mine, and stated that he was lying on the couch in his sitting room; and at exactly 12:00 o'clock noon on April 23, 1913, he felt the earth tremble and heard a rumbling noise. The time was verified by his wife who had just prepared dinner. He immediately jumped to the window and saw a cloud of brown smoke and pieces of wood and coal flying into the air a distance of two to three hundred feet above the chimney. The fan attendant was running towards the Birkhamer home. Birkhamer immediately called up the Pittsburgh Coal Company and told them that an explosion had occurred in the mine and that he would go down to the fan and report further to them in a few minutes. He ran down to the fan drift, the fan attendant returning with him. The fan man did not want to close the doors of the fan drift until he had called up the person on the opposite shift asking him what he should do. Birkhamer, who had formerly acted as fan attendant and felt he knew what should be done, protested against the delay and the fan man then wished to call the master mechanic. Birkhamer finally prevailed upon him to close the doors immediately in order to restore ventilation as quickly as possible as it might be a question of life to delay. They closed the doors of the fan drift and Birkhamer then sent the fan man down to the stable to get

bags to pack the crevices. Birkhamer then returned to the house and again phoned the Pittsburgh Coal Company confirming his earlier message. It was then about 12:12 p.m. According to the men who got out alive they were nearly overcome, but when the air got better they were able to continue to the entrance. The prompt action in closing the explosion doors was most fortunate as the roads the men traveled were intakes. Mr. Birkhamer stated that he estimated the rumbling or movement of the earth lasted for 40 seconds.

Of about 167 men in the mine, there were probably 90 who were uninjured by flame or violence of the explosion. Of this number about 20 were suffocated by the afterdamp in trying to make their escape, the others, about 70, escaping by following the fresh air from No. 8 face through the abandoned workings off No. 15 butt to No. 4 face.

Had breathing apparatus and trained men been available for immediate rescue work, the possibilities of rescuing these 20 men would have been good. Apparatus and men were not at the base of operations until possibly 7:00 p.m., when the Pittsburgh Coal Company crew consisting of five men from Jacobs Creek arrived. On account of defective apparatus this crew rather retarded than expedited the recovery work. It also seems apparent that had these 20 men not tried to penetrate the smoke and afterdamp between them and the main intake, but retreated toward the faces of the entries they were on, which had not been penetrated by the explosion, they would have been rescued subsequently. This shows the desirability of refuge chambers in different quarters of a mine.

Stories of Survivors.

About 70 men escaped from the mine after the explosion. The evidence given by various persons at the Coroner's inquest will serve to give the

details of the work of rescue immediately following the explosion.

Brad Jackson, colored, of Finleyville, Pa.: "was working in No. 1 room on No. 16 butt No. 8 face section on the day of the explosion. Heard a hissing rushing sound, saw brattice door on entry bending almost double, then door flew back and a cloud of dust blinded him. Saw no flame and thought large fall had occurred. Door hung back against the rib, and he knew fan had stopped. 17 men worked on No. 16 butt and nobody seemed to know what had happened. Finally Jackson and eight others started out. They encountered some bad air, but got out alright to the parting on the main entry. Here they met dilly rider Stokes and he said there had been an explosion. They saw LeRoy lying in the drain apparently dead. Some of their party had worn open lights all the time. They went out Mingo slope after waiting on the parting for a short time."

S. D. Holmes, colored, of Finleyville, Pa., "was at work on the day of the explosion in room No. 23 off 14th butt off No. 8 face. His son was driver in No. 11 butt that day. Explosion occurred at 12:25. Did not see anything, but heard a queer sound or concussion. His son came down entry and said to him that there had been an explosion. They came out to No. 8 face and met Donnelly and also saw smoke there. Then went on out No. 8 face as far as No. 20 butt, but could not get out there, so came back to No. 16 entry and came out through there, crawling over falls, and got out to the parting on the main entry where they met night boss Thompson who had come in from outside. Thompson told him that his other son, who was a driver in No. 4 butt off 14th face was probably dead. They then went outside by way of Mingo slope."

James Landrum, colored, of Finleyville, Pa., "worked in the mine on the day of the explosion in No. 19 butt entry off 8th face. Was sitting in breakthrough between Nos. 11 and 12 rooms and heard a queer sound and concussion.

Thought it was an explosion and told his brother in No. 11 room, as he had heard one before in an Oklahoma mine. Saw a cloud of dust and went down entry to No. 19 door and there saw the trapper and driver; and going down through door met a crowd of men who had tried to go out No. 9 face but were driven back by smoke. Then met A. B. Brown, assistant foreman, and helped him to set a door up. Brown went away out No. 8 entry and told him to wait, but Brown stayed away too long and Landrum started back to No. 16 butt, as he knew that way out, and with six others crawled through No. 15 butt and thence out No. 4 face to the parting on the main entry, thence up the Mingo slope and outside."

Edward Piggford, of Mingo, Pa. "worked in Cincinnati mine on day of explosion. Worked on machine, and had finished cutting No. 20 room on No. 20 butt off 8th face, when the explosion occurred. Escaped through No. 16 butt. No. 12 face off No. 20 butt had been danger-boarded off that morning, but board was removed and they cut the entry."

Robert Carten, of Gastonville, Pa. "worked in mine on day of explosion. Was trackman from No. 12 butt to No. 20 butt off 8th face. Was at head of No. 16 butt when explosion occurred. Escaped through No. 16 butt and up Mingo slope. Did not know of any dangerous conditions in the Cincinnati mine."

A. B. Brown, of Charleroi, Pa., "Assistant Mine Foreman at Cincinnati mine since February 4, 1913. Was in No. 16 butt off 8th face when explosion occurred. His duty to assist the mine foreman and to look after the ventilation. No one ever interfered with him in the performance of his duties. The general rules were posted up and were printed in English, Italian, Lithuanian and Litturish. English speaking miners were in the minority.

"He at one time collected about 70 men following the explosion. Told them to wait in No. 8 face opposite No. 16 butt until he had made an examination.

He found he could not get far along No. 9 face on account of smoke and afterdamp, so he returned. Meanwhile, Superintendent Carter had arrived with rescue party. He then started out through No. 16 butt and thence out Mingo slope to the outside, arriving outside about 4:45 p.m."

Charles Crawl, of Monongahela, Pa., "worked in Cincinnati mine on April 23. Escaped from No. 20 entry after 58 hours in the mine. A. B. Brown, assistant mine foreman, had told him that morning that he intended to quit: he was not satisfied with the Cincinnati mine. Legler was working with Crawl when the explosion occurred and they remained together until rescue by Lauder and McVickers."

Nature of the death of the men: Many of the men working in the 14th face entries and butt entries off same, also in the 9th and 10th butt entries off the 8th face, were burned, and a few killed by violence; but the majority of the men were overcome by afterdamp, and it is probable that they did not live more than 10 to 20 minutes after the explosion; except in the 8th face entries inby the 10th butt, that is, in the district from which the large body of men who escaped were working.

Men who might have been recovered: In this district about 12 men were found overcome who might have escaped if they had followed the others through the old workings, or used the precaution of Crawl and Legler, instead of trying to penetrate the blackdamp in order to escape by way of the haulage road. Had the first rescue parties been equipped with breathing apparatus, they could have explored this district from the main entry along 8th face as the irrespirable gases covered only a distance of about 1,000 feet, in which case several of the men here might have been saved. This first rescue party entered

through the old workings by the route by which the group of men had escaped and did not get out along 8th face to the point where the bodies were later found. Subsequently the operations of the rescue party with the breathing apparatus were directed by the Pittsburgh Coal Company's management, in conjunction with the state inspectors, in another portion of the mine, i.e. the 1st and 2nd butt entries off the 8th face, thence to the 14th face workings.

Alleged causes: All the investigators and investigating committees were unanimous in arriving at the cause of the explosion. Unquestionably the origin was at face of the 12th butt off No. 14 face entry. A miner, No. 34, had evidently fired a shot on the left rib, which had broken into a clay vein, liberating a gas blower. As it was near noon, it is conjectured that after firing the shot he ate his lunch, and then pushed an empty car up to the face. The car was found close against the pile of coal, with the wheels blocked. As it was up-grade to the face it is believed that he was bending down while pushing the car and blocking it; then as he straightened up to go forward to the face with his open lamp in his cap, he ignited the gas. Subsequently when investigating the face of this entry the gas was found to be very "quick" or snappy. It exploded in a lamp before a cap was formed, probably because of quick diffusion due to an impinging air current carried by a brattice to within about 20 feet of the face after the explosion. The brattice had been reerected on the same posts and some of the brattice sheets still remained in place, therefore conditions were almost identical with those prevailing before the explosion. Owing to the good ventilation evidently the volume of fire damp was not large, as the violence at the point where ignited was not great. Though badly burned, the miner traveled out about 20 feet before

falling, as indicated by the location of his body.

On the return or right side of the brattice, a small gas cap could be obtained. Several samples of gas were collected at the face and nearby the gas was explosive by lamp test. The samples did not represent the explosive portions of the atmosphere as they showed a very small percentage of methane by chemical analysis and no ethane, the latter a constituent of natural gas. This would dispel one of the first theories assigned as to the cause of the explosion, namely, leakage from oil or gas wells.

Evidently the body of gas which was ignited was liberated from the clay vein at the face of No. 12 butt. The machine cut on the "tight" or right side of No. 12 butt had not penetrated the clay vein, but the machine men must have known they were encountering a fault while making the cut. The butt shot fired subsequently shattered the clay vein and liberated the gas therefrom.

Ignition of coal dust: The gas explosion, slight as it was, evidently stirred up coal dust (of which there was a considerable quantity in this entry), and the inflammation resulted in a dust explosion which rapidly increased in intensity as it passed out of the 12th butt and traversed the 14th face group of entries. At the heads of the butt entries off the 14th face, and at a few other places, the explosion was locally severe, but on the whole it could not be termed a violent explosion considering the extensive area penetrated by flame. The sprinkling and wet places evidently retarded the explosion and the long wet stretches on the main haulage caused it to die away.

The dilly rider having known that the mine foreman, assistant mine

foreman and the entryman from No. 6 butt west off 14th face had gone up to that entry just before 12 o'clock to clear the standing gas and arrange for firing the shot which the entrman had been afraid to fire on account of the gas, caused the exploring and rescuing parties to conclude that the origin of the explosion would be found at the face of that entry. Subsequently these three men were found, blown under the undercut at the face of 6th butt. The mine foreman's safety lamp was in pieces 30 feet back from the face, but no shot had been fired. While the origin was not at this point yet there is no doubt but that the explosion was reinforced in this entry, causing a high pressure wave to follow the original one.

Rescue and recovery work: (See outline map in Addenda showing movements of men who escaped). The rescue and recovery work was started without any delay. The explosion doors at the fan which had been blown open were closed and the fan repaired and started within 8 minutes after the explosion occurred.

William Carter, Superintendent of Cincinnati mine, was at Nottingham mine on April 23, where he was notified by telephone that the explosion had occurred. With mine foreman Boles he drove to the Mingo slope entrance. Here he organized a rescuing party which entered the Mingo slope, going thence along the main entry to 8th face, entered 8th face north, but could not get far by reason of the afterdamp. The party returned to the main entry and then went in 8th face south to slant, then up slant and in No. 2 butt and saw six dead men lying along that entry. They then heard of men being alive back on 8th face, so returned out the main entry to 4th face and traveled with the air through old No. 15 butt, crawling over falls to 8th face. They went in 8th face to No. 21 butt and found no one; then came back along 8th face motor

road and soon thought they saw the reflection of a light. Somebody called out, when they found it was Carter's son Joe and a party of men with assistant foreman Brown. Meanwhile night boss Thompson came in through old 15th and took a number of the men out by the same route. (See messages written with chalk about this time, under sub-heading "11 and 12 butts off 8th face".) Carter remained to see if anyone else could be rescued. Donnelly was found lying on 9th face at No. 13 butt; his body was still warm and they gave him artificial respiration, but without result. Then the party returned through old No. 15 butt, all feeling sick.

Several men had been in the mine foreman's shanty at the dilly parting when the explosion occurred. One of these men afterwards stated to George S. Rice that the effect of the explosion was that of a great concussion, which hurt their ears, and accompanied by a steady blowing which banged the door of the shanty. They could hear timber flying past and crashing against the ribs. The safety lamps hanging on the wall were blown down and extinguished. For sometime no one spoke until they heard someone calling from across the entry asking for a light. They stuffed their handkerchiefs in their mouths and crossed the road in the dark. It was still blowing hard and the air was hot. They felt their way through a crosscut into a road where there was good air. One of them had an open lamp in his pocket, and after several attempts managed to get it lighted. With this they managed to reach the slope entrance three-fourths of a mile distant through old workings and by crawling over falls. There were about six in this party. The boss driver who was in the shanty denied that the men crossed the main haulage road, but stated that he led the party over an overcast at No. 4 butt and escaped by way of Mingo slope.

William Lauder, Elizabeth, Pa., Inspector for the Pittsburgh Coal Company, submitted a report of the rescue and recovery work carried on by Inspectors Lauder, Louttit and Ferguson, of that company, from which has been extracted the following:

"I arrived at Cincinnati mine at 2 p.m. on April 23, and entered Mingo slope, where I met a man with a safety lamp and took him along with me. We met some men at the dilly-road parting and they said Superintendent Carter had gone into No. 4 face. Started into No. 4 and met Superintendent Carter returning with a party, and he said they had with them all the living men from No. 8 face. Found machine boss shanty destroyed and body of machine boss nearby. Then someone saw a light back on No. 8 face and we went in there and found a door frame on fire, which was extinguished by Louttit, Shaw, Ferguson, Faraday and myself. Found loaded car overturned and driver and mule dead. Bainbridge was found alive near junction of No. 2 butt and 8th face. He was taken to the surface, given medical treatment and removed to the hospital. We then proceeded along No. 2 butt off No. 8 face and found six men lying along entry apparently overcome by after-damp. Reached the junction of No. 2 butt with Nos. 11, 12, 13 and 14 faces but here the afterdamp stopped any further exploration.

"The company helmet men from Jacobs Creek were then called upon to explore Nos. 11, 12, 13 and 14 faces and Nos. 1 and 2 butts off No. 14 face. I asked them if their helmets were in good order and they said 'Yes', and I had them stand in No. 14 face awhile to test out their helmets. The helmet party of three men then started up No. 14 face and came back, then into No. 1 butt and up that entry and through the last cutthrough and down No. 2 butt. McColligan was overcome and fell down. We could not get McColligan and

McCracken out on account of the afterdamp. Canvas was then hung and the air current forced up so that McColligan and McCracken could be dragged out. I then had a severe headache and went out to rest for a couple of hours. Meanwhile the helmet men from the Federal Bureau of Mines had come in and had examined Nos. 3 and 4 butts; previously the Bureau crew had explored Nos. 11, 12, 13 and 14 faces and Nos. 1 and 2 butts, finding McColligan's flashlight in the last named. Then we carried ventilation up No. 14 face, and the helmet men from the Bureau of Mines inspected Nos. 5, 6, 7 and 8 butts.

"Then closed off Nos. 6 and 7 butts outside the last breakthrough and the return was down No. 8 butt. This carried ventilation along No. 14 face to Nos. 9 and 10 butts and the Bureau of Mines helmet men examined Nos. 9 and 10 butts, two breakthroughs at a time. Bodies then removed, air current short-circuited at No. 9 butt, and carried on up No. 14 face to Nos. 11 and 12 butts, which were then examined by the helmet men, and then the air current was carried up these entries. We had to canvas clear to the face to carry out the afterdamp and gas accumulated in Nos. 11 and 12 butts. This was the last exploration work done by the helmet men. They continued to act as reserve to the brattice crews.

"On Nos. 11 and 12 butts east from No. 11 face two men were found with coats wrapped about their heads, having been suffocated by the afterdamp.

"Nos. 3 and 4 butts off No. 14 face were then opened up and the bodies therein recovered. Nos. 11 and 12 butts off No. 8 face were in good condition, all stoppings intact and no bodies found. Nos. 13, 14, 15 and 16 butts off No. 8 face also in good condition, but Nos. 17 and 18 butts contained considerable afterdamp, which is difficult to explain.

"Proceeding down No. 8 face, McVickers and myself opened the door

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"Proceeding down No. 8 face, McVickers and myself opened the door

into chute leading to No. 20 butt and found two men behind this door - Crawl and Legler. This was 58 hours after the explosion. We helped these men out No. 8 face and turned them over to Britt. Inspected all this section and found everything in good shape, but no more men were found."

Breathing apparatus was made use of in the recovery work, crews from the Pittsburgh Coal Company, Pittsburgh-Buffalo Company, and Bureau of Mines being in attendance; 20 sets in all being at hand with required accessories.

Pittsburgh Coal Company crew: This crew of five men, with Draeger 1907 type apparatus with helmets, arrived from Jacobs Creek late in the afternoon and proceeded into the mine to join the rescuing party on 2nd butt off 8th face. Their apparatus was carried in by a reserve crew so as to keep the apparatus men in shape for the advance work. Arriving at the chute to 14th face entry, the base was established there. From this point the crew with apparatus explored Nos. 11, 12, 13 and 14 face entries south to the left of 1st and 2nd butt entries. They had just started up No. 2 butt entry on their return trip when McColligan collapsed in a breakthrough. The others tried to drag him out to fresh air and two of them also went down, but were able to gain their feet and stumble out to fresh air at the base. Several of the men without apparatus tried to reach the man who was down but were unable to do so until the air had been conducted up to these entries. Two physicians worked with McColligan for over an hour, using artificial means of respiration, electric batteries, and then the pulmotor brought in by the Bureau of Mines crew at about 8:30 p.m. Altogether they worked with him for two hours and thirty minutes without any response. One of the other men who was overcome was brought to the outside and had oxygen administered to him from one of the apparatus

bottles and in half an hour was able to be taken home. Mr. Paul and Mr. Rice examined the two sets of apparatus, which were the Draeger 1907 type; the apparatus of the man who died was entirely out of order. The flexible tube which is inserted in the thimble immediately over the injector, had been pulled out of the socket, so that the man was breathing some of the outside air, and was that much worse off by having the apparatus on account of its weight. A similar joint on the other apparatus was loose, although not detached, and would undoubtedly have allowed afterdamp to leak in.

Pittsburgh-Buffalo Company crew: This crew of eight men from Marianna with four Draeger 1907 type apparatus with helmets, arrived at Mingo slope about 7 p.m. Mr. Beeson who was in charge was advised that they did not need help in any way as they had a large force in the mine. They remained on the outside, going in later in the evening with the second crew from the Bureau of Mines.

Bureau of Mines crew: At 2:20 p.m., D. D. Davis, Foreman of Car No. 6 at Bruceton, Pa., telephoned to J. W. Paul at Pittsburgh announcing the rumor of an explosion at the Cincinnati mine, near Courtney, Pa. The Pittsburgh Coal Company's office was then called but no information could be obtained other than something had happened at the Cincinnati mine and that they had their own men on the scene. The use of Car No. 6, apparatus and crew were tendered but not immediately accepted. Mr. Deike was dispatched to Courtney to verify the rumor and secure information and make report if assistance was necessary. He arrived there at 5:45 p.m. and immediately sought out Mr. Schluederberg, General Manager, who said that an explosion had occurred and that about 60 men were unaccounted for and that the Pittsburgh Coal Company's rescue team was in the mine, having entered from the Mingo slope entrance, from which point all the rescue operations were being carried on. The use of Car No. 6 with apparatus and crew was offered

There were no railroad connections to the Mingo entrance, so the rescue apparatus and supplies had to be unloaded and taken by wagon two miles to that entrance. Much delay was experienced in getting a wagon. Meanwhile Mr. Rice and Mr. Howarth, together with A. G. Beeson, Chief Engineer of the Pittsburgh-Buffalo Company, who was going to meet and take charge of that company's rescue crew, having heard that there had been a disaster but knowing no particulars, proceeded to the mine by trolley car, arriving there about 6:30 p.m.

While waiting for the car at Finleyville it was learned there had been a serious disaster and the car going in that direction was crowded. In passing the upcast fan shaft, smoke was noted and a strong afterdamp smell pervaded the valley in the vicinity. The car motorman said it had been much worse on an earlier trip past the shaft.

Mr. Fritchman, a district superintendent of the Pittsburgh Coal Company, was in charge of the Mingo entrance. He informed Mr. Rice that he did not know how many men were entombed, that many had come out, and, in response to a statement that the Bureau's rescue corps would go down as soon as it arrived from Finleyville, he stated that there were already large parties of rescuers in the mine, among them the rescue corps of the Pittsburgh Coal Company, with nine helmets (later proved to be six), and that no more were wanted for the present but might be needed later on. Mr. Rice asked him to notify those in charge underground of the arrival within a short time of the Bureau's rescue corps.

The wagon with the rescue outfit did not reach the mine entrance until about 8:00 p.m. and at that time Mr. Fritchman stated that there was as yet no call for additional help, and that until he had such, he was under instructions not to permit anyone to enter without permission from those in charge. However, some time afterward there was a call for a pulmotor to revive some

rescue men who had been overcome. Mr. Rice took advantage of it to dispatch a party of Bureau men made up of Messrs. Raudenbush, Mason, Salisbury, Price and Roberts, who went into the mine at 9:05 p.m. with breathing apparatus and a pulmotor. Mr. Rice remained at the temporary headquarters which had been established for the Bureau's rescue apparatus and supplies, until other expected Bureau men arrived. One of the Pittsburgh Coal Company's rescue men who had been overcome reached the outside about 9:30 and was given oxygen treatment by another pulmotor of the Bureau's equipment.

The party, under charge of D. J. Price, proceeded down the rock slope tunnel 1,000 feet to main entry or dilly road, thence along main haulage 3,000 feet in a northwesterly direction to the junction with No. 8 face entry, thence through a chute to No. 2 butt entry and along No. 2 butt 1200 feet, at which point the party reached the recovered body of McColligan, the helmet man who had been overcome, surrounded by three doctors and about ten members of the exploring party. The pulmotor was immediately applied to McColligan until one bottle of oxygen was nearly exhausted, after which Roberts, Price, Salisbury, Raudenbush and Mason alternated in administering artificial respiration. A second bottle of oxygen was telephoned for and brought from the outside and a portion of its contents administered. After continuous work for over an hour no heart action could be induced and all three doctors pronounced life extinct. However, artificial respiration and the pulmotor were used constantly for 15 or 20 minutes longer, but with no apparent effect. Wolf lamps had been grouped about the body and covered up, so that the body was kept warm continually while the pulmotor and artificial respiration had been alternated for the entire period of 1 hour 20 minutes; also the doctors present had administered three hypodermic injections of strychnine. No indications of heart action were detected during this period. We were unable to state how long McColligan's body had been at the point previous

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to the arrival of our party.

The Bureau rescue corps using breathing apparatus then made advance explorations in the 11, 12, 13 and 14 face entries north and Nos. 1 and 2 butts west off 14th face entry to put out any fires which might have started, and to locate men overcome, or bodies. As the explosion had been violent in this section of the mine there was little chance of men being alive. It was, however, very necessary to determine whether fire existed. A smouldering fire had been put out in the 8th face entry at the mouth of the 2nd butt. In the 14th face group of entries there was much gas, so that if fires existed it was very important that they should be put out before ventilation was restored.

At 11:30 p.m. J. W. Paul, Mining Engineer in charge of rescue operations arrived at the Mingo entrance from Finleyville with additional supplies from the rescue car. Mr. George Riggs, a volunteer, who had received training with rescue apparatus, Mr. Deike who had come over the hill from the river entrance at 9:30 p.m., and two members of the Pittsburgh-Buffalo Company's rescue crew, all supplied with breathing apparatus, together with Messrs. Rice and Paul entered the mine at 12:05 a.m. and proceeded to the 2nd butt entry at the 14th face. Shortly afterward it was desired to make certain changes in the ventilating current, and the Bureau's corps went out of the mine for a short rest. They were called, and again entered the mine at 3:25 a.m. Thursday, at this time accompanied by Mr. Davis with breathing apparatus. Advance explorations, using mouth-piece breathing apparatus, were made in the 3rd, 4th, 5th, 6th, 7th and 8th butt entries off the 14th face entry, to insure there being no fire before ventilation was turned into each entry successively, and also to locate bodies.

This work having been completed and the bodies removed early Thursday morning in this group of entries, the Bureau's rescue corps went out of the mine at 8:00 a.m. to rest.

In order to allow this advance exploration work with breathing apparatus to proceed consecutively, it was deemed necessary to have additional men so that there could be a corps on each shift; accordingly Messrs. L. M. Jones, H. I. Smith and J. W. Koster were called from the Pittsburgh station Thursday morning, and with additional apparatus reached the Mingo entrance at noon. At 4 p.m., Thursday, the entire Bureau corps in charge of Mr. Paul went into the mine and proceeded to the mouth of No. 9 butt entry off the 14th face. Having observed the situation, Mr. Paul selected for the night shift Messrs. Jones, Koster, Smith, Roberts and Davis, also Mr. J. S. Laughrey, a volunteer equipped with breathing apparatus; in addition there were four men of the Pittsburgh Coal Company rescue corps equipped with breathing apparatus. The remainder of the Bureau's corps went out of the mine to rest, so as to be ready for the next shift. Exploration was made to the head of the 9th and 10th entries. There was considerable difficulty on account of water in these entries, and at different times the crews retreated to the base to adjust the breathing apparatus of three of the men. The latter were slightly affected but were able to retreat to fresh air with the assistance of other members of the crew. Finally, however, the faces of these entries were reached and the bodies located. Finding that there was no fire, brattices were put up in the cutthroughs, and ventilation sufficiently restored to get out the bodies by men not using breathing apparatus.

At 10:30 p.m., the exploration having been completed, the air was short circuited straight up to 14th face to the 11th and 12th butt entries. These butt entries were explored by the men with breathing apparatus. No fire being found, the brattices were carried up into them by men without breathing apparatus, in order to recover the bodies. At this time the oxygen for the

apparatus having been exhausted it was necessary to return to the outside, and as it was thought that it would take considerable time to finish bratticing these entries and to get out the bodies, the next squad with breathing apparatus was not needed during the night, but entered the mine Friday morning, the intervening time being occupied in the building of stoppings. During the night ventilation having been established by this bratticing through the entries off the 14th, breathing apparatus was not necessary to complete the exploration.

After completing the recovery work down Nos. 3, 4, 5, 6, 7 and 8 butts east off 14th face, a base was reestablished on the main entry at 8th face. Then the ventilating current was turned into the entries off the 8th face and all the butt entries and to the face of 8th face were explored. After a little bratticing had been done it was found that the air was good throughout this portion of the mine, so it was unnecessary to employ the breathing apparatus. Two live men were recovered by the exploring party consisting of Messrs. Lauder and McVickers, of the Pittsburgh Coal Company, and Howarth, of the State Mine Inspection force, in a chute leading to No. 20 butt off 8th face entry, 60 hours after the explosion. They were assisted out of the mine and recovered rapidly from the ill effects of their imprisonment. On Sunday, four days after the explosion, five live mules were brought out of No. 8 face entry. 6 men had been asphyxiated in this entry at mouth of slant to No. 11 butt.

The Bureau's rescue corps and the rescue car remained on hand until the following Thursday (May 1) but there was no further need for their services. In the meantime investigations of the features of the explosion had been carried on by Messrs. Rice, Paul and others.

NOTES OF EVIDENCE

OBTAINED BY BUREAU OF MINES EMPLOYEES

Personnel: Four different commissions investigated the conditions as soon as the ventilation was restored. The first was a Committee of State Mine Inspectors, appointed by Mr. J. E. Roderick, Chief of the Department of Mines, and included the following:- Thomas K. Adams, Chairman; Charles McGregor; Thomas Williams; Arthur Neale, and I. G. Roby. The second was also appointed by Chief Roderick and comprised three mining experts outside the Department of Mines, as follows:- W. I. Calverly, J. H. Sanford, and R. M. McKinney. The third consisted of Messrs. Rice and Paul, of the Bureau of Mines, and two of the Pittsburgh Coal Company officials. The fourth was appointed by the District Attorney and the Coroner of Washington County, and consisted of Mr. Paul, Bureau of Mines, and Messrs. Van Bittner and Gaitins, U.M.W. of A.

As to the initial cause, all four commissions agreed, so that in this report of the investigation we may confine ourselves entirely to the evidence as obtained by the Bureau of Mines engineers. In all of the investigations, excepting that one conducted by the Commission of State Mine Inspectors, there were employees of the Pittsburgh Coal Company present who gave assistance and guidance to the investigators in the affected area.

These investigations began Monday, April 28, and were continued throughout the week, being completed by Monday, May 8. On this date the Coroner's Jury met for the inquest. The reports of the different commissions and the Coroner's Verdict and testimony submitted are included in Part II of this report.

Extent of Explosion: Direction of forces,- The explosion originated at face of No. 12 butt off 14th face and was confined to the live workings. It traveled down Nos. 11 and 12 butts to 14th face entries, thence south on 14th

face to 10th butt where forces divided, part continuing out 14th face entry south, and part going in toward the face of Nos. 9 and 10 butt entries and part crossing over to No. 13 face. Forces from 14th face traveled up Nos. 9 and 10 butts for distance of four breakthroughs, destroying the stoppings and blowing them toward No. 9 butt. The force going east on 10th butt from 14th face divided again at 13th face, part continuing out 10th butt east, and part going north and south on 13th face. Forces traveled out Nos. 11, 12, 13, 14 faces and thence traveled to the faces of Nos. 6, 7 and 8 butts, and at No. 6 butt explosive forces must have been reenforced, as there is evidence of increased violence through this section where gas had accumulated (see fire bosses' report). Forces also traveled up No. 4 butt off 14th face, and evidence of great violence is shown, empty wagons demolished, etc. Forces also traveled up Nos. 1 and 2 butts off No. 14 face, but did not quite reach the face of these entries. Part of the force traveled out from 14th face to 8th face through butt entries 2 to 10, and thence to main haulage entry, diminishing in violence after passing the main sidetrack. No evidence of great violence was manifested beyond trip of cars at slant to No. 11 butt on 8th face entry. Most of the men beyond this point made their escape through old workings.

The explosion manifested itself on the outside by blowing open the explosion doors of the fan and the bursting out of a cloud of dust and smoke, but there was no evidence of flame there. A cap piece of one of the fan shaft bearings was moved out of its place. (See statement, page 14, by Mr. Birkhamer an eye witness.) There was practically no manifestation of an explosion at the other entrances of the mine.

Extent of flame: The flame extended a distance north and south through the 14th face group of entries, about 3,000 feet; and east and west

from the faces of the 3rd and 4th butts to the mouth of the 8th face entry a distance of about 2,500 feet. These distances do not refer to the aggregate travel of the flame, which in zigzagging would be many times these distances, but to the diameters of the area covered by the flame.

Details of Evidence, entry by entry.

On Sunday, April 27, Mr. Miller, then District Attorney of Washington County, in a conversation over the telephone with Mr. Rice, asked that one of the Bureau of Mines engineers assist in the investigation being made under his direction. Mr. Paul was designated and accompanied the committee on the morning of April 29. On this latter date inquiry was made of Mr. Schluederberg asking if he would be willing to have a separate examination made by the Bureau of Mines engineers. He finally advised that two of the Bureau engineers could visit the mine on Friday, accompanying the Pittsburgh Coal Company engineers. Messrs. Rice and Paul, accompanied by Mr. Raudenbush, made this investigation. Later samples of mine air, face coal and road dust were collected by H. I. Smith, H. D. Mason and W. A. Raudenbush.

Summing up all the evidence secured during recovery work and by the various investigating committees, the following data was obtained, entry by entry. (a).

Main entries and Mingo slope: From the mouth of the slope to the main entry there was no indication of any force. Also, along the main dilly road from the slope entry to the sidetrack there was no indication of force, except at one of the cog pillars along the entry at the outby end of the main

(a) When the location of bodies and their designation by numbers was not recorded in notes taken by B.of M. engineers, the desired information was obtained from map on page 637, Colliery Engineer, June, 1913.

dilly parting. This had been slightly disturbed, but the coal company employees advised that this apparent displacement had been caused by a wrecked trip of cars prior to the explosion.

At the mine foreman's shanty the safety lamps which had been hanging on the walls were knocked down and extinguished. Walls were bulged out on both sides. Opposite the shanty an electric bulb in the middle of the double entry was not broken although resting against the timber on the inby face. Several other exposed bulbs were also unbroken.

The snapper at the parting (body #15) was found lying on dilly rope on the dilly parting, killed by the force of the explosion. Outby the 7th face entry on the motor road there was at first much loose coal and small pieces of coal scattered along the track. The wires and trolley were down, but near the dilly parting the trolley was up. The corners of pillars were rounded and scoured on the inby exposures. The road was slightly dusty in places but probably was not so before the explosion, as in some places it was found quite sloppy. There was very little timber along the roadway, and what there was was in place. There was no evidence of flame outby the 8th face entry. There was a considerable stretch of wet road outby the 7th face entry.

A road dust sample (Lab. No. 17132-F) was gathered for 50 feet along the main entry outby the 8th face switch and the 7th face overcast. This was high in moisture (8 percent) and moderately high in ash (24 percent); the thermal efficiency (B.t.u. 9,920) was low, and the inflammability indicated by laboratory tests was low.

Manway: Inby the mine foreman's shanty at parting considerable coal, both coarse and fine, was found on the manway, and some pieces of roof had fallen. The manway was somewhat damp and there was little dust, there being no haulage

through it, and it is not likely that the flame penetrated this entry outby 8th face. (See sketch 2 of 8th face from main entry to No. 1 butt.)

Nos. 7, 8 and 9 faces south: The overcast over main entry leading to 7th face entry north was damaged, the floor being blown out, but the walls were intact. The wreckage dropped down and with little movement outward. No coking was observed here. The machine shop in 8th face was destroyed, the walls being blown across the slant toward 1st and 2nd butts. The body (#12) of the machine boss was found under the wall wreckage. Coke was found on outby side of roof peg in trolley guard on 8th face at outby end of parting. Trip of empty cars on sidetrack not coupled. Body (#1) of driver and a dead mule were found on the parting. Third and fourth car from 2nd butt had thick coating of coke on inby end; dust on only one other car showed coking. At mouth of chute into 2nd butt a wrecked car was found. The rescuing party upon entering 8th face south discovered a fire between 1st and 2nd butts. Brattice cloth and west side of door frame were smouldering, making lots of smoke, but the fire was quickly extinguished. The door from this frame was blown outby against east rib and lying opposite south rib of 2nd butt a piece of canvas probably from this frame was found on 8th face, 80 feet west of the frame. There was another door frame in 2nd butt between 8th and 9th faces but the door from this frame was said to have been removed prior to the explosion. Bainbridge, an assistant fire boss, was rescued from this section of the mine; he was found in a semi-conscious condition. The forces at this junction of 2nd butt and 8th face appeared to be neutralized by the counter action of forces down 2nd butt and in 8th face. Brick stopping between Nos. 1 and 2 butts on 9th face was not damaged. A mule and body (#2) were found on 2nd butt between slant and 9th face. Body #3 was found on 2nd butt outby first breakthrough to No. 1.

Nos. 1 and 2 butts off 8th face south: Bodies #4, 5, 6, 7 and 8 were found at No. 11 room off 2nd butt. Rooms #1 to 18 on 2nd butt were necked but not driven. Rooms were numbered on this entry from 8th face in, but driven on the retreating plan. None of the bodies on this entry were burned although a fire was started, as reported above.

Room 18, clear.

Room 19, clear; bottle of carbon oil here.

Room 20, machine ready to cut, has cut two-thirds across; truck on track; no disturbance; secured miner's torch at face.

Room 21, clear; coal down; roll of fuse and box of 9 caps at mouth of room.

Room 22, clear; full tank of calcium chloride in this room.

Room 23, bodies #9 and 10 found 10 feet inside of room; rib being drawn back; partly loaded car; fuse on rib half way up to face; wooden rail displaced at face.

Room 24, abandoned; check canvas on entry; body #11 found near neck of room.

Room 25, abandoned; not disturbed between rooms 24 and 25.

Room 26, abandoned; at neck are two cars of coal.

Room 27 to 38, inclusive, abandoned.

Room 32, danger board.

Room 36, mud on outby rib; stick held against rib by mud.

Body #95 found on No. 1 butt about 50 feet from 11th face.

Nos. 11, 12, 13 and 14 faces south: McCracken, one of the helmet men, went down on 14th face about 30 feet from No. 2 butt, from which point he was rescued and revived (see open circle on map). At mouth of No. 1 butt

coke showed on outby rib.

Face of 11th face, no gas; heavy coking on right and left ribs from face back to last open crosscut. Last open crosscut between 11th and 12th, coked dust on outby rib; carbon filaments on top of the coked dust. Ribs of 12th face, coked; roof also coked from face to last open crosscut to 11th face for 25 feet. Entry No. 13, last 55 feet carbon filaments on all exposures. Heavy coking back 55 feet from face on all ribs. No. 14 face, body #18 found at face and empty car near face; walls scoured for last 50 feet; coked dust on ribs for 100 feet back from face; track torn up for 200 feet back from face. Body #19 found outby last breakthrough. Bleeder room, 50 feet deep; inby No. 1 butt coked dust on each rib, heavy at mouth and on outby side of post near face; loaded car at face; center shot down and loaded. Inby No. 1 butt an empty car was found wrecked and turned end for end. Body #16 was found on 13th face opposite No. 2 butt. Body #17 was found on 14th face at mouth of No. 2 butt. Body #96 was found on 13th face a short distance north of slant. These men had evidently traveled an average distance of 750 feet after the explosion. A car was found opposite No. 4 butt on 14th face. This car was crushed against opposite rib, on its side, and badly wrecked. One set of wheels were found hooked on the angle of the pillar across the slant.

Nos. 11, 12, 13 and 14 face entries north of 4th butt: 100 feet inby 8th butt road dust sample No. 17133F was taken over a distance of 50 feet. Slight coking observed on outby exposures of ribs. 20 feet inby 8th butt gas sample No. 3698 was taken two feet from the bottom. The stopping in 2nd breakthrough inby 8th butt was intact. The stopping in the 3rd breakthrough was blown inby across 14th face to the west rib. The next four stoppings were blown into 13th face. The second stopping inby 10th butt and nearly op-

the mouth of the gob room between Nos. 10 and 11 butts there was coke on either corner. In the bleeder room inby 12th butt there was an empty car at the face; coked dust in room neck.

From the 8th butt to the last breakthrough on the 14th face there was more or less coked dust at the mouths of gob rooms and in breakthroughs, and at various points coking was found on the ribs on both inby and outby exposures, but it was generally on the outby or south exposure. Crusts of coked dust were very heavy at the mouth and on ribs opposite Nos. 11 and 12 butts. Going in from the 12th butt there was much coke on the inby exposures. At outby corner of the last breakthrough there was heavy crusting of coke extending around the corner pillar. Inby the last crosscut there was no evidence of heat or coke, the faces of all entries being wet. No. 14 face entry was squared up and with no coal or car. Mr. Locke's watch was found 50 feet from face.

No. 13 face entry: Undercut at face; right rib hole drilled, charged and one-half tamped; fuse flush with hole. A mining machine on the track was found opposite the breakthrough to No. 12, which was not cut through. Body #36 was found between machine and left rib. The crosscut had also been undercut and right rib hole partly drilled, being only 3 feet deep. Body #37 was found at the face of crosscut; it was naked, all the clothes having been blown from the body. In the last open breakthrough heavy coking on inby rib.

No. 12 face entry: Clear at face; one-fourth of a car of coal down in the corners; four sticks of explosive found back 20 feet from face. A crosscut had been started to 11th face, just turned. A car, half loaded, stood on the turn. Coal was down at the face with a shovel sticking in it.

Body #38 was found back on 12th face opposite second cutthrough from face. Coke on inby ribs of last open crosscuts to 11th and 13th face entries.

No. 11 face entry: Clear at face; 9 caps, 5 sticks of Coalite and 3 laps of fuse were found back a short distance from the face. The last gob room off 11th face was in 50 feet. Face clear, no coal down. Coked dust continued out 11th face to 12th butt east. Body #39 was found opposite second cutthrough from face.

No. 12 butt east off 11th face: Clear at face, no coal down; hole drilled, not charged. Blind breakthrough to 11th butt was turned, coal shot down and partly loaded out; empty car standing on the turn. Body #43 found at the face with coat wrapped around his head, suffocated by the afterdamp. Body #41 found on 11th face at mouth of No. 12 butt.

No. 11 butt east off 11th face: Clear at face; empty car standing on track 20 feet from the face; keg containing 4 sticks of explosive found along left rib about 40 feet from face. Body #44 found at face with coat wrapped around his head, suffocated by afterdamp. Body #42 found in 11th face near mouth of No. 11 butt.

West Butts off 14th Face.

No. 1 butt west off 14th face: No. 1 butt is turned off 14th face south. Coked dust was found on outby and inby sides of props; coal loaded out at face except left rib shot which was not down, but hole was drilled. Body #94 found on No. 1 butt at crosscut inby slant, not burned. Ribs coked from mouth up No. 1 butt to a point just inby where body was found. Face of No. 1 entry clear and no signs of heat for 200 feet back from face. One stick

of explosive found near face, probably Coalite. Found Devon watch in pocket of coat. Last crosscut to right was not through. Loaded car in crosscut; face of crosscut clear.

No. 2 butt west off 14th face: Partly loaded car at face. Found 4 sticks of 3A Coalite 40 feet back from face, also fuse, no caps. Body #93 found 100 feet back from face. Pool of water on No. 2 butt between 2nd and 3rd crosscuts. About 60 feet up No. 2 butt is point where the helmet man, McColligan, was overcome and died.

No. 3 butt west off 14th face: Four bushels of coal in broken wagon at face. Body #77 found at the face under a fall; body badly mangled. A car was blown against the left rib opposite the last crosscut; the sides and both ends were blown away. The bumper of the car was carried outby 15 feet. No. 3 butt was wet in many places. No coke found in this entry.

No. 4 butt west off 14th face: Room No. 1 off No. 4 butt, coked dust on ribs and props at mouth; room up 80 feet; props down. Body #79 was found with hair singed and hands burned at mouth of room. In No. 4 butt the track was torn up for 200 feet, about 75 feet back from face. Empty car found against face. Bad roof; small gas blower in water from roof. Body #78 found at face, injured by a fall and burned.

No. 5 butt west off 14th face: No. 1 room off No. 5 butt, a partly loaded car of sand was found in mouth of room lying across the track. The side of the car was broken in inby and the sand scattered inby. Coke was found on inby exposures at the mouth of the room. The ribs were scorched and scaly. A brick stopping was blown from a crosscut opposite room No. 1 to the mouth of

room No. 1. Coked dust was found within 20 feet of the face of No. 5 butt and extended back 50 feet. Clear at face. Air sample No. 3604 taken at face 18 hours after the explosion. (See tabulated analyses, page 62.)

No. 6 butt west off 14th face: The face of the entry had been undercut and the right side had been shot down and loaded out. There had been no recent shooting. The bodies of the mine foreman, assistant mine foreman and entryman, Nos. 20, 21 and 22, respectively, were found blown under the undercut and badly burned. Canvas and pick blown under the undercut with bodies. The face was wet due to water escaping from the coal, and drippers from the roof formed a pool. Canvas line brattice had been erected up to within 10 feet of the face. Canvas and brick were found blown under the undercut. Trace of gas was found in return air on right rib at the end of canvas. An empty car was found along the right rib, outby end of which was blown out. Safety lamp No. 119 was found 30 feet back from face in a shattered condition near inby end of car. Dust was found in crevices on outby side of rib projection on last open breakthrough between 6th and 7th butts. Force was inby to face. In last cutthrough to 3rd butt the track was torn up completely. Air sample No. 3655 was collected at face of entry, and road dust sample No. 17086F was collected along roadway. (See tabulated analyses, pages 62 and 67 respectively.)

No. 7 butt west off 14th face: Cut partly loaded out. Body #23 found at face. Loaded car near face was blown off the track. The outby end of car and part of one side were blown out. Coked dust was found on the coal on top of the car, also on left rib at face. No gas found at face. The track was torn up and blown outby to corner of breakthrough to 8th butt. Track in breakthrough to No. 6 butt was in place. The force was outby and toward 6th butt at the cutthrough.

No. 8 butt west off 14th face: Coal cleaned up at face. No gas found. Body #24 found in left corner of face. Loaded car found at face with outby end broken out and endgate blown outby 15 feet. Water in pools standing just outby the car. Carbon filaments on ribs. Coked dust on right rib. Force was outby in this entry.

No. 9 butt west off 14th face: The face of No. 9 butt was undercut and partly loaded out. A car partly loaded stood at the face. Body #29 was found against left rib with feet opposite inby rib of last crosscut. Body was lying on its back with head inby and showed no signs of burns. In this crosscut there was found a keg containing one stick Carbonite, 4 caps and dummy made of broken slate. Brattice cloth found near faces of both 9 and 10 butts. Body #30 was found near the face of room No. 1 off 9th butt. His clothes were burned off and his features badly disfigured. He was lying face downward, head outward. A pool of water, maximum depth of 3 feet, extended in 9th butt from 2nd crosscut to a point inby 5th crosscut. One-half inch methane cap was obtained one foot from roof at face with Wolf lamp six days after the explosion.

No. 10 butt west off 14th face: Bodies #26 and #27 found outby room No. 1 off 10th butt. Room No. 1: props were down with light falls of roof. There was a loaded car at face. Room No. 2: there was a loaded car at face. Cul-de-sac. Evidence of great heat; coke globules in room on inby exposures. Props along gob wall drawn in towards track. Both ribs blistered at mouth. Track raised up and pushed together at mouth of room. Loaded car at face of 10th butt. Right rib shot down and loaded out. Left rib shot hole drilled but not loaded. Miner's cap found at outby end of car. Body #28 found 30 feet

inby 6th crosscut, not burned. Two inch methane cap obtained at face with Wolf lamp during investigation six days after the explosion. First six stoppings blown out from 10th to 9th butt. Door between 9th and 10th butt entries in last closed crosscut was still hanging, but framework on both sides was broken out. Floor in No. 10 was very wet between 2nd and 5th crosscuts. Air sample No. 3656 taken 30 feet inby room No. 2 on 10th butt. (See tabulated analyses, page 64.)

No. 11 butt west off 14th face: The floor of the entry was covered with coked dust; the face was cleaned up; no gas was detected in the lamp at face of No. 11 butt when sample No. 3699 was taken. There was no coke observed at the face, but at the last crosscut there was coke on the southwest corner of pillar. For 25 feet outby this crosscut there was coke on outby exposure, and from this point to 14th face the coking was mainly on inby exposures. There was much evidence of heat all through the 11th butt entry. The surfaces had apparently been dusty. On the whole, while there was little movement or violence, the evidence of the flame indicated a movement from the last crosscut outward. The track from the last crosscut to the face was intact. A torch and explosives were found 30 feet back from the face. Body No. 33 was found 65 feet back from face of 11th butt. Canvas to face was burned. There was a tool box and a dinner bucket 40 feet inby last crosscut. The box contained 4 sticks of Carbonite and fuse in a small box without cover. Near the box was a miner's cap and acetylene lamp, and sand filled dummies at the dinner pail. No coked dust or blistering at the tool box. There was a shallow swamp at first crosscut.

Room No. 1: Bodies Nos. 31 and 32 found near face of room. Loaded car at face. These men apparently started around the car, one man helping the

other. They reached the pile of gob which was slanting toward the track and both men evidently weakened, fell, and slid down against the car. Coke on ribs at mouth.

Monkey entry off 11th butt: Face clear; loaded car at face; cap and open lamp found outby car; coke on ribs. No sign of heat within 40 feet of the face. Blistered coked dust on rib opposite cutthrough; also coke "in situ"; coked dust on both sides of posts leaning against ribs 20 feet outby cutthrough.

No. 12 butt west off 14th face: At the face of 12th butt a clay vein had been cut into and a strong gas feeder was found. Drawslate had fallen at face on coal shot down. Empty car with two chucks of wood under wheels stood near face.

Entry was being raised with a 5 percent grade. The last section of brattice cloth was still up and damp. There were some fine particles of coke on it but the brattice cloth did not appear burned. Outby this point the old brattice had been swept away outward. Around the empty car near the face there were fine coke globules, also along the ribs. A cap and lamp were found at outby end of the car and inby end of brattice. Body No. 34 was found against the north rib about 25 feet back from the end of the car. Still further out there were 3 sticks of explosive and one cap in a can. The wrappers had been scorched. There was coked dust in crusts inby last cutthrough on all exposures. Near the corner of the first crosscut there was coke on the outby exposures. In passing through the crosscut into the 11th butt, coke was on the outby or south exposure. In the 12th, outby the last crosscut, at the end of the former cross brattice, there was a two by four cross bar with part of the old curtain torn and burned in places. There was coke on the inby exposure of the two by four. On some ties just inby second cutthrough there was some coked dust on the inby sides. At the inner corner of the first cutthrough there was coke on the outby exposures. Also farther out near the 14th face there was coked dust on the outby exposures. Gas flamed in lamp 8 feet from face and 1 foot from roof six days after the explosion. Samples Nos. 3695, 3676 and 3596 were collected at face over a pile of coal and rock near gas blower. These show little methane so it would appear there was an undercurrent of fresh air when the samples were taken. Sample No. 17135F represents the fine road dust taken beside the track along right rib. Sample of coked dust No. 17129 was taken from left rib at first cutthrough. Road dust sample No. 17087F taken outby first cutthrough. Gas samples Nos. 3697, 3653 and 3660 taken at mouth of 12th butt, No. 3697 being taken 2 feet from bottom, and

No. 3660 at same location but one foot from top. Duplicate samples Nos. 3657 and 3658 were collected 20 feet inby on 12th butt 2 feet from top. No evidence of gas present at that time. (For results of analyses see tabulations Pages 60 to 64.)

Nos. 7, 8, 9 and 10 faces north: In continuing the exploration work in 8th face, it was found after passing 8th butt that the air was good; it was accounted for as coming through the old workings following the course by which the survivors from this section made their escape. No evidence of flame except at the junction with the main entries. Coke found on outby exposure of the roof brushing at junction of 8th face with main entry.

No. 8 face was the main haulage road for this section. A trip of seven loads was standing on this entry opposite mouth of the slant to 6th butt. As the motor was found gathering a trip from 4th butt it is assumed that the motorman cut off his loads on 8th face inby the point of frog and had gone up 4th butt for the balance of his trip. Two water cars badly smashed were found against left rib of slant to 6th butt. The first loaded car had right side blown out; second car same condition. These two were opposite mouth of slant. A pump from one of the water cars was found by the right side of the second car. Third car had outby end blown out; fourth car outby end bulged out as by sudden stopping; fifth and sixth cars not badly damaged; seventh or last car had inby end blown off and over top of car to the front end. This trip had started to move outby and then evidently came to a sudden stop, which caused the disarranged condition. Body #13 was found on 9th face about 100 feet inby slant to 6th butt.

There were 4 undercasts on 8th face at its intersection with butt entries Nos. 5, 6, 7 and 8. Nos. 5, 7 and 8 butts were return air courses,

while No. 6 was an intake. No 8 face is a main haulage way driven above the coal at this point, while No. 9 on the other hand, also an intake, is driven in the coal. The air at No. 9 face is conducted over Nos. 5, 7 and 8 butts by means of overcasts. The air in Nos. 5, 6, 7 and 8 butts is carried under 8th face entry at their intersections by means of undercasts.

Top of undercast on No. 8 face at 5th butt was blown down and the two 14 inch "I" beams used in its construction were bent downwards to floor of No. 5 butt. The track in No. 8 was blown towards air shaft. No. 6 undercast was not injured to any great extent; the rails of the motor haulage were not bent but the ties beneath the rails were driven down into the dirt for a foot. As this undercast separates two intakes it is not necessary that it be absolutely tight, and all that was done to repair it was to build a wall along the west side of 8th face entry to reinforce the one that had been there before, now somewhat cracked, in order that persons traveling the haulage way might not fall into the entry below. The undercast at 7th butt was not injured very much; there was a hole in the wall on the side towards 7th face and the wall on the other side was somewhat cracked, but these injuries were easily repaired. The undercast at No. 8 butt was uninjured. (See sectional sketches on Rectangle "A" in Addenda.)

The overcasts on No. 9 face did not show signs of great violence, and the bricks merely fell out of the one at No. 5 butt. The rails of the latter were not bent but were merely slid over to one side; the rails were placed back in position and bricked in as before. The bricks in the overcast at No. 7 seemed to have been blown up just a little but were still in place. The overcast on No. 8 butt was uninjured. No. 6 receives its air current from a face entry off the main entry and is the third intake, the main entries being the other two. The return from No. 5 butt and the entry parallel to No. 5 butt east off 7th face lead to the air shaft across No. 6 butt by means of the overcast.

Body #82 found at 9th face at mouth of No. 9 butt.

Body #89 found at 9th face about 100 feet inby No. 10 butt.

Bodies #80 and #81 found on 7th face about 100 feet inby 10th butt.

There was a trip of six empty cars found on 8th face just outby mouth of slant to 11th butt. These cars were off the track, the two inby ones lying diagonally across the track completely blocking the entry. Six bodies were found at this point: one of these, #83, had succeeded in climbing over part of the trip before he was overcome; the other five bodies Nos. 84, 85, 86, 87 and 88, were lying together against the inby end of trip, indicating that they had been overcome while trying to get over these wrecked cars. Body #90 found on 8th face about 100 feet outby 11th butt. Body #92 found on 9th face between 11th and 12th butts. Body #91 found on 9th face at mouth of 13th butt. This was the body of Donley who had tried to find a way out along 8th face; he succumbed to the afterdamp and his body was first found by the rescue party under Superintendent Carter. It was still warm when found and they tried to resuscitate him by giving artificial respiration. They continued their efforts until forced to retreat by the afterdamp. The bodies found on this entry were of men asphyxiated while trying to make their escape out these entries. Some of them had apparently traveled quite a distance before going down.

From the No. 8 face section inby 11th butt five mules were taken out alive on the Sunday following the explosion. These mules were in fair condition.

Crawl and Legler, the two men rescued alive from this entry as stated previously, were found behind a door between 19th and 20th butts. A third member of this party, body #90, was overcome while trying to make his way out No. 8 face entry. These men had been using open lights in attempting to get out.

Butt Entries off 8th Face.

Nos. 3 and 4 butts off 8th face: Brick stoppings in room necks on right blown toward No. 5 butt. Bottom of overcast in No. 4 blown off, walls in place. Piece of brick overcast weighing about 200 pounds found near 10th face. Stopping on left at outby end of parting partly blown inby. Motor and 10 loaded cars on sidetrack. Motorman, body #75, found about 25 feet outby motor. Coke on rib by run-around at motor. The motor had just backed up and was not coupled. Trolley wire was down near parting but in place farther out. Second and third loaded cars from motor had coke on outby ends; also coke in curved reflector on headlight of motor. Heavy coke in offset at body #75. Coked dust sample No. 17130 taken at this point. Body #14 found 100 feet outby parting. Body #70 found along trip in breakthrough to run-around. Body #65 found at inby end of trip. This body was found in three parts scattered over a distance of 100 feet: head and arms, trunk and leg, and leg. Body #66 found at inby end of run-around. Two mules were found opposite room No. 21, the last room off monkey entry. Body #76 found in breakthrough opposite room No. 21. Room 23, coke on outby exposures. Body #63 found inby last breakthrough.

Monkey entry off 4th butt:

Room 14, coke on ribs and posts up 50 feet. Body #73 found at middle of room. Heavy coking in all rooms off monkey entry. Rib in front of room 14 has large scales of light coke on outby exposures. Body #74 found between rooms 14 and 15.

Room 15, coke up for 50 feet; roof bad; props down. Found coat in room, oil flask in pocket. Body #71 found in last crosscut to room 16.

Room 16, coke on outby exposures at entry extending 50 feet in room. Partly loaded car at face.

Room 17, loaded car at face. Coke on floor, roof and ribs at face; left rib plastered with coke full length, principally on inby exposure. Body #72 found at face.

Room 18, cul-de-sac. Coke on ribs for 50 feet. Rib clear up to 100 feet. Four caps found on keg near mouth of room. Body #68 found in monkey entry near mouth of room.

Room 19, cul-de-sac. In about 125 feet. Coke on ribs for 50 feet. Body #69 found between rooms 19 and 20.

Rooms 20 and 21, cul-de-sac. In about 100 feet. Coke within 25 feet of face. Loaded car at face. Body #67 found 30 feet inside of room 20. Dummy paper, sized, found near body. Body #64 found in room 21 at face.

Room 22, in about 150 feet. Coke all way to face. Shot tamped in center with fuse at end of hole, not fired. Found two sticks of explosive and four caps in bucket.

Room 23, 200 feet deep. Coke all way up, mostly on inby side. Body #63 found at face. Loaded car at face.

Room 24, loaded car 20 feet from face. Coke all way up within 25 feet of face. Coke on outby end of car. Found watch. Room up 225 feet. Body #62 found 40 feet in room.

Room 25, explored mouth only; no signs of coke.

Rooms 26 to 30, inclusive, explored mouths only; coke on ribs.

Rooms 31 to 34, inclusive, explored mouths only; no coke.

Sample of road dust No. 17134F was taken on 4th butt at room 23 counting from 8th face. (See tabulated analyses and inflammibility tests.) Coke on outby ribs and in room necks. Road dry and dusty. Ribs showed coke on outby faces. Not much indication of violence on account of very little timber in the entry.

Nos. 5, 6, 7 and 8 butts off 8th face: The overcast at 5th butt over the slant from 8th face to 6th butt was completely destroyed, but parts were not blown far away. Air was returning down No. 5. Two wrecked empty cars were found in two different crosscuts between 5th and 6th butts about 400 to 600 feet from 8th face, probably moved there in cleaning up. Coked dust on outby exposures on right rib in 6th butt about 800 feet from 8th face.

About 60 feet outby slant from 6th butt to 13th face there were four loaded cars: the outby one was off the track, evidently outby. Body #61 found just outby slant to 13th face. Body #25 found short distance outby chute to 13th face. At the chute to 13th face in No. 6 butt there were two empty cars partly wrecked. The outby car was off the track and moved toward the left rib. The inby car was off the track and forced outby. Coke on back of car on outby exposure. The mules from this section are not accounted for.

Between 13th and 14th faces on 6th butt an empty car was blown outby and off the track. Back end was blown in and both sides opened outwards at back. In slant to 13th face coke was found on outby face of roof projection. (See analysis of sample No. 17131, in Addenda.) Coke also on rib projection at junction of slant and 6th butt. Just outby this slant a crosscut to No. 7 butt showed force going toward that entry. The trolley in 6th butt was up most of the distance. The breakthroughs to the 7th butt all had bricks from the stoppings blown from 7th to 6th butts. There was coke on outby faces on both right and left ribs.

No. 9 butt off 8th face: Body #45 found 30 feet outby engine toward 11th face. Hoisting engine stationed near 11th face a short distance east of first cutthrough from 11th face. Archibald Fergusion, engine driver, body #47, found 25 feet outby the engine. Heavy coke at engine on inby

exposures. There were six loaded cars standing on the parting: three were not disturbed. Body #46 found at inby end of loaded cars. One loaded car was blown across the track into a crosscut. Two empty cars were blown off the track toward right rib. Force apparently going toward 8th face. Three dead mules were found between the parting and water sump about 600 feet beyond. Just outby chute from No. 10 bodies #48 and #49 were found.

In Nos. 9 and 10 butts there was a local swamp. In No. 10 butt the roof had been shot down through this swamp to give even grade above the water. No. 9 butt on account of this swamp was very wet. Bodies Nos. 57, 58 and 59 were found in the run-around. Body #56 was found at outby end of run-around. Body #60 found about 75 feet from No. 10 face.

No. 9 butt at 8th face: Overcast, top walls and rails blown toward 8th face. Car of ties in chute blown toward 8th face.

No. 10 butt off 8th face:

Rooms 1 to 23, inclusive, worked out and abandoned.

Room 24, pillar work. Loaded car at end of rib. No indication of heat. Bodies #54 and #55 found in this room. Between rooms 24 and 25 a stopping was blown against rib of entry on room side.

Room 25, rib work. Fall on car. Body #51 found 80 feet in room. No evidence of heat. Coke on entry between rooms 25 and 26.

Room 26, rib work. Loaded car at end of pillar 100 feet in. Coke on coal and on car. Bodies #52 and #53 found inby last cutthrough. Coke on rib at mouth. On entry between rooms 26 and 27 coke on ribs, outby exposures.

Room 27, coke at mouth on ribs. Rib work. Loaded car at end of rib. Body #50 found 50 feet outby car. No coke on car at crosscut to room 26.

Coke in cakes on ribs and props. Coke on ribs on entry between rooms 27 and 28, outby exposures.

Room 28, heavily coked at first crosscut and at last crosscut at face of room on right rib. Place not working. No coke on entry from rooms 28 to 31, inclusive. All heavily coked at mouth.

Room 32, has not been working. Coked dust clear to face, mostly on outby exposures. Carbon filaments on all exposures at face. Post at face of gob room has coke on exposure facing 11th face entry. This room was holed through into the gob room off 11th face.

Nos. 11 and 12 butts off 8th face: Clear; no damage; one car off track; one stopping broken near 10th face. No bodies found on these entries. On a 10 by 12 inch timber on 11th butt entry the following was written:-

"Time OK 1:35, OK 1:55, wrote 1:15. Wm. McD, H. McD. We lived after the explo. Tell brother Wm. to be good to mother and the rest and live rithous. We die rithous and trust in God written Orson."

"T. Jeffers (colored). Tell the children to be good and tom to be good to T. C."

The identity of these men has been established from newspaper reports: they were the survivors from this section of the mine who found their way out under the leadership of McDonald. Rescuing parties were near this entry at about the time given in the message.

Nos. 13 and 14 butts off 8th face: Door going into No. 14 inby overcast was off hinges. Overcast at 10th face over No. 13 butt not disturbed. No evidence of disturbance in Nos. 13 and 14 butts.

Nos. 15 and 16 butts off 8th face: No evidence of disturbance on these entries.

Nos. 17 and 18 butts off 8th face: William Lauder stated that they contained considerable blackdamp, which was hard to explain.

Nos. 19 and 20 butts off 8th face: Two live men, Crawl and Legler, found Saturday, April 26, 1913, in chute between 19th and 20th butts, near door, lying on backs with heads on a 10 by 12 inch block of timber. Found by Lauder and McVickers. They had collected a number of dinner buckets and were well supplied with food and water. Superintendent Carter had passed through the door twice after the explosion but did not see these men. He said the air was good at that point. One of these men was delirious; the other was able to talk. They walked out to the main entry with assistance and were then hauled to the pit mouth. Both were sent to the hospital at Monongahela City where they quickly recovered. No disturbance on Nos. 19 and 20 butts. Crawl said afterward that the force at his working place was but slight and that he kept on loading a car of coal.

SUMMARY OF ANALYSES OF MINE AIR SAMPLES

TAKEN AT THE CINCINNATI MINE.

I. Under normal working conditions prior to the explosion.

II. In still air during recovery work following the explosion.

III. In moving air currents after the ventilation had been partly or completely restored.

I. Under normal working conditions, the analyses of samples taken two years prior to the explosion show a small percentage of Methane present in the return air and also in the worked out sections of the mine.

I. Analyses of air samples collected two years prior to the explosion.

Sample Nos.	A	B	C	D	E	F
Laboratory Nos.	1370	1371	1372	1373	1374	1375
Area	--	--	--	45	50	42 :58-1/2
Velocity	--	--	--	364	345	740 : 1656
Cu.ft.per min.	--	--	--	16380	17250	128,000
Per cent CH_4	0.04	0.08	0.03	0.12	0.08	0.08
Cu.ft.CH_4per min	--	--	--	19.66	13.80	102.40
Cu. ft. explosive mixture per hour possible	--	--	--	21400	15100	111,700
Barometer	--	--	29.28	29.26	29.23	29.22
Wet bulb	--	--	47	54	55	53
Dry bulb	--	--	49	56	57	54
% humidity	--	--	87	88	94	94
Collector	Jones	Jones	Jones	Jones	Jones	Jones
Date	2-23-11	2-23-11	2-23-11	2-23-11	2-23-11	2-23-11

Sample A: Room 1 off 3rd butt off 10th face. Pillars drawn.

Sample B: Stagnant air in old room No. 66 off 6th butt off 4th face entry.

Sample C: From face of No. 24 butt 50 feet inby last cutthrough off 10th face about 9,000 feet from opening.

Sample D: Normal return mine air from Nos. 1, 2, 3 and 4 butts off 10th face, and Nos. 1 and 2 butts off 7th face.

Sample E: Was collected on No. 7 face entry 7,500 feet from opening. It represents normal mine air from Nos. 5 and 6, 7 and 8, 11 and 12, 13 and 14 butts off No. 4 face entry.

Sample F: Was collected at the junction of the returns at the bottom of upcast shaft.

II. Analyses of still mine air collected during recovery work.

Sample No.	G	H	I	J	K	L	M
Laboratory No.	3604	3655	3676	3695	3696	3698	3699
CO_2	1.09	0.15	0.05	0.07	0.07	0.06	0.05
O_2	15.48	20.83	20.80	20.88	20.77	20.72	20.93
CO	1.13	0.00	0.00	0.00	0.00	0.00	0.00
CH_4	15.82	0.40	0.62	0.22	0.20	0.11	0.00
N	66.22	79.02	78.53	78.83	78.96	79.21	79.02
Total	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Barometer	--	29.06	--	29.35	29.35	29.42	29.32
Method of collecting.	Vacuum	Bulb	Vacuum	Vacuum	Vacuum	Vacuum	Vacuum
Collectors	Deike Rauden-bush.	Smith	Smith Mason Raudenbush	Rice Paul	Rice Paul	Rice Paul	Rice Paul
Date	4-23-13	5-7-13	5-7-13	5-3-13?	5-3-13?	5-2-13?	--

Sample G: Collected about 18 hours after the explosion at face 30 feet beyond last cutthrough in No. 5 butt entry off 14th face while wearing breathing apparatus. Smoke and fumes were noticeable extending down about two feet from the top. The gas was very irritating to the eyes.

Sample H: Collected at face of No. 6 butt off 14th face. Before starting to take sample an explosive mixture was found at the face.

Sample I: Collected at face of No. 12 butt off 14th face. A very strong feeder was encountered here and the gas exploded in the lamp 8 feet from the face. A good air current was passing 20 feet from the face around a canvas line brattice. This sample was taken directly over a pile of coal and rock and evidently a current of fresh air diluted the gas at this point.

Samples J and K: Duplicates, collected at face of No. 12 butt off 14th face about two feet from roof. Quiet air ahead of ventilation. Gas explosive 8 feet back from the face. It is probable an air current circulated around the car and face, making the mixture non-explosive where sampled.

Sample L: Collected 20 feet inby No. 8 butt on 14th face two feet from bottom.

Sample M: Collected at face off No. 11 butt off 14th face entry 3 inches from roof about 15 feet ahead of line brattice. No cap detected on safety lamp.

Samples taken during recovery work immediately following the explosion show varying conditions in different parts of the mine. Of special interest is the sample taken at the face of No. 5 butt entry off 14th face 18 hours after the explosion. This sample (G) was obtained by men wearing breathing apparatus who had advanced from the fresh air base on 14th face for the purpose of exploring faces of Nos. 5, 6, 7 and 8 butts west. The high percentages of Carbon Monoxide, Carbon Dioxide and Methane, and the low percentage of Oxygen present indicate the composition of the afterdamp. A slight dilution of this afterdamp with fresh air would have made a highly explosive mixture, with disastrous results had fire been present.

III. Analyses of return mine air collected during investigative work after ventilation was restored.

Sample No.	N	O	P	Q
Laboratory No.	3651	3652	3653	3656
Area	61.0	61.0	62.5	56.4
Velocity	373	373	254	181
Cu. ft. per minute	22,700	22,700	15,900	10,200
CO_2	0.05	0.05	0.05	0.05
O_2	20.87	20.84	20.85	20.87
CO	0.00	0.00	0.00	0.00
CH_4	0.09	0.10	0.15	0.13
N	78.99	79.01	78.95	78.95
Total	100.00	100.00	100.00	100.00
Cu. ft. CH_4 per minute	20.43	22.70	23.85	13.26
Cu. ft. explosive gas possible per hour	22,200	24,730	26,020	14,470
Barometer	29.06	29.06	29.06	29.06
Wet bulb	54.00	54.00	54.25	54.50
Dry bulb	55.00	55.00	55.00	55.00
% humidity	94.00	94.00	95.00	97.00
Method of collecting	bulb	bulb	bulb	bulb
Collectors	Smith	Smith	Mason Raudenbush	Smith
Date	5-7-13	5-7-13	5-7-13	5-7-13

For information as to where samples were taken, see page 66.

III. Samples of moving air currents (Continued).

Sample No.	R	S	T	U
Laboratory No.	3657	3658	3660	3697
Area	62.5	62.5	60.6	62.5
Velocity	295	295	--	295
Cu. ft. per minute	18,400	18,400	--	18,400
CO_2	0.08	0.05	0.04	0.02
O_2	20.77	20.86	20.67	20.92
CO	0.00	0.00	0.00	0.00
CH_4	0.17	0.14	0.20	0.01
N	78.98	78.95	79.09	79.05
Total	100.00	100.00	100.00	100.00
Cu. ft. CH_4 per minute	31.28	25.76	--	1.84
Cu. ft. explosive gas possible per hour	34,120	28,100	--	2,010
Barometer	29.34	29.34	29.32	29.34
Wet bulb	53.50	53.50	--	53.50
Dry bulb	54.50	54.50	--	54.50
% humidity	94.00	94.00	--	94.00
Method of collecting	vacuum	bulb	bulb	vacuum
Collectors	Rice Paul	Rice Paul	Rice Paul	Rice Paul
Date	5-2-13 2 p.m.	5-2-13?	5-3-13?	5-2-13?

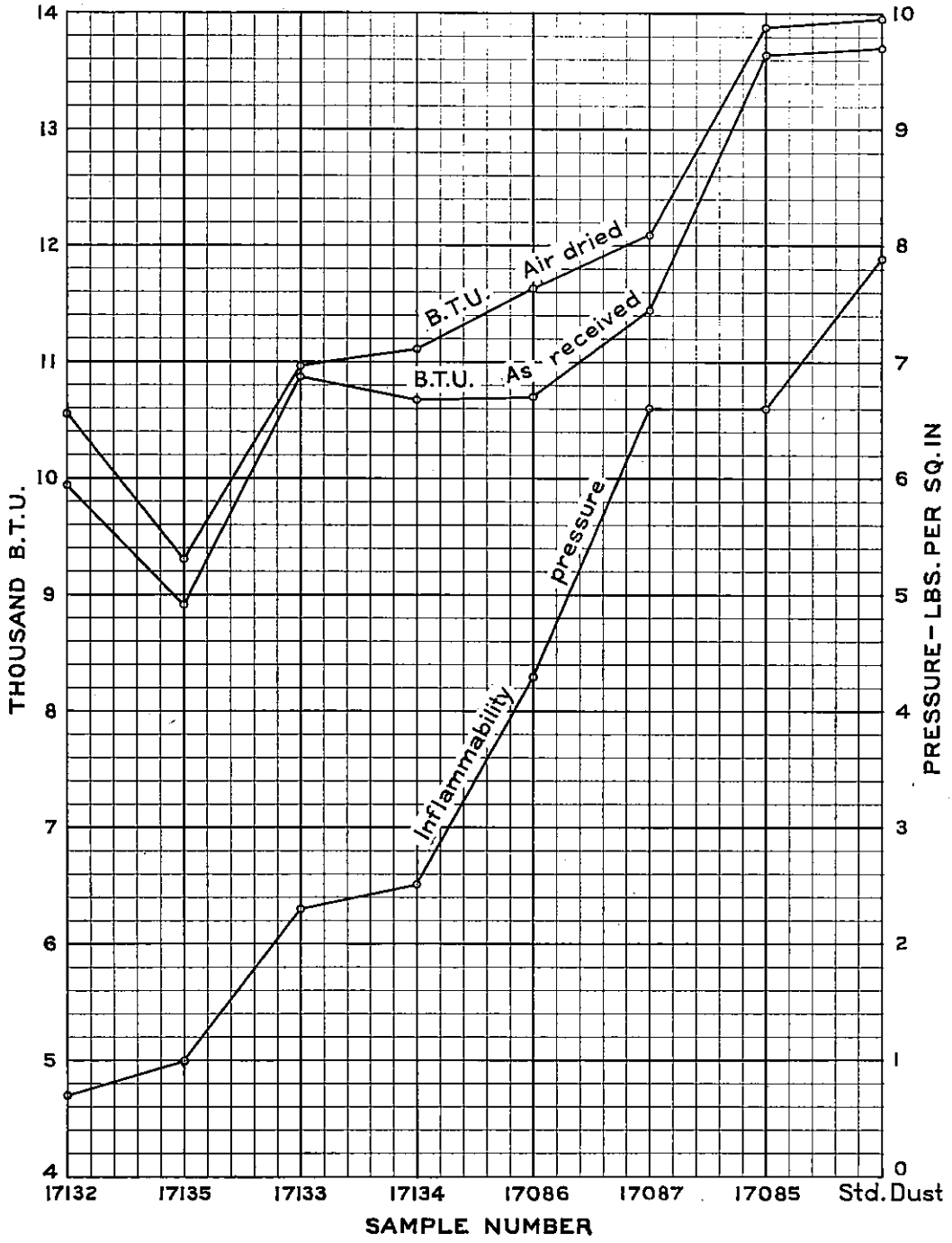
For information as to where samples were taken, see page 66.

Cincinnati Mine Inflammability (dust) Tests.

Lab.No.	Character and location of dust	Coal as received. Percent through 20 mesh	Moist.	Ash	V.M. / C.	B.t.u.	Inflam. pressure lbs. per sq. inch
	Standard Pittsburgh dust	--	3.50	3.48	35.15 / 55.45	(a) 13700 / 13937	7.9
17085	Coal, face sample composite	--	3.03	6.39	38.9 / 61.1	13655 / 13898	6.6
17086	Road dust #6 butt off 14th face	33.8	8.77	18.31	38.3 / 61.7	10719 / 11621	4.3
17087	Road dust 12 butt off 14th face	30.8	6.15	16.47	38.3 / 61.7	11477 / 12089	6.6
17132	Road dust main haulage near 7th face	35.27	7.91	23.79	34.7 / 65.3	9920 / 10550	0.7
17133	Road dust 14th face 100 feet inby 8th butt	38.50	2.78	23.03	38.4 / 61.6	10868 / 10951	2.3
17134	Road dust 4 butt, 12 rooms from 11th face	37.1	6.23	21.05	39.6 / 60.4	10670 / 11101	2.5
17135	Road dust 12 butt outby last crosscut	34.2	6.20	31.43	41.5 / 58.5	8953 / 9329	1.1

(a) The top line represents B.t.u. as received and the bottom line B.t.u. air dried.

For comparison the results of inflammability tests have been placed in tabulated and chart form (See Chart page 68), comparison in each case being made with Standard Pittsburgh dust. The composite face coal sample from Cincinnati mine shows a lower inflammability pressure in pounds per square inch than Standard Pittsburgh dust. On the other hand we find in No. 12 butt entry that the road dust is as highly inflammable as the face coal sample, while in No. 6 butt entry the road dust is also highly inflammable; in either place presenting a favorable condition for the propogation of a dust explosion.



Comparison of inflammability and calorific value of coal and road dust samples from Cincinnati mine.

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CONCLUSIONS AND LESSONS

Summary: From all the evidence at hand, it appears that an accident from a sudden outburst of gas had not been guarded against although frequent and continued accumulations were reported in the advancing entries day after day, and clay veins often encountered. The cause of the explosion has been readily determined, the possible means of its prevention has been generally admitted, while the placing of responsibility still brings about an unsatisfactory condition.

The origin being known, the propagation of the destructive forces has been determined and followed with accuracy throughout their course. The rescue and recovery work was carried on without delay, greater speed being obtained because of the very satisfactory exploration work with breathing apparatus. The various investigations were thorough and complete and from the reports of the investigators the Coroner's Jury was able to reach its verdict readily.

Lessons: There is the old lesson to be learned from this accident: it is found in the evidence before the Coroner's Jury as given by Mr. McGregor, one of the Pennsylvania State Mine Inspectors, "That all the mines in the district in which the Cincinnati mine is located should be worked exclusively with locked safety lamps".

This accident should not have occurred, and had locked safety lamps been used exclusively or electric lamps of permissible type, the probabilities of its occurrence would have been very remote. In most things save this one most important preventive measure, the efforts of the company were directed along safety lines. The mine was laid out in good shape, ventilating currents of sufficient volume to meet all ordinary requirements were maintained, roads and working places were reasonably clean, and the use of sprinkling devices

and calcium chloride were resorted to in order to render the dust harmless; although it must be admitted the wetting of the dust was insufficiently done in many of the entries. The fact that where there were long wet stretches the explosion died away, as in the main haulage entry, shows the efficacy of this method.

A more or less dusty coal mine is dangerous but when firedamp is present, or sometimes is found, it becomes peculiarly dangerous since, as in this case, a mere inflammation of gas becomes converted into a great explosion or disaster. This Cincinnati mine cannot be called a very gaseous mine; in fact the numerous mine air samples that have been collected by the Bureau indicate otherwise.

Judging from sample "F" No. 1375 of the main return, the mine made 102.4 cubic feet of methane per minute, which would mean about 2,000 cubic feet of explosive mixture per minute. However, with so strong a ventilating current as employed, the percentage in the air current was negligible. Two years prior to the explosion, samples taken by Mr. L. M. Jones of the Bureau showed but 0.08 per cent of methane in a current of 128,000 cubic feet per minute. After the explosion the maximum percentage in any of the moving currents or splits was but 0.2 of one percent; hence, with the excellent ventilation that prevailed, there was no showing of gas in a safety lamp.

The danger from gas arises in the advance faces. For example, in the 11th and 12th butt entries, while the percentage of pure methane in the current was but 0.2 per cent, the amount of explosive mixture made per minute would be about 320 cubic feet. As the average cross-section of the mine entries is about 60 square feet, it will be observed that every minute the ventilation was suspended there would be sufficient gas given off to fill up

solidly with explosive gas mixture 5 linear feet of entry. Under these conditions it is easy to see how rapidly an apparently safe condition might be turned in a few minutes into an extremely dangerous one. Certainly the use of open lights is not justified. A fall might occur throwing down the line brattice, or a door be left open which might easily lead to a great disaster.

However perfect the regulations governing the operation of a gaseous mine may be in all other respects, the use of mixed lights will render all preventive measures unavailing. As it is impossible on account of the class of labor necessarily employed to depend upon the human element entirely for the elimination of these accidents, it would seem highly desirable that all known safety measures should be thrown around the workmen - most of whom have little experience in mining and cannot even understand English - to offset their mistakes and lack of knowledge as much as possible.

In this particular accident the Pennsylvania State Law requiring that "In the cutting of ..... entries or other narrow workings, going into solid coal, in mines wherein explosive gas is generated in dangerous quantities, a bore hole shall be kept not less than three feet in advance of the face of the work, or three feet in advance of any shot hole drilled for a blast to be fired in", was violated. Had this law been complied with the gas accumulation at the hidden clay vein would probably have been discovered and means taken to provide against such an accident as occurred.

How such accidents could be prevented:

(1) By not allowing open lamps to be used. Either safety lamps or portable electric lamps should be employed.

(2) By compliance with the law in the drilling of bore holes in all entries in advance of the working face.

(3) By the employment of inspectors as shot firers, the place being examined after shooting before the miner was permitted to return and load the coal.

(4) Rendering the coal dust inert throughout the whole mine. Had the coal dust not been ignited only one man would have been burned, i.e. the man in the 12th butt entry who ignited the gas. The main entries of the mine were reasonably well cared for as regards wetting down of the dust. Had this not been done the flame would have extended farther, and it is quite probable that the men who escaped would have been killed. On the other hand, the wetting down was not carried so thoroughly up to the faces of the various entries, hence the explosion had ample dust to feed on, and killed most of the men in areas where it might have been difficult to have started an explosion; thus making it evident that the only safe way is to render coal dust inert throughout the whole mine by one or more of the following methods:

(a) Humidifying;

(b) Wetting down, as was partially done;

(c) More extensive use of calcium chloride (which was used in places);

(d) Placing a layer of fine rock dust throughout the mine;

(e) Combinations of the foregoing.

PART II.

1. Report of the Commission of Mine Inspectors to the Chief of the Department of Mines of Pennsylvania.

2. Report of the Second Special Commission appointed by the Chief of the Department of Mines of Pennsylvania.

3. Report of the Proceedings of the Coroner's Inquest, containing testimony of members of the Special Commission appointed by the District Attorney of Washington County; also a report of the findings of the Inspectors of the Pittsburgh Coal Company as presented by Mr. Lauder; and finally the Verdict as rendered by the Coroner's Jury.

These reports are included in this report merely as a matter of record, and without further comment.

REPORTS OF THE COMMISSIONERS TO

CHIEF OF DEPARTMENT OF MINES

"In compliance with your request of April 26, we investigated and examined the Cincinnati mine of the Monongahela River Coal & Coke Co., and submit to you the following report as to what in our belief was the cause of the explosion which occurred at this mine on April 23.

"We have carefully examined that portion of the Cincinnati mine which was affected by the explosion, and also the surrounding parts of the mine not directly or seriously affected thereby. In this instance, as in all other serious and wide-spread mine explosions it is difficult to determine with absolute surety the origin or the cause of the explosion, but we have concluded that the initial explosion probably occurred in No. 12 butt entry driven off from 14 face entry north, where a shot ruptured a clay vein and allowed the gas back of it, under considerable pressure, to escape. In this instance a tight shot, ~~Fig. 8,~~ had evidently been first fired and loaded out, exposing but not penetrating the clay vein. Subsequently when the butt or second shot, which penetrated the clay vein, was fired a strong gas feeder was tapped. This gas feeder can be heard blowing off even now.

"The man working in No. 12 butt entry was probably using an open light, as his working place had not been generating gas before the clay vein was tapped. It is our belief that the gas was liberated by the shot, and being ignited by the miner's lamp, the explosion resulted. We could find no gas being given off in any entries in this section, with the exception of No. 6 butt entry, which had also penetrated a clay vein 3 or 4 yards. We do not think this latter clay vein had anything to do with the origin of the explosion.

"The initial explosion was augmented by the gas driven from the coal by the intense heat which is shown to have existed by the condition of the entries through which the primary explosion passed. The brick air stoppings were built to within one breakthrough of the face of the several entries, and the mine was kept in a clean, orderly condition. We further report that in the area unaffected by the explosion we found the mine in an excellent condition.

"We entered the mine by way of the traveling slope, located near the active workings, and proceeded along the main haulage road. We found the force of the explosion ceased near the mouth of the No. 4 face entry. We found the overcasts blown down on the main haulage road. We traveled up No. 2 butt entry and Nos. 11, 12, 13, 14, face entries and examined them carefully, and noted the conditions existing in Nos. 11, 12, 13, and 14 face entries south, and Nos. 1, 2, 3, 4, 5, 6, 7, and 8 butt entries off No. 14 face entry, and found such evidences of the effects of the explosion as the destruction of the stoppings, doors, and mine cars. We also found coke dust and other evidences of heat on the side walls, from No. 1 butt entry to the face of the several face entries, with little injury to the roads from falling roof.

"On April 29 we went to Nos. 9, 10, 11, and 12 butt entries off No. 14 face entry; to the north face entries Nos. 11, 12, 13, and 14; to butt entries Nos. 9, 10, 11, and 12 off of No. 11 face entry and saw the results of the force of the explosion in those entries, also found much coked dust resulting from the heat between No. 10 butt entry and faces of the north face entries, and face of No. 12 butt entry.

"On the 30th we traveled much of the ground examined on the previous

days to make a more minute inspection and note carefully the existing conditions, so as to better ascertain the direction in which the force of the explosion traveled; to determine the point at which it originated, and the cause thereof. We also examined that portion of the mine not affected by the force of the explosion and where a number of the men lost their lives by afterdamp, and also from where a large number of men escaped shortly after the explosion, and in which two men were found alive 55 hours after the explosion had taken place.

"After carefully examining all of the damaged portion of the Cincinnati mine and noting carefully all the evidences of the explosion, we unanimously agree that it originated at the face of No. 12 butt entry being driven west off No. 14 face entry north and was caused by the naked light of a miner igniting a body of gas which had suddenly issued from the clay vein uncovered by the shot, and which had accumulated in the entry.

"The force of the explosion traveled down No. 11 and 12 entries, passed entries Nos. 14, 13, 12, and 11, proceeded southward to Nos. 8, 7, 6, 5, 4, and 3 butt entries, then to Nos. 2 and 1 butt entries, where it cushioned against the faces of Nos. 11, 12, 13, and 14 face entries south, and was exhausted in an easterly direction toward the mouth of the mine. According to our observations there is a probability that a secondary explosion took place, one at the face of Nos. 5, 6, 7, and 8 butt entries, off No. 14 face entry, owing to the fact that much gas was being produced at the face of No. 6 butt entry from the very strong gas feeder. Another explosion seems to have taken place in Nos. 3 and 4 butt entries, off No. 14 face entry; at any rate it is apparent that the explosive force was much increased at these points."

REPORT OF THE SECOND SPECIAL COMMISSION

"We entered the Cincinnati mine of the Monongahela River Consolidated Coal and Coke Co., April 30, by way of the Mingo rock slope. This slope is driven on about a 20-degree dip to the coal bed, which is about 200 feet below the surface. We proceeded from this slope along the rock tunnel to the main haulage road, which at this point is about 1-1/4 miles from the river front where the tipple is situated. We proceeded along this haulage road about 7,000 feet to where was found the first evidences of the explosion, and then continued to where the body of the parting boss had been found in a manhole, at the parting. Even beyond this point, a considerable distance, the guards used to protect the men from the trolley wire had not been disturbed, except for a board here and there. Some of the electric bulbs were intact in the course of the explosion, from which it would appear that the force was not great to this point.

"Proceeding to the junction of No. 3 and No. 4 butt entries with the lower north main entries Nos. 7, 8, 9, and 10, evidences of great force and fire were plainly visible. At this point the machine boss had his workshop in a breakthrough which extended from one entry to another, being brick lined with 9-inch walls on each end. These walls were destroyed and it was at this particular junction there was more evidence of fire than in any other of the lower face entries. From this place we proceeded by way of No. 8 face entry to Nos. 5, 6, 7, and 8 butt entries which are driven beyond the main entries, in a westerly direction. We traveled these butt entries 2,000 feet until they intersected with the four upper face entries, Nos. 11, 12, 13, and 14. We then proceeded along No. 11 face entry to butt entries 11 and 12 which are being driven in an easterly direction to meet Nos. 11 and 12 which are being driven from No. 10 face entry. We pro-

ceeded to the extreme end and examined carefully the working places of Nos. 11, 12, 13, and 14 face entries. There was no evidence of fire within some 25 or 30 feet of the face of these entries and no disturbance was observed.

"Paper, fuse, and explosives were lying just as the workmen had placed them, even dinner buckets were not disturbed. Going back to where Nos. 11 and 12 butts west start from No. 14 face, there was evidence of fire having played a conspicuous part in coking the face of the coal. The heat must have been very intense at this point and the flame must have lingered some time, because the coking effect was evident almost from the top to the bottom of the coal bed. We proceeded up to the face of No. 12 butt and noticed that the face of the clay vein had evidently been shot and not disturbed afterwards. From this point we retraced our steps and passed through the breakthrough to the face of No. 11 butt entry, then back along No. 14 face, crossed over the face entry and went into Nos. 9 and 10 butts, traveling toward No. 10 face entry. After traveling 1,000 to 1,200 feet we could go no farther on account of an accumulation of water in a swamp, so we went to the faces of Nos. 9 and 10 butts off face entry No. 14, thence back along No. 14 to Nos. 8, 7, 6, and 5 butt entries, where there is an intersection of the north and south face entries.

"We traveled along No. 14 south, walking to the face of Nos. 3 and 4 butt entries east, up the face of Nos. 1 and 2, butt entries, and to the face of Nos. 14, 13, 12, and 11 south face entries. We then traveled to the lower face entries by way of Nos. 3 and 4 butt entries. This was the extent of our travels on Wednesday.

"On Thursday morning we again entered the mine following the same course to the intersection of Nos. 3 and 4 butt entries with Nos. 5, 6, 7, and 8 face entries, proceeding along these face entries to Nos. 9 and 10, butt entries, which we traveled until stopped by water which prevented our going through the upper face entries to these entries. Going back down we traveled along No. 10 face entry to the faces of Nos. 11 and 12 butt entries. We were then in a section that had not been affected by the force of the explosion, although afterdamp would have entered and traveled some distance in these face entries. We proceeded, however, to the extreme end of this section of the mine and up Nos. 19 and 20 butts to the face entries, which were being driven off of these two butts north and south at the time of the explosion. Having satisfied ourselves as to the condition of this section, we retraced our steps, again traveling from No. 8 butt to the upper face entry and along No. 11 face north. We examined every detail that we thought might have a bearing upon determining positively where this explosion got its initial start.

"When we arrived at the face of No. 12 butt, off No. 14 face, it was plainly evident that this was the point where the explosion originated, and as previously stated, where the clay vein had been shot and gas had been given off freely evidently the tight shot had been fired and loaded out, exposing but not penetrating the clay vein. When the butt shot was fired it penetrated the clay vein and tapped a strong gas feeder, as gas could be heard blowing out of the fissures when we made our examination, which, of course, was a week after the explosion.

"It is fair to assume that when the butt shot was first fired gas was given off more freely than at the time we made our examination. It would appear

to us also that prior to the butt shot being fired the entry was not making any gas. When the workman charged and lighted this shot he would naturally walk back from the face and stand in some protected place until the shot went off. It being noontime, it is probable that the man would sit down and eat his lunch while the smoke was clearing out of his working place. An empty car was standing right up to the face entrance, and it is fair to assume that the man when returning to his working place pushed this empty car ahead of him to the rise. Of course, the man pushing the car would naturally have his head down low, and when he reached the end of the rails and stood erect with a light on his head he would ignite the gas that had accumulated during his absence. His cap and lamp were lying about 10 or 12 feet from the face, but his body was found about 30 or 35 feet from the face.

"The entry was bratticed to within 18 or 20 feet of the face, which appears to have been the custom in most of the entries. ~~(See Fig. 2.)~~ The last 10 or 12 feet of this brattice had evidently not been disturbed by the explosion, while the brattice further out was blown down. There was evidence of fire at the face of this entry where the coal had been blistered, and also where the flame had come in contact with the side of the entry. From this place we traveled back to the breakthrough and passed through it into No. 11 butt, which is parallel to No. 12. In No. 11 butt we examined everything carefully and found that no gas was being given off in this entry. There was no evidence of flame having come in contact with the coal within 20 or 30 feet of the face, while all through the breakthrough and a considerable distance up the entry there had evidently been intense heat and flames. This was plainly evident because on the sides of the entry the surfaces of the coal were coked.

It seemed to use to prove, as we traveled away from the face of No. 13 butt, toward No. 14 face entry that the force of the explosion increased and the destruction had become greater.

"At the face of Nos. 9 and 10 entries mine cars were badly wrecked, the line of force having traveled from No. 14 face entry toward the face of Nos. 9 and 10 butt entries. We retraced our steps to No. 8 butt, where we made a thorough examination, because in No. 6 butt gas had been previously reported, 12 feet from the face where a clay vein had been cut, and where in all probability gas was liberated. Here the face had been cut and the tight shot loaded out, and it was evident that coal had been drilled preparatory to shooting out the butt. This entry had been worked with safety lamps, and this is the entry in which, we understand, the mine foreman and his assistant and the men who were working the entry, were found. This would show conclusively that the direction of the force was down the 14 face entry up to the face of these butt entries, as we noticed upon our examination that the debris had been scattered along the entry right up to the working face. From this point we traveled south because the direction of the explosion was certainly toward the face of these entries. We examined this section thoroughly for gas and only discovered it at the face of No. 12 butt where we are positive almost that the explosion started. The face of No. 6 butt, as previously stated, was some 12 feet beyond the clay vein, and water was being given off from this vein, but no great amount of gas, as the gas was escaping through the water, and the noise was more in evidence that the gas itself. We also noticed that a little gas was given off in No. 4 butt entry. The explosive force was in the firection of the lower face entries and the damage appeared similar to that in Nos. 9 and 10 as far as Nos.

3 and 4 butts, where its energy decreased by getting relief up the air-shaft and along the main haulage roads. As previously stated there was no damage done to the lower main section beyond No. 11 butt and it appeared that all the workmen in this section escaped with the exception of a few men who panic stricken rushed along the main traveling road into the afterdamp, against the advice of the assistant mine foreman and others. Two men working at the face of Nos. 11 and 12 butts, off No. 8 face, north, escaped 3 or 4 hours after the explosion occurred by way of the lower return airway.

"In that part of the mine unaffected by the explosion we find the conditions have not been changed from what they were prior to the explosion. There was ample ventilation and it was conducted around all of the working faces. We noticed that brick stoppings were erected in practically every instance to the last breakthrough, except, of course, those used for haulage purposes. The roads were moist and practically free from dust, and clean and free from obstructions. We also noticed in this section that drums of calcium chloride were placed in convenient places and used for sprinkling the roads. In that part of the mine which you might term the 'upper face section' the force of the explosion was very destructive; all of the stoppings were blown out as were the overcasts. These overcasts and stoppings were built of bricks.

"In this section of the mine we also noticed three drums of calcium chloride containing 250 pounds each, which were not opened, and this would indicate that ample quantities of this safety factor had been provided, since some of the drums were partly used. We think we can give to this calcium chloride some of the credit for the explosion not being more destructive than it was, because it seems as if every precaution that must be observed in

exploiting our coal fields against dangers which arise, had been taken.

"There is no doubt but that the initial explosion was augmented by the gas given off from the coal by the intense heat. This was shown by the condition of the entries through which the primary explosion passed. We are satisfied, too, that in a brisk air-current some coal dust will be held in suspension, which coming in contact with the flame of the explosion will add to the volume of the gas and increase the energy.

"We are of the opinion that little gas is given off in any of the entries in this section, because at the time of our visit, with the ventilation disarranged and air stoppings and overcasts temporarily built of wood and brattice cloth, the entries were free from gas. As you will notice by reference to the map, Nos. 9 and 10 butt entries are driven a considerable distance from face entry No. 14. The same is true of Nos. 3 and 4 butt entries and the four face entries 11, 12, 13, and 14, north and south, off Nos. 5, 6, 7, and 8 butts. Leaving this section and going to 19 and 20 entries, off the lower face entry 8, north, some distance away, there was no evidence of gas to justify the use of safety lamps. We feel that no one will seek to dispute the fact that the section of the mine unaffected by the explosion was found in excellent condition viewed from every standpoint."

REPORT OF CORONER'S INQUEST

Notes taken by H. D. Mason, Jr.

May 17, 1913.

Mr. J. W. Paul, Mining Engineer:

I beg to submit the following report upon the Coroner's inquest concerning the Cincinnati mine explosion.

Pursuant to your instructions of May 11, I proceeded from Pittsburgh to Monongahela City and attended all sessions of the inquest there May 12 and 13, and took notes upon all testimony submitted. The inquest opened at 10.00 A.M., on May 12, and concluded at 4.30 P.M., on May 13. A total of 28 witnesses were examined under oath. Coroner James T. Heffran, of Washington County, conducted the proceedings. Coroner Heffran, Attorney C. M. Johnson (for Pittsburgh Coal Co.) and District Attorney R. G. Miller of Washington County cross-examined all witnesses, no one else being permitted to do any questioning, although pertinent questions could be submitted to any of these three.

The State Department of Mines was represented by Chief James E. Roderick, and Inspectors Alexander McCanch, I. G. Roby, Thomas K. Adams, C. P. McGregor, Joseph Williams, Arthur Neale, and F. W. Cunningham.

Three reports were read covering the extent and cause of the disaster. The first report was prepared by State Mine Inspectors McGregor, Adams, Neale, Williams and Roby, and addressed to

Chief Roderick. The second report was prepared by Inspectors Lauder, Louttit and Ferguson of the Pittsburgh Coal Co., and addressed to Assistant General Manager James F. Armstrong. The third report was prepared by W. R. Calverley, (Berwind-White Coal Co.), J. H. Sanford, (Carnegie Coal Co.), and J. M. McKinney, Mining Engineer, and was addressed to Chief Roderick of the State Department of Mines.

All three reports agree upon the cause of the explosion in Cincinnati Mine; namely, - the ignition of gas by an open light at the face of #12 Butt off #14 Face Entry, - the accumulation of gas coming from a large clay vein which had been loosened by the firing of the "Butt" shot.

A fourth investigation was made on April 29 and 30, by State Inspectors McCaugh and Cunningham, accompanied by District President Van Bittner, U.M.W. of A., Grover Gaitens, and Coroner Heffran, and the testimony of the first four named assigned the same cause; i.e.: - that the initial explosion occurred at the face of #12 Butt off #14 Face through the ignition of gas by the open light of the miner working at that face.

Verdict of Coroner's Jury:

Six citizens of Monongahela City comprised the Coroner's Jury, - Harry Laudefeld, Isaac Yohe, J. B. F. Allen, W. F. Alten, J. B. Hoon, and T. J. Eckbreth. They received their charge from Coroner Heffran at 4:30 P.M., May 13, and returned their verdict at 8.30 P.M.

The verdict places the legal responsibility for the deaths of 96 men in Cincinnati Mine upon Mine Foreman McNeil, who was killed, for permitting open lights to be used in a section of the

mine where gas was being generated in such large quantity; and the moral responsibility upon the Mining Law of Pennsylvania, which does not render compulsory the use of safety lamps in such sections, but leaves such decision to the discretion of the Mine Foreman.

Following are important extracts from the testimony of the several witnesses: (Monday, May 12, 10 A.M. to 4.30 P.M.)

1st witness: Alexander McCanch, Mine Inspector. Questions by Coroner Heffran.

Testified that he had taken charge of First Bituminous District on May 15, 1909. His first inspection of the Cincinnati Mine was made in October, 1909. Inside conditions at that time were only fair; the air was not well distributed, roadways were dusty, there was gas accumulated in the abandoned workings but none was found in the active workings. Since 1909 these conditions have been improved, the ventilation distributed more efficiently the dust cleaned off the roadways, two sprinkling wagons installed, safety lamps used exclusively in pillar workings, brick stoppings built to replace wooden ones, the Mingo slope tunnel enlarged and rendered a better travelling-way, and permissible explosives introduced.

Last examination previous to the explosion was made on March 7, 8, 10, 1913. Extracts from inspection report of March 7, 8, 10, 1913. - Drainage good. Revolutions of fan, 156 per minute. Total air entering mine, 114,000 cu. ft. per minute.

Splits	Cu. ft. of air	Men on split	Cu. ft. per man on last cutthrough.
1st	14,000	20	700
2nd	10,000	20	500

3rd	9,600	20	480
4th	6,480	16	408
5th	5,600	14	400
6th	9,000	30	300
7th	7,280	30	240
8th	7,000	22	318

Total - - -172 men, also 6 night men.

Ventilation should be improved in rooms and in pillar workings. Ventilation good in entries.

Following this inspection of March 7, 8 and 10, he wrote a letter to Mine Foreman McDonald and Superintendent Carter containing the following recommendations:

> Dust on roadways should be removed.
> Refuse matter on entries should be cleaned up.
> Electric wires should be protected at crossing places.
> Miners are using combustible material for tamping.
> Dry cell batteries should not be used for firing shots.
> More attention should be given the posting of draw-slate.
> Signals should be placed upon the rear of all motor-trips.
> Circulation of air in rooms and pillar workings should be increased.
> Superintendent has failed to sign his fire-bosses report since February 7, 1913.

Said he was not certain as to whether or not all these recommendations had been carried out. Following this inspection his attention had not been called to any dangerous conditions existing at Cincinnati Mine.

On April 23 he was inspecting Ellsworth #1 mine and had just come outside that afternoon when informed of an explosion at Cincinnati Mine. Arrived at Mingo Slope about 7.00 P.M. that evening and at once proceeded inside the mine and found Cunningham, Lauder and Faraday

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in charge of a party working to reestablish the ventilation in face entries #11, 12, 13 and 14. Remained in mine until 8.30 A.M., April 24. Testified that explosion originated at the face of #12 Butt off #14 Face Entry, #12 being driven about 300 feet off #14 Face. He found a very heavy feeder of gas at the face of #12 Butt, and a large clay vein partially broken down by a "butt" shot, which had evidently been fired previous to the explosion and caused the free liberation of gas from the clay vein. This gas feeder was still a large one five days after the explosion. He surmises that early on the morning of April 23, the miner in #12 Butt had fired his "tight" shot on the right side and loaded out several wagons. Then about noon-time he had fired his "butt" shot on the left side, breaking into the clay vein and liberating the gas. Before firing this shot the miner had gone back to the cut-through and probably waited there long enough to eat his dinner. Meanwhile a large quantity of gas had accumulated at the face of the entry, and when the miner pushed his empty wagon up towards the face (entry rises on about 3% grade) his open light ignited the gas. Lamp was found 14 feet from face, also cap with pick lying beside the empty wagon. Miner's body was found 30 feet back from face lying behind brattice on right rib, he had evidently rushed out to that point after igniting the gas.

As far as he knew none of these Butt Entries off #14 Face were being worked with safety lamps. On inspection of March 7, 8, and 10, he found #9 and #10 Butts making a little gas, but none in #6 or #12 Butts. He ordered the mine foreman to send out the entry men from #9 and #10 and have them get safety lamps. This was done.

Fire Boss Records for this Inspection Period.

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March 3 - 1st Examination 3 to 6 A.M., Gas reported in #12 Butt off #14 Face.
- 2nd " 7 to 11 " No gas reported.

March 4 - 1st " No gas reported.

- 2nd " No gas reported.

March 5 - 1st " Gas reported in #12 Butt off #14 Face.

- 2nd " " " " #10 " " " "

March 6 - 1st " " " " #12 Face " #10 Butt.

- 2nd " " " "#6 & 10 Butt off #14 Face.

March 7 - 1st " " " " #10 Butt off #14 Face.

- 2nd " " " " " " " " "

March 8 - 1st " " " " #9 Room, #12 Butt off #14 Face.

- 2nd " No gas reported.

March 9 - " No gas reported.

March 10- 1st " Gas in #9 Room, #12 Butt off #8 Face.

- 2nd " " " " " " " " " "

He visited places where gas was reported for March 7 and 8, and found gas in #10 Butt, but none in #9 Room, as it had been removed therefrom by the completion of a cut-through. Testified that in his opinion the explosion in #12 Butt was caused by an "open-light" and not by the firing of the Butt-shot, as the rapid liberation of gas followed the firing of the shot and was due to the rupturing of the clay vein by the shot. At the face of #12 Butt the ribs were scorched from top to bottom. Further down the entry thick coke was found covering road-dust. Portion of brattice near face of #12 Butt remained

standing after explosion, but further down the entry the brattice was blown down. Wagon remained standing at face of #12 Butt, rear wheels blocked.

At time of inspection March 7, 8, and 10, there was sufficient air current through last cut-through into #12 Butt, viz: 7,280 cu. ft., per minute; #12 Butt is on #7 split; #9 and #10 Butts also on this split and return air from #10 passes through #11 and #12 Butts; therefore, if gas was generated in #9 and #10 (where there had been a clay vein) it would return in air current through #11 and #12 Butts.

Clay veins were not encountered very frequently in this section of the mine. Permissible explosives used exclusively. (Coalite). On last inspection he found some dusty places in the mine, but these places were not in the area affected by the explosion. Calcium chloride was being used on roadways, also two sprinkling wagons employed. Parts of the mine were very moist.

On #2 Butt off #8 Face six men died from effects of afterdamp. On #9, 10, 11, 12 Butts off #14 Face the men were apparently killed by flame, not by violence. On #6 and #4 Butts off #14 Face, and in #14 Face (south) men evidently killed by violence. Is of the opinion that the explosion might have been prevented by the more extensive use of safety lamps.

(To questions of Attorney Johnson, Pgh. Coal Co.)

Conditions in Cincinnati Mine had been much improved since his first inspection of October 1909. The operating company had cooperated with him in improving inside conditions.

The territory effected by the explosion was a limited portion

of the mine workings. Prior to the firing of the "tight-shot" in #12 Butt the clay vein had not been exposed, although the previous machine cutting must have struck the clay at the bottom. The clay vein appears to run parallel to the face of #12 Butt Entry. The limited area of the explosion demonstrates that the mine was comparatively free from dust on road-ways.

Where gas is not being generated (in a gaseous mine) the State mining law permits the use of open lights. The miner in #12 Butt did not violate the mining law by using an open light. Electricity is used in the mine. The undercutting in face of #12 Butt was made by an electric machine, probably on April 22, which machine was found in #13 Face after the explosion.

Considered the Cincinnati mine a "safe" one.

2nd Witness - J. V. McDonald, Courtney, Pa. Questions by Coroner Heffran.

Testified that he had formerly been employed as mine foreman at Cincinnati mine; in this capacity for eight months. Left employment there March 30, 1913. Was foreman there when McCanch made his inspection of March 7, 8, 10, 1913. He employed two certified assistant foremen and three certified fire-bosses. Considered the mine in fair condition when he left. Found gas occasionally. Received letter from Inspector McCanch on March 11, 1913, and complied with the recommendations therein, as follows:

Had calcium chloride distributed over the dusty entries, and sprinkled them at night. Placed curtains on entries to afford better distribution of air to rooms and rib workings. Conferred with Superintend-

ent Carter concerning this letter.

Had used no safety lamps in advance entries. Gas was frequently reported in Butt entries off #14 Face, especially #4 and #6 Butt. At one time #6 Butt was stopped on account of gas until a break-through was completed. All the butt entries off #14 face were liable to generate some gas. #1 and #2 Butts, did not remember of gas being reported there. Nos. 3, 4, 9, 10, 11 and 12, had all had gas reported at times. Nos. 11, 12, 13 and 14 Faces (north) had traces of gas at one time. No safety lamps used in any of these entries. The employment of safety lamps on these entries was a matter of judgment on the part of the mine foreman. Says he was never interfered with in his work at the Cincinnati mine, supplies always furnished promptly, etc.

- To questions by District Attorney Miller. -

Never made any special report to Superintendent Carter concerning gas in these entries. Several clay veins were struck in #12 Butt off #14 Face and gas evolved from all. Did not consider the use of safety lamps necessary in working these entries. Considers anything over 5% gas explosive. He employed a fire-boss as assistant mine foreman because he could not find a certificate man. Never had any trouble with the fan.

(no questions given by Attorney Johnston)

3rd Witness - Brad Jackson, (colored) Finleyville, Pa. - Questions by Coroner Heffran.

Worked on #4 Face, rib work, on day of explosion. Was in #1 room off #16 Butt, heard a hissing, rushing sound, saw brattice door on entry bending almost double, then door flew back and a cloud

of dust blinded him. Saw no flame and thought large fall had occurred. Door hung back against the rib, and he knew fan had stopped. Seventeen men worked on #4 Face and nobody seemed to know what had happened. Finally Jackson and eight others started out. They encountered some bad air, but got out alright to the parting on the main entry. Here they met Dilley-rider Stokes and he said there had been an explosion. They saw LeRoy lying in the drain apparently dead. Some of their party had worn open lights all the time. They went out Mingo slope after waiting on the parting for a short time. Had never personally detected gas in the Cincinnati Mine.

(No questions by Attorneys Miller and Johnston).

4th Witness, Joseph England, Jr., Gastonville, Pa., Questions by Coroner Heffran.

Had worked as brattice man in Cincinnati mine for 11 months. Not in mine on April 23; had been sick since April 19. Does not hold fire-boss certificate, but had worked with fire-bosses. Received orders each morning at fire-boss shanty. Had canvassed some entries frequently - Nos. 3, 4, 6, 9, 10, 11, and 12 Butts off #14 Face. Knew there was gas in #12 Butt, could not say what amount. Saw fire-boss get gas in Wolf lamp one day about 50 feet back from face in #6 Butt. Sometimes they used safety lamps while bratticing. He knew of the following entries working with safety lamps at times, viz: Nos. 3, 6, and 9 butts off #14 Face, but #11 and #12 Butts had always worked with open lights. Considered the Cincinnati mine dangerous where there were foreigners (who could not read) working, as they

told him to wait, but Brown stayed away too long and Landrum started back to #16 Butt, as he knew that way out, with six others, crawled through #15 Butt and thence out #4 Face to the parting on the Main Entry, thence up the Mingo slope and outside.

He had never seen any gas in his entry, #12 Face. About a year ago he drove #12 Face off #10 Butt and had found gas there. Robert Gainer, who was killed in the explosion, lived next door to him and had worked in #7 Butt off #14 Face, and he said that he often had to come home early on account of gas in his entry.

(To question by Attorney Johnson)

Said he will return to work at Cincinnati Mine when it is reopened.

(To question by Attorney Johnson)

Said he would not want to work in #12 Butt off #14 Face with an open light.

7th Witness, John Bassett (colored) Monongahela, Pa., Questions by Coroner Heffran.

Not in mine when explosion occurred, as he had quit work there on April 16. Drove #5 Butt off #14 Face. #6 Butt was making a good deal of gas and he often had to go home early for this reason. One day in #6 his open light set off the gas and the flame rolled back along the roof for 40 or 50 feet.

On April 15, the Assistant Mine Foreman had come in to #6 Butt and the gas extinguished his safety lamp three times at the last breakthrough, and all entry men were ordered to go home that day. #5, 6, 7, and 8 Butts all worked with open lights.

(No questions by Attorneys Miller and Johnson)

8th Witness, R. B. Brewer, Greensburg, Pa. Questions by Coroner Heffran.

Had a son killed at Cincinnati Mine, a driver in the Butts off #14 Face.

Read an extract from a letter written to him by his son on April 17. "I very near lost my mule here the other day; the gas took fire and burned very near all the hair off my mule, and I had to run to get away myself".

9th Witness, Henry Mercer, Monongahela, Pa., To questions by Coroner Heffran.

He quit work at Cincinnati Mine on April 15. Had a son killed in explosion - driver and snapper. He worked in #6 Butt off #14 Face. On April 13, the fire-boss came and sent him out of #6 on account of the gas there. (no other questions).

10th Witness, Edward Piggford, Mingo, Pa. Question by Coroner Heffran.

Worked at Cincinnati Mine on day of explosion. Worked on machine, and had finished cutting #20 room on #20 Butt off #8 Face, when the explosion occurred. Escaped through #16 Butt. #12 Face off #20 Butt had been danger-boarded off that morning, but board was removed and they cut the entry. Considered Cincinnati a safe mine. It was customary to use electric cutting machines in entries generating gas, unless there was too much gas present. (no other questions.)

11th Witness, Gory Stokes, Cincinnati, Pa., Questions by Coroner Heffran.

Dilley rider at Cincinnati Mine. Empty trip had just started in at 5 min. of twelve, and he was standing in second wagon, not over

300 feet from the pit-mouth, when he was blown down into the wagon and his cap and lamp blown into the wagon behind. Reached signal wire and rang for engineer to stop, which he did. Then, after striking three matches, he found his lamp and relighted it; then there came a cloud of dust and smoke and blinded him for a few minutes. After this had passed he signalled the engineer to start the trip and he rode inside to the parting. The smoke cloud seemed to pull back into the mine again and soon the moving trip caught up with it. Arriving at the parting he heard the telephone ring in the old mine-foreman's shanty and went in there and answered it. It was the fan-man outside who said that the doors were blown open at the fan and an explosion had occured. He told the fan man to do what he could to close the doors and get the fan started, and then went on back to the new foreman's shanty and found it blown to pieces. Returning to the old shanty at the parting he found his "butty", Leroy, lying across the "dilley" line at the side of the track and he had to pull the rope up a little to get Leroy's body out and lifted it onto the empty track. Then he called the fan man again and said that the air current seemed to be moving inward. Also called up outside to the river opening, and they told him that Superintendent Carter had started into the mine with a rescue party.

(Question by Attorney Johnston)

He started in Wednesday morning, April 24, at recovery work, and almost without rest, continued until Monday morning.

12th Witness, C. W. Clement, (Colored) Finleyville, Pa. To questions by Coroner Heffran.

Not at work on day of explosion, but was the day previous. Worked in room 18 off #4 Butt off #8 Face, and four months ago had worked in #4 Butt and quit there on account of too much gas. Joe Weaver, who worked in #6 Butt off #14 Face, told him there was lots of gas in #6 and it had been stopped for that reason. Assistant Foreman Weldon told Weaver that he would go up to #6 Butt with him and see if they could not get it started up again. One day Fire-boss Parker had marked #6 Butt safe and a few hours later the gas was lighted there and burned back 60 feet along the entry. (no more questions.)

13th Witness, Robert Carten, Gastonville, Pa., Questions of Coroner Heffran.

Worked in mine on day of explosion. Was track-man from #12 Butt to #20 Butt off #8 Face. Was at head of #16 Butt when explosion occurred. Escaped through #16 Butt and up Mingo slope. Did not know of any dangerous conditions in the Cincinnati Mine. (no other questions).

(recalled) Gory Stokes, dilley-rider. Questions by Coroner Heffran.

About 11.30 A.M., on side-track, overheard a conversation between Mine Foreman McNeil, Assistant Foreman Weldon and miner Victor Amprimis from #6 Butt off #14 Face, who had started home and stopped at shanty and told McNeil that he was afraid to shoot in #6 because of "too much gas". These three men then proceeded back the main entry, presumably to fire a shot in #6 Butt. (Their bodies were afterward found at the face of #6 Butt - #20, 21 and 22.)

14th Witness, George Crusan, Monongahela, Pa., To Questions of

Coroner Heffran.

Worked as roadman in #4 Face, at time of explosion, with his father. They escaped out Main Entry and up Mingo slope. Had never worked in the Butt entries off #14 Face. Did not know of any dangerous conditions in mine.

15th Witness, Lawrence Donnelly, Monongahela, Pa., Questions by Coroner Heffran.

Worked at Cincinnati mine fan, day shift, changed to night shift every two weeks. Had a brother killed in the explosion. Easter Sunday, March 23, was the last day the fan had been stopped - to make repairs at the power - house. Sometimes had slight trouble with the fan. At 12.20 explosion jerked fan and stopped it momentarily, also blew iron explosion doors open. Called two farm hands from Birkhamer's and they shut explosion doors and stuffed up air crevices with cloth and other material. Within 8 minutes the fan was again operating efficiently. Gave the indicator card from the fan to Inspector Louttit of the Pittsburgh Coal Co., shortly after the explosion. (Indicator card now produced and explained to jury, showing that fan was only stopped momentarily.)

2.6 Water gauge was fan capacity.
157 Revolutions per minute was maximum speed.
153 " " " " operating speed, at time of explosion.

nobody else at fan-house when explosion occurred.

16th Witness, George Mc Vickers, Monongahela, Pa., Questions by Coroner Heffran.

Fire-boss at Cincinnati mine. Had worked there for 18 months. Other two fire-bosses are Parker and Boyle. All three came outside

about 11.15 A.M. His section comprised the Butt entries off #8 Face, and no gas found there April 23, Had 16 men on his section using safety lamps and 20 using open lights. Thinks entire section could have been worked safely with open lights, but the Mining Law required safety lamps on rib work. (Reference made to Fire-boss record and extracts read from same.)

17th Witness, Harry Parker, Monongahela, Pa., Questions by Coroner Heffran.

Fire-boss at Cincinnati Mine. Had worked there since January 13, 1913. Had been fireboss since 1896 and worked at six other mines along Monongahela Valley. He had all the Butts off #14 Face in his section. There were found splits of air in this section. Had changed ventilation in this section shortly before the explosion to improve the circulation of air. Had been in #12 Butt off #14 Face about 9.30 A.M., and found no indications of gas.

Reading from Fire-boss record, as follows:

April	14,	Gas	reported	in	#9	Butt off	#14	Face,
"	15,	"	"	"	#4 and #6	Butt off	#14	Face,
"	16,	"	"	"	"	"	"	"
"	17,	"	"	"	"	"	"	"
"	18,	"	"	"	"	"	"	"
"	19,	"	"	"	#3,#4, #6	"	"	"
"	21,	"	"	"	"	"	"	"
"	22,	"	"	"	#4, #6	"	"	" (fenced off)
"	23,	"	"	"	"	"	"	"

#3, 4 and 6 Butts were worked with safety lamps for a time. #5 Butt was not working April 23. Nos. 7, 8, 9, 10, 11, and 12, Butts worked with open lights. The natural conditions in all these Butt entries was much the same and all liable to generate more or less

gas at times, even when there were no clay veins encountered.

Considered that the use of locked safety lamps throughout this section would render it safer. He saw no indications of clay vein in #12 Butt at 9.30 A.M., on April 23, on his second round of inspection. Cannot say where the explosion originated. His section was rather large for him to cover and he had told Mine Foreman McNeil that he could not handle any additional territory. Had a slight argument with Assistant Weldon on April 23, over #6 Butt, as Weldon had made chalk marks in #5 Butt for a cut-through to #6 Butt and Weldon was in #6 hanging up more canvas.

There were no shot-firers on this section. Assistant Weldon generally did the shooting in the gaseous entries. He never saw any of the miners do any shooting in the "safety-lamp" entries. Mine Foreman McNeil never talked to him about gas in this section, or about safety lamps. He once spoke to Superintendent Carter about gas in this section.

There is not nearly so much gas in the Cincinnati Mine as there was when he worked there in 1890. The roadways are less dusty than formerly. There is now 135,000 cu. ft. of air sent into the mine, while in 1890 he thinks there was only about 35,000 c.f. The Cincinnati Mine was in better condition on April 23, than he ever had known it to be previously. (no other questions).

Adjournment until 9.00 A.M. May 13.

Session of May 13, 9 A.M. to 4.30 P.M.

18th Witness, A. B. Brown, Charleroi, Pa., Questions by Coroner Heffran.

Assistant Mine Foreman at Cincinnati Mine since February 4, 1913. Was in #16 Butt off #8 Face when explosion occurred. His duty to assist the mine foreman and to look after the ventilation. No one ever interfered with him in the performance of his duties. The general rules were posted up and were printed in English, Italian, Lithuanian and Litturish.

Care was taken in the firing of shots. English speaking miners were in the minority. He at one time collected about 70 men following the explosion. Told them to wait in #8 face, opposite #16 Butt, until he made an examination. He found he could not get far along #9 Face on account of smoke and afterdamp, so he returned. Meanwhile, Superintendent Carter had arrived with rescue party. He then started out through #16 Butt and thence out Mingo slope to the outside; arrived outside about 4.45 P.M. (no other questions).

19th Witness, William Carter, Finleyville, Pa., Questions by Coroner Heffran.

Superintendent of Cincinnati, Coal Bluff and Nottingham Mines. Had been thus employed for nine months. At Nottingham mine on April 23, and notified by telephone that an explosion had occurred at Cincinnati. Talked to Todd over the telephone and told him to get the fan in shape. Got Mine Foreman Boles at Nottingham mine and they drove over to Mingo, slope entrance.

Met Todd there, and with several other men entered Mingo Slope, thence along Main Entry to #8 Face. Entered #8 Face but could not get far by reason of afterdamp. Returned to Main Entry and then went along #2 Butt and saw six dead men lying along that entry. They then heard of men living back on #8 Face, and so returned to #4 Face and travelled

in there "with the air", thence through old #15 Butt, crawling over falls, to #8 Face. Went out #8 Face to #21 Butt but saw no one; then came back along #8 Face motor road and soon thought he saw the reflection of a light. Somebody called out, and it was his son "Joe" and a party of men with Assistant Foreman Brown. Meanwhile Night-Boss Thompson came in through old #15 Butt and took a portion of the men outside by the same route. He remained to see if anybody else could be saved. At #14 Butt off #8 Face Donnelly was lying and they worked with him, but without result. Then they all went out through old #15, all feeling weak. His other son was killed off #14 Face.

There were 236 men on the mine payroll. Only method of determining just how many men were inside on the 23rd was the tipplesheet, and this was not an absolute check.

He employed the mine foreman, three assistants, and three certified fire-bosses. Had countersigned all his mine-foreman's reports. Knew that gas had been reported, and on one occasion talked with Mine Foreman McDonald about the gas on #9 Butt off #14 Face and had breakthrough driven. Had not conferred with Mine Foreman McNeil and did not know that any safety lamps were being used in the butts off #14 Face.

Mine Foreman McNeil had been employed 23 days. Considered it safe to use open lights throughout the Cincinnati Mine.

Believed the explosion originated in #12 Butt off #14 Face by the ignition of the gas given off from the clay vein there by an open light. Probably a safety lamp in #12 Butt would have prevented the explosion. Gas might have accumulated in any of these advance

entries off #14 Face. #9 and #10 Butts were the furtherest advanced entries off #14 Face, but they were not the only entries to generate gas in this section. Does not know whether or not the miners were instructed in the use of safety lamps. Under the Mining Law the entire responsibility for the inside work rests with the Mine Foreman, and not with the Superintendent. Had always furnished all supplies as requested by the Mine Foreman. In #6 Butt off #14 Face the "butt" shot is ready but no hole drilled, and no shot was fired there.

(questions by Attorney Miller)

The end of the brattice in #12 Butt off #14 Face is about 12 or 14 feet from the face, he thinks. Does not think more air current would have prevented the explosion, but might have made the mixture even more explosive. It would not have been practicable to carry the brattice in #12 Butt any closer to the face. Does not think the spark from an electric cutting machine would have ignited the mixture in #12 Butt. The sole cause was the use of the open light.

In the inspection following the explosion he found gas in Nos. 4, 6, 10, and 12 Butts off #14 Face. This entire section may generate gas under normal conditions, but sufficient air current renders it safe to work with open lights. It was the duty of the mine foreman to put in safety lamps as he thought necessary. The use of safety lamps would render the operation safer in this section. A spark from the electric cutting machine might have ignited the gas in #12 Butt. (contradiction).

The miners never wish to use the safety-lamps where the

open light can be used, as the safety lamp reduces the amount of work done - hence the wages of the miner.

20th Witness; G. W. Schluederberg, Pittsburgh, Pa. Questions by Coroner Heffran.

General Manager of the Pittsburgh Coal Co., Cincinnati mine operated by the Pittsburgh Coal Co., but owned by Monongahela River Consolidated Coal & Coke Co., All their mines divided into three groups with a manager and inspector for each group. Inspector H. I. Miller has the Cincinnati Mine. H. B. N. Louttit is the chief inspector.

About noon, April 23, Birkhamer called him at his office in Pittsburgh and said that there was trouble at the Cincinnati Mine, large quantities of smoke issuing from the fan opening. Then went to Crafton by railroad and got Assistant General Manager J. M. Armstrong, and they travelled by automobile from Crafton to the Mingo Slope Entrance of the mine, arriving about 2.00 P.M. He was pleased to find the fan running at Mingo. Did not go inside the mine. Understood that Inspectors Louttit and Miller had charge inside, so he and J. M. Armstrong took charge outside. Armstrong was at the Mingo opening and he went around by automobile to the river opening and took charge there. Secured two policemen from Monongahela and later on six State troopers, who guarded both entrances to the mine.

There were 96 bodies taken from the mine, all out the river opening. All rescue and recovery parties entered the mine from the Mingo slope. Superintendents, mine foremen and fire bosses were called from the adjacent mines of the company, and responded loyally,

over 70 men assisting in the rescue and recovery work. All the company inspectors were also inside. They had ample help from their own employees. He organized different departments for the rapid pushing of the recovery work, viz; Commissary; identification; doctors; brattice gangs; rest places, etc. All bodies taken care of by Undertaker Bebout of Monongahela City. (no other questions).

21st Witness, J. M. Armstrong, Pittsburgh, Pa. Questions by Coroner Heffran.

Assistant General Manager of Pittsburgh Coal Company; had charge of one group of mines. Cincinnati mine not in this group. Arrived at mine about 2.00 P.M., on April 23, with Schluederberg. Did not enter the mine himself until Thursday of the following week. Then made an investigation as to cause of the explosion with Inspectors Louttit and Ferguson and Lauder. They all agreed upon the probable cause of the explosion. (no other questions.)

22nd Witness. William Lauder, Elizabeth, Pa.

Inspector for the Pittsburgh Coal Co. Reading of report prepared by Inspectors Lauder, Louttit and Ferguson. - Extracts from this report -

"I arrived at Cincinnati Mine at 2.00 P.M. on April 23, and entered Mingo Slope, where I met a man with a safety lamp and took him along with me. We met some men at the dilley-road parting and they said Superintendent Carter had gone into #4 Face. Started into #4 and met Supt. Carter returning with a party, and he said they had with them all the living men from #8 Face. Found Machine Boss shanty destroyed and body of machine boss nearby. Then someone saw a light

back on #8 Face and we went in there and found a door-frame on fire, which was extinguished by Lauder, Shaw, Ferguson, Faraday and myself. Found loaded car overturned and driver and mule dead." "We then proceeded along #2 Butt off #8 Face and found six men lying along entry apparently overcome by after-damp. Reached the junction of #2 Butt with Nos. 11, 12, 13, and 14 Faces but here the afterdamp stopped any further exploration.

The company helmet men from Jacobs Creek were then called upon to explore Nos. 11, 12, 13 and 14 Faces and #1 and #2 Butt off #14 Face. I asked them if their helmets were in good order and they said "yes", and I had them stand in #14 Face awhile to test out their helmets. The helmet party of three men then started up #14 Face and came back then into #1 Butt and up that entry and through the last cut-through and down #2 Butt. McColligan was overcome and fell down". "We could not get McColligan and McCracken out on account of the after-damp. Canvas was then hung and the air current forced up so that McColligan and McCracken could be dragged out. I then had a severe headache and went out to rest for a couple of hours. Meanwhile the helmet men from the Federal Bureau of Mines had come in and had examined #3 and #4 Butts; were unable to get bodies out of said entries on account of not having sufficient air with them. (He did not explain this. Also omitted to state that previously the Bureau crew had explored #11, 12, 13, 14 Faces and #1 and 2 Butts, finding McColligan's flashlight in the last named.) We then carried ventilation up #14 Face, and the helmet men from the Bureau of Mines inspected #5, 6, 7 and 8 Butts. Then I asked

Mr Paul to send men into #9 and #10 Butts, but Mr. Paul said "no", he would not until ventilation was restored. (Omits to state that Mr. Paul's request was to restore ventilation in #5, 6, 7, 8 Butts, as they were filled with gas, and not canvas the mouths of these entries off as Lauder wished to do. Also omits to state that Mr. Paul's suggestion was carried out before the exploration of #9 and 10 Butt was proceeded with.)

Then Mr. Paul said to me that his men could go if I said so, provided I would be responsible if anything happened to his men.(?) I said I would not be responsible. Also talked with Inspector McCanch about this matter. We wished to work more rapidly by shutting off #5,6,7 and 8 Butts, but Mr. Paul would not send his men into #9 and 10 Butts under these circumstances." "Then closed off #5 and 7 Butts outside the last breakthrough and the return was down to #8 Butt. This carried ventilation along #14 Face to #9 and 10 Butts and the helmet men examined #9 and #10 Butts, two breakthroughs at a time. Bodies then removed, air current short-circuited at #9 Butt, and carried on up #14 Face to #11 and 12 Butts, which were then examined by the helmet men, and then the air current was carried up these entries. We had to canvas clear to the face to carry out the afterdamp and gas accumulated in #11 and 12 Butts. This was the last work done by the helmet men.

On #11 and 12 Butts off #11 Face two men were found with coats wrapped about their heads, having been suffocated by the after-damp. No 3 and 4 Butts off #14 Face were then opened up and the bodies therein recovered. #11 and 12 Butts off #8 Face were in good condition, all stoppings intact and no bodies found. #13, 14, 15, 16 Butts off #8 Face also in good condition, but #17 and #18 Butts

contained considerable after-damp, which is difficult to explain.

Proceeding down #8 Face, McVickers and myself opened the door into chute leading to #20 Butt and found two men behind this door Crawl and Legler. This being 58 hours after the explosion. We helped these men out #8 Face and turned them over to Britt. Inspected all this section and found everything in good shape, but no more men were found.

Direction of Forces: Explosion originated at face of #12 Butt off #14 Face and travelled down #11 and 12 Butts to #14 Face where forces divided. Brick stoppings between #13 and 14 Faces were blown towards #13 Face. Forces traveled up #9 and 10 Butts for distance of four breakthroughs, destroying the stoppings and blowing them towards #9 Butt. Forces also traveled out #11, 12, 13, and 14 Faces and traveled up #5, 6, 7, 8 Butts, and at #6 Butt explosive forces must have been reinforced, as there is evidence of increased violence through this section. Forces also traveled up #3 and 4 Butts off #14 Face, and evidence of great violence is shown, empty wagons demolished, etc. Forces also traveled up #1 and 2 Butts off #14 Face, but did not quite reach the faces of these Butts. In the lower portions of #1 and 2 Butts the ribs are somewhat coked and blistered.

Force also traveled out from #14 Face through #2 Butt and thence to main haulage entry, diminishing in violence after passing the main sidetrack. Evidently the body of gas which was ignited was liberated from the clay vein at the face of #12 Butt. The machine cut on the "tight" side or right side of #12 had not penetrated the

clay vein, but the machine men must have known that they were encountering a fault. Sometime after the "butt" shot was fired, shattering the clay vein and liberating the gas therefrom, the loader pushed his empty wagon up to the face, and, upon raising his head, the gas was exploded from his open light. In #11 and 12 Butts the bottom is covered with coked dust, also the ribs show evidence of great heat."

(Questions by Coroner Heffran) The explosion did not cover a wider area because the other portions of the mine were free from gas and coal dust.

(Questions by District Attorney Miller)

#6 Butt off #14 Face contained no drill-hole, and no shot had been fired. In #6 Butt at last breakthrough the track was torn up completely. Three bodies at face of #6 Butt were burned and wedged close to the face of the coal. At the face of #13 Face (north) a body was found with all clothes torn off. In #11 and 12 Butts off 11 Face two men; in #2 Butt off #8 Face, 6 men; and at slant to #11 and 12 Butts off #8 Face, 6 men; these had all died from suffocation.

(Questions by Coroner Heffran)

The blowing open of the explosion doors over the fan shaft "tailed-out" explosives forces at that point; this limited the extent of the explosion, as well as the absence of gas and coal dust from the unaffected territory. A safety lamp might have prevented the explosion in #12 Butt, although the gas could have been ignited through a safety lamp if not handled carefully. It is the mine foreman's duty to instruct the miners in the use of safety lamps. According to the fire-bosses record, it was not necessary to use safety lamps in

Butts off #14 Face. To the best of his knowledge the Mining Law had been observed in working this section. Refused to answer as to whether or not this explosion could be blamed on the Mining Law. The natural conditions in all the Butt entries off #14 Face were much the same. As he found conditions after the explosion, he thinks this section should be worked with safety lamps. In most cases the proximity of a clay vein is known by the change in the character of the coal - it becomes curly and tough. Saw no indications of "drilling ahead" in any of the entries where there were indications of "spars" or "clay-veins". In #12 Butt the machine cut had reached the clay vein but had not penetrated it. The spark from an electric machine would not have set off the gas in #12 Butt.

Does not know of any instance where the Pittsburgh Coal Co., interfered with one of their mine foremen when he wished to put safety lamps in a mine.

(Questions by District Attorney Miller)

Not familiar with conditions in the mine previous to the explosion. Customary to carry brattice cloth close to the faces in all raise entries. Had been in Cincinnati mine one year previous to the explosion. State Inspectors McCanch, Bell, and Cunningham came into the mine the evening of the explosion. (No other questions)

19th Witness, Superintendent Wm. Carter, (recalled to stand.)
Questions by District Attorney Miller.

Had received letter from Inspector McCanch on March 11, 1913, and taken recommendations up with Mine Foreman McDonald at that time. Had been in #5, 6, 7, 8 Butts off #14 Face on the Friday

previous to the explosion, but not in any of the other entries off #14 Face. At that time he conferred with mine foreman McNeil about new motor road in #6 Butt, and did not go to the face of that entry.

23rd Witness. Mine Inspector C. B. McGregor, Grafton, Pa.

Detailed to make investigation and report along with Inspectors Adams, Neale, Williams and Roby. Made inspection on April 28, 29 and 30. - Reading of this report.- Extracts from same. - -

"Explosive forces tailed out on main haulage way near #4 Face and on #8 Face near #11 and 12 Butts. Evidence of heat in #11, 12, 13,14 Faces, and #1 and 2 Butts off #14 Face, but not much violence. Evidence of considerable violence, as well as great heat, in #5, 6, 7, 8 Butts and #9, 10, 11, 12 Butts off #14 Face. Origin of Explosion was at face of #12 Butt off #14 Face caused by ignition of body of gas by an open light, said gas having been liberated from shattering of clay vein by the firing of the "butt" shot. A probability that two secondary explosions took place, one at faces of #5, 6, 7, 8 Butts, and one at the face of #3 and 4 Butts off #14 Face, as gas was being generated at faces of both #6 and 4 Butts."

(Questions by Coroner Heffran.)

Judging by the conditions found after the explosion this entire section should have been worked with locked safety lamps. The Mining Law does not apply exactly to this case regarding the use of safety lamps. As a personal opinion he thinks that all the mines in this district should be worked with locked safety lamps.

(Questions by Attorney Johnson).

To determine whether or not safety lamps are necessary in a mine the fan should be closed down for 24 hours and a thorough examination then made of all workings, and if dangerous conditions developed the entire mine should be put on safety lamps. This procedure, however, is not covered by the Mining Law.

"Mixed Lights" should never be used. (No other questions.)

24th Witness. Inspector F. W. Cunningham, Charleroi, Pa.
Questions by Coroner Heffran.

Made an investigation of Cincinnati Mine on April 29 and 30, with Coroner Heffran. (Displayed a sketch to the jury which he had made of the face of #12 Butt and explained same to them).

Believes that to insure safety locked safety lamps should be used in this mine. According to the Mining Law the company had operated the Cincinnati Mine in a legal manner.

(Question by Attorney Johnston)

Made a personal examination of #6 Butt aff #14 Face. Dug into the coal with a pick but could discover no evidence of a drill hole there. No shot had been fired. (No other questions.)

25th Witness. VanBrittner, Crafton, Pa. (Questions by Coroner Heffran.)

District President of District #5, U.M.W. of A. Worked as a coal miner for 16 years. Holds no fire-boss nor mine foreman certificate. Inspected Cincinnati Mine on April 29 and 30. Initial point of explosion face of #12 Butt off #14 Face. Body of gas there generated from the clay vein had been ignited by an open light. Gas accumulations in #4 and 6 Butts also added to the intensity and range of the explosion. Clay vein in #12 Face must have been known when

undercutting was done there. Several of the butt entries off #14 Face had frequently generated Gas. The use of safety lamps would have prevented this explosion. Believes in the use of safety lamps but not in the use of electricity along with safety lamps. Under the Mining Law the responsibility for the explosion rests upon the mine foreman. Does not deem this a good law, as too much responsibility is placed upon the Mine Foreman.

(Questions by Attorney Johnston)

Never worked as an operator, mine foreman or fire-boss, but as miner, driver, etc. Worked largely in mines of Panhandle District. Generally found gas generated when a clay vein was encountered. Does not know of any explosion caused by a spark from an electric coal cutting machine. Does not believe the entire responsibility should be placed upon the mine foreman.

(no other questions)

26th Witness. Grover Gaitins, Carnegie, Pa. Questions by Coroner Heffran.

Mined coal for 30 years in Scotland and United States. Mainly in Westmoreland County, Pittsburgh District, and Panhandle district (8 years). Holds a fire-boss certificate.

Inspected Cincinnati mine with VanBrittner on April 29 and 30. Found gas with safety lamp in #4, 6, 10, 12, Butts off #14 Face Entry. There was evidence of great heat throughout this section of the mine.

Explosion started at face of #12 Butt off #14 Face, from ignition of gas by an open light, the gas coming from clay vein in

the face of #12 Butt. The other portions of the mine he inspected appeared to be in fair condition. A better supply of air should have been furnished to the faces off the Butt entries off #14 Face. Safety lamps should be used exclusively, never "mixed lights". (no other questions.)

27th Witness. W. R. Calverley, Windber, Pa. (Questions by Coroner Heffran.)

General Superintendent of the Berwind-White Coal Co. Has had 43 years experience in coal mines. Holds fire-boss and mine foreman's certificates. Received a letter from Chief J. E. Roderick of the Department of Mines, appointing him, in company with J.H. Sanford and J. M. McKinney, to investigate and report upon the Cincinnati Mine explosion.

Reading of this report to J. E. Roderick. (Extracts from this report.

"The initial explosion occurred at the face of #12 Butt off #14 Face from the ignition of a gas feeder by an open light, said gas feeder coming from a large clay vein in the face of #12 Butt entry. The gas was evolved following the firing of a "butt" shot which shattered the clay vein. During the investigation gas was found at the faces of #4, 6, 12 Butts off #14 Face, #12 being the only feeder of any consequence."

(Questions by Coroner Heffran)

The entries giving off gas should be worked with locked safety lamps. The gas did not accumulate in #12 Butt until after the "butt" shot had been fired. "mixed lights" are a safe proposition when given the proper supervision. The poor illumination from the

safety lamp ruins the eye-sight and increases the loss of life through falls of roof and coal. A strong believer in "mixed-lights". Explosions have occurred in mines which used safety lamps exclusively.

The mine foreman very seldom disregard the instructions of the mine inspectors. The mine foreman should have full authority inside the mine.

(Questions by Attorney Johnston).

Certain duties are also imposed upon the miner by the Mining Law. The miner must not enter his working place unless the fireboss has marked it safe. The exercise of good judgment on the part of the miner, as well as by the fire-boss, the mine foreman, and the Superintendent, are necessary to real safety in mining operations. (no more questions.)

Coroner Hoffran now announced that if anybody in the audience wished to testify they could step to the witness stand.

28th Witness, Charles Crawl, Monongahela, Pa., Questions by Coroner Heffran.

Worked in Cincinnati mine on April 23. Escaped from #20 entry after 58 hours in the mine. A. B. Brown, Asst. Mine Foreman, had told him that morning that he intended to quit. He was not satisfied with the Cincinnati Mine. Legler was working with Crawl when the explosion occurred and they remained together until rescued by Lauder and McVickers.

Examination of witness concluded 4.05 P.M.

Coroner Heffran concluded his charge to the jury at 4.30 P.M. and the hall was cleared to permit the jury to deliberate.

Verdict returned at 8.30 P.M., and read in public.

VERDICT OF CORONER'S JURY

- - - -

We, the Jury, find that Stephen Long and the 95 others named above, came to their death in the Cincinnati Mine of the Monongahela River Consolidated Coal & Coke Company, Washington County, Pa., on April 23, 1913, from violence and asphyxiation as a result of an explosion of gas in the said Cincinnati mine at about 12.15 P.M., while the miners were at work and the mine in operation.

We further find by the evidence given by those who worked in the mine at the time of the explosion and previously, also the state mine inspectors, experts, and officials and others who made an investigation and examination of the mine after the explosion, that the cause of the said explosion of gas was as follows:

(A) That it originated in #12 Butt Entry off #14 Face Entry as a result of entryman who worked in said entry, firing a butt shot, which struck a clay vein exposing a feeder of gas. After firing shot, entryman evidently went to the break-through to eat his dinner, and on returning with empty car he ignited gas with his open light, with which he was permitted to work; we also find that no gas has been reported in said entry since March 5, 1913, by any of the mine officials.

(B) Further that said explosion of gas, which we find originated in said #12 entry, reinforced itself in other entries, namely; 4 and 6 butt entries, in which gas was generated and had been reported by the mine officials at different times and which entries were being worked with safety lamps.

(C) We further find that said explosion could have been prevented had safety lamps been used in this section of the mine.

(D) While under the law the legal responsibility for any explosion such as this would rest on the mine foreman, we say frankly, that greater responsibility rests upon the law and particularly upon those responsible for its enactment, for this reason - that it places the entire responsibility for the operation of the mine on the man granted a certificate of competency by the state, but employed and paid by the owner and operator - certainly an absurdity on the face of it, and one that under human events will not successfully protect life either in theory or practice. If the present system must continue, surely the legal responsibility ought to be placed upon the owner or operator equally with the mine foreman. Guided by the testimony given, opinions expressed by those in official capacity as well as those employed in and about the mine, we make the following recommendations:

FIRST: To the management of the Cincinnati Mine, that hereafter it be operated by safety lamps as a whole and that no machinery be used that would make possible the emission of sparks. Surely the lesson to be learned here is the folly of working a gaseous mine with part open and part safety lamps.

SECOND: To the Legislature and Senate of this state, that if it is your desire to make safe the operation of the mines, that in the enactment of mining legislation you be guided more by the opinions of those entrusted with the responsibility of safeguarding lives, namely: The state mine inspectors, the mine foreman and the miner, rather than

the opinion of a corporation, attorneys, and managers of corporations, who from a careful reading of the present law, seem to have in mind the competitive nature of business and the protection of property, rather than the safeguarding of human life.

THIRD: To the Department of Mines: We recommend that a more definite report be required from the fire-bosses and mine foremen of the dangers existing in the mine in their daily and weekly reports. For instance, if gas be discovered, that they be required to state in what part of the working place it is found, whether it be on fall, clay vein, roof or face of working, and, if possible, in what volume.

FOURTH: We call attention to this fact, that while many of the mines of this district are working in whole or part with safety lamps, that this is not because of any legal requirement, but rather because of the diligence of the inspectors; hence until the final authority for the same operation of the mines be vested where it should be - in the state inspectors of mines - without the right of reverse of appeal by the common pleas and supreme courts with all its delays, that the owners and operators or managers of mines cheerfully comply with the recommendation of inspectors, particularly those made for the purpose of safeguarding life, and they should not be considered a business hardship.

Further, we recommend that at any mine where gas is, or has been discovered, or is being generated, that they be worked with safety lamps and other necessary precautions, and that the use of machinery that gives off sparks be discontinued.

We have carefully considered the evidence and law and the

opinions expressed by those who testified, and feel that we have placed the responsibility for the explosion where it properly belongs, namely; On the mine foreman, legally, as we believe through an error of judgment on his part he permitted part open and part safety lamps in that part of the mine where the explosion took place, but we place a greater responsibility morally on the law and those responsible for the framing and enactment of such a law.

Signed: C. H. Landefeld, Foreman,
T. J. Eckbreth,
B. S. Allen,
W. F. Alten,
J. D. Hoon,
Isaac Yohe.

Monongahela, Pa.,
May 13, 1913.

ADDENDA.

I. Analyses of coal, road dust, and coked dust.

II. Inflammability tests and curves.

III. Photographs taken at time of accident.

IV. Press clippings.

V. Outline map of Cincinnati mine.

VI. Rectangle "A", Cincinnati mine.

VII. Rectangle "B", Cincinnati mine.

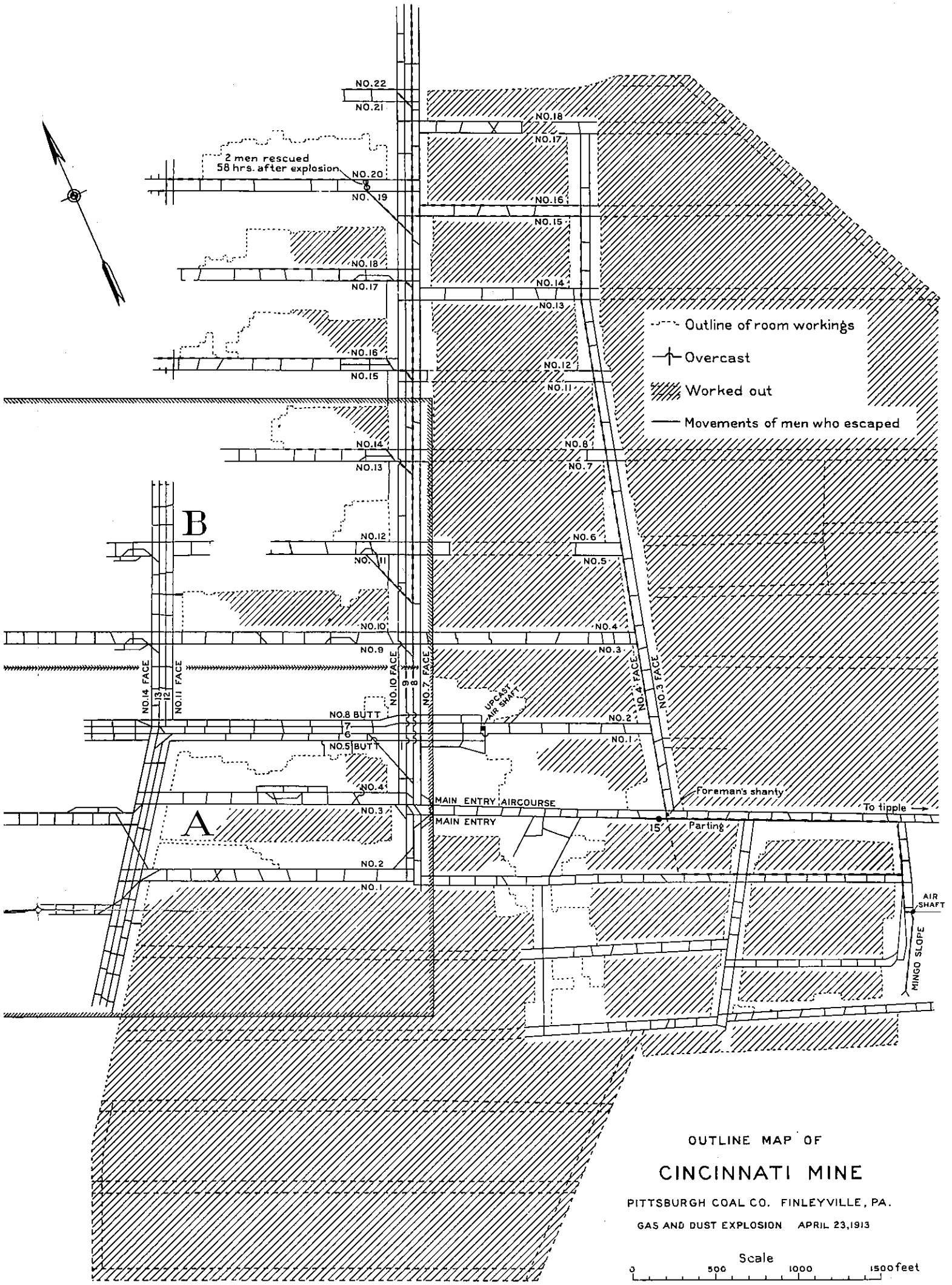
Chemical analyses were made of the face coal, road dust and coked dust samples as follows, by A. C. Fieldner, Chemist.

Standard Face samples Nos. 17082, 17083 and 17084.

Composite sample, made by combining and mixing above three samples, Nos. 17085F.

Coked dust sample, Lab. Nos. 17129, 17130 and 21818.

Road dust samples, Lab. Nos. 17086F, 17087F, 17132F, 17133F, 17134F and 17135F.



OUTLINE MAP OF

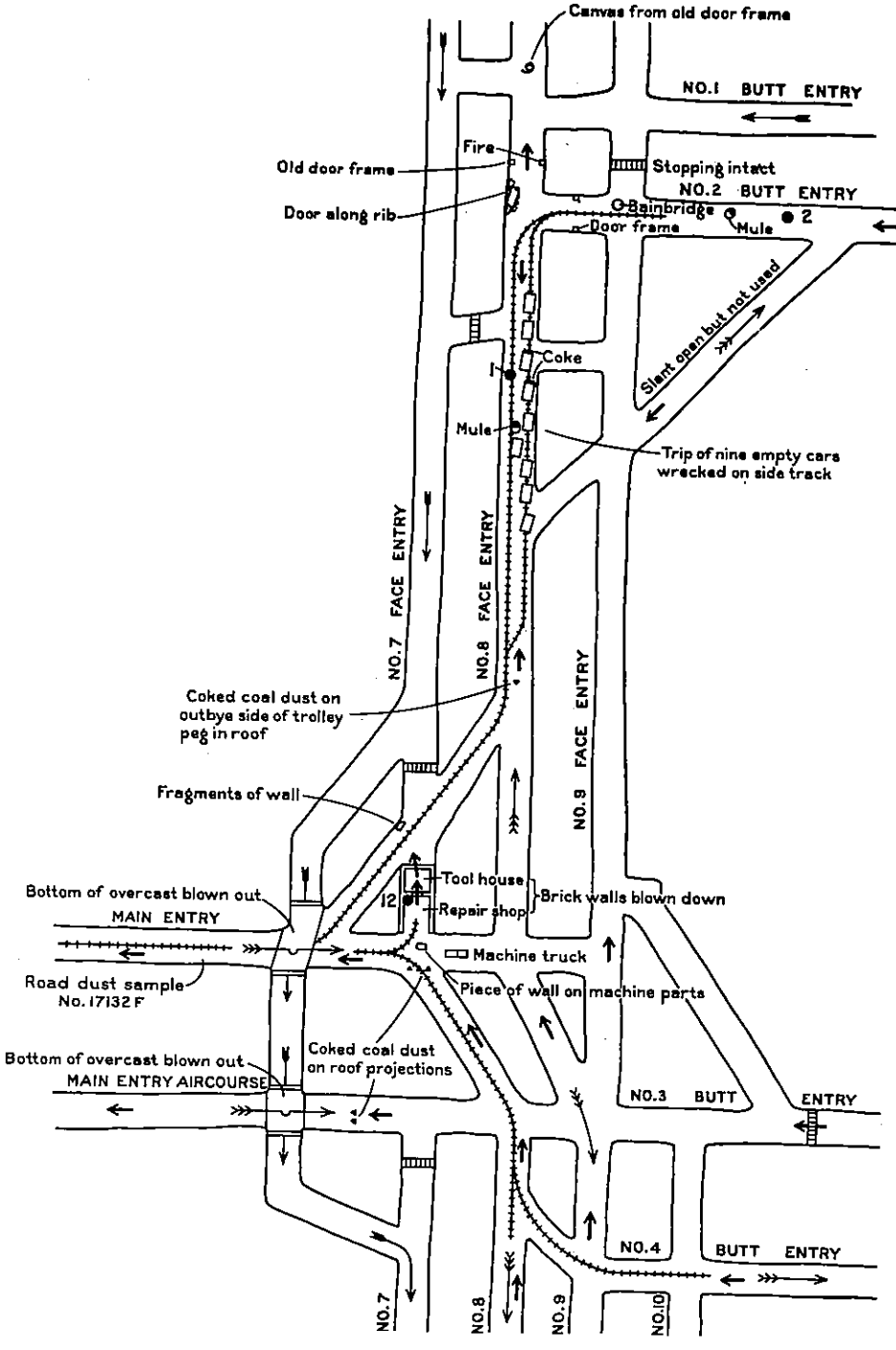
CINCINNATI MINE

PITTSBURGH COAL CO. FINLEYVILLE, PA.

GAS AND DUST EXPLOSION APRIL 23, 1913

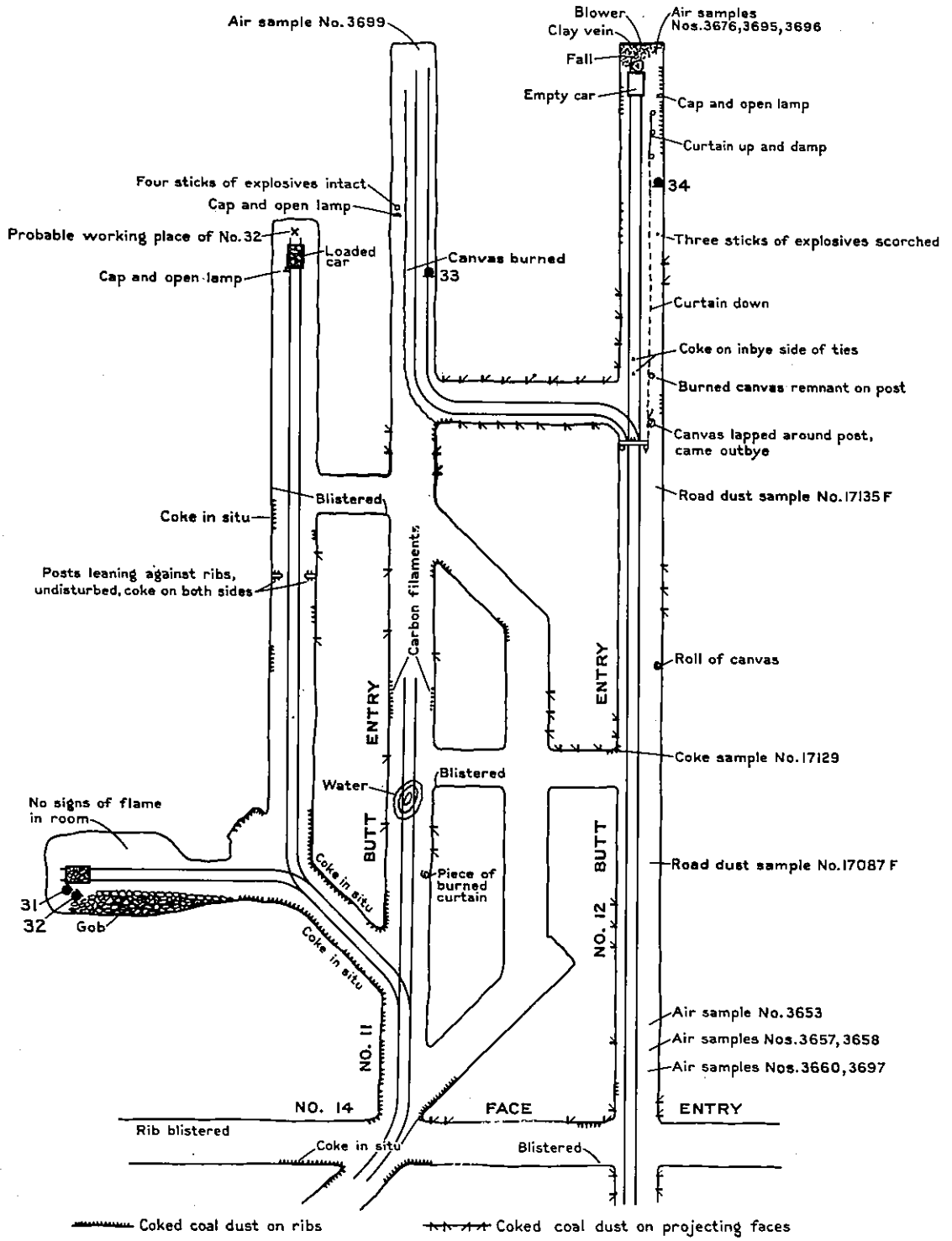
Scale

0 500 1000 1500 feet



NOS. 7,8,9 AND 10 FACE ENTRIES BETWEEN NO.1 AND NO.4 BUTT ENTRIES

SKETCH NO.2



NO. 11 AND NO. 12 BUTT ENTRIES WEST OF NO. 14 FACE ENTRY

SKETCH NO. 3