Reports

Reports of Recovery

Dated

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Zeigler Mine

To the Director,

Bureau of Mines,

Washington, D. C.

REPORT

on the

RECOVERY OF THE ZEIGLER MINE,

ZEIGLER, ILL.

Respectfully Submitted by

R. J. Williams

Mining Engineer

7/7/10.

REPORT

on the

RECOVERY OF THE ZEIGLER MINE,

ZEIGLER, ILLINOIS.

SYNOPSIS:-

INTRODUCTION:-

The mining town of Zeigler, Illinois, is located in the southeast part of Franklin County, 300 miles south of Chicago and 84 miles southeast of St. Louis. It is connected with the Illinois Central Railroad, the Chicago, Burlington & Quincy Railroad and the Missouri Pacific Railway by the Chicago, Zeigler & Gulf Railway. Money has been lavished on this town in the endeavor to make it the most up-to-date coal camp in Illinois. The date "2904" cut in the corner-stone of the engine house is intended to show that this mine is one thousand years ahead of the times.

The Zeigler Coal Company began hoisting coal early in June, 1904. The mine was developed on the double and triple entry room-and-pillar system in the No. 6 seam of the Illinois Series (formerly known as the No. 7 seam because of its superiority over the No. 6 to the northwest). This seam has here an average thickness of 12 feet, lies practically level under a cover of 417 feet, and generates considerable quantities of marsh gas. Sensational labor troubles and disasterous fires and explosions have given great notoriety to this Zeigler mine.

THE FIRST EXPLOSION:-

The first explosion occured at 7:10 a m April 3rd, 1905. The indirect cause of this disaster was the failure of the ventilating machinery at 11:30 p m March 31st, making it necessary to shut down the fan for 55 hours and 40 minutes. During this period an attempt was made to obtain ventilation by means of three air-compressors, the total catalogue capacities of which were 3,600 cubic feet of free air per min-

ute. This volume of fresh air proved insufficient to dilute the marsh gas being generated by the mine, and a squad of men (without having made any previous examination for gas) entered the south run-around between "B" entry and the west aircourse and with their naked lights "touched off" The body of gas which had collected here because this was a high point in the mine. The explosion which followed killed fifty seven men and badly wrecked the mine. Its force was augmented by the exploding of forty one kegs of black powder stored underground in the mine magazine, and of a large number of additional kegs at the working faces.

The mine was put in shape after this explosion and the development work progressed for three and a half years until the production was brought to a maximum output of 3,600 tons in one day.

THE MINE FIRE:-

About 5 o'clock in the evening, November 3rd, 1908, after the day shift had left the mine, a fire originated at the door in the crosscut between the 1st and 3rd west "C" south entries opposite room No. 17 as shown on the mine map at the point marked "G". This fire is supposed to have been caused by crossed electric wires, and small as it was in the beginning it caused the mine to be idle for a year and ten months, originated several explosions, and brought about the death of 31 men who attempted to put it out.

This fire was not discovered until 6:30 p m, November 3rd. The ventilation at the time was forcing air up the 2nd west "C" south entry and returning it through the 3rd west "C" south, and when the rescue

squad entered at 8:30 p m the fire had made headway east along the 3rd west "C" south entry to the neck of room No. 12. To check its advance, a stopping was built at the entrance of the 2nd west "C" south, this being completed at 11:00 p m. At midnight the fire burned the gases, the flame traveling along the 3rd west "C" south and setting on fire the overcast across the south cut-off at the point on the mine map marked "H". The seven men in the mine at the time reached the surface in safety, and by 10 o'clock the following morning the work of sealing both shafts was completed.

Several attempts from the surface were made to put out the fire. A bore-hole carrying carrying a 4 inch pipe was put down at the location of the above mentioned crosscut across the south cut-off, and by this means a stream of water was pumped into the mine steadily for 5 or 6 days. Then 60 barrels of sulphur were burned in a specially constructed furnace and the sulphur dioxide gas thus generated was forced down the airshaft and bore-hole by a blower fan. Finally steam under an initial pressure of 100 to 150 pounds was turned into the mine for 5 days through the bore-hole.

In the meantime eight Draeger oxygen helmets were purchased. Shortly after the introduction of the steam, a negro wearing one of the helmets was sent alone into the mine to recommoiter.. It is reported that he had been drinking liquor, that the potash cartridges were badly caked from previous use, and that there were no fresh cartridges on hand. The negro finding his breathing getting more and more difficult became frightened, pulled off the helmets and perished.

THE SECOND EXPLOSION:-

About the 1st of January, 1909, the seals over the hoisting and airshafts were removed, the fan was started as an exhaust, and a squad of men entered the hoisting shaft. They hung curtains across the 1st and 3rd west "C" south entries and all the north workings, but left the 2nd west "C" south and the south workings open. They then began to ventilate and clean up the mine. The work was successful until a point was reached where the double parting connecting the 1st west "C" south and the 1st west "C" north narrows down to a single entry, as shown by "K" on the mine map. Fresh air coming from the 1st west "C" north was forced through this point, thence up the 1st west "C" south and was returned through the 3rd west "C" south. The upper end of each of these west "C" south entries was filled with marsh gas, and when this was carried over the region where the fire had previously raged there was an explosion which killed twenty six men and again wrecked the mine. This occured at 12:15 the morning of the 10th of January, 1909. Two miners were brought out alive, and it is reported that if there had been f cartridges for the helmets eleven more men might have been recovered as the rescuers were close enough to the dying men to hear their groans but could not reach them on account of the poisonous gases. Forty hours later black smoke issued from the airshaft and immediately both shafts were sealed.

THE THIRD EXPLOSION:-

The hoisting shaft has three compartments, two for the ten-ton coal skips and one for the lowering and raising of men. A separate hoist-

ing equipment operates the manway cage. On January 29th, 1909, an airlock was built above the manway compartment, and men wearing helmets entered the mine and began to curtain off the 1st, 2nd, and 3rd west "C" south entries and all the north workings. During this work one man wearing a Draeger helmet lost his life. It is reported by men who were with him that the pneumatic cushion was so inflated as to cause the man's jaws to ache, and that he opened the release valve for relief thereby allowing gases to enter the machine. Furthermore, he had previously been under the doctor's care for heart trouble.

On February 9th the fan was started as an exhaust and a squad of men entered the mine and built board and plaster stoppings across the north side of the shaft bottom, and across the west aircourse immediately north of the first southwest crosscut. They also hung a curtain on the "C" entry just north of the same crosscut, causing the air to be deflected south on the "C" entry. Two hours after this curtain was hung, 11:15 am February 10th, three men who had advanced down the "C" entry to the 1st west "C" south saw fire light a body of gas ahead of them on the "C" entry. This caused an explosion which killed three men at the shaft bottom. The three men who saw the fire were successful in reaching the surface, as were also five men who were on the "C" entry at the first southwest crosscut, and three men who were plastering the stopping on the west aircourse. The same afternoon both shafts were again sealed and remained closed for fifteen months.

THE FINAL RECOVERY:-

The Bell & Zeller Mining Company obtained a lease on this property from the Zeigler Coal Company and early in May, 1910, made another attempt at recovery which finally proved successful. This work was under the general direction of Superintendent W. S. Burris, formerly State Mine Inspector in Illinois. Friman Coar, mine manager, had charge of the day shift, and Ed. Loughron and Nelson Johnson bossed the evening and midnight shifts respectively. Each shift numbered eight men and a boss. Acting on the Bell & Zoller Mining Company's invitation to assist in this work, James M. Webb and the writer arrived at Zeigler May 18th with the equipment of the Government Mine Rescue Station at Urbana, Illinois.

Experience during the previous explosions had demonstrated that if the mine-bottom could be ventilated and all the falls loaded out, the final complete recovery of the mine would be assured. The following paragraphs explain in detail the various steps taken in the recovery of the twenty three acres forming the mine-bottom; and for the sake of clearness this description is divided into four periods.

FIRST PERIOD:- May 9th to June 4th, 1910. See Mine Map #2.

On May 9th, 1910, the seal over the hoisting shaft was removed and a 5-foot Stevenson paddlewheel fan was installed and connected with the airlock over the manway compartment by a wooden conduit. May 11th the fan was started as a blower. Riding on the manway cage men then succeeded in building a partition from the surface to the shaft-bottom, carrying the air down the manway compartment and returning it up the skipways.

When the shaft-bottom was reached, it was found that a heavy fall of top-coal and rock, beginning fifty feet north of the shaft, completely blocked the entry. A board and plaster stopping was then built in front of this fall. Another large fall prevented progress south from the cage on the main bottom, and a board and plaster stopping was erected in front of it. These stoppings are marked #1 and #3 on the mine map.

Because these falls blocked progress both north and south of the main bottom, a wooden tunnel was constructed leading from the shaft south along the west side of the main bottom as far as the first crosscut leading west, and through this crosscut to the west aircourse. This tunnel was 6 feet high, 4 feet wide and 230 feet long, was built of 1" x 6" pine flooring on the two sides and top, and was plastered with wood fibre plaster on the inside. Fresh air was conducted through this tunnel, and by this means board and plaster stopping #4 was erected in the west aircourse. A temporary canvas brattice was hung from the end of this tunnel to the "C" entry to allow the building of board and plaster stopping #5 on "C" entry.

The south leg of this tunnel was then joined to the northwest rib of the intersection of the west aircourse and this first southwest crosscut, making the air intake north along the west aircourse and returning it through the "C" entry to the above mentioned crosscut, through that crosscut on the outside of the wooden tunnel to the shaft bottom, and thence out the skipways.

Board and plaster stoppings #5 to #20 were then built as shown on the mine map, after which stopping #1 was removed and the fall immediately north of the shaft was cleaned up. This fall contained 490 tons of roof-coal and rock, which was hoisted in the skips and loaded into railroad cars under the tipple. This completed what may be designated as the first period in the recovery of the mine.

SECOND PERIOD:- June 5th to 23rd, 1910. See Mine Map #3.

Stoppings #2 and #13 were removed, a curtain brattice was hung across the entrance to the wooden tunnel, and board and plaster stopping #21 was built. This arrangement changed the ventilation, taking the fresh air directly north from the manway compartment of the hoisting shaft, conducting it on the east side of the mine, and returning it through the first southeast crosscut. Under this arrangement the work of erecting stoppings #22 to #55 was successfully accomplished.

Two bodies of water were encountered in this region; the first water lay along the "A" south entry at the location of stoppings #35 to #41 and was removed by three 2-inch siphons running three days. The second body of water, lying near stopping #52 was pumped out in 39 hours by a Cameron pump (4-inch suction, 3-inch discharge, and operated by compressed air).

During the progress of this work a great deal of difficulty was met with in moving the marsh gas. The temporary ventilating machinery never furnished over 5,000 cubic feet of air per minute, and as the area of the entries measured 100 to 150 square feet, the velocity was consequently low. Each afternoon when the barometer fell, the gas had a tendency to back on the men, often making it impossible to advance. In such cases the Draeger helmets proved of great advantage. A single illustration of this will here be given:- June 20th the Cameron pump refered to above was taken from the surface down the hoisting shaft in order to install it twenty feet west of stopping #51. The following table shows how this was done:-

June 20th, 1910.

Time.	Barometer.	Methods.
7:00 a m.	29.185	
8:00 a m.	29.185	Men were able to work at setting
9:00 a m.	29.160	the pump without having to wear
10:00 a m.	29.155	helmets
11:00 a m.	29.150	
12:00 noon.	29.125	
1:00 p m.	29.100	Men could not get to pump without
2:00 p m.	29.060	helmets.
3:00 p m.	29.040	
4:00 p m.	29.020	Men wearing helmets continued the
5:00 p m.	29.015	work of setting the pump.
6:00 p m.	29.025	
7:00 p m.	29.045	
8:00 p m.	29.045	
9:00 p m.	29.045	Men were able again to work at the
10:00 p m.	29.045	pump without the aid of helmets.
11:00 p m.	29.055	
12:00 midnight.	29.065	

Helmets were used also to make an inspection of the bottom of the air-shaft before stopping #31 was erected; to hang curtain brattices on the "A" south entries to make possible the building of board and plaster stoppings #49 and #50, and to perform other feats impossible without them. It was found that six out of the eight helmets purchased by the Zeigler Coal Co. 16 months previous could not be used because of deterioration through mis-use and disuse. The following list specifies the defective parts, the numerator showing the number of spoiled items and the denominator giving the total number required for the eight machines:-

8/8 Breathing Bags

9/16 Breathing Pipes

6/8 Inflation Tubes

5/8 Inflation Bulbs.

Zeigler Mine Fire

by R. Y. Williams.

On November 3, 1908, at about 5 P.M., a fire originated in Ziegler mine, which is situated at Zeigler, Franklin County, Ill. The mine was owned and operated by the Zeigler Coal Company. The mine was opened in 1904 and worked the No. 6 seam of the Illinois series. The seam is 12 feet thick, is practically level, and is under a cover of 417 feet. The mine generates considerable quantities of marsh gas. Labor troubles, explosions and disastrous fires form a large part of the history of this mine.

The first explosion occurred at 7:10 a.m. April 3, 1905. The indirect cause of this disaster was the failure of the ventilating machinery at 11:30 p.m. March 31, making it necessary to shut down the fan for 55 hours and 40 minutes. During this period an attempt was made to obtain ventilation by means of three air-compressors,,the total capacity of which was 3,600 cu. ft. of free air per minute. This volume of fresh air proved insufficient to dilute the marsh gas being generated by the mine, and a squad of men (without having made any previous examination for gas) entered the south run-around between "B" entry and the west air-course and with their naked lights "touched off" the body of gas which had collected at this high point in the mine.

The explosion which followed killed 57 men and badly wrecked the mine. Its force was augmented by the explosion of 41 kegs of black powder stored underground in the mine magazine, and of a large number of additional kegs at the working faces.

Origin of the Fire

The mine was reopened after this explosion and the development

work progressed 3-1/2 years until its production amounted to 3600 tons per day.

On November 3, 1908, about 5 p.m., after the day shift day left the mine, a fire originated at the door of the crosscut between the first and third west "C" south entries, opposite room No. 17, as indicated on the accompanying map. It is supposed that the fire originated by the short circuiting of electric wires. Small as this fire was in the beginning it caused the mine to be idle for one year and ten months, originated several explosions, and brought about the death of 31 men who attempted to put it out. The fire was not discovered until it had been burning about one and one-half hours. The ventilation was forcing the air up the second west "C" south entry and returning through the third west "C" south entry. A rescue squad entered the mine at 8:30 p.m. and found that the fire had made headway to the neck of room No. 12. A stopping was built at the entrance of the second west "C" south entry to check the fire. This was completed at 11:00 p.m.

At midnight the gases were burning. The flame was traveling along the third west "D" south and setting on fire the overcast across the south cut-off at the point on the mine map marked "H". The seven men in the mine at the time reached the surface in safety, and by 10 o'clock the following morning the work of sealing both shafts was completed.

Several attempts, from the surface, were made to put out the fire. A bore-hole carrying a 4-inch pipe was put down

over the above mentioned cross-cut across the south cut-off, and by this means a stream of water was pumped into the mine steadily for 5 or 6 days. Then 60 barrels of sulphur were burned in a specially constructed furnace and the sulphur dioxide gas thus generated was forced down the air-shaft and bore-hole by a blower fan. Finally, steam under an initial pressure of 100 to 150 lbs. was turned into the mine for 5 days through the bore-hole.

In the meantime eight oxygen helmets were purchased. Shortly after the introduction of the steam, a negro, wearing one of the helmets, was sent alone into the mine to reconnoiter. It is reported that he had been drinking liquor, that the potash cartridges were badly caked from previous use, and that there were no fresh cartridges on hand. The negro finding his breathing getting more and more difficult became frightened, pulled off the helmets and perished.

The Second Explosion

About January 1, 1909, the seals over the hoisting and air shafts were removed, the fan started as an exhaust. Men entered by the hoisting shaft, and ~~hung~~ hung curtains across the first and third west "C" south entries, and all the north workings. The second west "C" south entry was left open. They began to ventilate and clean up the mine.

The work was successful until a point was reached where the double parting connecting the first west "C" south and the first west "C" north narrows down to a single entry, as shown by

"K" on the mine map. Fresh air coming from the first west "C" north was forced through this point, thence up the first west "C" south and was returned through the third west "C" south. The upper end of each of these west "C" south entries was filled with marsh gas, and when this was carried over the region where the fire had previously raged there was an explosion whick killed 26 men and again wrecked the mine. This explosion occurred at 12:15 a.m. January 10, 1909.

Two miners were brought out alive, and it is reported that if there had been cartridges for the helmets 11 more men might have been recovered as the rescuers were close enough to the dying men to hear their groans, but cound not reach them on account of the poisonous gases. Forty hours later, black smoke issued from the air-shaft and immediately both shafts were sealed.

The Third Explosion

On January 29, 1909 an air lock was built above the manway compartment of the shaft, and helmet men entered the mine to curtain off the first, second, and third west "C" south entries and all north workings.

During this work one man wearing a helmet lost his life. It is reported by men who were with him that the pneumatic cushion was so inflated as to cause the man's jaws to ache, and that he opened the release valve for relief thereby allowing gases to enter the machine. Furthermore, he had previously been under the doctor's care for heart trouble.

On February 9 the fan was started as an exhaust and a

squad of men entered the mine and built board and plaster stoppings across the north side of the shaft bottom, and across the west air-course immediately north of the first southwest crosscut. They also hung a curtain on the "C" entry just north of the same crosscut, causing the air to be deflected south on the "C" entry. Two hours after this curtain was hung, 11:15 a.m. February 10, three men who had advanced down the "C" entry to the first west "C" south saw fire ~~light~~ ignite a body of gas ahead of them on the "C" entry.

This caused an explosion which killed three men at the shaft bottom. The three men who saw the fire were successful in reaching the surface, as were also five men who were on the "C" entry at the first southwest crosscut, and three men who were plastering the stopping on the west aircourse. The same afternoon both shafts were again sealed and remained closed for 15 months.

Recovery work

The Bell & Zeller Mining Company obtained a lease on this property from the Zeigler Coal Company, and early in May 1910 made another attempt at recovery which finally proved successful. This work was under the general direction of Superintendent W. S. Burris, formerly State mine inspector in Illinois. Friman Coar, mine manager, had charge of the day shift, and Ed. Loughron and Nelson Johnson bossed the evening and midnight shifts respectively. Each shift numbered eight men and a boss. Acting on the company's invitation to assist in this work, James M. Webb and the writer arrived at Zeigler May 18 with the rescue equipment of the Urbana station.

Experience during the previous explosions had demonstra-

ted that if the mine-bottom could be ventilated and all the falls loaded out, the final complete recovery of the mine would be assured. The following paragraphs explain in detail the various steps taken in the recovery of the 23 acres forming the mine-bottom; and for the sake of clearness this description is divided into four periods.

FIRST PERIOD: May 9 to June 4, 1910. See mine map No. 2.

On May 9, 1910 the seal over the hoisting shaft was removed and a 5½ ft. Stevenson paddlewheel fan was installed and connected with the air-lock over the manway compartment by a wooden conduit. The fan was started as a blower on May 11, By working on the manway cage, a partition was built from the surface to the shaft-bottom, thus carrying the air down the manway compartment and returning it up the skipways.

When the shaft bottom was reached, it was found that a heavy fall of top-coal and rock, beginning 50 feet north of the shaft, completely blocked the entry. A board and plaster stopping was then built in front of this fall. Another large fall prevented progress south from the cage on the main bottom, and a board and plaster stopping was erected in front of it. These stoppings are marked No. 1 and No. 3 on the mine map.

Because these falls blocked progress both north and south of the main bottom, a wooden tunnel was constructed leading from the shaft south along the west side of the main bottom as far as the first crosscut leading west, and through this crosscut to the west aircourse. This tunnel was 6 feet high, 4 feet wide, and 230 feet long, and was built of 1 x 6 inch pine flooring on the two sides and top, and was plastered with wood fibre plaster on the inside. Fresh air was conducted through this tunnel, and by this

means board and plaster stopping No. 4 was erected in the west aircourse. A temporary canvas brattice was hung from the end of this tunnel to the "C" entry to allow the building of board and plaster stopping No. 5 on the "C" entry.

The south leg of this tunnel was then joined to the northwest rib at the intersection of the west aircourse and this first southwest crosscut. This made the air intake north along the west aircourse and return through the "C" entry to and through the southwest crosscut, on the outside of the wooden tunnel to the shaft bottom, and thence out the skipways.

Board and plaster stoppings Nos. 5 to 20 were then built as shown on the mine map, after which stopping No. 1 was removed and the fall immediately north of the shaft was cleaned up. This fall contained 490 tons of roof coal and rock, which was hoisted in the skips and loaded into railroad cars under the tipple. This completed what may be designated as the first period in the recovery of the mine.

SECOND PERIOD: June 5 to June 23, 1910. See mine map No. 3

Stoppings No. 2 and No. 13 were removed, a curtain brattice was hung across the entrance to the wooden tunnel, and board and plaster stopping No. 21 was built. This arrangement changed the ventilation, taking the fresh air directly north from the manway compartment of the hoisting shaft, to the east side of the mine, and returning it through the first southeast crosscut. Under this arrangement the work of erecting stoppings No. 22 to No. 55 was successfully accomplished.

Two bodies of water were encountered in this region; the

first water ~~lay~~ was along the "A" south entry near stoppings No. 35 to No. 41, and was removed in three days by three 2-inch siphons. The second body of water, near stoppings No. 52, was pumped out in 39 hours by a Cameron pump (4-inch suction, 3-inch discharge, and operated by compressed air).

During the progress of this work a great deal of difficulty was ~~met with~~ encountered in moving the marsh gas. The temporary ventilating machinery did not furnish over 5,000 cubic feet of air per minute, and as the area of the entries measured 100 to 150 sq. ft. the velocity was consequently low.

Each afternoon when the barometer fell the gas had a tendency to back on the men, often making it impossible to advance. In such cases the oxygen helmets proved of great advantage. A single illustration of this will here be given: June 20, the Cameron pump referred to above was taken from the surface down the hoisting shaft in order to install it 20 feet west of stopping No. 51. The following table shows how this was done:

Time.	Barometer.	Methods.
7:00 a.m.	29.185	
8:00 a.m.	29,185	Men were able to work at setting the
9:00 a.m.	29,160	pump without having to wear helmets.
10:00 a.m.	29,155	
11:00 a.m.	29,150	
12:00 noon	29,125	
1:00 p.m.	29,100	Men could not get to pump without
2:00 p.m.	29,060	helmets.
3:00 p.m.	29,040	
4:00 p.m.	29,020	Men wearing helmets continued the work
5:00 p.m.	29,015	of setting the pump.
6:00 p.m.	29,025	

Time.	Barometer.	
7:00 p.m.	29,045	
8:00 p.m.	29,045	
9:00 p.m.	29,045	Men were able again to work at the pump
10:00 p.m.	29,045	without the aid of helmets.
11:00 p.m.	29,055	
12:00 midnight	29,065	

Helmets were used also to make an inspection of the bottom of the air-shaft before stopping No. 31 was erected; to hang curtain brattices on the "A" south entries to make possible the building of board and plaster stoppings No. 49 and No. 50, and to perform other feats impossible without them.

It was found that six out of the eight helmets purchased by the Zeigler Coal Company, 16 months previous, could not be used because of the deterioration through misuse and disuse.

THIRD PERIOD: June 23, 1910. See mine map No. 4.

An old stopping in the crosscut between board and plaster stoppings No. 26 and No. 27 was made tight with a canvas curtain; two old doors on the northeast crosscut were closed; the curtain closing the entrance to the wooden tunnel was taken down; and half of stopping No. 6 was removed. This arrangement took the air directly to the "C" entry and returned it through the southwest crosscut on the outside of the wooden tunnel to the skipways. Stopping No. 5 was then removed and a canvas brattice built through the center of the "C" entry beginning at the northeast rib of the intersection of the southwest crosscut and the "C" entry and extending south as far as the third west "C" south entry. This permitted the building of board and plaster stoppings

No. 56, No. 57 and No. 58. A glance at the mine map will show that the building of these stoppings (a total of 58 in number) completely separated the shaft-bottom arrangement from the inside mine workings.

FOURTH PERIOD: June 24, 1910. See mine map No 5.

The two old doors in the northeast crosscut were opened; the canvas brattice closing the crosscut between stoppings No. 26 and No. 27 was torn down; stopping No. 6 was repaired; No. 21 was removed; a portion of the wooden tunnel was torn down and a board and plaster stopping was built across the southwest crosscut between "B" entry and the west aircourse; stopping No. 2 was closed and a regulator was made in stopping No. 4. After the above preparations had been completed, the 18-ft. Robinson fan at the airshaft was started as an exhaust, furnishing 27,000 cu. ft. of air on the west split in the mine and 45,000 cu. ft. on the east split. The next day the cleaning-up work was begun on the area thus ventilated.

Notes and Observations.

Gas Analyses: The following table containing 7 gas analyses shows the composition of the airshaft column during the progress of the recovery of the mine-bottom. These samples were taken through a short pipe which pierced the concrete of the airshaft seal and which was equipped with a gate valve. These samples were analyzed by means of a portable Orsat cabinet with combustion pipette attachment for determination of marsh gas.

Number of Analysis	Date	Carbon Dioxide	Oxygen	Carbon Monoxide	Marsh Gas	Nitrogen by Difference.
1	May 9	3.7	0.0	0.5	20.0	75.8
2	May 18	3.6	3.2	0.2	18.0	75.0
3	May 19	3.5	3.5	0.1	16.9	76.0
4	May 20	3.8	4.1	0.1	25.3	66.7
5	May 21	3.9	4.3	0.2	32.3	59.3
6	June 7	2.3	9.8	0.2	8.8	78.9
7	June 23	3.4	9.2	0.1	13.0	74.3
Ordinary fresh air		0.0	21.0	0.0	0.0	79.0

In sample No. 1 which was taken before the seal of the hoisting shaft was broken, it is interesting to note that there was not a trace of oxygen, which shows that the oxygen remaining after the explosions was completely absorbed by the coal. Sample No. 7 was taken just before the air-shaft seal was broken preparatory to the starting of the large Robinson fan; and it is worthy of notice that the air-shaft column remained too rich to explode during the 45 days that the work of bratticing the shaft-bottom from the inner workings was in progress.

Water Gauge Readings: During the early part of May, before either shaft seal had been broken, the readings of the water gauge were reported as shown in the accompanying table. These readings were made at the airshaft with the aid of the pipe through which the gas samples were obtained.

Date	Morning barometer	Water gauge	Evening barometer	Water gauge
May 1	29.78	0.1	29.80	0.0
May 2	29.80	— 0.1	29.74	0.3
May 3	30.16	— 0.3	30.18	0.1

Date	Morning barometer	Water gauge	Evening barometer	Water gauge
May 4	30.28	0.2	30.20	0.3
May 5	30.30	1.1	30.18	0.4
May 6	30.12	0.4	30.02	0.4
May 7	29.60	0.2	--	--

After seal at the hoisting shaft had been broken, the readings of the water gauge, taken at the same place as the above, showed considerably higher, as follows:

Date	Water gauge
May 12	1.4
May 15	1.5
May 18	1.1
May 19	0.9
May 20	0.8
May 21	0.9
May 28	0.8
June 7	0.6

It was generally believed at the mine that as soon as the hoisting shaft seal was broken the water gauge at the airshaft would register zero unless falls of roof completely blocked the entries connecting the two shafts in the mine. When it was found that the water gauge read higher, therefore, it was the opinion of many that the heavy falls, so much feared, had occurred, and it was thought that the extra height of the water was due to the barometric pressure. The above reasoning, however, was false. With one seal broken and the other intact, there would be a water reading at any mine if there was a difference of either temperature or composition of gases in the two air columns. At Zeigler, after the opening of the hoisting shaft, the temperature in the two shafts was nearly identical, but the composition of the gases

was very different, as will be seen from a comparison of sample No. 1 (in the table of gas analyses) which represented the air-shaft column, and ordinary fresh air which went to form the hoisting shaft column. Because of this high water and the known composition of the gases, it was finally decided that there should be a ready connection between the two shafts in the mine. Later developments showed the correctness of this reasoning.

Safety lamps used in this work: In order to be able to test for the presence of marsh gas, the boss of each shift carried an oil-burning safety lamp; but his eight men were equipped with electric safety lamps in order to increase their capacity for work. Mr. Coar used a Wolf safety lamp, Mr. loughron a Davy, and Mr. Johnson an Ashworth-Hepplewhite-Gray. The electric lamps used by the men consisted of an incandescent bulb (with tungsten filament) enclosed in an attachment suitable for an ordinary miner's cap, and connected by a two-wire insulated cable with a battery carried in the hip-pocket.

It is claimed by the makers that these electric lamps may be used in the presence of explosive gases with absolute safety. Nevertheless, during the work at Zeigler, it was feared that a spark caused by the making or breaking of the circuit might explode any marsh gas present, and strict rules were made forbidding anyone to turn his light off or on while in the mine.

The cost of recovery: The total cost of the work described in this report, covering the periods May 9 to June 25, 1910, was $10,000.

Lessons

1. All electric wiring should be of the best installation

and inspected frequently.

2. Oxygen helmets should be tested sufficiently to insure perfect condition. Rubber tubes deteriorate, and potash cells are liable to cake.

3. System is the one great feature in all recovery and rescue work.

Zeigler Mine Fire

by R. Y. Williams.

On November 3, 1908, at about 5 P.M., a fire originated in Ziegler mine, which is situated at Zeigler, Franklin County, Ill. The mine was owned and operated by the Zeigler Coal Company. The mine was opened in 1904 and worked the No. 6 seam of the Illinois series. The seam is 12 feet thick, is practically level, and is under a cover of 417 feet. The mine generates considerable quantities of marsh gas. Labor troubles, explosions and disastrous fires form a large part of the history of this mine.

The first explosion occurred at 7:10 a.m. April 3, 1905. The indirect cause of this disaster was the failure of the ventilating machinery at 11:30 p.m. March 31, making it necessary to shut down the fan for 55 hours and 40 minutes. During this period an attempt was made to obtain ventilation by means of three air-compressors,,the total capacity of which was 3,600 cu. ft. of free air per minute. This volume of fresh air proved insufficient to dilute the marsh gas being generated by the mine, and a squad of men (without having made any previous examination for gas) entered the south run-around between "B" entry and the west air-course and with their naked lights "touched off" the body of gas which had collected at this high point in the mine.

The explosion which followed killed 57 men and badly wrecked the mine. Its force was augmented by the explosion of 41 kegs of black powder stored underground in the mine magazine, and of a large number of additional kegs at the working faces.

Origin of the Fire

The mine was reopened after this explosion and the development

(d) The Cost of Recovery:-

The total cost of the work described in this report, covering the periods May 9th to June 25th, 1910, was $10,000.00.

the men consisted on an incandescent bulb (with tungsten filiment) enclosed in an attachment suitable for an ordinary miner's cap, and connected by a two-wire insulated cable with a battery carried in the hip-pocket of the wearer. It is claimed by the makers that these lamps may be used in the presence of explosive gases with absolute safety. Nevertheless, during the work at Zeigler, it was feared that a spark caused by the making or breaking of the circuit might explode any marsh gas present, and strict rules were made forbidding anyone to turn his light off or on while in the mine.

The following list shows the purchases made for electric mine-light equipment during the above four periods, May 9th to June 25th:- this being exclusive of the cost of recharging the batteries which was done at the mine:-

From the Cogswell Electric Safety Lamp Co.,
Taylorville, Illinois.

6	4-volt Lamps on hand.		
6	4-volt Batteries,.....	$ 36.00	
54	2-volt Electric Safety Lamps.....	351.00	
30	2-volt Batteries.....	75.00	
30	4-volt Tungsten Bulbs.....	15.00	
150	2-volt Tungsten Bulbs.....	75.00	$552.00

From Billey Packing & Flue Brush Mfg. Co.,
St. Louis, Missouri.

6	2-volt Electric Safety Lamps.....	$36.00	36.00
	Total....		$588.00

It was very generally believed at the mine that as soon as the hoisting shaft seal was broken, the water gauge at the airshaft would register zero unless falls of roof completely blocked the entries connecting the two shafts in the mine. When it was found that the water gauge read higher, therefore, it was the opinion of many that the heavy falls so much feared had occured, and it was thought that the extra height of the water gauge was due to barometric pressure. The above reasoning however was false. With one seal broken and the other intact, there would be a water gauge reading at any mine if there was a difference of either temperature or composition of gases in the two air columns. At Zeigler, after the opening of the hoisting shaft, the temperature in the two shafts was nearly identical, but the composition of the gases was very different, as will be seen from a comparison of sample #1 (in the table of gas analyses) which represented the airshaft column, and ordinary fresh air which went to form the hoisting shaft column. Because of this high water gauge and the known composition of the gases, it was finally argued and agreed to by all that there should be a leaky connection between the two shafts in the mine. Later developments showed the correctness of this reasoning.

(c) Safety Lamps used in this work:-

In order to be able to test for the presence of marsh gas, the boss of each shift carried an oil-burning safety lamp; but his eight men were equipped with electric safety lamps in order to increase their capacity for work. Mr. Coar used a Wolf safety lamp, Mr. Loughron a Davy, and Mr. Johnson an Ashworth-Hepplewhite-Gray. The electric lamps used by

forty five days that the work of bratticing the shaft-bottom from the inner workings was in progress.

(b) Interpretation of the Water Gauge:-

During the early part of May, before either shaft seal had been broken, the readings of the water gauge were reported as follows. These readings were made at the airshaft with the aid of the pipe through which the gas samples were obtained.

Date	Morning Barometer	Water Gauge	Evening Barometer	Water Gauge
May 1st,	29.78	.1	29.80	.0
May 2nd,	29.80	- .1	29.74	.3
May 3rd,	30.16	- .3	30.18	.1
May 4th,	30.28	.2	$0.20	.3
May 5th,	30.30	1.1	30.18	.4
May 6th,	30.12	.4	30.02	.4
May 7th,	29.60	.2	- -	-

After the seal at the hoisting shaft had been broken, the readings of the water gauge, taken at the same place as the above, showed considerably higher, as follows:-

Date	Water Gauge
May 12th,	1.4
May 15th,	1.5
May 18th,	1.1
May 19th,	.9
May 20th,	.8
May 21st,	.9
May 28th,	.8
June 7th,	.6

NOTES AND OBSERVATIONS :-

(a) Gas Analyses:-

The following table containing 7 gas analyses shows the composition of the airshaft column during the progress of the recovery of the mine-bottom. These samples were taken through a short pipe which pierced the concrete of the airshaft seal and which was equipped with a gate valve. When a sample of the gas was desired, a piece of rubber tubing was joined to the end of the pipe, the valve was opened, the gas was passed under water in a bucket and was collected in a specially made bottle with tight-fitting, ground-glass stopper. These samples were analysed by means of a portable Orsatt cabinet with combustion pipette attachment for determination of marsh gas.

Number of Analysis	Date	Carbon Dioxide	Oxygen	Carbon Monoxide	Marsh Gas	Nitrogen by Difference.
1	May 9th,	3.7	0.0	0.5	20.0	75.8
2	May 18th,	3.6	3.2	0.2	18.0	75.0
3	May 19th,	3.5	3.5	0.1	16.9	76.0
4	May 20th,	3.8	4.1	0.1	25.3	66.7
5	May 21st,	3.9	4.3	0.2	32.3	59.3
6	May 7th,	2.3	9.8	0.2	8.8	78.9
7	June 23rd,	3.4	9.2	0.1	13.0	74.3
Ordinary Fresh Air,		0.0	21.0	0.0	0.0	79.0

In sample #1 which was taken before the seal of the hoisting shaft was broken, it is interesting to note that there was not a trace of oxygen, which shows that the oxygen remaining after the explosions was completely absorbed by the coal. Sample #7 was taken just before the airshaft seal was broken preparatory to the starting of the large Robinson fan; and it is worthy of notice that the airshaft column remained too rich to explode during the

THIRD PERIOD:- June 23rd, 1910. See Mine Map #4

An old stopping in the crosscut between board and plaster stoppings #26 and #27 was made tight with a canvas curtain; two old doors on the northeast crosscut were closed; the curtain closing the entrance to the wooden tunnel was taken down; and half of stopping #6 was removed. This arrangement took the air directly to the "C" entry and returned it through the southwest crosscut on the outside of the wooden tunnel to the skipways. Stopping #5 was then removed and a canvas brattice built through the center of the "C" entry beginning at the northeast rib of the intersection of the southwest crosscut and the "C" entry and extending south as far as the 3rd west "C" south entry. This permitted the building of board and plaster stoppings #56, #57 and #58. A glance at the mine map will show that the building of these stoppings (a total of 58 in number) completely separated the shaft-bottom arrangement from the inside mine workings.

FOURTH PERIOD:- June 24th, 1910. See Mine Map #5.

The two old doors in the northeast crosscut were opened; the canvas brattice closing the crosscut between stoppings #26 and #27 was torn down; stopping #6 was repaired; #21 was removed; a portion of the wooden tunnel was torn down and a board and plaster stopping was built across the southwest crosscut between "B" entry and the west aircourse; stopping #2 was closed and a regulator was made in stopping #4. After the above preparations had been completed, the 18-foot Robinson fan at the airshaft was started as an exhaust, furnishing 27,000 cubic feet of air on the west split in the mine, and 45,000 on the east split. The next day the cleaning up work was begun on the area thus ventilated.

CSR/ACS

Pittsburgh, Pa., August 20, 1910.

REPORT ON RECOVERY OF ZEIGLER MINE

Mr. R. Y. Williams,

Urbana, Ill.

My dear Mr. Williams:

I received your admirable report of the recovery of the Zeigler Mine and have gone over same. I do not know whether this report will be suitable for publication by the Bureau of Mines or whether it can only be given publicity by sending to journals. I think it will be well to hold this in abeyance for the present. However, I will call your attention to a number of points which I think advisable for you to correct in case the paper is published by either way.

It will probably be advisable to cut out the latter part of the first clause of the introduction.

In the second paragraph of the first page, I note that you state that the seam lies under a cover of 417 feet. It was my recollection that it was considerably deeper than this. The Inspector's report says 505'.

In your statement about the mine fire starting November 3, 1908, you state the fire is supposed to have been caused by crossed electric wires. I was informed by the management at that time that they thought it was due to the trolley line which passed through the doorway and had been short-circuited in some way.

In the description of the fire, I was informed that they were fighting the fire with 25 or 30 men and through some mistake or error of

judgment, the fan was started up at full speed, causing the flame to jump back so fast that the overcast was reached and some of the men fighting the fire were overcome and narrowly escaped. The inference from your statement is that methane had been ignited. Since there was said to be no explosion, this does not appear likely. Regarding the foregoing, I do not mean that you should put this statement in the report without further investigation, but in any case, I think the allusion to the burning gases should be qualified.

It might not be undesirable in the description of the attempt to put out the fire to make the statement that the engineers of the U. S. Geological Survey came on the ground by invitation and used the rescue apparatus to help make examinations of the air shaft. Subsequently the company purchased helmets of their own and continued the work on their own account.

In the account of the second explosion, the information that I have was that they were working on the north side of the shaft and had successfully cleaned up the entries on that side until they had reached the last pair when they were obliged to change the current, since there was but a single passageway at the point "K" and by this means the gases were brought over the place where the fire had started at "G", but prior to doing this, they claimed to have made a very thorough examination with the safety helmets and found everything cool.

There was some question in my mind from information received the day following if a short-circuiting of the electric lines did not originate the explosion at or near the foot of the air shaft. There is also some possibility that two men, who were known to be watching near the foot of the air shaft with safety lamps, might have had an accident or a defective safety lamp.

In the third explosion, it would be very desirable to find where the three men who saw the ignition of the body of gas were standing at that moment.

In the final recovery of the mine, it would be very desirable if you should indicate the part that the helmets played at the beginning of the first period.

I noticed with interest the change in the amount of marsh gas present due to the changes in barometric pressure. This does not appear entirely clear from the barometric figures that you give. I think it might be well to plat the changes on profile paper. It would certainly by more pictorial.

If the article is published, it might not be best to make any particular statement of the exact condition of the rescue apparatus belonging to the company; that is, as to its defects.

In reading of the recovery in the second and third periods, it would appear to me that they were taking somewhat grave chances with so small a fan, and also in allowing the use of an old fashioned lamp like the Davy underground at all.

I think it would be advisable for you to state a little more definitely the use of the helmet apparatus in the advance work and also the methods of conducting individual parties. I do not mean every party, but certain typical parties in the erection of the stoppings, etc.

Regarding the comparison of the water gauge and the barometer in the air shaft, I think it would be well to plat this on profile paper.

As regards the final statement about the cost of the lamps, you will, of course, omit this for a published article.

Mr. Williams 8/20/10

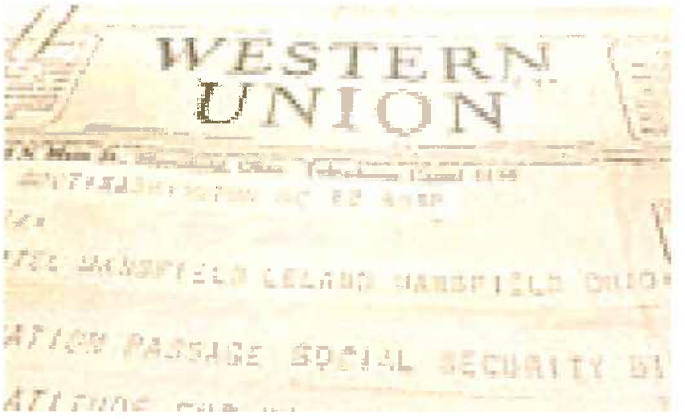
It is quite possible that you could improve the concluding remarks.

Through the body of the text, I think your method of description is excellent and very clear and I very much admire the report as a whole. I think that the maps are also excellent, but you might place on them a trifle more information, like where there were permanent stoppings still standing. This would make more evident the direction of the air currents.

Yours very truly,

Mining Engineer.

c.c. to Director



Telegraph

Dated

11/09/1908 - 05/16/1910

Form No. 2.

THE WESTERN UNION TELEGRAPH COMPANY.

INCORPORATED

24,000 OFFICES IN AMERICA. CABLE SERVICE TO ALL THE WORLD.

ROBERT C. CLOWRY, President and General Manager.

Receiver's No.	Time Filed	Check

SEND the following message subject to the terms on back hereof, which are hereby agreed to. 11/9 190

To Mr J W Gault

of J C Zeigler

Leaving tonight will reach Zeiglers Tuesday noon

Chamberland.

READ THE NOTICE AND AGREEMENT ON BACK.

ALL MESSAGES TAKEN BY THIS COMPANY ARE SUBJECT TO THE FOLLOWING TERMS:

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Correctness in the transmission of a message to any point on the lines of this Company can be INSURED by contract in writing, stating agreed amount of risk, and payment of premium thereon, at the following rates, in addition to the usual charge for repeated messages, viz, one per cent. for any distance not exceeding 1,000 miles, and two per cent. for any greater distance. No employee of the Company is authorized to vary the foregoing.

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Messages will be delivered free within the established free delivery limits of the terminal office. For delivery at a greater distance, a special charge will be made to cover the cost of such delivery.

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ROBERT C. CLOWRY, President and General Manager.

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ROBERT C. CLOWRY President and General Manager.

Receiver's No.	Time Filed	Check
	3.00 P.M.	Government Rates Paid 26

SEND the following message subject to the terms on back hereof, which are hereby agreed to. Ziegler, Ill. Nov. 10 1908

To J. A. Roberts, Geological Survey,
~~Forbes and Butler Sts.~~ Pittsburg, Pa.

Trace oxygen tanks and cartridges sent from station Monday ~~they~~ Not here this noon. Send word to Petersons wife.

Paul

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ROBERT C. CLOWRY President and General Manager.

Receiver's No.	Time Filed	Check
	5 — P.M.	31 Government Rates Paid

SEND the following message subject to the terms on back hereof, which are hereby agreed to.

Zeigler, Ill Nov. 10, 1908

To J. C. Robins, Geological Survey,
Pittsburg, Pa

Hire G. C. Rice, Chicago, & authority to purchase portable gas analysis cabinet cost about forty five dollars, If authority is declined advise Rice.

Paul.

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ROBERT C. CLOWRY, President and General Manager.

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ROBERT C. CLOWRY, President and General Manager.

Receiver's No.	Time Filed	Check
Recd		

SEND the following message subject to the terms on back hereof, which are hereby agreed to. Chicago Ill Nov 11 1908

To J. W. Paul

C/o Zeigler Coal Co Zeigler Ill

Purchased apparatus authorized am sending to you at West Frankfort will arrive early morning train also see letter addressed there

Geo. A. Rice

11/11/08 Recd P.M. J.W.P.

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ALL MESSAGES TAKEN BY THIS COMPANY ARE SUBJECT TO THE FOLLOWING TERMS:

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ROBERT C. CLOWRY, President and General Manager.

THE WESTERN UNION TELEGRAPH COMPANY.

INCORPORATED

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This is an **UNREPEATED MESSAGE**, and is delivered by request of the sender, under the conditions named above.

ROBERT C. CLOWRY, President and General Manager.

NUMBER	SENT BY	RECEIVED BY	CHECK
	Wn	D 22	Paid Govt

RECEIVED at 725 am Nov 1908

Dated Washington DC 15

To J. F. Paul Geological Survey

Benton Ky

Letter returned to Pittsburg early this week if Geiger work can be left with others

Nov 16-08 Recd 9.45 a.m. Mrs. Holmes JWP

Holmes

SEE OTHER SIDE FOR TELEGRAM

SEE OTHER SIDE FOR TELEGRAM

Form 2

THE WESTERN UNION TELEGRAPH COMPANY

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ROBERT C. CLOWRY, President and General Manager.

Receiver's No.	Time Filed	Check
	11.59 PM.	26 Government rates.

SEND the following message subject to the terms on back hereof, which are hereby agreed to.

Altamont, Ill. Nov. 17 1908

To J. C. Roberts,
Geological Survey,
Pittsburg, Pa.

Send bill of lading to Tolsted at Baylor I am enroute Pittsburg.
Paul

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ROBERT C. CLOWRY, President and General Manager.

Form No. 168.

THE WESTERN UNION TELEGRAPH COMPANY.

INCORPORATED

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This is an **UNREPEATED MESSAGE**, and is delivered by request of the sender, under the conditions named above.

ROBERT C. CLOWRY, President and General Manager.

11-23-03 Rec'd. 1-30 P.M. J.M.P.

RECEIVED at

#26 Hd Xn 33 Pd.Gov.Rate.8.03.

Duquoin Ills.Nov.21.

J.W.Paul,

Us.Geo.Survay,Pittsburg Pa.

Will express two helmets and knapapsacks monday please express us fifty cartridges mingramms shipment arrives newyork today from which replacement will be made.

Talsted.

SEE OTHER SIDE FOR TELEGRAM

SEE OTHER SIDE FOR TELEGRAM

Form No. 168.

THE WESTERN UNION TELEGRAPH COMPANY.

INCORPORATED

24,000 OFFICES IN AMERICA. CABLE SERVICE TO ALL THE WORLD.

This Company **TRANSMITS** and **DELIVERS** messages only on conditions limiting its liability, which have been assented to by the sender of the following message. Errors can be guarded against only by repeating a message back to the sending station for comparison, and the Company will not hold itself liable for errors or delays in transmission or delivery of **Unrepeated Messages**, beyond the amount of tolls paid thereon, nor in any case where the claim is not presented in writing within sixty days after the message is filed with the Company for transmission.

This is an **UNREPEATED MESSAGE**, and is delivered by request of the sender, under the conditions named above.

ROBERT C. CLOWRY, President and General Manager.

RECEIVED at

#9G Ri Xn 45 Pd.I0.40.

Zeigler Ills.Nov.26.

J.W.Paul,

U.S.Geo.Survay,Pittsburg Pa.

Am expressing apparatus today one air cushion punctured think we can repair if you have pneumatic tire repair outfit on hand packings in pump leaking badly men entered man hoist last evening everything workin smoothly.

Tolsted.

SEE OTHER SIDE FOR TELEGRAM

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This is an **UNREPEATED MESSAGE**, and is delivered by request of the sender, under the conditions named above.

ROBERT C. CLOWRY, President and General Manager.

RECEIVED at

#3IG Ce Xn 39 Paid.Gov.5.07.

Champaign Ills.Jan.II.

J.C.Roberts,

U.S.Geo.Survay,39th,&,Butler St,Pittsburg Pa.

Tell Paul that Leiter wires will not need assistance but welcomes investigation Williams and self will go to Zeigler tomorrow morning.

Geo.S.Rice.

5/25 Om. Rec'd Jany. 11-09.

SEE OTHER SIDE FOR TELEGRAM

SEE OTHER SIDE FOR TELEGRAM

Form 168

THE WESTERN UNION TELEGRAPH COMPANY.

INCORPORATED

24,000 OFFICES IN AMERICA. CABLE SERVICE TO ALL THE WORLD.

20
1 Pm.

RECEIVED at

23 Sy Jo 18 Paid GR

8011

Urbana Ill May 16-10

Rice Geol Survey Pgh

Webb and I leaving tuesday for Ziegler Ill. with complete rescue equipment.

Williams

SEE OTHER SIDE FOR TELEGRAM

The Western Union Telegraph Company

THE LARGEST TELEGRAPHIC SYSTEM IN THE WORLD. OVER ONE MILLION MILES OF WIRE IN THE UNITED STATES AND CANADA.

It has over 24,000 Telegraph Offices, including Branch Offices. It has also Direct Connection by Telegraph or Telephone with as many more remote and smaller stations, making a total list of over 50,000 in the United States, Canada and Mexico, and this number is rapidly increasing.

Seven Atlantic Cables,

Connecting North America with all points in Europe and beyond, including Two Cables of the American Telegraph and Cable Company, Four Cables of the Anglo-American Telegraph Company, and One Cable of the Direct United States Cable Co.

Direct Wires to Galveston, Texas, connecting at that place with the Cables of the Mexican, the Central and South American Telegraph Companies for all points in Mexico and Central and South America.

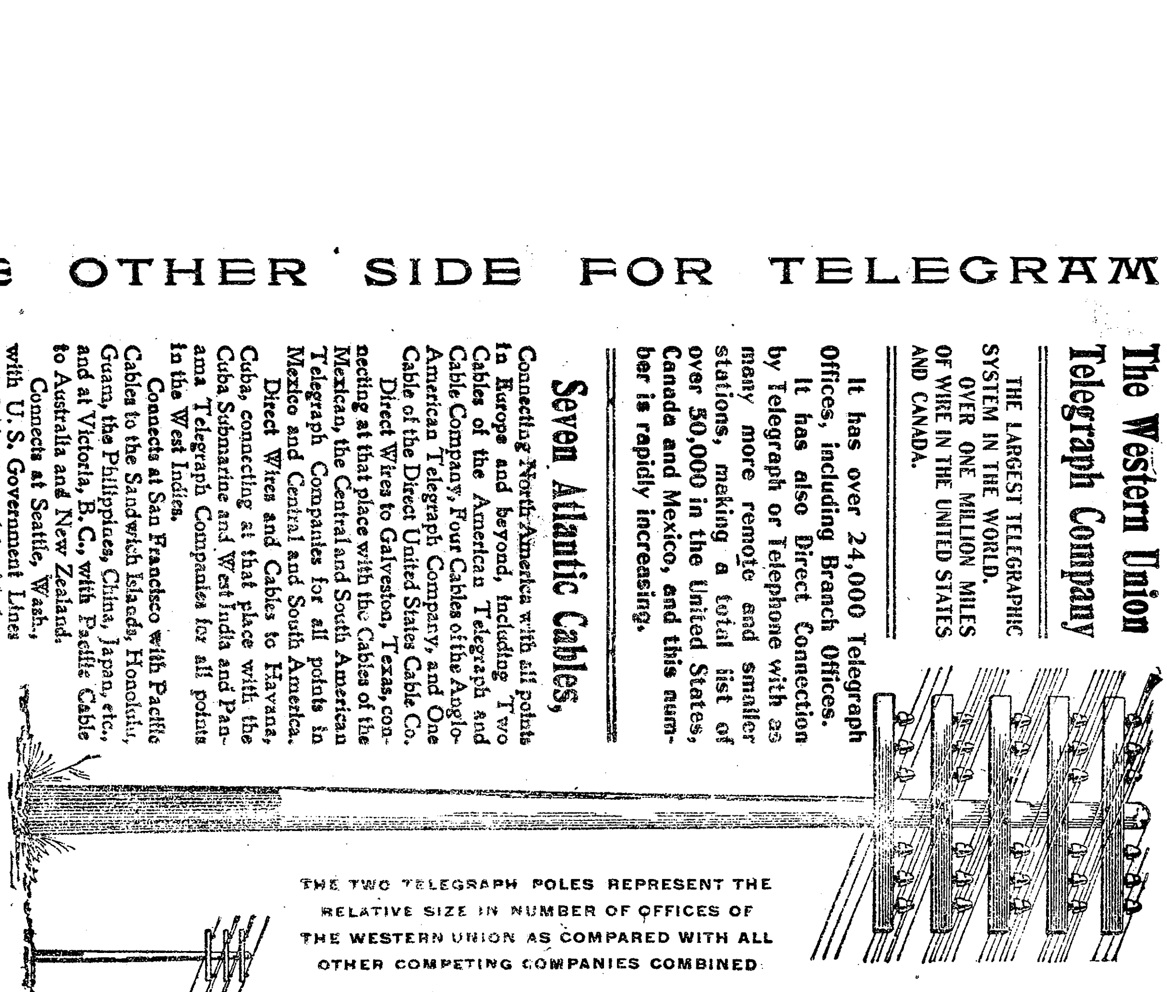
Direct Wires and Cables to Havana, Cuba, connecting at that place with the Cuba Submarine and West India and Panama Telegraph Companies for all points in the West Indies.

Connects at San Francisco with Pacific Cables to the Sandwich Islands, Honolulu, Guam, the Philippines, China, Japan, etc., and at Victoria, B. C., with Pacific Cable to Australia and New Zealand.

Connects at Seattle, Wash., with U. S. Government Lines and Cables to and in Alaska.

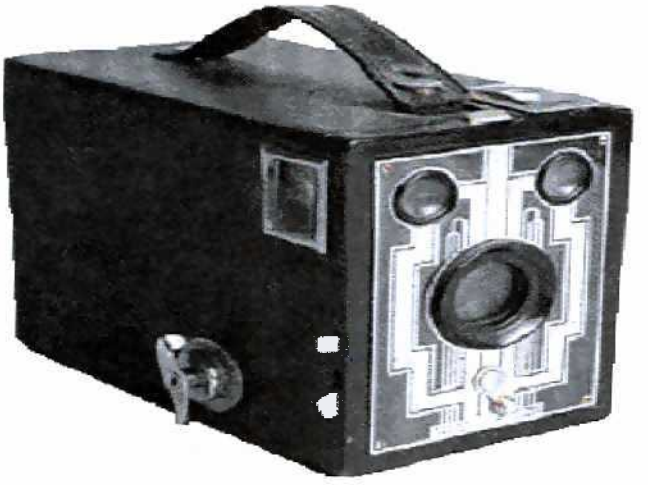
Exclusive connection with the Great North-Western Telegraph Co. of Canada.

Domestic and Foreign Money Orders by Telegraph and Cable



THE TWO TELEGRAPH POLES REPRESENT THE RELATIVE SIZE IN NUMBER OF OFFICES OF THE WESTERN UNION AS COMPARED WITH ALL OTHER COMPETING COMPANIES COMBINED

SEE OTHER SIDE FOR TELEGRAM



Photograph

Dated

1908

A most typical position of Mr. J. W. Paul

Correspondence

Dated

11/11/1908 - 09/06/18

JCR-F.

DEPARTMENT OF THE INTERIOR

UNITED STATES GEOLOGICAL SURVEY

TECHNOLOGIC BRANCH

REFER TO FILE NO.

Pittsburg, Penna., November 11,1908.

Mr. J. W. Paul,

Zeigler,

Illinois.

Dear Mr. Paul:-

I have your telegrams regarding oxygen tanks and have started tracer to follow them today; also received your telegram asking me to authorize Mr. Rice to purchase gas testing apparatus and will wire him today to make purchase.

Will send word to Peterson's wife that he is all right, assuming that this is what you mean.

Yours very truly,

Assistant Chief Engineer.

GEORGE S. RICE
~~CONSULTING~~ MINING ENGINEER U.S.G.S.
1417 FIRST NATIONAL BANK BLDG.
CHICAGO
TELEPHONE CENTRAL 470

Nov 4, 1908

Mr J W. Paul
Mining Engineer U.S.G.S.
West Frankfort Ill

Dear Sir -

As per my telegram of this afternoon, I received the authorization to purchase the portable gas analysis apparatus - After consulting with the Chemist of the Illinois Steel Co who use such apparatus and with Mr Carry-Carr of E. A. Sargeant & Co., I placed an order with the latter and at writing (5 P.M.) I am told it is about to be shipped in your name care Ziegler Coal Co, West Frankfort Ill - going by Wells-Fargo Express Co - Mr Carry-Carr has also written a letter addressed to you at West Frankfort containing some suggestions to Mr Chamberlin - The solutions (reagents) had to be made up especially and we had to take a chance on shipping hot - if they don't come through intact wire to me as early as possible - Please drop me a line telling of matters at Ziegler and Rend -
I asked Sargeant & Co to explain changes -

Yours Truly Geo S Rice

GEORGE S. RICE
CONSULTING MINING ENGINEER
1417 FIRST NATIONAL BANK BLDG.
CHICAGO

TELEPHONE CENTRAL 470

Chicago, Nov. 12, 1908.

Mr. J. W. Paul,

Care Ziegler Coal Company,

Ziegler, Ill.

My dear Mr. Paul:

Mr. G. W. Traer, Prest. of the Illinois Coal Operators Association, has just called me up to say that there is to be a State Commission meeting of the State Mine Inspectors and David Ross and others next Tuesday at Rend to go into the cause of the explosion there. He suggested that I go there and I told him that I should be only too glad under ordinary circumstances, but if I compiled the information that Dr. Holmes desired by December 1st it would be practically impossible for me to go there. However, I told him that if you were still at Ziegler I would let you know, so if you thought best you could go to the meeting.

I am anxiously awaiting news from Ziegler and Rend. If you have not already done so I wish you would send me a line.

Yours very truly,

G. S. Rice

pmk

JWP-W

40th & Butler sts., Pittsburg, Penna.

November 20, 1908.

Mr. E. B. Tolsted,
c/o Zeigler Coal Company,
Zeigler, Ill.

Dear Sir:

The empty oxygen tank which was shipped from Zeigler while I was there has arrived at this Station, but the bill-of-lading has not as yet been received. This bill-of-lading is No. 3515. Please mail same in to Mr. Robison at your earliest convenience.

I wired you to-day at Chicago, upon your return to Zeigler, to send two helmets and knapsacks to the Pittsburg Station, and for you to remain at Zeigler in charge of the other apparatus.

In conversation with Dr. Holmes yesterday, we concluded that it would be advisable for you to remain there until a further effort has been made to get down the hoisting shafts. Please keep me advised as to what progress is made at the mine.

Mr. Peterson reported at the Station to-day and states that there are on hand at Zeigler about 250 K.O.H. cartridges. In case cartridges are on hand at the time you are ordered to take away our material, you will please remember that we left here with 58 cartridges and, I believe, we used about 8 of them at the Benton mine,

Mr. E. B. Tolsted,

leaving 50 of our cartridges used at Zeigler, so it might be well, before packing up our stuff, to suggest to Mr. Leiter or Mr. Gordon that it would be acceptable to have them replace the cartridges that were used.

Yours truly,

Mining Engineer.

Zeigler, Illinois, Nov. 23, 1908.

Mr. Jas. H. Robinson,

United States Geological Survey,

Pittsburgh, Pa.

Dear Sir;-

Enclosed please find bill of lading No. 3515 covering shipment of one oxygen tank Zeigler to Pittsburgh.

I am also enclosing key to padlock on helmet trunk which I am shipping today. In case Mr. Paul is in Pittsburgh please turn this key over to him or if he is not there kindly give it to Mr. Hall with information as to what it is for.

Yours truly,

Elmer B Johnstead

Zeigler, Illinois, Nov. 23, 1908.

Mr. J. W. Paul, Mining Engi er,

United States Geological Survey,

Pittsburgh, Pa.

Dear Sir;-Please find enclosed bill of lading No. 4392 covering shipment of two helmets with knapsacks and three tubes as per your telegram ofNov. 20th. Before shipping the yellow box I bought from the coal company a padlock and I am enclosine one key for same. The other key I am sending to Mr. Robison with bill of lading No. 3515 and am asking Mr. Robison to turn this ove key over to you if you are in Pittsburgh or to Mr. Hallin case you are out of town.

I wired you from Du Quoin last evening asking you to send 50 cartridges and statingthat Mr. Mingramm's shipment was to arrive yesterday and that the replacement would be made from New York. There were 25 cartridges on hand when Mr. Peterson left instead of 250 as he stated to you and with 50 which Mr. Mingramm shipped us last week we have about 75 on hand.

As stated to you over the phone Mr. Leiter is having a hole drilled just south of the water tank. This will be finished this evening and he expects to turn into it about 50,000 gallons of water. He is also connecting a steam line and expects to turn steam down this same hole later. MacVicker went to Pitts-burgh when the air-shaft was sealed and is expected to return this evening bringing men with him to take charge of the shift of men who go down with the helmets. Cox went to St. Louis and was seen getting on a train going to Pittsburgh. It seems to be the general feeling that he will not return. Anair-lock has been placed above the man-hoist and it will be necessary for all men to put on the helmets before going down the hoist.

Since the air shaft has been closed a man has been kept stationed there with instructions to record the temperature and direction of flow of the gases... thru the pipe which was put in the seal. The flow has been outward at all times,,though occasionally it was barely perceptible. The temperature, I am told has been fairly constant at 59 degrees Fahrenheit.

The Benton Coal Co. had a windy shot in its mine last Thursday evening which resulted in the death of two men. The shot-firers had divided as they did in the Rend mine and were to meet at a given place at about midnight. For some reason which I have not been able to learn there were four men in one party. When the two men in the other party arrived at the meeting place they did not find the others there and could not hear their shots so they went after them. The men were found close to where they had started work and had fired only two or three shots. Two were burned, one of them so badly that he died later. Two were overcome with gas and a message was sent to Mr. Gordon at Zeigler asking him to send the doctor. Doctor Aderhold with two men from the mine started within a half an hour taking with them the two resusitating boxes. One man was stiffening when the doctor arrived and the secondwas breathing a little.(I am speaking now of those who were overcome with gas.) The doctor directed that oxygen be given to the second without any artificial respiration. The doctor used the oxygen and artificial respiration on the other man knowing however that it was useless. When the party left about three hours later the second man was conscious and was able to answer simple questions. A telephone message from Benton this evening stated that he is improving steadily.

Yours truly,

Elmer B Jolstad

JWP-W

40th & Butler sts., Pittsburg, Pa.,

November 23, 1908.

Mr. E. B. Tolsted,
c/o Zeigler Coal Company,
Zeigler, Ill.

Dear Sir:

I have your wire of the 21, requesting 50 potash cartridges, which I am expressing you to-day by Adams Express in a box and a barrel, and enclose herewith Government bill-of-lading for the same. After signing up the bill-of-lading, you will deliver the same to the agent at Zeigler and return the memorandum copy to this office.

As soon as the Zeigler Coal Company's helmets arrive, please pack up all of our material and forward to Pittsburg. At the same time, make a memorandum of all of the material and equipment that Mingramm has at the mine, and which was shipped from this Station, noting especially the supplies that belong to the Pittsburg-Buffalo Company.

Yours very truly,

J. W. Paul.

Mining Engineer.

Enclosure.

ZEIGLER COAL COMPANY

JAGO OFFICE:
VT VAN BUREN ST.

ZEIGLER, ILL., Nov 30th 1908.

My Dear Paul—

We are arranging to introduce into the pit SO$_2$ as you suggested to put the fire out having gotten batties in to confine the gas to the fire area.

I suppose that you are busy over the Marianna explosion or I would ask you to come out and see it working. Shall be glad to hear your views the result of our observations and conclusions. Thanking you for the suggestion I am

Yours very truly

Joseph Seaton

Zeigler, Ill, 6/11/10

Dear Mr. Rice:—

According to your recommendation Mr. Wilson wired me to attend the Chicago Convention of the Mine Inspectors Institute next week, and I am arranging to do so.

The work at the mine is proceeding slowly but surely. Falls and water make the advance difficult, not mentioning the gas to handle. Thus far 31 Board & Plaster stoppings have been erected in carrying out the general plan of building a line of breattices around the outside of the shaft bottom arrangement and shutting off all the work-entries. If this work is successful, an area will be recovered containing both shafts and measuring about 500 ft wide by 1700 ft long. The helmets have been used occasionally. Yours Resp. Williams

36

IN ANSWERING REFER TO No.-----

DEPARTMENT OF THE INTERIOR

BUREAU OF MINES

WASHINGTON

Urbana, Illinois, January 15, 1918.

1/18/18 Gmp.

Mr. J. W. Paul,
Bureau of Mines,
Pittsburgh, Pa.

My dear Mr. Paul:- Zeigler Explosion Reports.

I would like to obtain copies of all reports of explosions at Zeigler mine that have been investigated by the Bureau, especially the explosion of January 10, 1909, in which 26 men were killed. I wish these reports for the purpose of learning the past explosion history of this mine, in order to handle intelligently the situation that now exists there.

I have heard some criticisms of the Bureau's action in connection with the explosion of January 10, and I am extremely anxious for this reason to obtain all the information possible about it.

If there have been any confidential reports, if it is possible to do so, I would like to receive copies of them also.

Very truly yours,

W B Plank

WBP/AEC

JWP:AHE

DEPARTMENT OF THE INTERIOR
BUREAU OF MINES
PITTSBURGH, PA.

January 18, 1918.

ZIEGLER MINE

Mr. Plank,

In reply to your letter of January 15, there is being sent to you herewith file copy of report on several fires and explosions which occurred in the Ziegler mine beginning April 3, 1906, this report having been compiled by R. Y. Williams, July 7, 1910.

You speak of some criticism concerning the explosion of Jan. 10, 1909. The Bureau's engineers were not able to do anything in connection with this particular explosion for the reason that at the time of their arrival the mine was sealed, and the only real activity that the Bureau took was in finally opening the mine.

As the copy I am sending you is the only file copy that we have, please handle it carefully and return it to Pittsburgh when you are through with it.

Yours very truly,

J. W. P.

incl

IN ANSWERING REFER TO No.----------

DEPARTMENT OF THE INTERIOR

BUREAU OF MINES

~~WASHINGTON~~

Urbana, Illinois, January 22, 1918.

Mr. J. W. Paul,

Bureau of Mines,

Pittsburgh, Pa

My dear Mr. Paul:- Zeigler Explosion Report.

I am in receipt of your letter of January 18, regarding the several fires and explosions in the Zeigler mine, together with a copy of Mr. R. Y. Williams report on the recovery of the Zeigler Mine, dated July 7, 1910.

I am very glad indeed to receive this report, and will handle it carefully and return it to Pittsburgh when I am through with it, as you have requested.

Very truly yours,

W. B. Plank

WBP/AEC

DEPARTMENT OF THE INTERIOR

BUREAU OF MINES

MINING EXPERIMENT STATION, URBANA, ILLINOIS

September 6, 1918.

Dear Mr. Paul:

I am enclosing herewith a report on the recovery of the Zeigler Mine by R. Y. Williams, July 7, 1910. This report was sent to me from your office on January 18, with request that it be returned to you when I was through with it. I have had a copy made of it which will be retained in the files of this office.

Thanking you very much for the use of this report, I am,

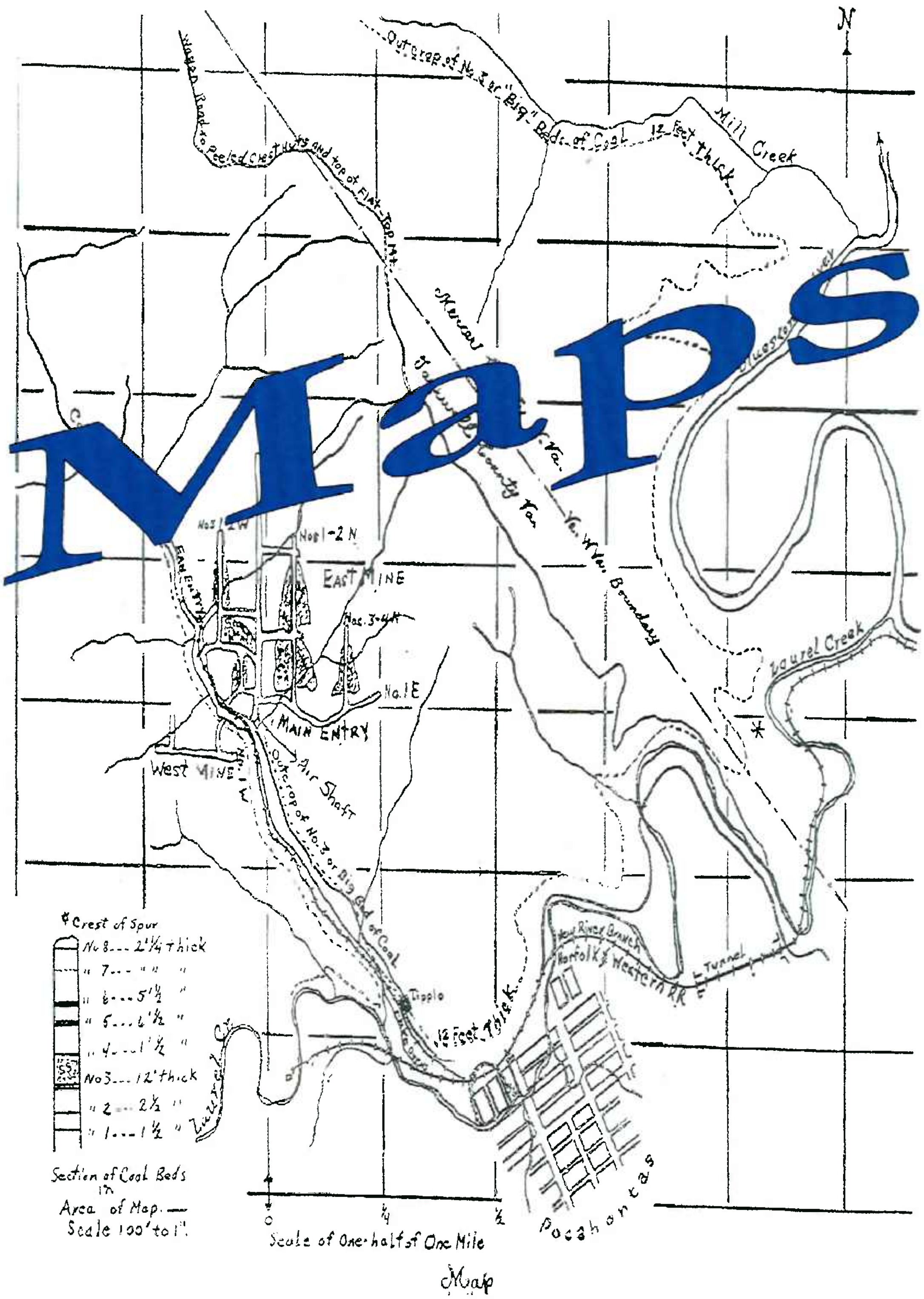
Very truly yours,

J. W. Paul

Inclosure No. 2233

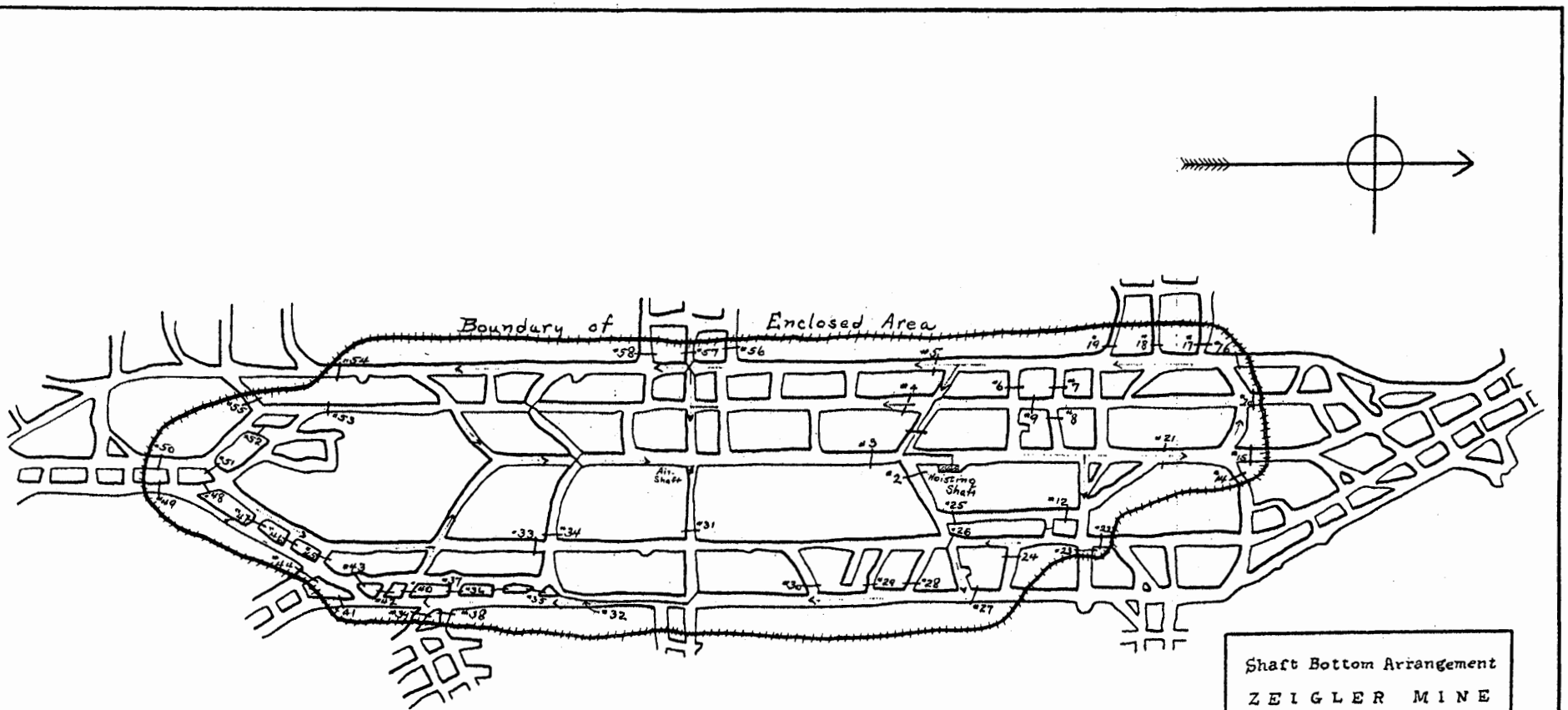
J.W.P. 9/11/18 Files

Maps



N
Outcrop of No. 3 or "Big" Beds of Coal 12 Feet thick
Mill Creek
Wagon Road to Peeled Chestnuts and top of Flat Top Mt.
Mercer County W. Va.
Tazewell County Va.
Va. W. Va. Boundary
Laurel Creek
EAST MINE
No. 1-2 N
Nos. 3-4 N
No. 1 E
MAIN ENTRY
West MINE
Air Shaft
Outcrop of No. 3 or Big Bed of Coal
Tipple
12 Feet Thick
New River Branch
Norfolk & Western RR
Tunnel
Pocahontas
Crest of Spur
No 8 --- 2 1/4 thick
" 7 --- " "
" 6 --- 5 1/2 "
" 5 --- 6 1/2 "
" 4 --- 1 1/2 "
No 3 --- 12' thick
" 2 --- 2 1/2 "
" 1 --- 1 1/2 "
Section of Coal Beds in Area of Map. Scale 100' to 1".
0
1/4
1/2
Scale of One-half of One Mile

Map



Shaft Bottom Arrangement

ZEIGLER MINE

Zeigler, Illinois.

Scale 1" - 200'

Traced by RYW 1910