Historical Summary of Mine Disasters in the United States VOLUME I - Coal Mines - 1810-1958

March 13, 1884; Laurel Mine, Pocahontas, Va.; 112 Killed

(From Bureau of Mines Bulletin 20, pp. 20, 29)

The night shift was in the mine at 1 o'clock in the morning when the explosion shook the ground and dwellings for half a mile around the mine. None of those in the mine survived. The mine consisted of five openings from the outcrop in a ravine into the hillside. Cars, timbers, and debris were hurled from the openings with awful force. The fan, the mine buildings, and surroundings on the surface in front of the openings were demolished. Fire succeeded the explosion in the mine, and all that could be done was to seal the openings as the fire and smoke rapidly increased. After the sealing, steam was conveyed into the mine from five boilers. The mine was flooded, then opened, and the bodies were recovered in April. It was thought that dust, with possibly some gas, was fired by blasting. Gas could not be found in the mine after the explosion, although some claimed to have found it while working there before the disaster. The mine was considered nongassy, and no safety lamps were used. Ventilation was of a low order. Blasting was done at the end of each shift. Shooting was "off-the-solid," using excessive amounts of black blasting powder. The mine was very dry and dusty.

Reports

March 1884

East Coal Mine

THE VIRGINIAS

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Jed. Hotchkiss, Editor

The Pocahontas Coal Mine Explosion

Nothing has ever occured in the mining history of Virginia that has attracted so much attention and elicited so much comment, both wise and unwise, as the great calamity, in the form of an explosion, that took place in the East coal mine of the Southwest Virginia Improvement Company at Pocahontas, Tazewell county, Virginia, at about half past one o'clock of the morning of Thursday, March 13th, 1884, which occasioned the death of at least 114 miners, mine bosses, and others employed in that mine, not one escaping to tell the story, from personal experience, of this great and hitherto unexampled disaster; one of a kind, that, so far as we know, never before happened in the history of mining operations in the coal beds of the Carboniferous series in Virginia and West Virginia.

We visited the scene of this explosion on the 17th and 18th of the month, as soon after it as we could reach Pocahontas where every possible facility was furnished us by the officers of the company for obtaining information concerning the condition of the mine and of the conduct of mining operations therein when this explosion took place, placing at our disposal the working maps of the mine, completed to the time of the accident, and the regulations in force at the mines, leaving us free to investigate this great calamity as fully as we might desire,--it being the wish of those in authority to have the fullest and widest publicity given to the facts of the circumstances attending this sweeping calamity that instantly deprived so many human beings of life and blighted (temporarily it is true) the fair prospects of a mining company just as it was entering upon a career of prosperity after the large expenditure of money, time and talent necessary for the inauguration of such a great enterprise.

We have had the maps of this mine and its vicinity and that of the mine itself as it was at the time of the explosion, engraved expressly for "The Virginias"; they accompany this issue and explain, more clearly than words possibly can, the facts of the method of working this mine, of the extent of the present workings, of the system of ventilation in operation there, the lay of the No. 3 "big bed" of coal there worked, etc.--Before stating what is known concerning this explosion we will briefly present the facts of the location and condition of these mines and of the coal bed in which they have been driven.

A reference to the map on page 15 of this volume of "The Virginias" will show a branch railway--the New River branch of the Norfolk & Western Railway--terminating in the northern angle of Tazewell county, Virginia; at the end of that branch road is the mining village of Pocahontas, in Virginia, though but a short distance from the line of West Virginia. The map on the next page shows the plan of Pocahontas and the position of that village in reference to the mines of the Southwest Virginia Improvement Company, the Norfolk & Western RR., the state line and Bluestone river and some of its tributaries.

The area shown on the following map is about two and a quarter square miles of the end of a southeastward projecting spur of the Flat-top mountain, a spur that is bounded northeast by the deeply trenched ravine-like valley of Mill creek, southwest by the similar valley of Coal run, and southeast by Laurel creek and Bluestone river, which flow in the same general northeast direction. The mouth of Mill Creek is 2,254' above tide, that of Laurel creek 2,270', and that of Coal run near 2,315', making a fall of about 60' from the mouth of Coal run to that of Mill creek; so the "big" or No. 3 coal bed, the one mined at Pocahontas, that has the bottom of its outcrop but a few feet above the level of the mouth of Coal run, has the same bottom outcroping more than 50' above the mouth of Mill creek, the coal bed maintaining nearly the same level along its southeastern outcrop while the streams fall to lower levels as they flow to the northeast, trenching more and more deeply into the rock formations they traverse.

The "Peeled Chestnuts" road, that appears as a light line along the general course of the Va.--W. Va. boundary, starting from the level of Laurel creek, winds up and then runs along very near the crest of this State-line spur. At the point on this road marked by a star, about a mile northwest from Laurel creek, this crest is about 300' above Laurel creek; so the section of the part of this spur shown on the map would be one of some 300' above the mouth of Laurel creek. This section is given on the map, showing three fine beds of semi-bituminous coal in the lower portion of this spur. Coal beds Nos. 1 and 2 are below water level at Pocahontas, but No. 3, the "big bed," with its full thickness of twelve feet, and its massive overlying sand-rock are striking objects in the face of the spur in front of that village. Not far down the Bluestone, beyond the limits of this map, that river reaches the bottom of the Lower Coal Measures, Rogers' No. XII, in which the coal beds here shown are found, and soon trenches deeply into the New River red shales, those of formation No. XI. To the northwest, a few miles distant, this spur and the successively higher and higher ones that, parallel with it, rise on the northeast, run into Flat-top mountain, the eastern escarpment of the Great Carboniferous group, which there contains and exposes more than a thousand feet of the Lower Coal Measures, those which our Pennsylvania geological friends are pleased to call the "Pottsville conglomerate," but which here contain a dozen beds of the best semi-bituminous coking coal known, including, besides the 12-feet "big bed," four beds that range in thickness from 4' 9" to 6' 6".

These Lower Measures coal beds that outcrop above water level in the eastward slopes of Flat-top mountain and its spurs, dip to the northwest and pass through that mountain, coming to day again in its westward slopes and spurs on the waters of the Big Sandy, Guyandot and other rivers of the Ohio. It follows from this that on ascending the streams that flow from Flat-top to Laurel creek and Bluestone river, each of these coal beds will at some point pass under the level of these streams, just as the outcrop of the "big bed" is shown on the map approaching Mill creek and crossing Coal run; hence mining operations on the eastern side of Flat-top will at first begin up these lateral creeks, near where the coal beds take cover, and be continued eastward, so as to be level and drainage free; just as the Pocahontas mines are located and worked. So far the operations there have found the "big bed" of uniform thickness, resting on a remarkably uniform floor diping very moderately from 15' to 20' to the mile to the northwest. The main entry at the Pocahontas mine was made about a half mile up Coal run; the fan, or fartherest entry, was made three-fourths of a mile up, but still a fourth of a mile below where the big bed takes cover.

The plan of mining operations at Pocahontas is shown on the map on page 47, a photographic reduction of a tracing of the working plan of the mine, on a scale of 50' to 1', in the office of the S. W. Virginia Improvement Co., the owner and worker of the mines at Pocahontas; this map is ruled in 500' squares.

The main entry, with a width of 10' and a height of 9' to 12', (depending on whether the whole bed is cut through or not), commencing on the northeast side of Coal run, 3/4 of a mile northwest of Pocahontas, has been entered due north for about 2,300', most of the way as two parallel drifts, to regulate ventilation, with a wall of coal 25' wide, cut by cross entries into sections each approximately 100' long. From the main entry entries are turned to the east--No. 1 at about 150' from the entrance, No. 2 at about 725', and No. 3 at about 1,500', each doubled like the main entry and for the same reason; while to the west are turned entries Nos. 1, 2, and 3 at 280', 540', and 925', respectively, from the entrance.

Parallel to the main entry, about 500' from it to the east, are entries Nos. 1 and 2 north, extended 1,400', separated by walls of 25' of coal up to No. 2 east and of 50' between Nos. 2 and 3 east, divided into sections by cross entries; from these two north entries working chambers have been mined, as shown on the map. To the east of Nos. 1 and 2 north, parallel and 500' distant, are entries Nos. 3 and 4 north, extended some 800', worked and mined like Nos. 3 and 4, but not to the same extent. The main entry and Nos. 1, 2, 3, and 4 north are connected at their southern ends by No. 1 east and the "air-course," extended some 400' beyond No. 4.

From the left of the main entry at 270', 540' and 925', respectively, entries Nos. 1, 2, and 3 west turn to the west; No. 1 in 330' runs to day as entry No. 1 west on Coal branch 390' above the main entry; No. 2 west in 500' runs to day, as entry No. 2 west, 510' up the creek from No. 1 west; and No. 3 west in 650' runs to day as the "fan" or No. 3 west entry, 150' up Coal run from No. 2 west. From No. 3 west a double entry, Nos. 1 and 2 west, extends north some 500' parallel with the main entry; from this as well as from Nos. 1 and 2 west chambers have been mined, and from some of those of No. 2 west the pillars have been robed, those lined diagonally.

The area of mining operations in the East mine, rejecting the extension of the main entry, are embraced in a square of 1,500' sides, or about 52 acres; but the area actually worked out would not be more than 15 acres.--We have reported the actual output of these mines from the time of the beginning of shipments in May, 1883, to March 1, 1884, as 177,322 tons. This 12-feet coal bed will yield 12,000 tons to the acre; so the entire output could have been taken from 15 acres. The entries proper of this mine, as numbered on the plan, would make a length of from 3½ to 4 miles.

The levels of the East mine at several points are given on both maps, refering to the mouth of the main entry as the datum level; this on the map on page 34 is marked o'; in that on page 47 it is put down as 100'. Calling the mouth of the main entry o', or zero, the entrance to No. 3 west, from the main entry, is 26' higher, and the north end of the main entry is 42' higher; the entrance to No. 1 north is 8' higher and that to No. 2 east from No. 1 north is 21' higher; the entrance to No. 1 west, from without, is 9' above the main entry, that of No. 2 west from without, 18', and that of the fan entry is 21' higher; the air-bridge is 23' above the mouth of the main entry.--These are important elements in the problem of the ventilation of this mine.

The ventilation of the East mine was effected by a Murphy fan, with arms of 8' radius, placed at the fan entry, the one farthest up Coal run, operated by a steam engine in an attached building; the fan acted as an exhaust, drawing the air that entered at the "air-shaft," or entry, through all the workings of the mine in the direction shown by the arrows in the entries on the map on page 47, the course of the current being made direct and continuous by ventilating doors in charge of door boys.--The capacity of the fan in use was far greater than any demand of the mine with its present area; in fact, so far as we could learn, and from our own experience, there was always a superabundance of fresh air in this mine and the draft of the current passing from the air-shaft to the fan entry was often uncomfortably strong. It is in evidence that some 20 minutes before the explosion took place, L. M. Hampton, the night mine boss, who perished in the mine, sent orders to the engineer in charge of the fan to slacken the speed of the exhaust, "the current of air being so strong in the mine that it blew out the miners' lamps."

The rules for the government of those employed in the mines at Pocahontas, which we found posted at the entrance to the mine, and elsewhere, we give in full on page 45. These are full and plain, providing for all the emergencies which experience had hitherto suggested as necessary to expect in mining in the regular above-water-level bituminous and semi-bituminous coal beds of West Virginia, Pennsylvania and other states, as these were the first mines of this character ever worked to any extent in Virginia.

The explosion.--The known facts concerning the explosion are but few. Mr. W. H. Cochran the general mine boss, had charge of the mine on Wednesday, March 12th., up to 6 p.m., when the night shift of miners took the place of the day shift. He reports that he left everything in perfect order as far as he could see, with a good circulation of air in every part of the mine. When he left he put the mine in charge of the night mine boss, L. M. Hampton, and retired to his dwelling near the fan entry. Nothing unusual occured until about one o'clock Thursday morning, when Hampton sent a messenger to the engineer at the fan entry to slacken the speed of the fan, as before stated. About twenty minutes after one the first explosion, according to Mr. Cochran, took place, evidencing itself to him by a loud and heavy report following a rush of air and a rattle of fragments like a hail storm, which aroused him from his bed just as a cloud of blazing coal dust with fragments, of timbers--mine props from near the entrance to the mine-- and other materials blew in his window, broke up his bed and other furniture, filling his room with dust and smoke. His house was directly in front of the fan-entry on the opposite side of the Coal run ravine; some of the broad shanties near this house were blown down, others were not. The map shows that the directions of entry No. 2 west and of the fan entry converge; the rush of air from these two entries, laden with coal dust and mine debris, met against the steep bank on the opposite side of Coal run and rushed up the lateral ravine that puts in there from the west, carrying a volume of coal dust and fragments of wood for some distance up that ravine, but not across the spur of the mountain on that side as has been stated. The force of the explosion, in so far as the outside of the mine was concerned, was greater at this point than elsewhere for the reason stated, and its effects could be seen on the trees and on the ground on the side of the ravine for about 100 yards up and down the run, but no trees of any size were uprooted and the observable effects of it were not greater than a wind of 100 miles an hour could produce. Mine cars that were on the track in the mine were forced out with great velocity, so that these cars were hurled across the ravine, by the force of these converging blasts, and dashed to pieces against the bank and the large trees there standing. Similar blackened spots are opposite the main entry and entry No. 1 west, but they are not more than half as large as the one above described nor is there anything to show that there was as great a rush of air at these entries as at those above.

Nothing outside of the mine was set on fire nor were any of the trees chared, although coal dust penetrated the bark of some of the larger trees quite deeply. Mr. Cochran says he heard five distinct reports from the explosion, but a locomotive engineer, who had just pushed a train of mine cars into the main entrance, reports that he heard but three.

After sending for Supt. W. A. Lathrop, Mr. Wm. H. Cochran, the inside mine boss, an old Cornish miner, accompanied by two miners, Wm. Whitaker and John Peters, went some 300' up the main entry, to just beyond the entrance to entry No. 1 west, when they were driven back by after-damp; no bodies were seen. Soon after, with the same miners and John Jones, outside boss, he went up the main entry to No. 1 east, which he followed some 200', or about halfway to No. 1 north, where a mutilated body was seen. They then returned to the main entry and went up it about 500', or nearly to No. 2 east, where another body was seen nearly covered up with scale coal; just beyond this point it was found unsafe to go, on account of after-damp, so they returned to entry No. 1 east again and went up it to near No. 1 north, where was seen a portion of the blackened leg of a man; they were again forced to retire.--Some time afterwards Mr. Cochran, with Sam. Morley, Geo. Britton and a Hungarian, entered the air-shaft and followed the air-course and penetrated No. 1 east some 700', or nearly to No. 3 north, where were found two bodies, the clothes of one of them on fire; a little further on the Hungarian stired up burning slack coal with his foot and they beat a hasty retreat, realizing that the mine was on fire, and that they would be speedily suffocated, as it was they were all sickened by the foul air.

Wm. Culbreth, assistant mine boss, and Tom. Harman, both experienced miners, about 10 a.m. of the 14th, entered No. 1 east entry, by the air-course, some 200', where they found in the entry a mass of burning coals which forced them to return. Their report convinced Supt. Lathrop that the mine was on fire, and that it was useless to make further efforts to penetrate to the workings and recover the bodies of the miners; he then ordered the entries to be closed, hoping thereby to keep the fire from spreading.

Very soon after the explosion Supt. Lathrop telegraphed to the Midlothian coal mines, Chesterfield county, Va., asking that some of the mine bosses and miners who were accustomed to work in the mines of that locality, which are very deep, under water-level, and where fire-damp and other deleterious mine gases are frequently encountered, would speedily come to Pocahontas, bringing safety lamps, etc., and aid in recovering those entombed in the mine, or at least their bodies, and in ascertaining the condition of the mine. In response to this request Col. George S. Dodds and Mr. Wm. Clifford, mining experts, and a party of experienced miners

at once left for Pocahontas by special train; they arrived there about 5 a.m. of the 14th, the day following the explosion. In the meantime Supt. Lathrop had removed the small fan at the entrance to the West mine and erected it at the fan entry of the East mine, hoping that by its aid the mine could be ventilated so it could be entered. After the arrival of Col. Dodds and party and an examination of the condition of affairs, it was decided that it would be dangerous to use this fan, as it would only promote the conflagration within; it was also decided that the mine could not be entered in its present condition. A conference of the mining experts present led to the conclusion that the only thing to do was to close all the entrances to the mine as tightly as possible, with double brattices, or partitions of heavy timbers with some 8 ft. of fire-clay tamped in between them, this making a water-tight dam across each entrance, and then to proceed at once to inject steam into the mine, as this could be done speedily from the engine at the machine shop and from the locomotives at hand; and then to make preparations to flood the mine with water from Coal run. This sealing up of the mine was speedily accomplished and several engines put to work forcing in steam. The Midlothian party returned home on the 15th, as they could be of no use at Pocahontas. The same day Mr. J. P. Ilsley, President of the Southwest Va. Improvement Co., arrived from Philadelphia, where is the principal office of that company.

After it had been decided to flood the mine a steam pump of large capacity was obtained from the Crozer Steel & Iron Co., at Roanoke, Va., and attached to the engine at the machine shop near the fan entry. Mr. C. H. Duhring, the President of the Flat-top Coal Co., (the one that is arranging to very soon open a number of mines in this "big bed" of coal in the lands northeast of Mill Creek, which will be reached by an extension of the N. & W. Ry., down Bluestone river), who has had a large experience in the boring of oil wells in Pennsylvania, happened to be in Mercer county at the time of the explosion; he promptly came to Pocahontas, as also did Mr. J. H. Bramwell, Superintendent and Mining Engineer of the same company, offering their assistance. When it was decided to flood the mines it was well known that it would be necessary to have shafts sunk from the surface of the ground above, on the State-line spur, down to the ends of the entries, so that vent could be had for the air and gases that the inflooding water would force to the upper levels of the mine. Mr. Duhring suggested that the speediest way to get these shafts would be to bring from the oil regions a well-boring outfit and bore 6' holes down through the strata from the surface,--offering at the same time to go in person to the oil region and procure this outfit and experts to drill the holes. His offer was accepted and he left on the 15th, and in a few days had the men and machinery at Pocahontas and the work of drilling out these shafts is now in progress. It was thought that the deepest one would not be more than 250' deep, but levels were being run to ascertain the exact depth when we left.

Up to this writing, March 19, it is reported that 114 men and boys were in the mine; 65 of these were whites--26 of them Hungarians, the others a few French, Germans and Italians, and the rest mainly from Virginia, West Virginia and North Carolina,--and 49 blacks, mostly from Virginia. Of course all of these have perished, and probably some others, as the miners were in the habit of taking in with them men not regularly employed to aid them in their work.

This sums up all that is really known concerning this remarkable explosion up to this time. The newspapers of the country have been filled with all sorts of exaggerated statements concerning the outside effects of the explosion and of what was seen by those that succeeded in entering short distances into the mine; still worse have been the lying statements that have been circulated in reference to the conduct of the two or three hundred miners left at Pocahontas without mining employment by this explosion. Everything there has been quiet and orderly and there has been but little open lamentation, for the reason that not more than a half dozen resident families lost relatives in the mine. Not a body or a fragment of a body has been exposed to daylight. The Superintendent immediately after the explosion, offered employment to all the men there in clearing away the rubbish around the entrances, righting the railway tracks, closing the entrances to the mine, and in a general clearing up of the ground around the village and the mines, which had been neglected because of the pressing demand for coal--of which the mine was putting out from 1,000 to 1,400 tons a day--which absorbed all the labor that could be procured.

On the 17th, the Monday after the explosion, men were at work erecting a fan at the entrance to the West mine and repairing the railway track so that mining operations could at once be resumed in that mine, and we saw a notice posted asking all miners that wished employment in that mine to report for duty. Many of the 200 coke ovens were in blast and others would be put in at once, as there is a large bank of slack coal, that removed from the main entry in driving it to begin regular mining, near the main entrance, that can be used in the coke ovens.

Of course there is a feeling of sadness and gloom prevalent throughout this little mining town, but the miners know that the company has suffered great pecuniary loss, that it has done all that could possibly be done to rescue their friends and comrades from the mine or to recover their bodies, and that they have its sympathy and aid, which have been authoritatively tendered by a meeting of the directory in Philadelphia, and extended by the officials at Pocahontas. Whatever may have been the cause of the explosion the intelligent ones of the miners do not consider that there has been culpable negligence in the management of the mine; it has been as carefully operated as the very best in coals similarly disposed.--No men ever behaved better under similar circumstances than

have these men, though representing so many nationalities as well as two distinct races. They deserve well of our people, and we hope the following appeal, on which we see the names of the worthy superintendent, Mr. W. A. Lathrop and his most estimable wife, for the aid of the families of the victims of the disaster, will be liberally responded to:

Pocahontas, Va., March 29, 1884.

Editor Lynchburg Daily News: We understand that some malicious minded person or persons have been circulating reports to the effect that we are not in need of funds for the alleviation of the suffering of those left destitute by the recent disaster at this place--and the result has been a meagre response to the call for aid. Trust you will publish and other papers charitably inclined will please copy the appended proceedings of a meeting. Any aid in the shape of money or food and provisions will be thankfully received and receipted for by Mr. E. S. Haney, Treasurer of the Relief Committee. Calls for help come in daily from widows at a distance who have lost their husbands in the mines.

J. O. Moore, Secretary.

Pocahontas, Va., March 19th, 1884.--At a meeting of the Citizens' Relief Committee held tonight to solicit subscriptions of aid to the sufferers of the recent disaster, the following officers were elected:

President, W. O. Davis; Secretary, J. O. Moore; Treasurer, E. S. Haney; and Mrs. W. A. Lathrop, Mrs. Wallace Drumheller, J. N. Bergley, and W. A. Lathrop, directors.

The following resolutions were adopted:

1st. That the Board of Directors are hereby instructed to take immediate steps to relieve the present necessities.

2nd. That they obtain as soon as possible, the names of families deprived of their support and their necessities.

3rd. In view of the fact that there are undoubtedly many families scattered through the State and elsewhere, unknown to the Committee, dependent on the lost, be it hereby resolved that the co-operation of the press and of the town authorities is requested to assist in obtaining information.

4th. The Directors are instructed to prepare a plan setting forth what can be done to furnish employment to those able to work, and what is advisable to assist others.

J. L. Moore, Secretary.

It should be recorded in this connection that on the 14th, the Legislature of Virginia, then in session, took steps to appropriate $2,500 for the immediate relief of the sufferers by this explosion, and this sum would have been given if the President of the company had not telegraphed the Governor that such aid would not be needed, "as the directors and friends of the company are doing and will continue to do everything that is necessary to relieve the distress that has been occasioned."--The Norfolk & Western Ry. promptly offered any assistance

it could render, and the citizens of Lynchburg promptly took action to send relief to those needing it.--The board of directors of the S. W. Va. I. Co. met in Philadelphia, where their principal office is, the morning after the disaster and at once "decided to instruct the superintendent at the mine, Wm. A. Lathrop, to do all possible to recover the bodies and relieve the distress of the families of the victims."--A cablegram from London, England, where some of the stockholders of this company live, was also received offering assistance.

Superintendent Lathrop has been instructed by his company to ask the council of the American Institute of Mining Engineers to appoint a commission of well known mining engineers, men experienced in working both bituminous and anthracite coal mines, to thoroughly investigate this disaster and, if possible, to ascertain the cause of the explosion and to make suggestions as to what may be done to guard against any repetition of such there in the future. We learn that this request has already been sent to Dr. Raymond, the secretary.--We would also like to have Director J. W. Powell of the U. S. Geological survey send some of his experts to investigate this matter as pertinent to the work of the survey now going on in the region that embraces these mines.

The cause of this explosion will probably, in most particulars, always remain a mystery, as no witness of it survives; but it is reasonably to be expected that much information on this subject will be obtained when the mine is again opened and opportunity given to inspect its condition as left by the explosion; but even this evidence, which it is not likely will be had for some time to come, will be comparatively worthless if fire has spread much in the mine, for that, in such a free burning and coking coal as the Flat-top, would soon obliterate most traces of the explosion, even to the cremating of the bodies of its victims. In the meantime, from the first news of this disaster, many theories have been advanced to account for it, some of them absurd, others sensible if the conditions on which they were based had been those of this locality, and others that may be accepted in part.--Many of the statements that have been published as to the opinions of those informed in such matters are untrue, as we know from one that has gone the rounds of the papers attributed to the writer, which represents him as saying that in his opinion blasting-powder was the principal agent, when his only statement was that powder was probably one of several agents that caused or helped the explosion.

The known causes of explosions and fires in mines are very numerous. Accidents most of them are called, but they are generally the result of wilful and inexcusable carelessness or of stupid and surprising ignorance on the part of the miners; violation of the known rules of the mine and of the repeated cautions of those in charge. The miner will hang his burning lamp on coal or timber and leave it there to ignite timber or the coal or to liberate gases, by its heat, that will suddenly take fire;

he will fill cartridges with powder, from an open keg or from a pile of it poured out on the floor of the mine, with a burning lamp from which hot oil drips hung to his cap, and hanging over the powder; he will light his pipe and smoke sitting on or beside a keg of powder, or on a pile of straw; will clean his lamp or oil can with rags or "waste" and then throw the oily rags aside, perhaps on a pile of fine coal or coal dust where are the materials for spontaneous combustion, (Just as a few days ago in Frankfort, Ky., where a new warehouse was set on fire by a bucket of coal on which some greasy rags had been thrown); he will persist in exploding--"flashing" he calls it--the gases of combustion, that result from firing his blasts, although strictly forbiden to do so, that he may sooner get back to his "breast" and load up the coal broken down by the blast, notwithstanding the fact that himself or his comrades, are often badly burnt by such explosions.

Before stating our opinion as to some of the causes that may have led to or promoted this terrible calamity, it may be well to very briefly summarize, without giving names, some of the causes mentioned in the newspapers that have come under our notice, most of them given as the statements of experts in mining matters. For example: "All know that it was caused by an accumulation of gas at a time when the operators were not aware of its presence."--"That the dimness and uncertainty of the lights was caused by gas, and that had the current of air been increased rather than diminished, an explosion might have been prevented."--"That a large fall of coal let in a blast of gas from some underground reservoir."--"Carelessness in the use of powder with which the miners were blasting coal."--"A gas reservoir."--"The ordinary accumulation of fire-damp."--"One of the miners struck a fissure filled with gas."--"This is a dusty mine and coal dust contributes largely to the force of explosions in coal mines. Many of the men employed were inexperienced in blasting, and the force of a blow, shot out in an atmosphere containing an admixture of fire-damp too small to be detected by the Davy safety lamp, is increased manifold by coal dust. Different varieties of coal produce different lengths of flame."--"Blowers or feeders, which issue from coal, are met with in coal mines. They often contribute to explosions. They are generally met with in straight work or entries driven in advance of the work."--"It is pretty well determined that the explosion was caused by fire-damp."--"The accident, it is thought, was caused by the men going too far into the mines with their lamps."--"Caused by the igniting of natural gas which had been accidentally liberated from fissures, by the miners' lamps."--"That the miners at the extreme end of the heading of the main entry struck a pocket of gas that caused the explosion."--"It is stated that powder had been placed at different points in the mine, and when the explosion occured flames shot up in the air over 100 feet high."--"The explosion was caused by a blast which probably opened up a large quantity of gas."--"Fire-damp liberated

by blasting or fire-damp accumulated in the mine."--"A comparatively small quantity of gas mixed with fine coal dust, would form an explosive force of terrific power."--"A dangerous excess of moisture combining with the carbon in the finely comminuted particles of coal dust, aggravated by the forcing in of damp and cool air by the fan, combined with the carbon of gunpowder just after its explosion, produced the elements of the fatal explosion."--"Carelessness is alleged as the cause of the explosion."--"No safety lamps were used, and it is said that the fan which supplied air to the mine was of insufficient power."

As the composition of coal is an essential element in determining its tendency to generate gases, we give below, as No. 1, the analysis of a sample representing a complete section of 11' 8" of the big coal bed of this mine, sampled and analyzed by chemist A. S. McCreath, of the Second Geological Survey, of Pennsylvania. For comparison, we add, as No. 2, an analysis of Midlothian, Va., screened coal, and of Connellsville, Pa., Broad-ford coal, as No. 3, also made by A. S. McCreath:

	No. 1	No. 2	No. 3
Volatile matter	20.738	38.23	30.107
Fixed carbon	73.728	54.27	59.616
Sulphur	0.618	1.54	0.784
Water	0.932	1.03	1.260
Ash	3.984	9.47	8.233

It will be seen from the above that the Pocahontas coal has nearly 18 per cent less volatile matter than the Midlothian which is so subject to fire-damp and in which there have been so many fatal explosions. We may also add from an experience of 10 years in burning New River, W. Va., coal, the same as Flat-top in character, that it burns steadily and without spurts of gas flames like the bituminous coals containing a large percentage of volatile matter.

In the admirable paper on "Fires in mines, their causes, and the means of extinguishing them," by R. P. Rothwell, M. E., in Vol. IV, p. 54, of Trans. Am. Inst. M. Engs., there is gathered a large amount of information on this subject. In one table there given, by a high authority in such matters, it appears that of 11 varieties of coals the least self-inflammable ones were those that contained the least percentage of water; in the same connection it is stated that all soft coals rich in volatile matter, and poor in fixed carbon are especially liable to lose their volatile constituents, the included gases, when exposed to the atmosphere, particularly if exposed to a high temperature and moisture. The composition of the Flat-top coal, as above given, removes it from the list of highly self-inflammable or of self-gas-producing coals under ordinary atmospheric influences.

Without commiting ourselves to any theory of the cause of the Pocahontas mine explosion, and again declaring that we do not consider the mine management responsible for it, because it had taken all the customary precautions of similar mines to guard against it, we think, from what we can gather that is worthy of consideration, that it resulted as a whole, from the following:

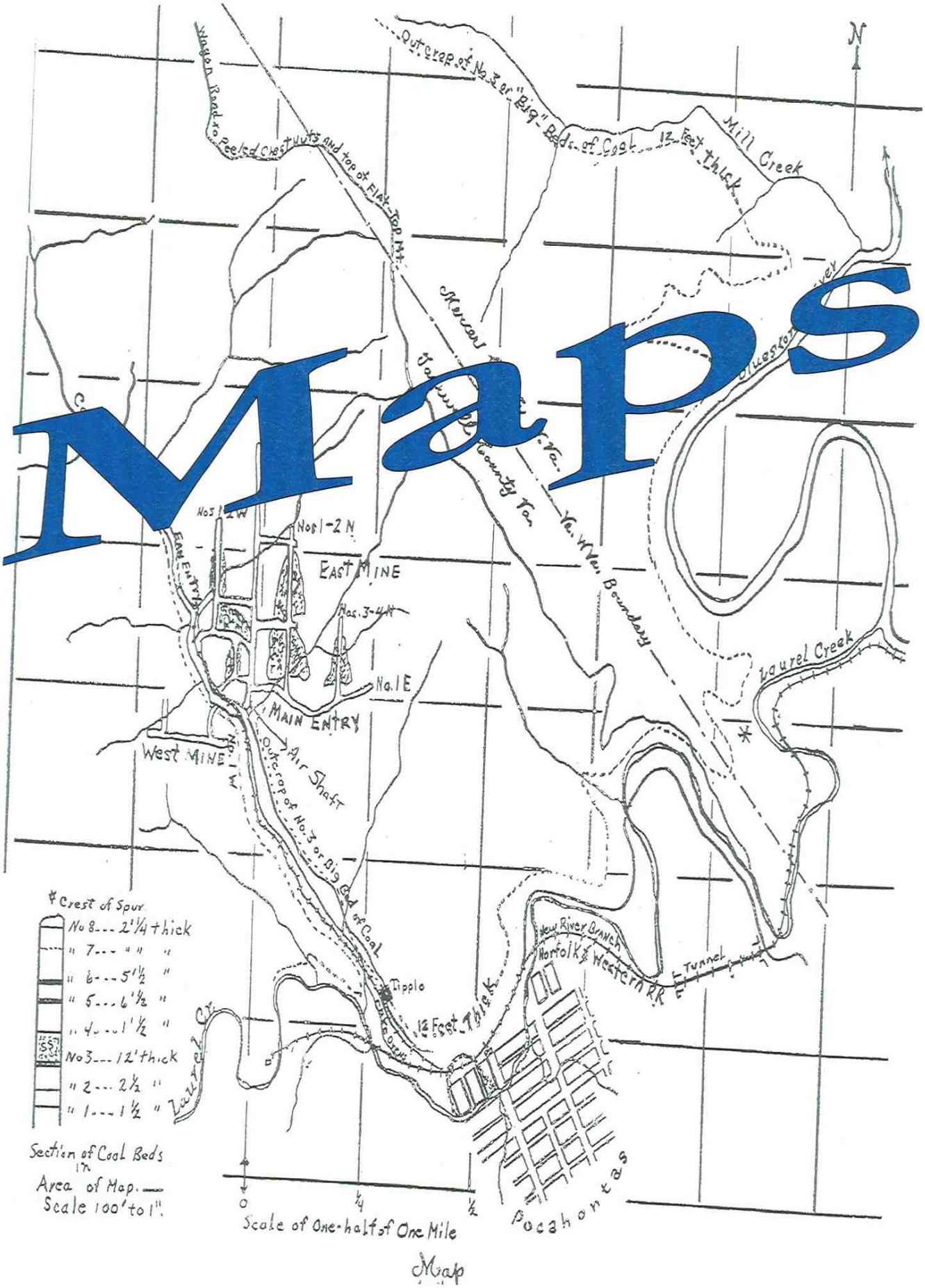
1st.--The firing or "flashing" of the gases of combustion, resulting from blasting operations, in a large number of the chambers worked, at about the same time, by the miners; these explosive gases having possibly at that time accumulated more than usual in consequence of the large amount of blasting then being done to obtain a large output (1,000 to 1,400 tons a day in a comparatively small mine) and in consequence of the condition of the atmosphere, as it is probable, from the kind of weather then prevailing, an easterly storm, that the mine was within an area of low barometer. The height of the roof of the mine would allow the presence of this gas to go undetected for some time, and it is a question whether the system of ventilation in use--efficient as all know it to have been for supplying fresh air--would withdraw these gases or dilute them sufficiently to render them harmless.--The miners were forbiden to fire these gases, but there is no questioning the fact that many of them constantly did it "on the sly."

2nd.--The use of a large quantity of blasting powder (Laflin and Rand 3F)--though no more than is customary in such mines--necessitating, or allowing, that each miner should take in a keg at a time so that there must have been from 100 kegs upward in the mine at the time; and especially the use of powder by so many inexperienced men, many of them speaking only foreign, and to those overseeing them unintelligible languages,--no matter how carefully they were watched.

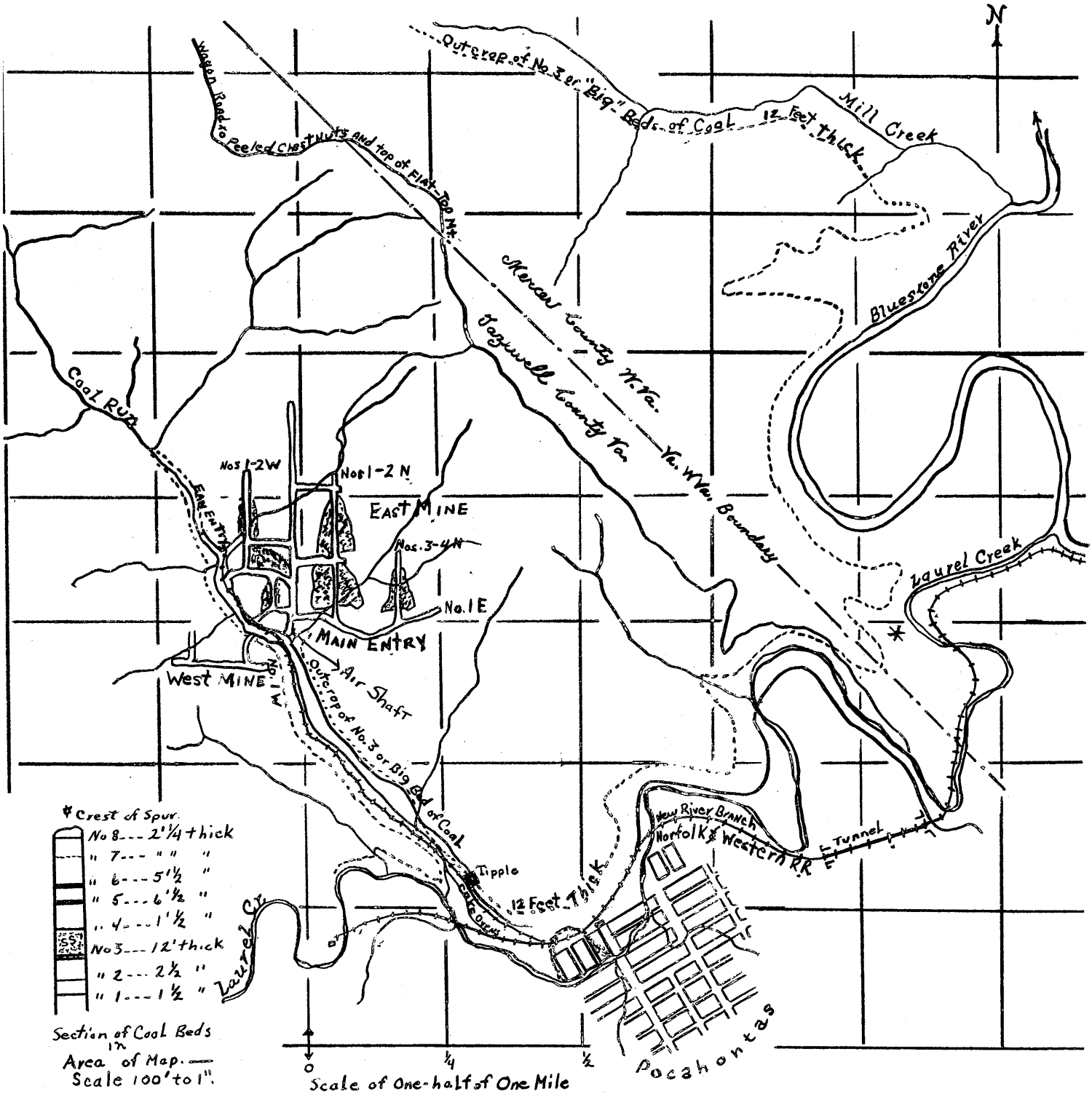
3rd.--The unavoidable accumulation of coal dust in such a remarkably dry mine, along all the entries and air-courses and in the chambers, doubtless furnished a vehicle for spreading the effects of the explosion, no matter what may have been its original cause or location.

We can readily understand, from what we have seen and learned, that there is enough to account for this explosion and its results in the three things above enumerated, to go no further. We do not pretend to say that other things may not have originated or promoted it; but of such we can only learn when access can be had to the mine.

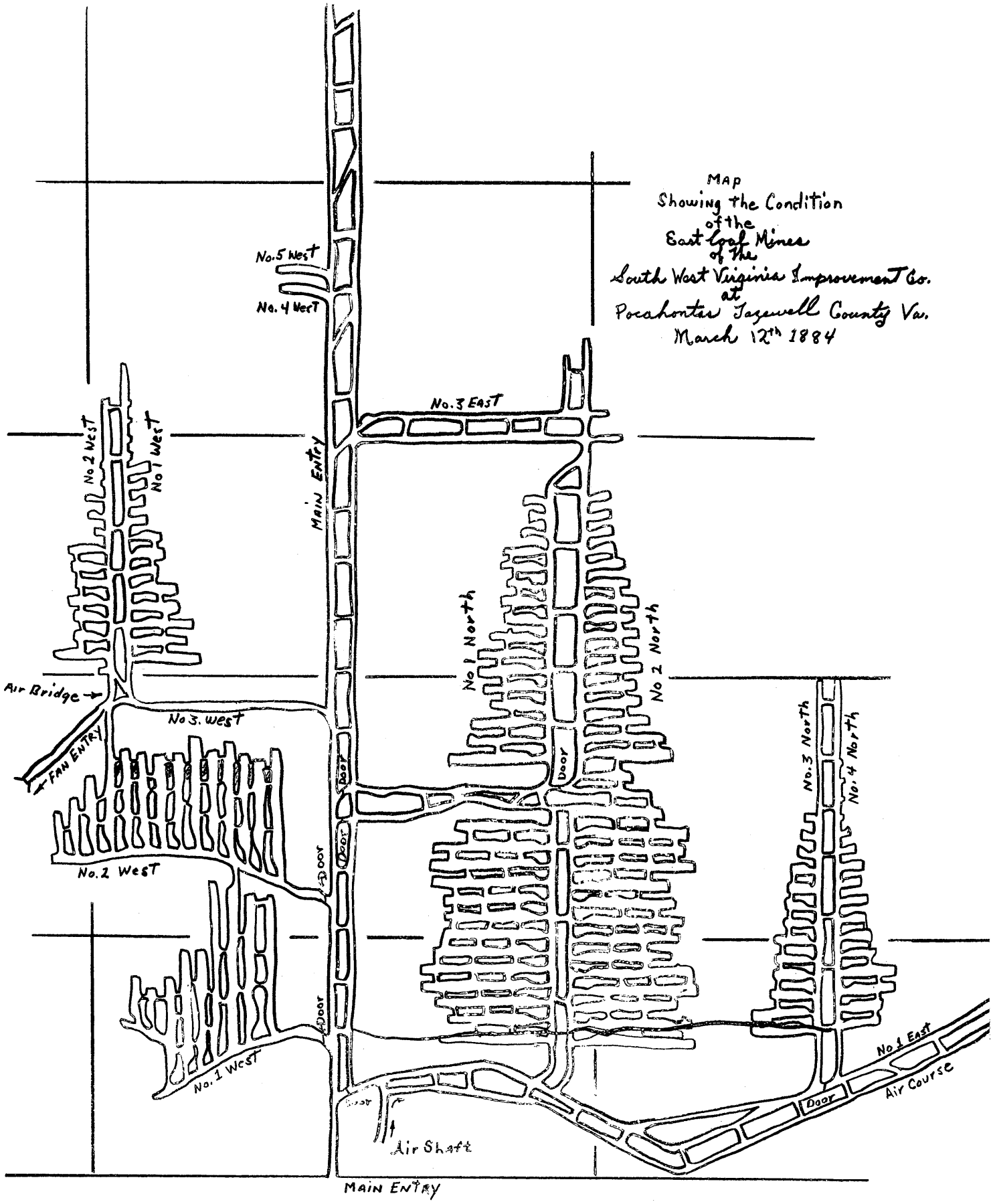
The lesson of this explosion for our Virginia and West Virginia mine owners, as well as of those of other states, in the westward slope of the great Coal basin of the Ohio, is: that they must, in some way, absolutely stop the "flashing" of gases by the miners; that they must, in all cases, provide air-shafts or through-cut air-courses for the escape of gases, etc., especially the light ones; that they must find some other explosive than blasting powder, or some coal-cuting machinery that will do most of the work now done by powder; and that the very dry mines must be, in some way, thoroughly moistened or damped.


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

Map



Map
of the
Vicinity of Pocahontas Tazewell Co.
Showing the Location of the
Coal Mines of the S. W. Virginia Improvement Co.
The scene of the Explosion of March 13th 1884
Compiled from Maps, etc. of the Co.
By Jed Hotchkiss. Top. Eng.
Staunton Va., Mar, 1884


MAP
Showing the Condition
of the
East Loaf Mines
of the
South West Virginia Improvement Co.
at
Pocahontas Tazewell County Va.
March 12th 1884
No. 5 West
No. 4 West
No. 3 East
No. 2 West
No. 1 West
Main Entry
Air Bridge
No. 3. west
Fan Entry
No. 2 West
No. 1 West
Door
Door
Door
Door
No. 1 North
No. 2 North
No. 3 North
No. 4 North
No. 1 East
Air Course
Air Shaft
Main Entry

Fort Wayne Gazette
Monday, March 17, 1884

NATURE'S CREMATORY.

The Pocahontas Mines Made Into a Huge Incinerating Furnace.

Mouths of the Pit Sealed Up for the Purpose of Extinguishing the Fires----The List of the Lost.

PETERSBURG, Va., March 15.—Neither words nor telegram convey to the slightest degree the destruction wrought in the mines of the Southwest Virginia Improvement company at Pocahontas by the explosion there on Thursday night. Nor can pen describe the anguish and sadness that pervade the little hamlet. The scenes around the mines have been the saddest that the human mind can conceive or the fancy paint.

One hundred and five of the miners are known to be lost, and, to make the disaster more awful, the bodies of the victims will be cremated, as the mines have been sealed and are now on fire and burning furiously. The victims of the disaster are Hungarians, Welshmen, Germans and negroes, most of whom are unmarried, only about twenty-five of them having families dependent on them for support.

As the mines will be closed for weeks the party of experienced miners from the Midlothian coal mines in Chesterfield county, in charge of Col. Dood, a mining engineer, who went up to Pocahontas to render such assistance as they could, will return to Chesterfield, as nothing can be done at present. It being feared that another explosion will occur, sentinels have been stationed around the entrances of the mine.

The disaster appears to have been the result of carelessness, as no safety-lamps were used, and it is further alleged that the fan to the mines was not of sufficient power to furnish necessary air. A few minutes before the explosion occurred the fan was stopped, as the lamps in the mine were going out. It has now been ascertained that powder had been placed at different points in the mine, and when the disaster took place flames shot up in the air to a distance of over one hundred feet.

The greatest sympathy is felt for the victims, and in the legislature this morning a resolution was passed instructing Governor Cameron to ascertain the extent of suffering among the families of the victims with a view to making appropriations for their relief. Another resolution was also passed instructing the committee on mines to inquire as to what legislation may be necessary to secure further safety to persons working in mines.

The citizens of Lynchburg held a meeting and appointed a committee to solicit contributions for the relief of the sufferers.

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The generally accepted explanation of the explosion is that it was occasioned by firedamp. Some claim what has always been contradicted by mine officials, that there is gas in the Pocahontas mine, and that the explosion was caused by a miner striking a gas fissure. On the contrary, experienced engineers say they have never known a case of explosion from striking gas fissures in a mine above the water level, as is the case with the Pocahontas. Those who contend for the first mentioned theory cited an instance of the recent killing of two men in the Pocahontas mines as alleged from the effects of a gas explosion. The men were blasting, and after the charge had been fixed retired behind a ledge where they would be safe from flying debris, but both were killed, and it is believed by gas.

The list of the victims so far as ascertained at this hour is as follows:

Whites—Boone Maxey, M. L. Hampton, Ed Mitchell, John Hicks, George Hicks, John L. Hicks, John Keys, M. J. Jewell, Luke Ray, Rush Davis, John Pelfrense, Carrol Gearbates, A. M. Dougherty, Paul Revell, George Mules, Lacorno Camers, Emil Goodman, Andrice Frito, Mike Beckeys, Pluto Jacobs, Krabanski, John Krabanski, Andro Beckeys, Arthur Dansle, John Key, Peter Rogendorf, Jordon Hicks, Jacob Pocato, B. B. Moore, L. C. Hopkins, Robert Davis, Ellis Miller, Lewis Schultz, James Crimo, Daniel Robertson, George Chapman, Johnson Surface, William Cummerford, A. A. Campbell, William S. Lusher, Thomas Woods, John Jewell, William Caller, Candell, Josiah Hoffman, James Corbett, and Joseph Edmonds.

Thirty-two of these men were Hungarians, and the others were from Virginia and Pennsylvania.

Colored—S. H. Ambertons, Robert Lewis, Amos Connor, John Hicks, Joseph Witter, John Lawson, John Maxwell, James Maxwell, George Maxwell, R. Richardson, James Hampton, Henry Sears, Daniel Johnson, Ed Tucker, Wade Stewart, Howard Quarles, Henry Mulvey, Henderson Miller, Jordan Hicks, Charles Wyatt, L. Richardson, James Pirdue, Robert Pirdue, Reed Howard, Daniel Wright, James Wright, Lucas Watson, James Conwell, Creed Burrows, Joseph Young, Pharoah Bowers, Joseph Price, Henry Henly, B. Henly, J. W. James, Henry Sales, Phillip Ragland, August Hog, Andrew Johnson, Wade Stewart, John Littler, William Moore, Riley Austin, Allen Graves, Giles Bacon, James Campbell, Milton Heath, Samuel Lawson, Lewis Cockerham, Andrew Marshall, and Baker Wilson.

RICHMOND, Va., March 14.—The general assembly, in view of the awful coal-mine disaster at Pocahontas, and the likelihood of great destitution among the families of the victims, adopted a joint resolution authorizing the governor to ascertain the approximate amount of money necessary to relieve their immediate wants.