

2.—Jack Scanlan, a miner; an adult. Knee injured by fall of coal. Not serious. April 12th.

*Dowlais Mines*, of East Tennessee Coal Company.—James Carter (colored), miner. Killed by fall of slate. Is said to have been notified by bank boss that his place was not safe, and that he, nevertheless, neglected to prop it. August 19th. Left a widow and children.

Slight injuries from slate falls to James Maher and James Hayward were reported.

*Mine of Jellico and Birdeye Coal Company*.—Thos. Hermann was injured by fall of slate, January 20th. The nature of the injury and the result are not stated in the report, the bank boss, (by whom the report is signed), apparently being most concerned with the effort to show that the "company is no way responsible for the accident." (Not serious?)

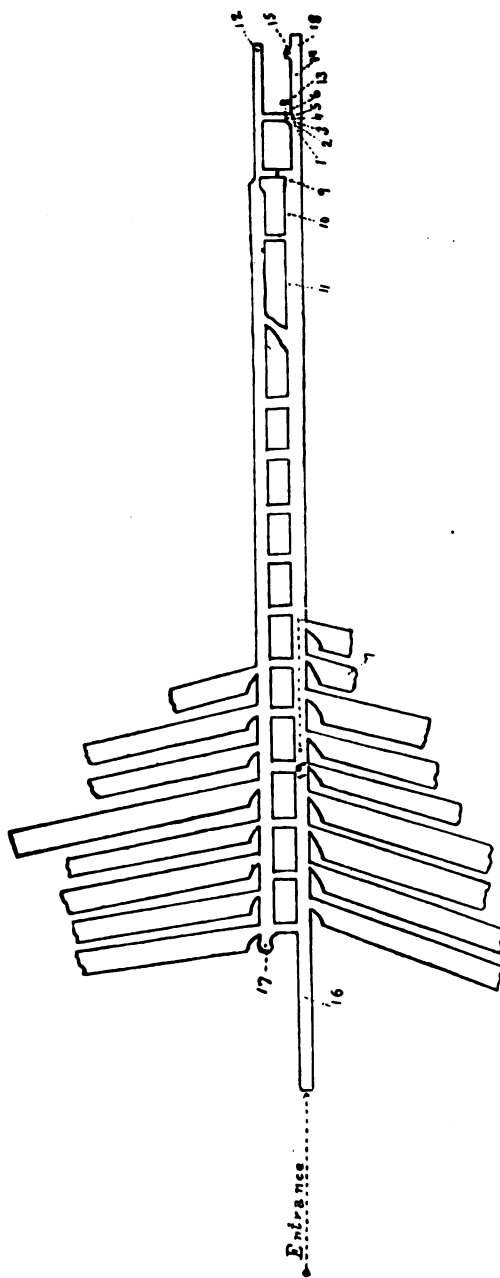
A minor injury to foot of George (Bedion?), at the "Birdeye" mine, leased by Mr. J. M. Wilson, September 18th, was reported. It was due to a fall of coal.

#### THE TATE SLOPE EXPLOSION.

The occurrence of this explosion, in January, 1895, was noted in the report for the year 1894.

The Tate Slope, now a part of the Sturgis Shaft mine, was in no way connected with it at the time of the accident; the original stretch of solid ground between the two mines was, perhaps, somewhat more than a quarter of a mile. The mine was not subject to inspection at the time of the accident, nor had it been for many months before. A record of the explosion does not, therefore, necessarily form a part of this report. Nevertheless, on account of the widespread attention which the explosion has received, and the especial interest manifested in it by miners in the Western Field, an account of the accident is given herein. A map of the slope, as on January 24, 1895, is presented on the following page.

The slope and parallel air-course were being driven simultaneously day and night, to meet an entry advancing from the Sturgis Shaft. Four diggers and a driver were employed. On the night of January 22d, an explosion occurred, killing all five of the



1, Miles Fitzsimmons. 2, Rob't Hall. 3, Geo. Waiton. 4, Albert Hall. 5, James Coffey. 6, Mule. 7, Mule. 8, Unexploded keg of powder. 9, 10, 11, Exploded kegs of powder. 12, Shot fired here. 13, Two caps. 14, Three caps. 15, Dinner pails and coat undisturbed. 16, Roof torn down where cross-timbered. 17, Air-Shaft with fire basket. 18, Track disturbed for 100 feet.

men underground. On January 24th, I visited the slope and made such investigations of the accident as could then be undertaken. During the examination of the bank I was accompanied by the following persons: Mr. L. C. Garrett, then lessee of the Sturgis Coal and Coke Company's mines (including the Tate Slope); Mr. Charles Quinn, surveyor; Mr. Joseph Hamilton, bank boss at the Sturgis Shaft; Mr. James Goldsworthy, who had supervision of the work at the Tate Slope; and Messrs. John Braden and Joseph Edmonson, miners.

The five persons killed by the explosion, which occurred about midnight, were:

- 1.—Miles Fitzsimmons, a digger. Left a widow and three children.
- 2.—Robert Hall, a digger. Left a widow and three children.
- 3.—Albert Hall, a digger. Unmarried.
- 4.—George Walton, a digger. Left a widow and three children.
- 5.—James Coffey, a driver. Left a widow.

The slope has a timbered approach about eighty feet long, and had been driven a total distance of about 1,120 feet, making the distance from the foot of the slope to the mouth equal to about 1,200 feet.

Seventeen rooms had been opened in the bank, nine on the slope side and eight on the air-course, all of them being situated toward the mouth of the bank. The first room on the slope side stands about 280 feet from the mouth of the mine (including the 80 feet of timbered approach), and the last room is about 290 feet below the first one. The first room on the air-course is immediately at the air-shaft, and the last one is about 285 feet below it. The first two rooms on the slope (which are the longest) had been driven about 220 feet each. The last two (being also the shortest) were each about 50 feet long. The mouths of the rooms, except the last two, on the slope had been closed. One of the last rooms was used as a stable, and a mule was standing in it at the time of the explosion.

The slope and parallel air-course on the left were being driven simultaneously, two of the men being employed in the air-course and two in the slope; the driver, Coffey, was hauling from both sides. No other work was being done.

There was an open break-through for the passage of the ventilating current, between the slope and air-course, at about 64 feet from the face of the air-course and 80 to 85 feet from the face of the slope. Another break-through had been started from the slope side, out of which one fall had been taken, at about 60 to 62 feet beyond the said open one. All the other break-throughs, save one, had been closed with brattices, which were still to be seen when I examined the place, though, of course, much injured. The excepted break-through was used as a haulway from the air-course, and was closed with a curtain. The distance between it and the lower open break-through is about 250 feet. From the last room on the slope to the lower open break-through is a distance of about 540 feet.

Ventilation was secured by means of a basket hung in a shaft, which stands at the beginning of the air-course, the distance from the mouth of the mine to the break-through through which the shaft is reached being about 245 feet (including the 80 feet of timbered approach). What volume of air was traveling at the time of the accident can not, of course, be stated. On November 17, 1894, in the course of inspecting the mines about Sturgis, I visited the Tate Slope. At that date there were 3,000 cubic feet of air passing through the lower break-through which was but a short distance from the faces. There was no fire-damp, detectable by ordinary means, in the return current. I was informed that a fire was usually kept in the basket, but whether there was one in it on the night of the accident was not known by those of whom I inquired. It is probable that there was no fire in it, since the night is reported to have been quite cold. The course of the ventilating current was straight down the slope to the lower break-through, thence back through the air-course straight to the shaft.

The bank was dry and dusty. No evidence of the presence of fire-damp could be detected at the time of the investigation, and so far as could be learned none had ever been found anywhere in the bank; as to the latter point, however, a more extended inquiry might elicit different testimony. It is safe to believe, however, that no considerable quantity of the gas had ever been encountered in the bank, since the mine had been worked only for local purposes and had received no greater care in its management than is usually

given to the average "local mine." Moreover, none of the work had been carried very far from the crop, and the depth of "surface" above was inconsiderable.

According to the statement of a young man who was at the Slope on the night of the accident, as reported to me by others, he "first heard a shot, and in three or four seconds the explosion came." He heard but two reports, one of which he felt satisfied was that of a "blast."

When this investigation was made, three exploded powder kegs (25-pound kegs), were found in the slope, stretched in an irregular line on the left side of the slope. I was informed that they had not been disturbed since the accident. (The mouth of the mine had been nailed up, and, moreover, entrance to the slope was hazardous on account of it being necessary to crawl through a small opening beneath overhanging unsupported clay, where cross-timbering had been knocked down.) None of the kegs showed evidence of having been opened before the explosion. They were all in the stretch above where the men were found, the first keg being about 179 feet above the lower break-through, the second one about 77 feet below the first, and the third about 30 feet below the second. The distance from the third keg to the lower break-through was about 72 feet, and to the first of the victims the distance was about 57 feet. The distance from the lowest room to the first keg was about 350 feet.

The bodies of the dead miners, I was informed, were found in the slope, grouped near the lower break-through, four of them being directly in the slope, and one of them lying within the break-through. The men seemed to have congregated there to wait till a shot in the face of the air-course went off. The positions of the bodies, as pointed out to me, were as follows.

1. *Miles Fitzsimmons*.—Found at 57 feet below the third powder keg, on right side of slope, lying on his right side, with face toward and close to the rib, and feet down the slope.

2. *Robert Hall*.—Found 8 feet below Fitzsimmons. He was lying across the track, on his right side, with head on left of slope and feet on the right.

3. *George Walton*.—Found next to Hall, about 2 feet below. He

was lying on his right side, with head on left of slope and feet on the right.

4. *Albert Hall*.—Found 4 feet below Walton. Was in the middle of the track, lying on his right side. Fell with head up the slope. Seemed to have been sitting on his heels. Was less burnt than the others. Hall was about opposite the center of the lower break-through into the air-course.

5. *James Coffey (driver)*.—Found just within the break-through, lying on his back, midway between the two sides, his heels about touching the rail on the left side of the slope, his head being about 5 feet from the rail. A much-scorched cap was found in the break-through, near where Coffey lay.

The positions of the bodies are shown on the accompanying plan, prepared at my request, and in part founded on measurements made by me, by Mr. Charles Quinn, surveyor. (Mr. Quinn failed to show the break-throughs between rooms.)

In the break-through where Coffey lay, to the right of him, within about 2 feet of his head and close to the right-hand rib, we found a keg of powder which had been opened with the point of a pick. It had not exploded. In the break-through I found pieces of scorched paper, near the powder keg. I was told that when first seen by the search party the paper was on the powder keg; if so, it probably had served for stopping the hole in the keg. There was no evidence of any violent disturbance of anything in the break-through having taken place.

In the slope, just below the break-through, a dead mule lay. It had been attached to a car. From opposite the center of the break-through down to a distance of about  $39\frac{1}{2}$  feet the backward pressure of the air was strong; caps and a coat were found that seemed to have been blown there. Beyond that, to the face of the slope, soot was blown, but there was no violence. Dinner pails and a folded coat were found there undisturbed, and a glove lying loosely on an empty powder can showed no evidence of disturbance. The men working at the face of the slope had been drilling.

Investigation of the conditions on the air-course side revealed that a heavy shot had evidently been fired in the face of the air-course. The drill-hole was 5 feet 2 inches long. The shot was evi-

dently fired on the solid. Much small coal had been produced—indeed, there were few large lumps such as usually made even in narrow work—and a great deal of fine coal had been produced. About 6 or 8 feet back from (above) the break-through into the slope stood an empty car, uninjured. The end fronting the face of the air-course (distance, about 75 feet), had considerable charred coal and much soot on it. No damage was done in the air-course.

In the slope a great deal of soot had been deposited on the sides, on the timbers, on the wooden rails and other objects. This was seen all the way down from the cross-timbering on the upper part of the slope; being most marked, perhaps, in the lower part. Considerable charred coal—evidently charred dust—was also found sticking to the coal on the sides of the slope and also on timbers. It was found on the in-bye side of the timbers.

The slope acted like a cannon, and except in the expansions afforded by the few upper rooms there was no violence. The wooden stoppings in the break-throughs between air-course and entry (the "slope") were, of course, blown down or loosened.

On the slope the track was undisturbed until a point opposite the lowest room was reached; it was then violently torn for a distance of about 100 feet. Beyond that there was no disturbance until within about 185 feet of the mouth of the mine (including the 80 feet of timbered approach), when the cross-timbering was torn down, letting the clay above come in. The force of the explosion seemed, therefore, first to strike the bottom of the slope at about 350 feet beyond (outwardly) the position of the first powder keg (as found), and, then, as it advanced up the slope to shift to the top. I was told that lumps of coal were ejected from the slope to a distance of about 300 feet. This conclusion, however, may be based simply upon the finding of lumps of coal at such distance in line with the mouth of the mine. The wood curbing around the top of the air-shaft was torn away.

There was no evidence of destruction in the rooms open to the slope, but the stoppings in the mouths of the third and fourth rooms were partially torn loose. A dead mule was found in the stable (next to bottom room), and some of the props there were down; but they had evidently been thrown down by the falling mule.

## CONCLUSIONS.

An explanation which gained currency shortly after the accident was to the effect that the ventilation of the mine was very defective, and that the explosion was due to fire damp, "forced out from old rooms and ignited by the naked lights carried by the men." I deem the theory, in the light of observed facts, altogether untenable. Of course, it can not safely be asserted that there was absolutely no fire-damp in the atmosphere at the face of the air-course. On the contrary, there is every probability that there is a percentage, however minute, in every advancing heading in the No. 9 coal about Sturgis, when mining has got well beneath the surface. But it seems quite clear that there was not enough to be affected by the lamp flame, and there certainly is no force in the theory that the explosion was started by fire-damp being ignited by the naked lights carried by the men; whatever (if any) gas there may have been in the atmosphere played but a secondary part in the explosion, and for all practical purposes the fire-damp question may be eliminated from consideration.

There have also been suggestions of foul play, to the effect that dynamite, placed in the mine by some villain, performed an important part. Such suggestions were heard shortly after the explosion, and they have become especially current within recent months. As to the value of this theory, as a collateral feature, I have no evidence, having no knowledge upon which to found a belief. It is certainly quite possible for the explosion of the powder to have been due to villainy; it is possible for secreted dynamite to have aggravated results; but if the injury done the mine is referred to as evidence, then it is not strong—the explosive force of 75 pounds of black powder is quite enough to cover that point; indeed, the disturbance was remarkably little, the quantity of powder burned being considered.

From the evidence gathered, the explosion seems to have originated from a heavy shot fired on the solid in the face of the air-course. The flame from the shot rolled along the roof, being greatly extended by coal-dust; rolled through the open break-through, passing over the open keg of powder there without firing it (showing that as yet there was no explosion), entered the slope, passing over the men



congregated near the break-through (scorching them), caught up more dust and gained in intensity as it advanced up the slope, against the air-current, heated the powder kegs up to 480 degrees, and the powder exploded. It is possible that the men inhaled the flame from the shot, as it passed over them, but I doubt that they were seriously injured in that way. I believe the immediate cause of their death to have been the explosion of the powder. Had they been 35 or 40 feet nearer the face of the slope, they would not have been affected by the flame coming from the air-course, and, possibly, might have escaped injury from the concussion of the powder explosion, though the pressure there must have been very great, relieved, however, by the extra space offered by the two open rooms above. But they would have been suffocated by the resulting gases. Whether the men were killed by the pressure resulting from the explosion of the powder or by the resulting gases may be a matter for conjecture; but I deem it a safe conclusion that had the powder not exploded, the men would not have been killed.

From the positions in which the bodies of the men were found, it would seem that Fitzsimmons, the two Halls and Walton threw themselves over to avoid the flame as it came from the break-through; Fitzsimmons must have caught the flame full in his face, and turned toward the rib. Coffey, found lying on his back in the break-through, may have been thrown there by the force of the powder explosion, or he may have been sitting on his heels and have fallen backward when startled.

Following is a statement received from the physician who examined the bodies of the victims of the lamentable disaster, in response to interrogatories sent by me:

"I first saw the men in the mines in the positions they were when killed. I did not make a final examination until they were brought out, which was at 4 A. M., January 23, 1895, and four hours after they were killed.

"I found that they were slightly burned on face and hands, just enough to remove the epidermis. The right arm of Fitzsimmons was also burned.

"There were no eyes out of any of them. No flesh hanging in

strips. No mouth open. No tongue protruding. No neck broken. No other bones broken. No agony on any face.

"They were all burned as near the same as could be described. The flesh below the epidermis was not burned. Both sides of face of each man was burned alike.—(Signed.) V. E. Handby, M. D."

Following is a copy of the verdict rendered by the jury summoned to hold an inquest over the bodies:

"We, the undersigned jurors, after being duly sworn and inquiring into the facts in the case, find as follows: That Miles Fitzsimmons, Al. Hall, Robt. Hall, James Coffee, and George Walton came to their death by explosion caused by shot setting off three kegs powder at Tate Slope, Union county, Ky., about 12 o'clock, night, the 22d day of January, 1895, and to the best of our knowledge was unavoidable. Thos. M. Talbott, foreman; C. Barnaby, Z. C. Azbridge, F. Sullivan, Cal. Hoyt, Jas. Herron."

"This is a true copy of the verdict of the jury in the Tate Slope explosion as appears on record. W. A. McKeaig, J. P. U. C."