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*COAL MINING AT STEUBENVILLE, O.*

BY WM. SMURTHWAITE.

The city of Steubenville is estimated as having a population of 15,000 inhabitants, and was formerly noted for her Jeane manufactories but now for her Coal, Iron and Glass industries. There are in this vicinity five blast furnaces, three rolling mills, four glass houses, three large flour mills, also foundries and machine shops. It is a thrifty and prosperous city. Located on the banks of the Ohio about 70 miles from Pittsburgh by river and 23 from Wheeling, is destined in the near future to be a great business centre.

Right across on the Virginia side are the high hills towering up five-hundred feet above the level of the river, while away westward back into the country for many miles the ground gradually rises and thus nestled amid the hills it is protected from the violence of the wind-storm, while the water-courses are amply sufficient to carry off the water let the rain storm be ever so great, which gives a great sense of security to her citizens. In addition to these advantages the location is a healthy one, there being but little sickness in proportion to population.

ut while these advantages to the city are greatly to be con-

sidered, her future success will largely depend upon the inexhaustible supply of her coal-fields, to promote and supply her growing industries. The shaft coal, generally known in the geological series as No. 6, is reached by sinking to a considerable depth, ranging from 85 feet up to 260 feet. The height of the vein varies from three feet six inches up to five feet.

Within the city limits are seven shafts and three others contiguous to the city line. In the centre of the group of these shafts is located the High shaft, having received that name at the time the Rolling Mill and Avericks was being sunk. And yet how significant was the name at that time, for its altitude was then, and is now, greater from low water mark than any of the other shafts. This shaft is located at the head of Market Street. The company was organized in 1856 and immediately commenced to sink, and reached the coal at the depth of 225 feet in 1857. It is about equal distance from the Allicanna shaft, north, and the Mingo shaft, south; and all of the ten shafts are about in line, fronting the river, running north and south, the whole distance being about five miles.

It has been proven, beyond any doubt, that wherever the coal is found to have a good cover of slate right above the coal head it is of a better quality than where found with a sandstone roof.

The slate is generally of a close nature very compact and impervious, hermetically sealing up the gases and preserving the coal in its primitive state. But the coal is not so well preserved where the sandrock forms the roof. The sandstone being of a porous nature the gases exude through the pores, and the coal loses, by the flowing off, of some of its essential qualities. I remember very well, when working as deputy at a colliery by the name of Cassop, in the county of Durham, England, that in one section of the mine there was a sandstone cover and the coal was much inferior to that found under the slate roof. I believe that if proper attention was paid to this matter, it would be found that these conditions exist everywhere under like circumstances. It is the prevailing opinion among a great many, at least, who are in search of, and who have secured coal fields, that if they can get a sandrock roof they are all right, as the expense of furnishing bank posts is a great item in coal mining. True, it is a great expense, but it is my opinion that wherever the same vein of coal is found to have a slate roof of sufficient thickness that the coal will be found to be of a better quality. And thus the proprietor would be better able even to

furnish pit posts from the fact he would have a better article for sale.

Nearly all of the pits in this locality have a heavy slate cover, and the coal of an excellent quality, possessing a vitality that is nearly always absent where the sandstone cover exists. A better coal for general purposes is hard to find, and it is questionable whether its superior is found in the country. It is used for all kinds of manufacturing purposes and gives entire satisfaction in every branch of industry. Right in this city it is very extensively used in our rolling mills, blast furnaces, potteries, glass houses, etc. It is also very extensively used for the manufacturing of gas, and is altogether used in the gas works of this city.

In sinking down to this coal there are heavy beds of sand-rock to pass through, besides beds of fire clay and slate. There are also, three small veins of coal passed through to reach the veins of coal afore mentioned. The last of these small veins appears in the shaft a few inches thick about 13 feet from the bottom of the shaft. No particular notice was paid to this vein at the time of sinking and it was entirely forgotten until it made its appearance about two feet from the regular vein having been exposed by a fall of slate.

It is our custom here, to make a circuit of the mine every morning. The mine manager along with his assistants, each, carrying a safety lamp examines each working place to see if any gases have accumulated during the night as the furnace is dampened down every evening after the pit is done hoisting coal.

The air current becomes very sluggish, and weak after the furnace is covered up, with ashes and slack, to keep the fire burning until morning, and in consequence thereof, it frequently happens that during the night, the gases have not all been carried off and must be cleaned out, by the bosses, before the men are permitted to go to their separate places with their naked lights or fearful consequences would be the result.

In the year 1869, as I was making my rounds according to custom, and had examined all of the working places in my division, I was in the habit of taking a little rest, and, lighting a candle to see my way out better to the shaft, at a particular place, where the two currents of air met, one coming from the north and the other from the south, united there and flowed in one current towards the furnace, and was discharged at the up cast pit, when

my attention was attracted by a loud hissing noise coming from one of the rooms that had been left behind, in the direction that I was in the habit of traveling. I immediately put out my naked light and proceeded cautiously to the place from whence the noise came and to my astonishment I discovered gas issuing from a fissure in the roof; and a little further on I discovered a fall of slate, about two feet thick, and above the little vein of coal exposed. The fall had set free a large amount of gas that had been pent up. I found that the whole space was filled with gas; the extent of it I could not tell as I could not very well pass over, my lamp being full of fire. I therefore concluded to go out by the "mule track" and come back over again on the other side to meet the current of air coming in the direction of the furnace. There was a very strong current of air passing over the fall so that I had no fear, whatever, of the air that was returning to the furnace being of an explosive mixture. As I approached the fall I discovered that the light in the lamp began to "tail up," that is, the presence of the gas showed itself upon the light within the gauze, in a blue flame in the form of a cone; and a few feet further on it filled the whole lamp gauze, or cylinder, in a flame of fire. I learned by this examination that the gas occupied the space of several hundred cubic feet, but was diluted as fast as it was moved into the return air course. I think, however, that this fall must have just occurred a little time before I arrived at the place. This feeder of gas continued for many months before it exhausted itself. I make particular mention of this fall and the sudden effusion of gas coming from this little vein of coal because it was the first occurrence of this kind here. We have had many since that time when the pressure of the gas burst down tons of slate. I remember several years ago, when Mr. Andrew Roy, now Mine Inspector, for the State, paid us a visit, in company with Mr. Skinner from Pomeroy, O., who were appointed by the State to ascertain the real condition of the coal mines and report their condition to the Governor for his consideration, that I took him into one of the old rooms and showed him a feeder of gas coming from this vein; and as soon as we reached the fall the gas filled the lamp. I make mention of these facts to waken again, if possible, in the minds of mining bosses, and mine managers, the dangers of traveling over falls with a naked light. I have personally known several men, and good pitmen too who understood their business well,

lose their lives by their thoughtlessness in going over falls with a naked light. There may not be any effusion of gas from above, but every practical miner knows that where a fall occurs it forms a receptacle for carbureted hydrogen gas to secrete itself above where the current of air cannot reach it, ready to burst forth in all its fury, causing death and destruction, whenever a naked light is applied. And with so many examples before us is it not strange that so many will persist in doing such reckless acts.

Every coal miner ought to be his own guardian and should make himself thoroughly acquainted with the duties that belong to his calling, so that he may be able to discharge them intelligently, for his own good. He ought to know more about his own particular working place, the nature of the roof, the character of the coal, if it is liable at any time to fall away from the roof while in the act of undermining, than the boss who may be but seldom in the place; and when he is, it may be but for a moment. The most of the mining bosses are taken from the ranks of the miners, and the ones taken are not always selected for their superior intelligence and judgment; for they may not have had even as much experience as some others who are left mining, but because they may possess some good traits of character that command respect, or it may be for some other consideration that they received such an important position. Therefore no miner ought to accept the opinion and judgment of a boss on matters pertaining to his own interests, where his health and safety is at stake, without first properly weighing, in his own mind, the opinion given by the boss as to its merits and practicability before adopting the plan suggested, or ordered by him. I want to be properly understood here that I am not advocating non-compliance with a regular rule, or order given or made by the mine manager; for without wholesome laws and strict enforcement of the same, no mine can be carried on successfully; but I am speaking chiefly of a case where the miner has to take care of himself, in his own working place; where he has to set up posts to secure his own safety. He ought to have enough common sense to take care of himself; but if not, and he has manifested it by his careless and reckless habits, the coal mine is no place for him and he ought not to be employed. Of course I am well aware that many accidents have happened where extraordinary care and precaution was exercised, and yet without avail.

But the most of the accidents that happen by falls have been by neglect on the part of the miner in not sufficiently propping up his place, and by that neglect, he has been crushed beneath the ponderous weight of slate.

The duties of mine managers are varied and many. It is expected of him to know the various systems of ventilation and to adopt means to provide enough fresh air to meet the necessary wants of the miner, and with a skillful hand direct the current into the various channels as to best subserve the general interests of all concerned. It is also expected of him to be fully conversant with the various modes and systems of mining, and to be able to select that plan most suitable for his mine. It is also expected of him that he will have some skill in engineering, and to be able to lay out a mine to the very best advantage, so that the material being mined may be brought to the place of delivery for shipment with as little expense as the circumstances would warrant. But the mine manager, almost above every other requisite, ought to be vigilant and watchful, especially if he has charge of a mine that gives off fire-damp in large quantities; and be ever on the alert for that deadly enemy of the coal miner. This enemy is ever ready, when released by the atmospheric pressure, to rush out and to gather together his forces and uniting with the air in just such proportions as would do the greatest injury. If ignited it would send forth its thundering noise and sheets of flaming fire, scorching and killing everything that has life within its reach.

The engineer may have run his train ninety-nine times over the road and met with no obstruction. The pickets sent out to watch the enemy may have watched ninety-nine times and have seen no cause of alarm. The mine manager may have examined his mine many times and found no large quantities of gas. The engineer neglecting but once to see that his engine and brakes were all right, and to keep a proper lookout ahead, might be the very time an obstruction would be on the track and his train detached, lives lost and property destroyed by this one act of carelessness. So with the pickets; they may forget watchfulness but one night when the enemy may make an attack upon the camp, the army be routed and destroyed, great advantages lost, and the whole army brought into contempt and shame by the carelessness of those who were entrusted with an important position. The mine manager's position is one of trust; and in his care is placed

the lives of his fellow-men, and he should feel that the responsibility resting upon him demands his watchfulness and care. And it may be at the very time that he thinks all things are right that he neglects the rigid examination that his mine demands, and that his air-courses may have been stopped up, by falls, cutting off his ventilation; or a sudden effusion of gas may have occurred, filling all the chambers of his mine with that dreadful fire-damp, when the men are sent into their work never dreaming of the terrible fate that is awaiting them when, like a mighty earthquake that shakes the very foundations of the earth, the gas is lit up and the fearful consequences follow when the explosion occurs. The mine is one vast sheet of flame spreading devastation and ruin everywhere; cars are broken and the axles are twisted as if they were but straws in the hands of a powerful cyclone as it whirls and screeches across the prairie. Lamentation and sorrow for the lost ones are heard. Wives weeping for their husbands; children for their fathers; mothers for their sons; and the cry is heard as "Rachel weeping for her children and would not be comforted because they were not." It beggars description and mocks the efforts of men to portray the appalling scene of such a calamity. Mine managers, if you can draw this fearful picture in your minds more vivid do so. See not only the weeping friends, at the time of such a calamity, but let your minds grasp all of the details that accompany such a catastrophe. And let it be a powerful incentive urging you on to the proper discharge of duty, never permitting anything to deter you from doing that which you have sacredly promised to perform.

Let your motto be watchfulness, vigilance and care.

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