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Title: Mining Ohio Coal

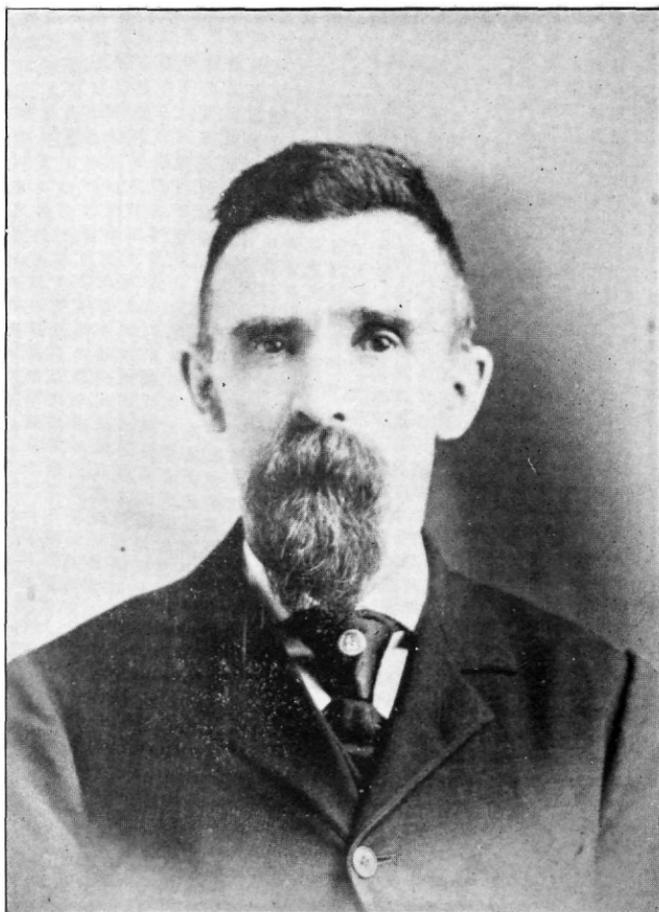
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EDWARD JONES.

MINING OHIO COAL.

To Thos. H. Love, Leesville. O.:

DEAR SIR:—The declining condition of the coal mining business in Ohio during the last few years makes the above subject introduced by you in your valuable contribution to the "Colliery Engineer and Metal Miner" a very interesting and timely question. First, the business is not profitable to the operator. Second, the condition of the coal miner is getting worse. Third, the coal seams are suffering from extravagant usage. Inasmuch as we cannot look outside of these conditions for relief, the perplexing question then naturally arises, Which of these must we change so as the others will be benefited? We cannot change the first without injury to the second, and "vice versa": we have therefore to turn our attention to the third party—the coal seam; and it is to this purpose that I ask your consideration to the following:

I will ask your permission, for the sake of argument, to grant me the privilege to criticise your "room and pillar" method of mining coal. My chief objection is that it fights against the creep, or the quiescent pressure of the overlying strata, incurring great expense and disadvantages upon the mine and the miners. Creep is a force, and I claim that this force, in bituminous seams, can be controlled. To prove this allow me to depart for a moment. See figure two accompanying sketch, which is a section of long wall advancing Scotch system. The creep is controlled to travel to any direction that is desirable. From A it is trained to move to the right to B, and also to the left to C; while entries D and E transfer their creep right and left also; consequently D's creep to the right moves to meet A's creep to the left at C; these forces do not join at C, they are trained to end there and not to mingle, also doing service to the miner in its course. There are good reasons for guiding the creep in this way which I shall not dwell upon here; let this suffice to prove, or rather support, the statement that creeps can be controlled. In the room and pillar system there is no attempt at governing the creep so as to assist the miner or to secure the mine. The roof is propped up in such a manner as to overcome this creep (?)—simply an attempt to master it with strength and expense of timber and with

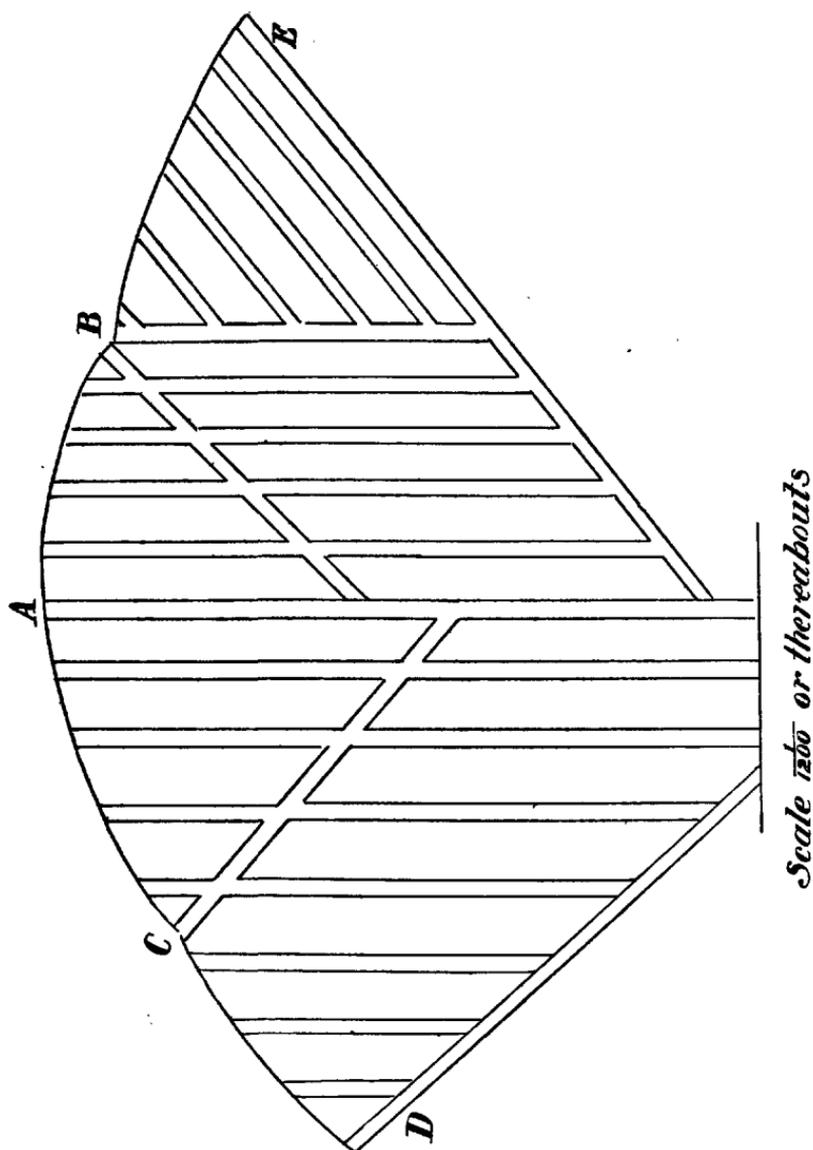


FIG. 2.—LONG WALL ADVANCING SCOTCH SYSTEM. THE LEADING SYSTEM OF LA SALLE AND BEAUREAN COUNTIES, ILLINOIS.

blocks of coal; the result is the confusing of the creep by throwing it on the pillars which act as buttresses; these again convey it on to the entries, breaking props as it travels, interfering with haulage roads by the crushing of entry pillars and causing the floor to heave. I could cite a case in Ohio where two cross-entries were lost, and with great difficulty and expense was the main entry saved. This was caused by working a panel of rooms to their distance and not drawing out the pillars, either because of their crushed condition, or that it was not safe, or very probably both.

Another objection is the method of mining the coal. The miner is confined to too small a line of face between two fast ends, and especially in entries, cross-cuts and "breakthroughs." It is evident that a much greater amount of exertion is required to displace the mineral than is required with the long wall, or some of its modified methods. The ventilation is made impure, and work is retarded and made risky to the personal safety of the miner by the expensive and cruel method of excessive shooting. Blasting powder "ad libitum" in the hands of semi-skilled miners is one of the greatest drawbacks to the coal trade to-day. Just reflect for a moment on the amount of narrow work that is being—to use a slang phrase—"burned out" with powder—main entries and their cross-cuts; cross-entries and their cross-cuts; jaws of rooms and breakthroughs, all of these making slack. When we consider the amount of slack shoveled into the gob; the pillars that are never touched; the immense piles of slack dumped on surface as refuse, together with the amount made in transit, mostly because of the effect of explosives, it is safe to say that not one-half of the seam goes to market as lump coal. Then there is the amount of timber that is entirely lost. The room as already slated is propped from jaw to finish, and if pillars are to be taken out, then commences double propping until the space left behind will appear like a plantation of young trees.

We have mentioned two powerful forces—the force of creeps and the force of explosives—both of these acting to the detriment of the coal seam and the coal miner. The question for the mining student is, Can these forces be handled so as to assist and not to counteract the efforts of the miner? or, Can we dismiss one and then control the other? In the common system of room and pillar as practiced in Ohio, I am afraid that it is impossible. Let us then suggest other methods and throw them open to criticism; may be some one, or more, will be able some day to solve the problem.

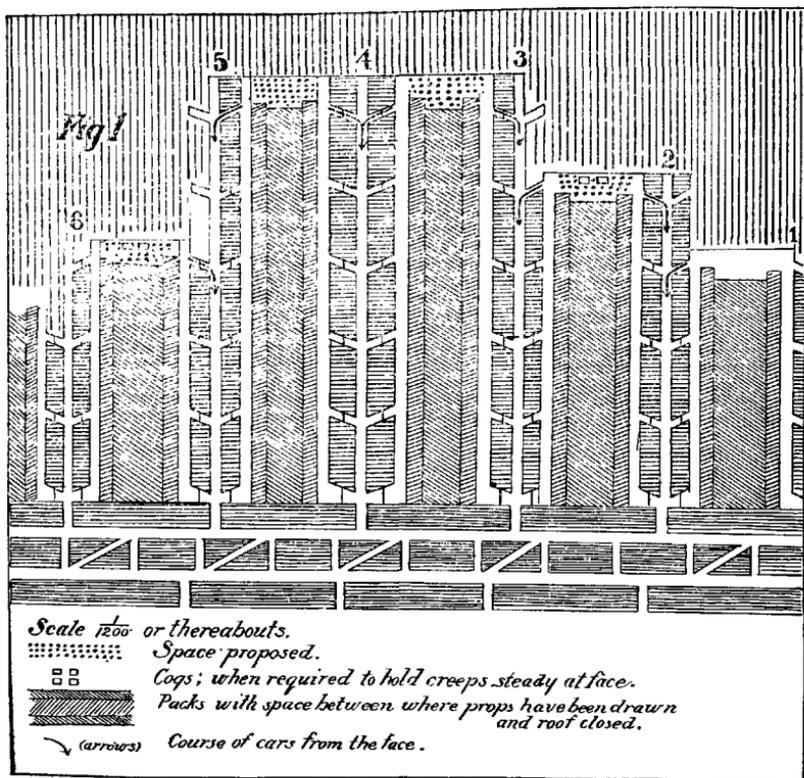
Long wall system dismisses the force of explosives and employs a portion of the force of creep to do the work of the former.

The surplus force that is not required on the face (long wall) is thrown upon the packs, which, of their shrinking constitution, without fighting creep to cause surges, gradually overcomes the force by disturbing it. I will always advocate long wall where it is practicable, and there are more seams that can be worked on that method, subject to modifications, than is generally conceded to us. I have an opinion, which is not considered very polite; I will give it to you. The reason why long wall is not more generally applied is because it is not well enough understood yet by those directly interested in mining coal. The parties that generally treat on the subject, theoretically in journals, text-books, maps, etc., are not, as a rule, embarrassed by the stubborn policy of an old coal mine; while the practical long wall miner that, almost instinctively, "knows all about it" do not discuss the problem where the miners and operators can be instructed by their experience. In local and mass meetings they invariably talk strike or its remedies; but remedy is not visible yet. Would it not be more beneficial to our interests to convene and take up questions of improved methods of mining as well?

My paper will get too lengthy to undertake to discuss long wall in all its details. I will confine the following to a modification of long wall advancing which I believe will suit the thick veins of Ohio—those of Sunday Creek more especially. The laying out of the underground workings are as follows:

Main entries from shaft should be driven on the "butts," or on the ends of the cleavage. Cross-headings and their "walls" at right angles to main entries, consequently are "on the face," or going across the cleavage. Distance apart on main entries between cross-heading will vary according to thickness of "clod," or the layer of soft material directly above the coal seam and below the sandrock or other strong layer. The thinner the "clod" the wider can the face be extended, but 120 feet of face is plenty long enough to handle under any circumstances. In my opinion a reasonable distance for Sunday Creek valley would be headings 150 feet apart, or thereabouts; this will give—See figure 1—from center of heading No. 3 to the right 4 or 5 feet (half road), pillar of coal 12 to 15 feet, road inside "wall" 8 or 9 feet, pack 12 to 15 feet, "gob" from 32 to 40 feet. Add the same distances again from left of heading No. 2, this will leave a line of face of from 90 to 110 feet. This line of face will require four men in each half of face—three miners and a "loader" working from X to the left, coal going out through heading No. 3. The same number working to the right of X, coal going out by heading No. 3.

The hauling road inside of wall, with heading pillar on one side and stone pack on the other, is not intended for a permanent road; we cannot get a permanent road under such conditions without considerable expense. Cross-cuts are drove in for 12 or 15 feet every 60 feet, or thereabouts, on the heading road. These headings and cross-cuts are kept in advance of working



face. When face has cut across the cross-cut, the track from last cross-cut inside the "wall" is taken up and used for the next stage and so on.

The gauge of this track should be inside width of car, say from 24 to 28 inches. A sheet of plate iron 3 feet x 3 feet or 4 feet x 3 feet, with a pair of short horned rails to enter along the coal face. These would allow the car to turn in a small space,

close to the face at roadhead and go towards X as far as would be necessary to load the coal, from where it had been dropped, without second handling.

The car should be made so as to suit the system. It should not be over 4 feet in length, under 3 feet in width, with a proportionate depth. It could be built very cheap. A rectangular box of 1 inch oak, strengthened by 5-16 inch iron bands. It can dispense with the end-gate and could be handled on tower, with specially arranged tipples, to unload more coal per man than with the ordinary big mine car. The above car would hold from 1,200 to 1,500 pounds, or more, of lump coal; two of these cars could be caged at once, tandem fashion; this would make the hoist equal to the present large mine car of Sunday Creek valley.

The pack should be well filled up to the roof and as close to the face as will allow the car, already described, to turn around; this should not be neglected even if the roof is strong. Slack, if any, or sulphurs should be kept together on the floor and in the middle of the pack. Do not distribute slack, sulphur and fire-clay in about equal proportions all through the pack; this may cause, in some mines, spontaneous combustion, or "gob fires." It is careless building with the distribution of combustible materials as described that is the chief cause of gob fires. The slate or shales from the gob, or waste, will furnish material for "builders" or "binders" for sides of pack.

The success of the method will depend mostly on the prop man; the drawing out of props to reduce that particular expense is not the main object in view. It is the judicious setting and releasing of the props that breaks the "clod" evenly and regularly, and throws the debris into the waste and not on to the face. If ever you may try this, or similar method of working, watch the person that undertakes to be the prop man, and if you find that he is careless, reckless or may be too timid about his charge, move him at once. The prop should be a round prop and not too strong nor too weak: a 7 foot prop with diameter at small end ranging from 5 to 7 inches, would I believe be about the right kind for the seams under discussion. Props in coal mines should always be set with small end on the floor, so as they can easily be pulled out if desired, especially in this method where it may happen that two or three will be standing with just their tops out of a pile of slate, etc., after a fall of roof; these can be taken out at a jerk or two with a tool for that purpose.

I should have mentioned that the cross-headings can be dismissed as haulage roads at any desirable distances. See figure 1, entry 4. The pillars on this cross-entry are thicker than those

on each side, for it is destined to be a permanent hauling road. The faces of 3, 2 and half of 1 to the right, and of 5, 6 and half of 7 to the left can be continued as before, but the haulage turned into No. 4. The heading "stumps", or pillars, can then be taken out and the roads hermetically sealed.

I will conclude by only naming the advantages aimed at. Evading the ruinous effect of confused creep by breaking into the roof as soon as possible, which is the only way to be relieved. The saving of timber used as props. Displacing the mineral with less exertion. A much greater percentage of marketable coal. A healthier ventilation with considerable less horse-power, but the greatest of all, that of reclaiming the vast amount of mineral that is entirely lost.

Yours respectfully,

ED. JONES,
Mine Foreman, Oglesby, Illinois.

CAPTAIN MORRIS: I move that the thanks of the Institute be extended to Mr. Jones for his valuable paper.

Seconded; carried.

MR. LOVE: I desire to say that the paper in the first place was not intended for this Institute. It was simply a letter to me in reply to an article of mine. I think mining engineers ought to study that system. I think it is a good system to work some of our Ohio seams.

MR. DOE: I would like to ask Mr. Jones, in the light of his experience in the Sunday Creek valley, how much space he thinks he could allow between the face of the coal and the posts pictured there?

MR. JONES: You mean the working space between this row of posts (indicating) and the face?

MR. DOE: Yes.

MR. JONES: There is some very good roof in the Sunday Creek valley and I believe you could take a cut of 6 or 7 feet there.

MR. DOE: Then you think it would be safe with that system of working, to have an open space of 6 or 7 feet there?

MR. JONES: Yes, sir; I believe it would.

MR. DOE: That would admit, then, of one system of mining machinery which could be adapted to that purpose?

MR. JONES: Probably so; the short mining machines.

MR. DOE: There is a long wall machine that could be adapted to that purpose. It could be worked inside of 6 feet without trouble, starting from one end and going clear across the face.

MR. JONES: I would expect that condition of the roof for a considerable distance from the face back to the waste. It would be in much better condition than in the present room and pillar system, because the creep has been released and you have only to contend with the weight of the coal from the back row of props to the face. I would expect that you could have a wider space without props than with the present room and pillar system.

MR. DOE: That looks reasonable. Mr. President, I would like very much to have a general discussion of this matter. I think it is a very serious question for our Hocking valley mines, and if a long wall working system could be adopted here, it would be a great saving in the cost of the coal, as well as waste of coal which has been discussed here this afternoon.

SECRETARY HASELTINE: We have had a great deal of long wall talk for a number of years, but the first intelligent presentation of the system is that which has been presented to-night. I never before listened to anybody talking on this subject who seemed to have any definite idea of what he was talking about, and I regret that we have not several hours to devote to this discussion. I think Mr. Jones has put us on to a plan which will be of great service, may be not to any of this generation, but at any rate to generations to come, in the production of coal in this State.

I want to ask Mr. Jones what is his idea as to material to be secured to make the packs of. In the thick veins of the Sunday Creek valley, not being any bone coal or impurities enough

to fill up the place, there would be nothing to fill the space caused by removing the coal. That would apply in the case of any pure coal without any debris to throw back.

MR. JONES: It is intended to use the refuse of the seam. It is very probable that some of the fire-clay above can be mined when the work is first extended, then refuse can be used from the face coal itself. The refuse of the Sunday Creek can be filled in what we call the body of the pack. The other substance can be taken out of the already broken top or roof. It is to support the haulage road on the right hand side of that block of coal just while the face is advancing sixty feet; therefore it does not require a great amount of material to build it.

MR. RUTLEDGE: I want to emphasize a remark my fellow miner made. Mr. Jones spoke of the weight, in long wall mining, doing the work. That is an excellent point. We have the old definition of what civil engineering was—the forces of nature advantageously converted by man. The weight of the face brought onto the coal is economical, is the cheapest. Long wall mining, I think, is the most scientific in the world. But we do not want to lose sight of that point; it is an excellent thing.

The motion relative to the further work of committee appointed at last meeting to gather information in regard to wasteful practices in coal mining, offered at the afternoon session and laid upon the table, was withdrawn and the following offered in its place by Mr. Llewellyn:

Moved, that the committee appointed last year be continued, and that the Mines and Mining Department, through its assistant inspectors, secure and furnish to the committee such information as may be required; and that this committee formulate and present to the next convention of the Institute a report embracing recommendations of changes in the mining laws tending to do away with or reduce the present wasteful mining practices in the State.

Seconded by Mr. Haseltine. Carried.

MR. JONES: I move a vote of thanks to the officers of the Institute for the able manner in which they have discharged their duties; also thanks to those who have read papers here, to whom same have not already been rendered.

The following applications for membership were read by the Secretary, all of whom were elected:

E. B. Pedlow, New Straitsville, O.; Z. Williams, Nelsonville, O.; A. T. Johnson, Cleveland, O.; F. C. Keighley, Uniontown, Pa.; James P. Davis, Dell Roy, O.; W. C. Pierce, Indianapolis, Ind.; M. E. Serat, Kansas City, Mo.; E. E. Fox, Massillon, O.; E. R. Merrill, Columbus, O.; D. C. Thomas, Hollister, O.; F. R. Baker, Athens, O.; Arthur L. Williston, Columbus, O.; E. P. Lord, Pittsburg, Pa.; F. C. Caldwell, Columbus, O.

After the Secretary had given full information as to the excursion to-morrow, the Institute, on motion of Mr. Love, adjourned.