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*REVIEW OF ANDREW ROY'S REVIEW OF PROF.
ORTON'S DISCUSSION OF THE NUMBER
ONE (OR SHARON) COAL SEAM.*

(READ AT JACKSON MEETING, JUNE, 1885.)

The number one of Newberry, or Sharon coal of Prof. Orton, or the Brier Hill, or the Black, or the Massillon coal, without a doubt, means one and the same seam of coal; and has been from the time of its first discovery to the present time, a matter of dissension and controversy by and between practical miners, as well as between geologists, and, from what we now possibly know of this, the most irregular and inconstant (as well as a most valuable) seam of coal (by positive and practical proof), it is no wonder that our earlier geologists were mistaken in their conclusions.

Mr. Roy states in his review that when the surveys of Mahoning and Trumbull counties were made, geologists insisted that it did not exist north of Gov. Tod's mines; that then, a driller, that knew nothing of geology, found coal ten miles north of that mine, etc.

But, Mr. Roy should also have said, that this survey was made about thirty years ago; then, when we consider that practice, tests, observations and continual hunting makes a geologist, it is no wonder that men thirty years ago in this State should err, for they had nothing to guide them but theory; but after so many years of actual tests, explorations and experience, it is unaccountable to me that Mr. Roy should become a victim of such errors (and I might say his previous teachings) as he has become in his review of Prof. Orton's discussion of the No. 1 or Sharon coal.

It is true to be very and wishfully technical, and critically critical, errors can be pointed out in the writings of all geologists, and especially so when discussing this seam of coal, and as doctors differ and belittle one another, so do geologists; and in no case have I seen it more apparent than in Roy's Review of Orton's, on the lower coal measures; but in an experience of thirty-five years in the Mahoning and Tuscarawas valleys, my opinion is, that Prof. Orton's discussion on the No. 1 or Sharon Seam of Coal, is the ablest and most correct of any that I have read, and is, and will be, the standard for future geologists.

On one point I would, perhaps, coincide with Mr. Roy in preferring figures, in naming the coal seams to that which is

adopted by Prof. Orton, but this is only a matter of taste or convenience, and by no means an error.

Mr. Roy further says that, Prof. Orton has found a true scheme in regard to the lower coals, (I think so, too), that he has traced them from the Pennsylvania line, etc. But he says, we believe he has done no such thing, etc.

Now, we believe he can, and as far as the No. 1 (or Sharon coal) is concerned, he can draw a line around the entire field, and say with much more safety that coal *does not* exist outside of that line than he can that coal *does exist* outside of the line, notwithstanding coal bearing rocks may be found outside such a line.

But, as Prof. Orton remarks, the line will be a sinuous one and not a bee line, as Mr. Roy would wish the reader to understand.

This No. 1, Brier Hill, Black, or Sharon seam of coal, was known to exist at several points in Mercer county, Pennsylvania, around "Sharon," "Clarksfield" and "Greenville," and was mined at these points about as early as it was at Brier Hill (Gov. Tod's mine) in Mahoning county. The writer is sure that it was extensively mined in 1848, and in 1850 he was mining in that locality himself, in a mine called "Joy's Bank," some four miles west of Greenville, Pennsylvania, and about the same distance east of Orangeville, Ohio, the coal being taken by canal to Erie, Pennsylvania.

Now, when I say, that near Greenville, Pennsylvania, the "extreme eastern" point of the lower coal seam is found, I am as fully justified, as when saying, that in the neighborhood of Wadsworth, Medina county, Ohio, is the "extreme western" point, and the guarantee in each case is the fact, that none has been found east of Greenville, nor west of Wadsworth, nor in my opinion ever will be found.

Now, then, draw a line from Greenville, Pa., running southwest, to Warren, Trumbull county, Ohio, then through Paris and Ravenna, Portage county, Ohio, and then to Akron, in Summit county, Ohio, and then to Wadsworth, Medina county, Ohio, and you will have the entire length of the northerly margin of the coal basin, and if drift had not filled up the valleys, the crop of the coal, though sinuous and irregular, could be traced south of this line. Now the course will change, and will run very nearly south to Orrville and Dalton, Wayne county, then continue little east of south, to the southwest corner of Stark county, the most southerly point this coal has yet been found, and (from numerous tests made) ever likely to be found. We will now return in a northeasterly direction, to Canton,

Stark county, and Atwater, Portage county, then we will run about due east to Poland, Mahoning county, then north on the Pennsylvania line to the southeast corner of Hubbard township, in Trumbull county, Ohio, then northeast to Mercer, Mercer county, Pa., then northwest to Greenville, Pa., or the place of beginning.

Now, all the tests by drilling or otherwise, that have been made, for over thirty years, prove the fact that No. 1 coal is not to be found anywhere outside of the line indicated, and not one per cent. of the area indicated will contain this seam of coal, and excepting few narrow basins of this coal found in Palmyra township, Portage county is about barren of the lower coal seam. Prof. Newberry says, and Mr. Roy holds out the same idea, that there is no reason why the No. 1, (or Sharon) coal should not underlie Tuscarawas, and all of Stark, Columbiana and Mahoning counties. Now such a thing may be possible, but outside of its possibility, everything else proves such theory a fallacy. Indeed, it may be claimed as possible that our No. 1 (Sharon coal) is not the lower seam of coal, and about a year ago parties did very positively claim that they had found a five-foot vein of coal some three hundred feet below our No. 1 seam, near Canal Fulton, Stark county, and, if I correctly remember, Mr. Roy pronounced the samples given him as "anthracite;" but until a better proof is given of the finding of that coal we would best let it still be as "possible," but far from being probable, and until the No. 1 coal is found to exist in minable thickness beneath other coals—Nos. 2, 3, 4, etc. (no such a thing as yet having been found)—I shall believe in the most reasonable theory of Prof. Orton, that the coal formation took place in marshes on the border of an ancient sea, and that the width of the basin is very limited.

The *fac simile* of the marshes that produced this coal can be seen to-day on the sea coast, at Atlantic City and other places, and what is true of the sea coast marshes of to-day—their size, irregularity of shape, etc., and generally found in groups—the same can be said of the "Pots," or the coal deposit of our lower seam of coal. The size and shape of one pot would be no indication of the shape or size of another—no rule, but all exceptions.

Mr. Roy says that Prof. Orton's scheme of the lower coals is based upon the theory that the seam, as a general rule, is a continuous sheet, stretching across the coal field, etc., and that the deposit was upon low, marshy plains, around the borders of a sea, etc.

Mr. Roy says there never was a greater mistake, and that any

intelligent observer who will travel through the coal mines of the State will soon satisfy himself of the fallacy of this theory, and that he will find subterranean hills sixty and seventy feet in height in which the coal is deposited, etc. Now, the language used by Prof. Orton on the No. 1 (or Sharon) coal is this, and is almost identical in its meaning with what Mr. Roy says, and for the life of me I can't understand wherein he should criticise, unless it is done for the love of criticism. Prof. Orton says the organic deposits of the coal were exceedingly irregular, never covering but a small fraction of the area included in any boundary line. Also, as it is the case of the Sharon seam elsewhere in Ohio, the coal of the Massillon field is in all cases disposed in distinct basins which range in size from a few acres to a few hundred, but rarely exceed two hundred acres. The greater number range from thirty to seventy acres, etc. Again, Prof. Orton says, the elevation of the coal in different parts of the same mine have a play of twenty to fifty feet. Mr. Roy says the basins are from a few acres to quite large, extending from one county to another. To be critically critical, I would ask Mr. Roy if it is a good reason that, because a basin of coal extends from one county to another, it is a "large" basin. We think not. County lines have not much width, hence a basin of less than ten acres in size could be part in one county and a part in another county. Just the same with township lines and down to quarter section lines. Mr. Roy is aware of the version that "line fences" often cut out the coal. It is often found that one farmer having only eighty acres of land has from thirty to fifty acres of coal, while his neighbors all around him, having 160 acres or more, have not one foot of coal. Now, the only difference I can perceive in the general descriptions of the No. 1 coal, between Prof. Orton and Mr. Roy is, that Prof. Orton calls six a "six," and Mr. Roy insists that it is "half-a-dozen."

The basins of coal having over 100 acres in the No. 1 seam are very limited. I think Church Hill and the Brookfield slope basins are the only ones in the Mahoning district that have more than 100 acres of coal, and I am very sure that the Willow Bank basin is the only one that has yet been found in the Massillon district to exceed 100 acres of coal.

It is possible that Mr. Roy has (as he says) seen underground hills to the height of seventy feet, but I have only known few instances of such hills to the height of sixty feet, but from twenty to thirty-five feet very common. Right here I wish to say a few words in regard to the levels of two mines, as given by Prof. Orton in his paper on the Massillon coal field, general dip, etc., the Willow Bank, No. 1, and the Mountain

mine. It is true that Prof. Orton cautions that it is necessary to have in mind that the elevation of coal in different parts of the same mines have a play of twenty to fifty feet, but the impression is left to the reader, (and Prof. Orton is aware, by this time, that some readers love to be critical), that while the Mountain mine and Willow, No. 1, are near together, the dip is much greater from the Chippewa to the Mountain mine, being 147 feet, than it is to the Willow mine, that being only 125 feet. To make this perfectly clear: the two mines are sunk in the same basin of coal, only three-fourth mile apart, the Willow mine at one extreme end of the basin and the Mountain at the other extreme end. The Willow was sunk in a hill, and the Mountain shaft nearly at the deepest point of the basin; hence in taking levels to find what the general dip of the coal is, the Willow mine should not be considered; and if the deepest point in each basin was taken into consideration, I think the general dip of the coal would be found quite uniform from the northwest to the southeast.

Mr. Roy next raises a question, that from his former teachings and tests, and observations of the most thoroughly practical, as well as all our best known geologists, I thought was as much settled as that mineral coal was produced by vegetation.

He (Roy) says: but, do we know that Brier Hill coal and the Massillon coal, are one and the same seam. The Mahoning coal rests in basins cut into the Cuyahoga Shale, while the Massillon coal rests in basins on top of the conglomerate rock, etc.

Now, the fact is, Mr. Roy, that when coal is found in the Massillon district, the conglomerate rock beneath is very thin, and often not found at all. I have drilled several holes, from thirty to fifty feet below the coal seam, and found nothing but dark blue shale, but where coal does not exist, though it may be found only 300 feet away, you will find the conglomerate in its majesty, at an elevation of from twenty to seventy feet higher than the coal basin, that may be in the vicinity, and many a drill hole to the uninitiated has cost much money, (unnecessary) for being determined to have the hole down to the level of where he previously found the coal.

Another proof Mr. Roy advances in this "new departure" is, that the two coals are dissimilar in character, the Brier Hill being long grain, laminated in structure, and a typical furnace coal. The Massillon, on the other hand, being short grained, and not well fitted for furnace use, etc. Now, on this point, Mr. Roy, "surely," has been imposed upon by some practical joker, or some one that knew nothing about smelting irons. Just as Prof. Newberry was imposed upon when he says, in

Volume III, when discussing the Massillon coal, that Massillon coal was an "excellent" furnace coal but a pity it was so wasted by using three and a half to four tons of coal to make one ton of iron, etc. Now, if the proper reason was given to Prof. Newbery why three and a half tons of coal was used in Massillon and only two and a half tons in the Mahoning valley to produce one ton of iron, it would be this: In Massillon the ore used (Black Band) had only about forty per cent. of iron, while in the Mahoning valley most of the ore used (Lake ore) had from fifty-five to sixty-five per cent. of iron; hence it will not take very strong reasoning to conclude that the waste of fuel was not much after all.

Now, what are the facts in this case, and I say it from positive and practical experience of ten years, excepting the difference of about three to four per cent. more carbon in the Mahoning coal, the Massillon coal is equally as well adapted for furnace use as the Mahoning coal is, and is much superior to any Shawnee or Hocking coal for the smelting of iron; but of late years, neither Mahoning or Massillon coal is much used, because Connelsville coke is cheaper and better adapted for the smelting of iron. Again, is it true, that all the Brier Hill coal (No. 1) is typical furnace coal? Not by any means. (Mr. Roy better let smelting iron alone and stick to the coal mine.) Many exceptions are to be found in the Mahoning valley as well as in the Massillon district; for instance, the Church Hill and the Brookfield Slope coals (the two largest basins in the Mahoning valley) were never considered up to the standard of furnace coal, and indeed the Brookfield shaft coal was so impure as not to be considered even a fair domestic coal, and other mines, I might mention, equally as bad. The Massillon district never was without one or more mines that produce good furnace coal, and to-day not less than three mines of that kind are here, which will favorably compare with any three mines in the Mahoning valley—the Garfield, Beaver Run and Rose Hill—all three being situated south of Massillon.

Another proof Mr. Roy brings forward, and which is equally as absurd is, that in the Mahoning valley three distinct seams of coal, in the space of sixty six feet, are found above the No. 1 coal, and mentions the "Garfield" shaft in Trumbull county, where they can be seen. Then with great assurance (that a mare's nest is found) and that such can't be seen at other points, asks, do they appear in the other parts of the coal field? etc.; and says, none of these seams represent coal No. 2, that seam being due thirty to forty feet lower, and none of them represent No. 3 coal.

In regard to the foregoing I would say, that whatever they do represent, the phenomena has been seen at two points in the Massillon district, on Newman Creek, and at the Warrington and Grove mines, two miles south of Massillon, at about from forty to fifty feet from the lower coal a seam of over three feet is found, and ten feet higher a seam of twelve inches is found, and twelve feet still higher a seam of four inches is found, and as a matter of fact, either one of these seams, as well as those that Mr. Roy mentions, can be, and no doubt is, the No. 2 coal, the other two being local riders; and when Mr. Roy says that neither one can be No. 2 seam, for the reason that he gives, that No. 2 is due from thirty to thirty five feet above the lower coal, he is as much mistaken as if he said from eighty to one hundred feet. Every man that has had experience in drilling for the No. 1 seam, knows that the true place of the No. 2 seam is, anywhere from thirty to eighty feet above No. 1 coal, and the reason for this great difference is, that where the coal No. 1 is drilled to in the swamp (or basin), the difference is greater between the two seams than where the drill hole strikes the No. 1 on an higher elevation.

But has these Rider coals, or the quality of the coal, anything to do to prove the distinctness of a coal seam? If so, we would ask Mr. Roy what seam will he call the "Mineral Ridge" coal. Here we have an unaccountable freak of nature that, in no other place, as yet, in this country, and I may be safe in saying the world, that such a thing has been seen as the lowest coal measure carrying with it, and beneath it, a strata of blackband ore, and no amount of criticism or theory will prove but what the Mineral Ridge coal is the lower seam, for the reason that the eye can see, or could have seen it at the old Weathersfield shaft, the Block, or River Hill coal one side of the shaft, and the Mineral Ridge with its Blackband ore the other side of the shaft, and south of that shaft, an area of about one by two miles, this greatly inferior coal and Blackband ore is found. Then south of that, again the River Hill coal comes in, in all its purity.

Again, I would ask to what seam does the Camp Creek coal, of Stark county, belong? It is found equally as deep in the ground as the Pigeon Run, only one mile north of it, Elm Run mine, same distance west, Justus mine, two miles south, and the Garfield mine, one mile east of it, and in composition, construction or quality, has no resemblance whatever to anything ever before found in the Massillon district. The southeast part of the basin is a "typical" Massillon coal—no better ever went to market—while the northwestern part of the basin, excepting

about fifteen inches of the lower part of the seam is, what the owner calls, cannel coal, but what is commonly called "bone" coal, of a good quality, having, if I correctly remember, something less than 40 per cent. carbon.

Few men have had more advantages to be thoroughly posted as regards the lower seam of coal than Mr. Roy, and I can't but think that his review of Prof. Orton's discussion on the lower coal measure was otherwise than to have the subject thoroughly discussed, and that he really believes now, as he formerly did, and in the main as Prof. Orton, myself and others do. I have for ten years believed that the lower coal seam, of minable thickness, could not be found underlying other coals of minable thickness, or if it did, that it lost its identity and character, and could not be recognized; and according to my experience and observation, I recognize in Prof. Orton's theory, the best yet advanced.

A. HOWELLS.

