

REMARKS ON THE ORE AND IRONSTONE

of

ROSEDALE ABBEY.

BY MR. JOS. BEWICK.

(Read to the NEIMME on February 5, 1857)

' This iron ore, which has of late created so great a sensation amongst our geologists, ironmasters, and mining engineers, is found in one of those beautiful and secluded dales for which the moorland districts of North Yorkshire are so celebrated, known by the name of Rosedale, being near to & village of Rosedale Abbey, situated about ten miles to the north-east of the town of Pickering, and about sixteen miles to the south-west of the port of Whitby. The extraordinary excitement which the discovery of this iron ore created arose not only from its great thickness and rich quality, but also from a large portion of it being in its natural state easily attracted by the magnet. Although I had long heard this peculiar deposit much talked about, and wonderful accounts from time to time reached me as to its amazing thickness, extent, &c., it was not till June last that I was induced to visit it. This apparent indifference on my part may be accounted for from the fact of my having previously examined the most of the dales where the lias formation is fully developed, and had arrived at the conclusion that out of the two chief ironstone deposits which it contains, only one was of any real commercial value, viz., that found in what is locally termed the marlstone series, identical with the thick bed of Cleveland; the other, which I thought was the one they had discovered in Rosedale, found intervening the alum-shale and sandstone rock, being, in my opinion too coarse and silicious to be used alone advantageously in the manufacture of iron. On visiting the quarry where the ore is at present worked, near to the village of Rosedale Abbey, I was immediately impressed with the striking analogy it bore in its aspect to our basaltic dykes, and a further examination at once led me to the conclusion that it was of igneous origin—in fact, that it was neither more nor less than, as I firmly believe, an extensive volcanic dyke of iron ore. This opinion, I know, is at variance with that of many gentlemen possessing great practical experience, as well as scientific acquirements. It was not, however, till I had possessed myself of proof sufficiently convincing and conclusive, as I thought, that I arrived at this opinion. The proofs afforded me are, first, its vertical or unstratified formation; secondly, from its containing no organic remains whatever; and, thirdly, from its being highly susceptible to magnetic influence, as well as exhibiting the appearance of its having been in a state of incandescence.

With evidence such as this to guide you, I cannot see how any other conclusion can be come to than that this iron ore has been produced by volcanic action. The extent of this vein—whether of considerable extent or otherwise—cannot at present be ascertained. This can only be revealed to us by actual experiment. By the side of the valley where it is exposed to view, it is traceable, apparently, for a distance of 300 or 400 yards, but as it is nothing but a confused mass, thrown together without either order or regularity just, apparently, as it has been ejected from the interior of the earth—it is impossible even to guess at its breadth. The probability is that the mass, on reaching the surface of the earth, spread itself over the ground on both sides of the vein, and present appearances further the supposition that the vein becomes narrower in the downward direction, as, in excavating the quarry which is opened out on the north side of the dyke, the shale against which the ore rests forms an angle or slope, something like that represented in diagram No. 2. The valley, too, as far as we can judge, apparently intersects the vein in a diagonal direction, which, of course, will expose a much more extensive face than if it had been intersected at right angles.

I again visited Rosedale on the second and ninth of last month (November) for the purpose of seeing what progress had been made with the experiments now going on, and also to inspect some ironstone which has lately been opened out there; and in order that I might ascertain accurately what had been done in their subterraneous explorings in the vein, I took with me my circumferentor, and, with the sanction of the overlooker, made a survey of the workings, a sketch of which is represented in diagram No. 1. I found they were driving the drift in the heart of the vein, and apparently in a direction parallel

to it. It had then reached the distance of 193 yards, and I was told they were about to commence at the face of the present two other drifts running at right angles from it, with a view of ascertaining its breadth, and until those trials be completed nothing further in the shape of information can be obtained beyond what is already known. The drift is six feet high and seven feet wide, and is let at 30s. per yard, one yard producing about nine tons of ore. This information was of some importance to me, as I gathered from it this fact, that whilst a portion of this ore is much heavier than the ordinary ironstone of the Grosmont district, yet in bulk it is somewhat lighter than the stone I am at present working in the mines under my charge, for it will be seen from the product just given that it takes 14 cubic feet to each ton of ore, whereas it only takes 13 cubic feet to produce a ton of our stone, thus shewing that there must be a large portion of extraneous matter mixed with this ore of very little value. I was also anxious to ascertain whether there was any visible magnetical disturbance produced by this vein on the needle of the circumferentor, and in proceeding with my survey I soon found this to be the case, for on taking the angle between A and B, a distance of only 25 feet (previous to this there was no variation), I found the direction to be North 87° West, and on removing my instrument to B, and taking the back sight to A, I found instead of the needle indicating North 87° West, it stood at North 6° East, skewing a variation of 9° in an easterly direction. It then became necessary for me, in completing my survey, to fix the needle and read off the angles by the vernier. This dyke appears to be traversing the district in a westerly direction, trending a little to the north, and it is a singular fact that it has never yet been traced beyond the locality where it is found, that I am aware of. It is more than probable, however, that a closer examination will discover it in the districts both East and West of Rosedale.

Judging from what has been advanced with reference to this vein, especially as regards this locality, we are naturally led to infer that 'any considerable quantity of ore is not likely to be obtainable from a field so limited in its extent as this appears to be—I mean, of course, its daily produce—from the great difficulty there would be of placing a large number of workmen in a mine so limited in its area. The working too of this ore, which is of a very hard and compact character, must be costly when compared with the ironstones of Cleveland, Grosmont, and other districts; and I cannot avoid expressing my belief that the commercial value of this mineral has been overated. Diagram No. 2 gives you some idea of the position in which this ore is found, though its shape, of course, is partly ideal.

On the other side of the Vale, and a little to the north of the dyke, is seen, high up in the hill, and skirting the side of the valley, a thick seam of ironstone, the features of which much resemble those of the ore, and many are impressed with the belief that they are one and the same deposit. This, however, it is clear to me, is the same bed which I have taken the liberty of designating the top seam of the lias formation, and which, as I have already stated, intervenes the alum shale and sandstone rock, and a single glance of the experienced eye will at once detect the difference between them. This bed is very irregularly diffused throughout the whole of the Has district of North Yorkshire, varying very much both in quantity and quality. In some places you find it only a few feet thick; next you meet with it swollen out to the enormous thickness of fifteen or twenty feet; then, again, entirely wanting. In some places portions of it are of an average quality, but, generally speaking, it is too strongly impregnated with sand to be used, as I before stated, extensively in iron making. Diagram No. 3 is a section of the thickness of this seam of ironstone, as seen in "11 Northdale," about two miles to the north of Rosedale Abbey, the property of Capt. Vardon, where it is no less than twenty feet thick. Four feet of the top part of it appears rich in iron, and six feet of the bottom part of middling quality, and the middle portion very coarse indeed, samples of which I now produce. It is again met within "Hartoft Vale," about two miles to the south-east of Rosedale Abbey, where it has been lately opened out, and although there is a great thickness of it there also, only about three feet of it appears to be of average quality. This stone is at present worked by Messrs. Palmer & Co., Messrs. Seymour & Co., and the Eskdale Ironstone Co., on the beach north of Whitby, and by the Whitby Iron Co. and the Murkeyside Mining Co., in Goathland, about eight miles from Whitby, joining the Whitby and Pickering Railway, and is at present engaging the attention of various other parties.

Mr. Marley appears to have an objection to this being called the "top seam," and as I think it of some importance that a correct understanding should be come to as regards the nomenclature of the ironstone series, in a district so important as that of North Yorkshire, I may just state that my reason for designating it the "top seam" of the lias formation is simply from the fact of that rock containing only two workable deposits of ironstone, and that the strata immediately above it comprises another and distinct class of rocks, the one being a marine, and the other a terreous deposit, as their organic remains abundantly testify. The latter, in fact, being those which may be termed the carboniferous series of the moorland districts of North Yorkshire. This being the case I think it is much better, for the sake of

avoiding confusion, that the ironstones found in these strata should be classed according to the respective situations they occupy in the series they belong to.

My object in thus troubling the members of this Institution with the foregoing remarks is twofold. First, to show that the iron ore of Rosedale, instead of being a large mineral field, as was first asserted, and still believed to be so by many, is nothing more than a volcanic dyke; and, secondly, that the ironstone lately opened out in this locality is not, as it is reported to be, the main seam now being worked in Cleveland and Grosmont districts, but is in my opinion, if Mr. Marley will permit me to say so, the top seam.

Public attention having been so much drawn to this district, and that this company have closed their workings since this was written.

An analysis of this stone, as well as the ore, with a map of the district, having already been given by Mr. Marley, it is only necessary for me to refer those who may wish for this information to his paper.

to a much greater extent than any other since the Cleveland discoveries, it may not be amiss, in conclusion, to glance at the prospect it holds out to speculators in iron mining, and the advantages to be derived from it generally. There is nothing so likely to attract as that which has something of the wonderful to recommend it, and this, I think, may very properly be applied to Rosedale.

The announcement that inexhaustible quantities of iron ore had been . found in this valley, a large portion of which was not only richer than any yet discovered, but was also termed highly magnetic, was so startling an occurrence, as to stamp the locality, in the eyes of a portion of the mining and iron manufacturing public, as the one of all others that would, in all probability, yield the cheapest and best mineral. It was, therefore, not to be wondered at that people from all quarters should flock to it, in order to examine what may be considered little less than a geological phenomenon. Since, however, it has been found that this ore is restricted within much narrower limits than was at first expected, its aspect has become very much changed for the worse, and it now remains to be seen whether the extent of it is sufficient to warrant the making of a railway, without which it could never be profitably worked, failing which, I am of opinion the ironstone of this district must remain some time longer undisturbed, without other markets than those of the north can be found for it. I understand, nevertheless, a survey of a proposed line of railway has already been made, which, it is intended, shall form a junction with the North Yorkshire and Cleveland Railway, the construction of which, however, will, no doubt, as I have already said, depend upon the extent of the dyke. This once ascertained, the quantity it contains will be a mere question of calculation. It is true they have enormous quantities of the top seam in this district, a large portion of which appears to be of fair average quality, but it must be remembered that in the event of this railway being made, which Mr. Marley tells us will be about fourteen miles in length, it will, in all probability, open out in its route other fields of this stone, quite as well situated for working as that in Rosedale, and, being so much nearer a market, will, of course, be disposed of at a lower figure. This district being the point furthest south where the lias ironstone has yet been discovered, viz., within ten miles of the Whitby and Pickering Railway, at the town of Pickering, the idea naturally suggests itself that the iron districts of the West Riding of Yorkshire would afford the best market for this mineral, at any rate, it must be apparent to every one who knows anything of the neighbour, hood, that it is not very favourably situated for competing successfully with some other districts in supplying the markets of the north.