GROVERAKE MINE.

THE VEINS.—Operations in this Mine have not been confined to one vein, but to several that appear to converge near one point, and these veins, although running at different angles before they unite, have all, in general language, an easterly and westerly bearing. The lodes of this series converge to a point as they run east, and of course spread out in the opposite direction like a fan.

The vein that lies towards the north is Red Vein, the next is Greencleuch Vein, and the next, lying more towards the south, is Groverake Vein, which has a nearly direct east and west bearing, and from which radiates Burtrce Pasture Vein, lying still further to the south. The veins in which any mining is being done are principally Groverake, and partly Greencleuch veins, in the ground between Rake and Wallace’s Levels. It does not appear that there has been much mining done in Red Vein nor in Burtrce Pasture Vein at this part of the field.

MINING OPERATIONS.—There are two working entrances to the Mine—viz., Rake Level, the mouth of which is situated at some little distance from, but quite conveniently for, the washing work, and about 220 fathoms west of the junction of Groverake, Greencleuch, and Red Veins. Rake Level is driven towards the east on Groverake Vein in the Plate above the Firestone. The other working opening is Whinsey or Groverake Shaft, sunk from the surface within eight or nine fathoms of Rake Level mouth, and extending to a depth of about 52 fathoms.

THE ADIT LEVEL, which is driven in Groverake vein at a random of nearly 32 fathoms under Rake Level, is comprehensive in its action, as it forms the main drain to other old mining systems lying considerably to the south-east of Groverake. The outlet from this level is situated about half a mile up the valley from Rookhope smelting works, and is in a straight line, perhaps one and a third mile from the Whinsey Shaft of Groverake Mine. This level was the water adit of both Rispoy and Wellescleuch, two obsolete and inaccessible mines that are, particularly the latter, understood to have proved very productive undertakings in their day.

This Adit Level is driven in the Coal Sill in Groverake Mine, and is sometimes called the Coal Sill Drift; it is now in a very bad state of repair, if not altogether closed, and its restoration, as shall be noticed further on, would prove of paramount importance in the future working of Groverake system.

UNDER THE ADIT LEVEL a sinking has been put down 20 fathoms in depth, and at the bottom of this engine sump the Low Level has been cut for about 77 fathoms to the east, and about 83 fathoms to the west in Groverake Vein commanding the Great Lime. There is also an intermediate drift, called Waggon Drift, cut about the same distance in both directions from the engine sump, about the middle of the Great Limestone Sill.
This lower portion of the Mine was unwatered by an hydraulic engine, and as that machine was stopped and removed some years ago, the workings situated under level are inaccessible. If a supply of water can be obtained to work the engine it should certainly be again employed for unwatering the lower section of the Mine, and the veins in the Great Lime should then be thoroughly explored at the points of junction of the different lodes. So far as opened out, Groverake Vein did not appear very rich in the Great Lime, but the efforts in that vein were only limited, and there is every chance of meeting with very valuable leads and flats at and near where a number of veins come together; and it should be stated here that the opening out properly of the veins in the Great Lime offers one of the most feasible means of entirely changing the condition of what is now a very poor Mine.

Whimsey Shaft is sunk down to the Low Level, so there is a convenient way available for giving access to all the points of this Mine, and for delivering the House on the present washing floors.

**Above the Adit Level.** Up to Rak o Level, there are several intermediate drifts that do not appear to have been considered worthy of a name on some of the sections, and are not now the seat of any active operations. The writer is informed that many years ago extensive mining was carried on in, and great quantities of ore taken from, the ground between Rak o Level and the Adit Level. Under any circumstances it will be impossible to open up the lower workings of the Mine without first clearing up the Adit; and the obstructions in that opening also prevent in a great degree any working under Rak o Level, and in that section of ground which holds such sills as the Lower Slate, Pattinson’s, the Firestone, and the Little Lime, there should be every chance of success by extending operations into new ground to the east.

Rak o Level is the principal driving, and in the roof of it up to Wallace’s Level, 24 fathoms higher, all the active operations are now being carried on in Groverake and Greencleuch Veins in connection with Groverake Mine, and in considering the parts of the Mine in which these workings are now being conducted, we shall, in the first place, refer to the workings in—

**Groverake Vein.**—The eastern extremity or forehead of Rak o Level, which is about 183 fathoms east of where several veins become joined, or what may be termed the junction, was being driven last quarter at £3 10s. per fathom and £2 per bing of ore. The vein was very wide, consisting, for the most part, of lighted or a fluor spar, with spots of ore. The ground is very easily cut, but is disappointing in containing so little ore. At the writer’s last visit the appearance of the forehead for ore had somewhat improved, but was far short of what might be expected in a vein of so much strength.

This Rak o Level end to cast, which is now standing, is understood to be in the middle of the Slate Sills; but the lode is so powerful here, the different strata do not appear to exercise much influence over it. The further prosecution of this forehead is considered a matter of vital importance.

Foreheads in Middle Drift, about 10 fathoms higher, are now being driven to improve the ventilation and open up ground in a lode of similar nature to that described, where the ground cuts without difficulty.

The East Forehead of Wallace’s Level was driven last quarter in a vein of a different description, that appeared somewhat troubled and very poor, and is now very properly suspended.

Besides those miners referred to as engaged driving foreheads, there are six partnerships of from two to six men each raising ore at from 35s. to 40s. per bing in connection with Wallace’s Level. Two partnerships, one of eight and another of six men, raising ore in roof of Middle Drift, at 38s. and 40s. per bing respectively. Three more partnerships, numbering collectively sixteen men, have been acting until now in driving sections of Middle Drift, and will be engaged possibly for the remainder of the quarter in setting for ore in the same ground in roof of that drift between Hill’s and Gardner’s Rises. A partnership of eight
men is engaged raising ore from the roof behind Rake Level East Porchhead, at the comparatively low price of 22s. per bing. Unfortunately this ground is not now looking so well as at the beginning of the quarter.

Four men (John Brown and partners) are engaged cross-cutting to north at 80s. per fathom. This is a measure of which I cordially approve, as it is according to the rules of good mining to see that no ore is left on the sides of the drifts in a strong and wide vein, and to have in view the possibility of meeting with adjoining or coalescent veins.

Of the wonderful number of 80 men mining in Greverake Vein, much the larger proportion are employed in a stretch of ground only about 120 fathoms in length, between Rake and Wallace's Levels; and it is found that when many miners are collected into a limited space they have the chance to interfere with the comfort and convenience of each other. It is imperative that the management should not overlook the possibility of this ground being soon exhausted, and to have further developments ready against such an issue.

Greenleuch Vein.—To the west of the Junction in Rake Level there were several workings carried on last quarter, and in the meantime two men are raising ore at £2 per bing, and a party of four men has been engaged to make a rise in the old roofs to test the productiveness of that portion of the vein in the Slate Sills. It is also under consideration to continue a sinking under the sole of Rake Level to prove the lode in the Firestone. Were the Coal Sills Drift opened out properly, it would act strongly in favour of the success of such a design.

It appears to me there are quite enough, if not rather more than enough, pickmen employed in this Mine to occupy the rather limited spaces from which ore can be profitably taken; nevertheless, if the miners can find sufficient ore to pay themselves at 40s. per bing of dressed ore, it is reasonable to conclude there will be an appreciable margin left for the Company. But, in counting the results, the collateral expenses, such as for dead drifting, rising, timbering, stone arching, rails, and wear and tear, must also be considered.

Surface Operations.—As has been already stated, the work from the Mine under present circumstances is brought to the surface only by Rake Level, and any extensive mining being done under that level and in roof of Adit Level, the stuff would require to be brought to the surface by Whimsey Shaft.

The Dead Heap, to which the débris has to be taken direct from the Mine, requires to be mounted in such a way that the waggons can be emptied much more easily than at present, or there should be waggons used on the Mine that will tip in any direction.

The Ore Washing is the most important department under this heading. Connected with Greverake Mine, and conveniently situated for receiving the house from the main points of egress, is a good line of teams, and evidently the number of these has been added to of late. Then, in proximity to the teams, and connected by a tramway having only a slight rise, is a complete set of Green's Ore Dressing Machinery.

Notice will now be taken, scrutiny, of each process to which the stuff is submitted in the course of dressing the ore, and what are considered defects, pointed out, and the alterations and additions that could be recommended as improvements suggested.

In the first place, the house is very poor, and should be grated and concentrated before being sent to the dressing apparatus. The stuff, as it comes from the Mine, should be passed over a dry grating attached to the teams, so as to separate the bigger lumps from the small stuff. The lumps should be washed by throwing a jet of water over them, and the absolutely poor stones and the pieces of the same description, chipped with hammers from the "knockings," should be separated from the rest of the round stuff and sent to the dead heaps. The "small" should be washed over a water grating so as to dispose of a quantity of waste débris and concentrate the grey stuff before sending it on to the dressing machinery.
The system of washing practised at Groverake, of sending all the rough stuff to the working apparatus may be characterised as great and unnecessary waste of the machinery. Then three should be two hoppers attached to the Ore dressing system, one to receive the larger pieces, and another for the “small.” A stone breaker would also be a valuable acquisition. The advantages to be derived from such additions have been dilated on in the remarks in the section of this paper that treats of Greenlaws and other Mines, and need not be dwelt on further here.

The writer is glad to observe that there is an intermediate revolving classifier between the crusher and the classifier attached to No. 1 Jigger. The crusher is of the old-fashioned three-roller type, and should be modernised. There are seven jiggers that appear to work fairly well. There is also a good chat-mill connected with the apparatus. There are four circular buddles that require to be re-arranged in the manner, as referred to in a previous chapter; one is glad, however, to notice that the buddles are placed under cover. There are two classifiers connected with the buddles. The first buddy classifier might with propriety be made somewhat larger, and the second classifier, which is built of stone and mortar of some kind, is larger than the situation requires; for there is a rise of nearly two feet in the feed pipe that comes from it to the buddy, which is equivalent to reducing the active properties of the classifier by that vertical height.

It may be observed that there are two Deposit Flots and two sets of rolling canvas to collect and wash the ore from the buddy tailings.

So far as the available plant and machinery are concerned, a small effort would place Groverake Washing Work on a pretty serviceable basis. Having fully in view all the issues involved, the writer freely asserts that the Washing Work at Groverake Mine is wrongly placed, and, with a prosperous Mine, would regard it as a question worthy of consideration whether or not it should be removed. The most natural site for the dressing apparatus is where it can be supplied with sufficient water without interrupting in any degree the useful action of the available surface feeders, for the benefit of the pumping or any other underground work. The most suitable situation—because where the advantages indicated are available on which to place a wash for Groverake—is near the mouth of the Adit Level; and, with a railway at hand by which the concentrated Bouse could be conveyed from the Mine to the mill, one is at a loss to conceive how the inutility of the present site was not forced on those responsible for choosing it.

The contract rate of $8. 9d. per ton of dressed ore, that is paid for washing the Bouse from this Mine is, when everything is considered, quite reasonable; but, were the slight alterations and improvements referred to above, and the modifications of the system of work carried out, a reduction of the dressing costs of from two to three shillings per ton of ore might be made, with the additional advantage of avoiding much unnecessary action of the dressing machinery. There is a possibility of sending out from the Mine so much of the rough Bouse as will, to ensure the dressing being got through in reasonable time, necessitate a preliminary treatment or concentration of the Mine-stuff.

Special Features.—The water supply is the most important point to which attention can be directed under this heading. It appears that the feeder, that was at one time utilised for working an Hydraulic Engine for pumping, is now employed in connection with the ore-dressing machinery; and seeing that the minimum supply may be, even when giving it the favour of my doubt, no more than sufficient to carry on one of these divisions of the essential work connected with the Mine, we are left in the position of having to consider which of three courses will have to be adopted to secure the full mastery of the situation—that is, to carry on a proper system of ore-washing, and at the same time to be able to work in the lower and more hopeful portions of the Mine that are not relieved by the Water Adits. The alternatives are these:—First. To remove the ore-dressing machinery to near Rispey old level mouth. Second. To try to find a sufficient water supply to work a pumping machine placed on Itako Level, and allowing the water to be used a second time over the floors. Third. To have recourse to steam power for pumping and winding.
In the present state of the Mine, and under other adverse circumstances, the writer cannot now recommend even the consideration of the first issue.

With regard to the second course, he is disposed to conclude it will require all the energetic action the Company can spare, in the way of collecting further supplies of surface water, to make up for the loss of Corbitmore Dam at Rookhope-head, which is not within the line of the Company’s boundary, and which under a previous régime must have been of untold importance to the mining interests of Rookhope Valley. We are thus obliged to contemplate the third mode of procedure, which, after fully considering all the bearings of the case, the writer unhesitatingly recommends.

If it is fully decided to carry the underground operations of Groverake system down into the Great Lime Sill; the stuff could be drawn to the surface, and the water could be pumped from the Low Level to the Adit by a steam engine, placed at the surface at Rake Level mouth; that would not cost above £120, and should not consume over 160 tons of coal in twelve months.

Under any circumstance, the provision of an increased supply of water is a matter that will require to be particularly considered in the future management of this Mine, were it for no other object than to carry on the ore-dressing properly. The Douze appears to be got from Groverake Mine in a very rough state, and great quantities of the raw material have to be submitted to the dressing process before much clean ore is obtained. The water-courses, that bring in a supply from the feeders of water to be found on the south side of Rookhope Burn, will have to be considerably extended, to catch the streams and springs lying further to the east that have not yet been turned to account. There will also be a necessity of making reservoirs, to give storage space for the large quantities of water that can be collected during the rainy seasons. Speaking from general observation only, but not from having made a special survey of the district, there appear to be in the locality some eligible sites for dams, of which we may point to a fine flat on the slope that lies south of the Explosives Magazine for Groverake Works.

Anyone looking at the surroundings of this Mine would naturally conclude that the branch of the railway system, that passes the Mine and Smelting Mill, would be utilised for bringing the ore to the Mill; also for conveying materials to the Mine; but an economy of that kind does not appear to prevail. Before the use of the railway can be secured for conveying material between the works at Groverake and the Smelt Mill, a short branch will have to be made to communicate with each of these points, and the consideration of the scheme is recommended as well worthy the notice of the Directors.

There has been more difficulty than usual in getting a comprehensive knowledge of the workings made in past years in Groverake Mine, on account of there only being apparently a skeleton section of that Mine to which access can be given.