A FIELD FOR ENTERPRISE.

WE continue this subject upon mines and mining interests of Canada, commenced in our last number. In that number we closed with a review of the iron mining business.

Valuable mines of lead are also found in Canada. The Ramsay mines, lot 3, range 6, are described in the Geological Survey as follows:—

A vein cutting nearly horizontal beds of grey, geodiferous, brown-weathering dolomite. The vein is composed of calcspar, and has a breadth varying from two and a half to five feet, in which the galena is disseminated in a width of from eight to twenty-four inches. In some portions the vein is almost dead ground, while in others, judging by the eye, it would yield nearly two tons of eighty per cent. ore per fathom. The bearing of the lode is about N. W., and its underlie to the north-eastward, about a foot in a fathom. A trial shaft has been sunk on the lode to the depth of thirty-seven feet, and the working of seventy-five fathoms of gronnd, in 1858, yielded twenty-six tons of ore of eighty per cent. A smelting furnace was erected to reduce the ore, and a ten horse-power engine used to give blast to the furnace and dry the shaft, but a considerable spring of water having been struck, it became necessary to erect a more powerful engine, and one of fifty horse-power has just been completed. The dolomite is underlaid conformably by sandstone, which crops out about a mile from the mine, and is unconformably supported by crystalline limestone and gneiss of Laurentian age. About 105 fathoms south-eastward from the main shaft, a counter lode joins the main one, at an angle of about 20°; its course being nearly N.N.E. and S.S.W. At the junction of the two lodes a shaft has been sunk in sandstone, to a depth of twenty-one feet, and in the excavation of the pit in which the united lodes have a breadth of ten feet, there have been obtained about seven tons of ore of twenty per cent.

The Landsdown Mine, Lot 8, *Range* 8.—Ore from a vein cutting crystalline limestone, and running N. 60° W. The vein has a thickness of from six to twelve inches, and is composed of calcspar, in which the galena is disseminated in lumps; which, in a trial shaft of about fifty feet, sunk in 1854, on the land of Mr. Buel, were sufficient to pay the expenses. The largest of these lumps may have been five or six inches in width. A counter-lode diverges from the main one near the shaft, and in this neighborhood, there occur four additional lead-bearing veins, running parallel with the main one, all contained in a breadth of about 1,000 feet. They run obliquely across the lots, and thus intersect the lands of several proprietors. On lot four of the same range, Messrs. Foley & Co., of Montreal, have sunk a small shaft on one of the lodes.

Bedford, Lot 19, *Range* 7.—Ore from one to five nearly parallel lodes, cutting crystalline limestone, in a breadth of about a quarter of a mile, on the property of Mr. Weston Hunt, of Quebec. The gangue of the lode is a mixture of heavy spar and calcspar. About a mile to the eastward of these, are other nearly parallel lodes, also cutting crystalline limestone, on land belonging to the same proprietor. Shallow trial shafts were many years ago sunk on some of these, but what quantity of lead ore was obtained in them, is not known. On lot 13, range 5, of Bedford, Messrs. Foley & Co., of Montreal, have sunk a trial shaft to a depth of fourteen feet, on a lead-bearing lode of six inches, of which the gangue is heavy spar. It cuts crystalline limestone, and reaches gneiss, and in both rocks shows good bunches of ore. This lode is about three miles south-west from those first mentioned, and runs parallel with them.

N. B.—The distance between the Lansdowne and Bedford lodes is about twenty-five miles; they bear for one another, and it appears not at all improbable that the veins in the two localities may be identical, or belong to one group. If a line from the Bedford to the Landsdowne lodes were continued twenty-five miles farther, it would cross the St. Lawrence, and strike Rossie in the St. Lawrence County, New York, where a well-known group of veins of lead ore intersects Laurentian gneiss. Though just now abandoned, some of these are supposed to be still unexhausted, and two of them are known, at one period, to have yielded a great quantity of ore; one of them as much as $142 worth to a fathom. The Ramsay lode belongs to a series of veins which run parallel with those of Bedford, at a distance of about forty miles to the north-eastward, and, although the two groups cut different rocks, both are probably of one age, which would not be older than that of the calciferous formation of the Lower Silurian series.

We next come to the valuable copper mining interests of the Province. The Bruce Mines, Lake Huron, owned by the Montreal Mining Company, are a group of lodes traversing the location in a north-westward direction, intersecting a thick mass of interstratified greenstone trap. The strata here present an anticlinal form, the lodes running down the crown of it. All of the lodes contain more or less copper ore, which is disseminated in a gangue of quartz. The main lode, which is worked with another of about the same thickness, is, on an average, from two to four feet wide. In a careful examination made in 1848, about 3,000 square fathoms of these lodes were computed to contain about 6½ per cent. of copper. The quantity of ore obtained from the mine, since its opening in 1847, is stated to be about 9,000 tons of eighteen per cent. The quantity obtained in 1861 was 472 tons of seventeen per cent. The deepest working is fifty fathoms from the surface. The number of men employed is thirty-four. Smelting furnaces, on the reverberatory principle, were erected at the mine in 1853; the fuel used in these was bituminous coal imported from Cleveland; but after a trial of three years, the Company themselves ceased smelting, and subsequently leased their smelting works to Mr. H. R. Fletcher. At present, the ores are in part sent to the Baltimore market, and in part to the United Kingdom.

Acton Mine, Acton, lot 32, *range* 3.—The ore of the Acton mine occurs in masses subordinate to the stratification, at the summit of a band of greyish-white and reddish-grey compact sub-crystaline dolomite, from 200 to 300 feet thick, belonging to the base of the Quebec group. The dolomite is divided into massive beds; it is associated with a good deal of chert, and encloses mammillated fibrous concretionary forms, resembling those of travertine. At the summit, the dolomite often terminates in a breccia or conglomerate, with angular and rounded masses of lime-stone, intermingled with ragged, irregular masses of chert. In many places the dolomite is marked by the occurrence of the yellow, variegated and vitreous sulphurets of copper, which are in patches, running with the stratification. In the neighborhood of these, many veins and strings of quartz intersect the rock in various directions, and hold portions of the sulphurets of copper. The copper ores, which often contain native silver, appear to be more abundant in the upper part of the rock. At Acton, the conglomerate is separated from the main body of the dolomite by between eighty and ninety feet of dark grey or black slates, intermixed with diorite; inthese the conglomerate lies in large isolated masses, running parallel with the summit of the main body of the dolomite. On the opening of the mine, the sulphurets, where most abundant, appeared to occupy a position immediately near some of the isolated masses of conglomerate, and partially to surround them; in some parts constituting the paste of the conglomerate. As the work proceeded, many slips and dislocations, of no great magnitude, were found to cut the strata. Some of them appear to run with the strike, and others in two of parallel series, oblique to one another. These disturb the regular continuity of the copper-bearing bed, producing apparent undulations in the dip, and causing the diorite and the limestone to protrude into the copper ore, or unexpectedly to interrupt one another. The ores were found to be concentrated in three large masses, occurring in a length of about 120 fathoms. Proceeding south-westwardly, the space occupied by the most northern mass, from a breadth of a few inches, gradually widened out to about ten fathoms, in a length of about forty fathoms; beyond which it appeared to be thrown about fourteen fathoms obliquely to the westward. The general bearing of the succeeding two masses was still to the south-west. They were about fifteen fathoms apart, and the larger or more southward one swelled to a breadth of more than fifteen fathoms. The depth to which the ground has been worked on the general slope of the bed is about ten fathoms; the cupriferous rock at this depth has a breadth of about twelve feet in a shaft on the northern mass, and shews rich ore in the floor and the parts adjacent; but with the exception of what is called Pike's pit, in the most southern part, the floors of the other masses do not at present exhibit that same abundance of ore which characterized the upper part. The working of the mine, however, up to the present time, has been confined to the extraction of the rich ore which was in sight. Little or nothing has been done for discovery, and it cannot be said how near to the present floor of the mine may be found other masses similar to those that have been excavated. Beyond these masses, in opposite directions on the surface, the ore becomes more scattered in the strata; but there is evidence of its continuance for several hundred feet, in spots and patches, occasionally aggregated into masses of much less importance than the three principal ones. In the first few weeks' work in 1859, about 300 tons of ore, containing nearly thirty per cent. of copper were quarried, in open cuttings, from two of the masses, without making much apparent impression on the quantity in sight. The total quanlity said to be sent from the mine to 1861 is about 6,000 tons, holding an average of about 17 per cent. of copper.

Upton Mine, Upton, Lot 51, *Range* 20.—The band of dolomite, which sinks with a north-westward dip at Acton, rises again at Upton, on the opposite side of a synclinal form, at a distance of about six miles. Here, about twenty feet in the upper portion of the band are marked by the yellow sulphuret of copper, which is disseminated in the rock, as if in a bed, the ore being most abundant in the lower part. The rock is at the same time cut by many reticulating strings and veins of calcspar, which hold ore. An open cutting has been made on the outcrop of the bed; the quantity of ore obtained is stated by the proprietors to be forty tons, and a sample, represented by them to be an average one, yielded to the analysis of Mr. C. Robb fourteen per cent. of copper. The quantity of rock which has been excavated is uncertain.

Bissonette's Mine, Upton, Lot 49, *Range* 20.—From the position where the rock has been wrought in the previous mine, the band of dolomite runs south-westward for nearly a mile, and then appears to be thrown upwards of half a mile to the south-westward, by a dislocation. Bissonette's mine is on the south-west side of the dislocation, and apparently in the same stratigraphical place in the band as the Upton mine. The bed is about three and a half feet thick, and the ore lies in disseminated masses of various sizes up to twenty inches long, by from six to nine inches thick. The bed might probably yield from a half to three-fourths of a ton of ten per cent. ore to a fathom.

Wickham Mine, Wickham, Lot 15, *Range* 10.—The ore occurs in masses, disseminated in what appears to be a bed, of uncertain thickness, in the same band of dolomite as that of the Acton mine. An experimental shaft has recently been sunk on it to a depth of about five fathoms, in which good buches of ore have been met with. About four tons of thirty per cent. ore have been obtained from the excavation.

Yale's Mine, Durham, Lot 21, *Range* 7.—At this mine, several veins, carrying more or less copper, intersect a mass of magnesian limestone, which is supposed to belong to the same band as that of the Acton mine. The veins have a general bearing north-eastward, and trial shafts have been sunk on three of them, the thicknesses of which vary from six to thirty inches. The vein-stone is calcspar, with a little quartz, occasionally mixed with portions of the wall rock. On the most north-western vein, the excavation is two fathoms deep, and reaches black shale beneath the limestone. On the middle one, which is eighteen feet to the south-west, the excavation is six fathoms deep, again reaching black shale; and on the third, twenty-four feet farther to the south-eastward, a shaft sunk about four fathoms, is still in magnesian limestone. In this shaft the vein has an underlie to the south-eastward of about a foot in a fathom, and in a breadth of from six to twelve inches, shows good tumps of ore, mixed with calcspar and wall rock.

Black River Mine, St. Flavien.—At St. Flavien, about five leagues above the Chaudiere, and two leagues from the St. Lawrence, red shales occur, underlaid by a band of amygdaloidal diorite; this appears to occupy the place of the magnesian limestone, to which the band at Acton belongs. It is between a quarter and half a mile wide. and limestones occur both at the summit and at the base of the band, which in those parts appear to be of a concretionary, or conglomerate and brecciated character; being composed, particularly at the base, of rounded and angular masses of amygdaloidal diorite, varying in diameter from two inches to two feet. Many of these are calcareous, and much of the rock is red. The interstices among the masses are filled with calcspar, which is transversely fibrous towards the walls, and incloses crystallized quartz in the centre. This band is highly cupriferous, and ores of copper occur both in the beds and in veins or lodes which cut them: the bearing of the veins, however, being with the strike. The ore in the beds is copper pyrites, large masses of which, similar to the one exhibited, are associated with the limestones at the top. The veins, in addition to copper pyrites, hold the variegated and vitreous sulphurets. In one spot, native copper occurs in small masses in the conglomerate at the base of the diorite. The whole band has a striking resemblance to some of the rocks of the Upper Copper-bearing series of Lake Superior

N.B.—A band of diorite very similar to the one above mentioned, and perhaps a continuation of it, occurs at Drummondville, on the St. Francis, where the band is half a mile wide. On lot 1, range 1, of Wendover, it holds yellow, variegated and vitreous sulphurets of copper, which run in six or seven thin veins or courses, formed by breaks and slips in the diorite, within a breadth of 350 yards.

The rocks of the Quebec group, which are almost wholly on the south side of the St. Lawrence, are distributed in long narrow parallel synclinal forms, running N.E. and S.W. For the convenience of geological description, these have been divided into: 1st. The Lauzon and Farnham synclinal, which is the one most to the N.W.; 2nd. The Shipton and St. Armand synclinal, continued, to the N.E, in the Shipton and Leeds synclinal. Between these two synclinals runs the Bayer and Stanbridge anticlinal, and beyond them, to the S.E., is the Danville and Sutton anticlinal. From this, there branch, in the neighborhood of the St. Francis, the Sutton Mountain anticlinal, and the Melbourne and Potton anticlinal. The six copper-bearing beds and veins that have been mentioned, 4—9, are all included in the Lauzon and Farnham synclinal.

Harvey's Hill Mine, Leeds, lot 18, *range* 15.—At Harvey's Hill Mine, there occur, in a breadth of about 1000 feet, eight courses with a north-eastward bearing, composed chiefly of quartz, with various proportions of bitter-spar, chlorite and calcspar. They all cut the strata, with an underlie, at high angles, to the north-westward, and hold, in greater or less quantities, the yellow, variegated and vitreous sulphurets of copper. These quartz courses, which appear to have lenticular forms, occasionally extend upwards of 100 fathoms horizontally; some of them have shewn a width of as much as seven feet in the thickest part, occasionally carrying, for short distances, as much as two tons of twenty per cent. ore to a fathom. The rock of the country is a talcoid mica slate, which from its lustre is called nacreous slate. To prove the quartz courses in a downward direction, an adit level is being driven through these slates, from the north side of the hill, at a level of thirty-seven fathoms below its summit. The length of this adit, when complete, will be 220 fathoms. The same sulphurets of copper which characterize the quartz courses occur also in beds conformable with the stratification. Of these there are three at Harvey's Hill. The lowest one, resting on a six-feet bed of soapstone, is six inches thick; fifteen feet above this there is another three inches thick, and twenty fathoms still higher, one varying in thickness from twenty to thirty inches. In these beds, the ore is distributed through the nacreous slate in patches, generally of a lenticular form; they are usually thin, but sometimes attain one-half to three-fourths of an inch in the thickest part, and occasionally present, in section, lines of six inches, or even twelve inches in length. The patches interlock, one overlapping another, with variable distances between; while many single crystals and grains of ore are disseminated through the whole thickness of the beds. The quantity of ore obtained from the mine is uncertain; the number of men employed is about fifty.

St. Francis Mine, Cleveland, lot 25, *range* 12.—The ore is disseminated in a vein, slightly oblique to the stratification of a quartzo-chloritic rock, frequently studded with nodules of orthoclase feldspar, often surrounding small centres of quartz; the nodules give to the rock the aspect of an amygdaloid trap. The bed has an average thickness of three feet, and the rock is supposed to occupy a higher stratigraphical place than the Acton dolomite. The vein is traced, running N.E., for ninety fathoms. Five or six small excavations, each of a few fathoms in length, have been made in the outcrop, to the depth of two feet, and in these the variegated and vitreous ores are mixed with the yellow sulphuret.