THE HISTORY OF CORDOVA GOLD MINE

1890 - 1996

A Report compiled by Walter Hood
Belmont Lake, Belmont Township
Ontario, Canada

To our readers

The Cordova Mine History Booklet is based on actual reports made throughout the years by owners, mine operators and Ontario Government Inspectors.

Walter Hood researched the old mining records and Sally's Little Printing Shop scanned the reports into computer files, retaining the form and language, as well as could be done, and used "The Golden Old Style" type for the printing setup, to convey to the readers the excitement and dream of riches that was obviously felt by the prospectors and miners working on The Cordova Gold Mine.

We hope you will treasure the report on this important part of the your area's interesting past.

The Vansickle - Cordova Mines - Rockdale
July 20, 1996 Homecoming Committee

THE VANSICKLE * CORDOVA MINES * ROCKDALE JULY 20th, 1996 HOMECOMING

The actual date that the hamlet became *Cordova Mines* is not known precisely The *Homecoming Celebration* of *1996* does not signify a specific anniversary. It is known, however, that Cordova Mines is at least 100 years old in 1996.

THE HOMECOMING COMMITTEE

Chair person Shirley Pressick together with Treasurer Shirley Graham and Secretary Beth Reid of the Homecoming Committee, are to be congratulated for their enthusiasm, planning and hard work organizing the July 20th 1996 Homecoming. A great day will be enjoyed by all who return to Cordova Mines for this celebration.

Walter Hood, Belmont Lake.

INTRODUCTION

SUMMARY OF GOLD MINING IN THE AREA

(1943)

Except for the Cordova and Ledyard gold mines in Belmont Township, Peterborough County, the many gold prospects reported in Haliburton, Peterborough, and Victoria counties have, in many cases at least, proved to be barren of that metal or to contain it in uneconomic amounts.

BELMONT TOWNSHIP

Concession 1, Lot 19, East Half (Ledyard Mine)

The Ledyard gold mine, in the east half of lot 19, concession 1, Belmont township, was operated between the years 1893 and 1896. A shaft 8 by 11 feet, was sunk to a depth of 100 feet upon an east and west quartz vein cutting gabbro. A crosscut was driven for a length of 85 feet. The quartz vein at the surface was 4 to 6 feet wide; at a depth of 45 feet the vein was divided by a horse, so that the walls are 12 feet apart. At a depth of 100 feet the crosscut showed the vein to be 18 feet wide. The vein dips 45°S. Gold production for the years 1893 and 1894, from 55 tons milled, was valued at $236.00

Concession 1, Lot 20, East Half (Cordova Mine)

The Cordova, formerly the Belmont, gold mine was discovered in 1892. Production in the years 1892-93, 1898-1903, 1912-15, 1917 and 1939-40 from 120,670 tons milled amounted to 22,774 ounces of gold, valued at $474,201.00 Silver produced was 687 ounces, valued at $347.00 The total production, therefore, was valued at $474,548.00

This summary of the mining activities at Cordova Mines has been prepared largely from archival reports by the Bureau of Mines, Ontario which subsequently became the Department of Mines, Ontario and is currently under the jurisdiction of the Ministry of Northern Development and Mines, Ontario.

THE BELMONT MINE REPORT 1890

Belmont gold mine is in the township of that name in the county of Peterborough, and consists of the east half of lot 20 in the first concession. It is about ten miles northwest of the village of Marmora by the highway, from which place a railway track has been graded to an iron ore deposit upon an adjoining location owned by T. D. Ledyard of Toronto. An area of calc schist extends northward from the Silurian limestones to within a mile of the Belmont mine, where it lies up against a wide band of diorite.

The Belmont Gold Veins

The gold bearing veins are in the diorite, and have been traced near to the line of contact. There are three veins crossing the lot, one close to the road allowance between lot 20 and lot 21 on an east and west course, a second parallel with it about the middle of lot 20, and a third on a northwest and southeast course diagonally across lot 20. The first of these is known as the Main vein, the second as the Centre, and the third as the O'Neill Another vein, known as the Chisholm, is parallel with the O'Neill, and extends from the southeast quarter of lot 21 in the first concession of Belmont to the west half of lot 20 in the first concession of Marmora. The Main vein for a portion of its length underlies the road allowance between lots 20 and 21 of Belmont, but its course is very nearly due east and west.

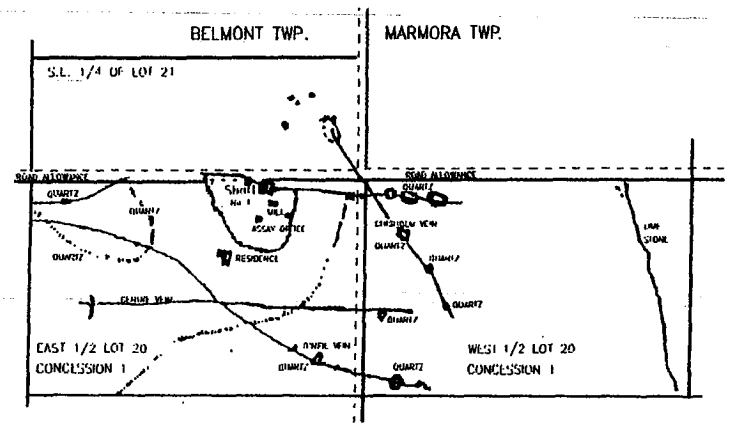
It is said that a party of the Geological Survey had camped upon it for a fortnight several years ago without suspecting that it possessed any value. The merit of discovery was reserved to H. T. Strickland of Peterborough, who while watering his horse by the roadside in 1890 observed the vein, broke off some samples with his hammer, and found that they held free gold. The lot had some time before been located to a settler named Brown whose widow was then in occupation.

THE 1891 REPORT

In July of the following year Mr. Strickland, with A.W. Carscallen, M.P. and Captain O'Neill visited the lot, took away some samples and had them assayed. The results were so good that terms were made with the occupant, the end of which was that Mrs. Brown took out the Crown patent and transferred all her interests to Mr. Carscallen.

Exploration work on the property in 1891-92

Exploration work was commenced upon the Main vein on 7th of September, 1891, where a shaft was sunk, and open cuttings were afterwards made on the same vein at the eastern end of the lot, as well as on the O'Neill and Centre Veins. At this time the location was held between Messrs. Carscallen, O'Neill, Strickland and Burnham each having a fourth interest. Work was continued until 7th October, 1892 by which time 1,000 tons of ore had been raised, and the property was then let to Middleton Crawford for a rental year, at a rental of $100 per month and a royalty.



BELMONT MINE MAP

THE 1892 REPORT

Mr. Crawford brought on one of his own gold mills, and 210 tons which the syndicate had mined was put through as a first test. I was told by Mr. Carscallen that this yielded $9.53 per ton of free gold; and the concentrates which were treated at Newark, N. J., yielded an additional $2.95. The average therefore was $10.93 and there is reason to believe that all the gold in the ore was not won. Mr. Crawford took out during his term about $5,000 of gold, so doubtless he would have been allowed to continue operations but for the conviction of the owners of the mine that his mill was letting too much of the gold escape in the tailings.

THE 1893 REPORT

The shaft of the Main vein was sunk to a depth of 132 feet. The gangue consists of white quartz with iron and copper pyrites. The iron pyrites occurs mostly in fine cubes, and in many places is enclosed with jaspery layers.

Prof. Chapman of Toronto, who made a careful report on the property when the shaft was down to 122 feet, says the Main vein consists of a gangue of white quartz carrying a considerable amount of iron pyrites and a little copper pyrites and that for some depth from the surface it is decomposed into earthy brown iron oxide mixed with siliceous matter and soil. The decomposed or oxidized matter, he states, pans richly throughout the course of the vein. The width of this vein at the surface is about 3 or 4 feet, or less in places. On descending, as shown by the shaft, the only deep opening yet made in the vein, it widens to 12 and 13 feet; but suddenly, at a considerable depth, it becomes nipped or pinched to less than a foot. The pinch continues for about 20 feet, when the vein again opens, and at the present depth of the shaft, 122 feet, it measures at least 6 feet. Samples taken personally from this depth, and selected so as to present as fair an average as possible, have given me by fire assay $16 per ton of 2,000 lb. of ore.

Prof. Chapmans report was made under date of May 9th, 1893. Referring to the O'Neill vein he mentions that a trial pit 28 feet deep had been opened near its south. eastern extremity. "The vein consists of quartz and disseminated pyrites, and is thus practically identical in character with the Main vein, although apparently of greater width. A fair sample of unoxidized ore taken from this pit gave me by fire assay $17 gold per ton of 2,000 lb. of ore. From its course or strike this O'Neill vein must cut the Main vein near or just beyond the northwestern edge of the location." Of the Centre vein, be says that a small sample of oxidized earthy matter, mixed more or less with soil, taken from the exposure gave nearly $5 per ton. "Although satisfactory as showing the actual presence of gold, this assay cannot be taken as an indication of the true yield of the vein, the ground at the spot being entirely unopened."

In summing up his estimate of the property, the value of which he affirms that he has not attempted to exaggerate in any way, Prof. Chapman says: "It is undeniable therefore that the quartz veins upon the property, taking one ton with another, carry workable amounts of gold bearing ore. But the great test after all is the mill test; and the results of the milling operations at Belmont mine show an average yield of at least $10 per ton of stuff passed through the mill".

SHAFTHOUSE AND MILL OF BELMONT MINE

Report of Ricketts and Banks of New York

In September of last year another report on this property was made by Ricketts and Banks, a well known firm of mining engineers and metallurgists of New York city, the former of whom is Prof. Ricketts of Colombia College.

The report was made to the Moira Gold Mining Company of New York, which had acquired an option on the property. In describing the ore deposits they say: " These consist of a system of quartz veins more or less decomposed near the surface and carrying sulphurets of iron and copper in depth; traces of galena were also observed". Four distinct veins were noticeable, two with a general east and west trend and a southerly dip, and two with a northwest and southeast trend and a southwest dip. The veins are contained in and interstratified with chloritic schist. The foot wall is schistose and as a rule generally well defined, but the hanging wall is less strongly marked, more or less undulating, harder and gneissoid in character. The sulphurets are scattered through the quartz gangue of the veins with occasional strings and bands near the walls or line of junction of the quartz and interstratified chloritic schist. The chloritic schist is persistent throughout the entire course of these veins, and is plainly observable where crosscuts and openings have been made; also wherever the quartz outcrops on the surface."

In describing the Main vein where the shaft has been sunk upon it they say: "The vein shows distinctly the entire depth of the shaft, a distance of about 132 feet. It has a west-northwest and east-southeast strike, and an almost vertical dip. The width of the vein at the surface is about 3 1/2 feet but on descending it widens to about 12 feet, pinching again to about 1 1/2 feet. This pinch continues for some distance, say 25 feet, when the vein again widens to about 6 feet

at or near the bottom of the shaft. A spur was noticed at a depth of about 50 feet coming in from the north. Near the surface, and in the upper part of the shaft, the ore was found to be more or less oxidized in character, but below this the vein matter is a hard white quartz containing sulphurets in variable quantities, and interstratified with schistose rock. At the time of inspection water was coming into the shaft in quantity from a crevice or split in the vein on the northeast side, near the bottom. The foot wall of the vein seemed to be quite regular, but the hanging wall was of a harder character and less well defined.

Test of the ore by assays and mill work

Samples were taken at various points on the location by chipping across the vein exposures and from the ore piles, and fifteen of these gave an average of $15.30 per ton. A sample of tailings from the Crawford mill was also tested and gave $3.51 per ton. This shows a high percentage of loss. But the most reliable result was obtained from a mill test of 12 tons of ore treated in the Crawford Improved Mill, the clean-up of which was made at the time of the inspection. This gave a total of $75.12 gold from the amalgam and $29.83 from the concentrates with a loss of $14.88 in the tailings, or an average content of $9.98 per ton. "The tailings from this test and from the previous runs made at the mine showed on panning much floured 'quick' and sulphurets; also some free gold."

My own visit to the Belmont mine was made on November 18, in the company of Mr. Carscallen, but the works had then been closed down for some time and the main shaft and nearly all the other openings were filled with water. I have therefore drawn upon the reports of Prof. Chapman and Messrs. Ricketts and Banks, who saw the works in progress, as furnishing trustworthy account of the veins shown by the workings, as well as the character and quality of the ores. Both reports concur in the opinion that the veins are true lodes, that the cost of mining and milling the ore should not exceed $4 per ton, and that an average yield of $10 per ton should realize a good profit.

In bonding the location to the Moira Gold Mining Company all members of the old syndicate except Mr. Carscallen parted with their interest in it; but it is not yet certain that the deal will be carried through .

The Ledyard Mine location in Belmont.

The Ledyard mine adjoins the Belmont on the south, being upon the east half of lot 19 in the first concession of Belmont. There

is an important out-cropping of magnetic iron ore in the northern portion of the lot, which has been leased to a company of New York capitalist's.

Magnetic Iron Ore

Exploration by borings seems to have satisfied the company that there was a large body of iron ore, of good quality, and a railway track has been graded from the line of the Central Ontario Railway near its junction with the Canadian Pacific to the ore deposit.

Discovery of a gold-bearing vein

In exploring the southern portion of his lot Mr. Ledyard discovered a quartz vein which upon examination was found to be auriferous, and some samples were rich in visible gold. The formation is diorite, and two parallel ranges cross the property in a northeast and southwest course for a length of about 300 yards rising to a height of 25 or 30 feet. These ranges of diorite are cut by two or more veins of quartz having an east and west course, and in the bluff of the eastern range one of the veins outcrops, showing it to lie between selvages of talcose schist and to dip southward at an angle of 45°.

Character and quality of the ore

About 30 yards west of this bluff a shaft of 8 by 12 feet has been sunk upon the vein to a depth of 45 feet. The vein varies in width from four to six feet and shows free gold to 25 feet. At the bottom of the shaft it is divided by a horse so that the walls are 12 feet apart. It is largely composed of a white cellular quartz with iron and copper pyrites in cavities, showing free gold, the decomposition products having leached out largely; but a portion of the quartz is stained with iron, holding iron pyrites decomposed in part into limonite. Some specimens are very pretty and rich.

At the southern end of the westerly range, called the Burnt Knoll, there is a large overflow of quartz, and pits sunk upon it indicate the presence of two veins crossing each other below. The Burnt Knoll is 150 yards west of the shaft, and apparently cut by the same vein. Numerous assays have been made of the ore from this property, nearly all of which show it to be rich; but it is never safe to compute the value of a gold mine from the data of samples.

Testing the value of the ore

Seven lots of iron pyrites and quartz assayed by Elliot and Chambers of Toronto gave an average of $326 per ton, and three lots of crystals of pyrites from the Burnt Knoll gave an average of $90 per

ton. One lot from the shaft, "about half a shot bag full of small pieces of ore from all over the ore pile showing no visible gold," was assayed at the Orford Copper Company's works at Oonstable Hook N. J., and gave 4.7 oz. or $94 per ton. Another lot of 25 lb. mostly from the Burnt Knoll and described as consisting of "a white, sub-translucent, rust-stained quartz carrying a somewhat large quantity of iron pyrites," was assayed by Dr. Hoffman of the Geological Survey, and shown to contain gold at the rate of 4.608 oz. per ton. A mill test of three tons made by Ricketts and Banks of New York produced $25.40 per ton, being 92 per cent of the assay value.

Exploratory work - Ledyard Mine.

Exploratory work on the Ledyard mine was commenced in May of last year under the management of William Nichol, and when I visited it on 18th November nine men were employed. Mr. Ledyard has organized a company to carry on operations, and it is proposed to treat the ore with a Huntington Mill.

THE 1894 REPORT - Ledyard Mine.

The Ledyard mine is situated a short distance from the south-east corner of the east half of lot No. 19, in the first concession of Belmont Township, County of Peterborough, 100 acres.

The property is owned by the Ledyard Gold Mine Company (Limited), with a capital stock of $1,000,000 in shares of $10 each; $150,000 reserved for working capital. President, T. D. Ledyard, Toronto, Vice President, T. B. Yeoman, Toronto; secretary-treasurer, T. H. Yeoman, Toronto; Counsel, Charles Henderson, Toronto; mine address, Wariston P. O.

At the time of my inspection, July 12th, Mr. Fred. Straith Miller had the superintendence of the work. He stated that his experience in mining and engineering had stretched over a period of 40 years, 15 of which had been spent in Germany, 3 in Wales, and since 1872, when he came to Canada he has had the direction of works in various parts of Ontario and Quebec. In 1893 this company engaged him as consulting engineer, and afterwards he had full charge of the work both in the mine and in the construction of the mill. Mr. John P. Williams, the captain of the mine, had been employed by the company for five month. He informed me that he bad been engaged for 20 years mining in England, and since coming to Canada 8 years ago he bad been constantly working in mines in different parts of the province. Mr. William Nichol was superintending the prospecting department and Mr. E. D. Ledyard was the company's secretary at the mine.

Developing the property

A working shaft 8 by 11 feet had been sunk on an east and west vein to the depth of 60 feet at an angle of 80 degrees, which was well timbered, down for 22 feet to the solid formation. Above the surface the timbering continued for 6 feet, showing the shaft from entrance down 28 feet to a landing, where the shaft below was closed with a door. From this point a drift 4 1/2 by 10 feet had been run in east of the shaft 26 feet, following the vein of ore. Below the trap door the shaft had been sunk to a further depth of 20 feet at an angle of 68 degrees when it became vertical and was carried down a still further depth of 18 feet. The vertical part of the shaft being filled with water, measurements of it were not taken, and of course I could not observe whether it was sunk in ore or not. In the working part of the shaft above the trap door the ladder way had not been walled off from the part through which the ore was lifted, and I gave instructions to have this completed before any further hoisting was done. The middle part of the shaft was properly timbered. The vein varied from 4 to 6 feet in width with the hanging wall of chloritic shist and foot wall of talcose schist. The gold is disseminated through the vein of quartz. The ore is raised by a horse power derrick in buckets with timber guards, dumped into a car and conveyed over a tramway into the upper part of the mill a distance of 100 feet eastward from the shaft. The trestle tramway is also continued in a westerly direction for the distance of about 600 feet from the shaft to a point known as the Burnt Knoll, on which the quartz vein crops out and where several surface openings had been made from which a considerable quantity of milling ore had been taken out. The elevated tram road required railing put on both sides, which I directed should be done. About 50 yards west of the Burnt Knoll another small mound occurs where gold bearing quartz was discovered at the surface on which several test openings had been made with excellent shoving of ore. The extensive area over which the ore bearing rock crops out and the several test workings, together with the quantity of good grade ore now in sight in shaft No. 1, would apparently confirm the view that a large body of valuable ore exists and is easy of access on this property. It may be of interest to note several other discoveries to which Mr. Nichol, the prospector, called my attention.

(1) North of the mill about 50 yards, where only a few shots had been put in, there was good showing of sulphurets and free gold.

(2) About 100 yards still further north another discovery of sulpurets and free gold had been made, and the quality proved to be good by panning the former and crushing the quartz.

(3) On the westerly part of the lot several veins have been uncovered, one showing the grade of ore as high as $22 per ton in the assay.

(4) Recently in addition to several others of less importance Mr. Nichol discovered a large vein running north and south, on which considerable stripping had been done, showing excellent results both as to quantity and value of the ore carrying free gold.

The mill is a frame building 66 by 28 feet with a wing for boiler and engine of 41 by 16 feet. The height is 23 feet, with drop to the floor of 7 feet. Total elevation 30 feet. The machinery consists of a boiler 48 h.p., engine 35 h.p., a Northey pump to supply water tank of 4,000 gallons at the west end of the mill, the water being taken from a temporary reservoir the distance of 350 feet, and a Huntington gold mill. As the ore is conveyed into the upper part of the mill it is dumped over the grizzly. The coarse ore is then shoveled into a No. 2 Dodge crusher of capacity ranging from one to three tons per hour. Thence it passes into a rotary screen of half-inch mesh and the outfall goes into an elevator which returns it again to the crusher. The screened ore falls into a conical bin, and thence passes through the Tulloch automatic ore feeder, which supplies the 3 1/2 foot Huntington centrifugal roller quartz mill in which it is pulverized to pass through a 60 mesh screen, where it is received on three copper amalgamating plates each in succession, and from these the pulp passes into a trough with riffles and down into the bottom feed to the Golden Gate concentrator, where the concentrates are saved and the tailings pass out into the waste screen. The mill was started in my presence for the first time and the machinery worked smoothly, but its efficiency could not be determined until fairly tested by treating a quantity of ore. Mr. T. D. Ledyard, the president and managing director of the company states in a recent letter: "The Huntington mill which we have is unfortunately a second hand one of the smallest size, and has been continually breaking down and giving us a good deal of trouble, but we have now got it repaired and trust that it will work steadily. We are however getting a new 5 foot Huntington mill from Fraser & Chalmers, of Chicago, which we hope to have in operation shortly, and the capacity of the two mills should then be 20 to 25 tons of ore per day".

Supply of ore and cost of mining and milling

In submitting a report to the company on the supply of ore and cost of mining and milling the same, Mr. F. Strait Miller, M.E., says: "From the points already developed there will be no difficulty in

keeping the mill supplied even if the capacity is increased three-fold, and as there are several other good veins on other parts of the property the future of these mines in regard to ore supplies can be looked upon as assured. I consider that there is enough ore in sight to keep the present mill going for several years, and it is only a question of men and money and power to open up and develop these and other rich veins which exist on the property, and thus increase the output to any desired extent. The cost of mining the ore, picking and tramming to mill, will not exceed two dollars, and probably when the open cut on the Knoll is more advanced this will be much reduced. The cost of milling 15 tons per day I estimate at about 80 cents per ton, and if the mill capacity is increased to 50 tons per day both the milling and mining should be done for less than $2.50 per ton." But experience makes one cautious in accepting roseate estimates of gold properties at par value. It. will be time enough to speak sanguinary when a much larger amount of development work has been done.

Employee's

At the date of my visit 14 men were employed and the large boarding house constructed for the Belmont iron mine on the adjoining lot, and about half a mile from the mine was being used for boarding and lodging the workmen and for the clerk's office. In addition to the blacksmith shop a mine office and assay room 30 by 12 was in process of erection, and a summer shanty capable of holding 16 to 20 men and a mining captain's shanty have been built.

The Ledyard Mine 1895 Report

The Ledyard mine was lying idle at the date of my visit, September 17th. Mr. W. G. Yeoman, of Toronto, was left in care of the property for the owners. Since last inspection the shaft had been sunk to a greater depth of 15 feet, making total depth 75 feet. A stope on the vein had been made at the first level, extending 25 feet east and raised to the surface. All the vein matter had been removed between the hanging and foot walls. The ladder-way down to the first level had been properly walled off from the part of the shaft used for hoisting the ore. A new Huntington mill had been put in place of the old one, with capacity of twenty tons daily. The mill building had been strengthened by additional sills and other supports, so that it is now well fitted to stand all strain of machinery when in operation. No other changes of importance have been made since the former report. Work had been conducted at intervals during the early part of the year both at the mine and mill, but has been suspended since the middle of June. Early in December last, the management of the mine was

placed in the hands of Mr. A. S. Brooks, of Marmora, who had put it in excellent condition for future operations. About 200 cords of wood were on hand. The property has been well looked after by the caretaker, Mr. Yeoman, who has resided at the mine since work was discontinued.

Belmont Mine 1897 Report.

The Belmont gold mine, on the east half of lot 20 in the first concession of Belmont, had been lying idle for some time, but recently it has changed proprietors. The Cordova Exploration Company, Limited, has taken it over after one of the owners had examined it. The company is a private one, composed of wealthy English capitalists, and has been operating mines in England, Scotland, Sweden, Spain and Norway. Mr. David Kerr, who has had charge of works for the company both in Spain and Norway, arrived August 27 from the lattre country to assume the management of this mine. At the time of my visit active measures were taken to commence mining work, as well as for the construction of a 10-stamp mill. An order was given to a Peterborough firm for a substantial plant to work the mine, and negotiations were going on with the same firm for the mill. Mr. Kerr informed me that work would begin at the mine almost immediately and he hoped to have the mill in running condition within a few months.

Belmont Mine 1899 Report.

The Belmont mine is located in the S. E. quarter of lot 21, and east half of lot 20 in Belmont Township, Peterborough County. The owner is A. V. Carscallen of Marmora, and the operators under option are the Cordova Exploration Co., Limited, of Cordova, Spain. The general manager is D. G. Kerr. Total number of men employed in all capacities, 57.

The underground workings are carried on through three shafts, a fourth shaft being now abandoned. Shaft No. 1, on lot 20, near the road, 10 by 12 feet cross-section, has a depth of 135 feet; inclination 75°. Hoisting is done, by skip. Shaft No. 2, 1,021 feet E. by N. of shaft No. 1, is 7 by 12 feet cross-section; has a depth of 75 feet; inclination 75° . Hoisting is done by kibble on a skidway. Shaft No. 3, 1,287 feet S. E. of shaft No. 1, is 8 by 10 feet cross section; depth, 40 feet. It is abandoned, and securely boarded up. Shaft No. 4. 350 feet S. E. from shaft No 2, is 10 feet by 12 feet cross section; depth 32 feet, vertical. It is a mere prospect shaft. A fifth shaft for air has been sunk 230 foot east; from shaft No. 2, 10 by 14 feet cross section; depth, 14 feet.

Levels

In shaft No. 1 the 75 foot level is driven east 45 feet, and west 33 feet; the 120 foot level, east 80 feet and west 65 feet. The cross section is irregular, but averaging about six by seven feet. In shaft No. 2 the 35 foot level is driven east 230 feet and west 50 feet: the 70 foot level is east 75 feet and west 110 feet.

Stopes

In shaft No. 1 the 75 foot level east is carried up to the surface; the 75 foot level west is 20 feet long and 15 feet high. Stopes in the 120 foot level are just beginning. The walls are sound throughout. In shaft No. 2, 35 foot level east the stope is carried to the surface. The walls are not sound. Lines of stulls have been set in the stope at two places 15 feet apart vertically, well lagged and loaded with waste rock. All has been done in a workmanlike and ample protection insured.

Surface plant

In shaft No. 1 the shaft house is substantially built. The hoisting engine is in full view of the shaft mouth. The sheave is 25 feet above the shaft mouth. There is an automatic dump for the skip, and the cable used in hoisting is three quarter inch. The tramway from the shaft house to the mill is 264 feet long. Shaft No. 2 has a temporary head-frame with a winding engine and boiler in an adjacent shed. Hoisting is by kibble on a skidway. In shaft No. 4 hoisting is by derrick. The old mill is now used as a blacksmith shop and storeroom. The location is 57 feet S. E. of shaft No. 1. The new mill is 264 feet S. S. E. of shaft No. 1. The plant consists of a grizzley, Blake crusher, 9 inches by 15 inches, 10 stamps of 850 pounds each, one Frue vanner, six foot belt, corrugated, one Frue vanner, four-foot belt, plain, and one gyrating vanner, six-foot belt, and three pointed settling boxes in a series for all tailings. Power is derived from a 40 h. p. engine and boiler in adjacent rooms. The tank house for water storage is 495 feet N. of shaft No. 1.

The assay office occupies a brick building 396 feet S. W. of shaft No. 1. The manager's office and quarters is 83 feet W. of the assay office.

State of the Mine.

Steam drills are employed in both mines No. 1 and 2. This is objectionable on account of the high temperature and dampness of the air, in spite of exhausting steam into sumps. Ventilation and

drainage are well provided for. No powder is allowed underground until holes are ready for charging. The storage of explosives is in a well-appointed frame building 495 feet N. of shaft No. 1. Recommendations were made to case off manways, post up signal codes, prohibit workmen from ascending or descending the shafts in skips or kibbles, in addition to other matters of less importance. Dates of inspection, July 27 and November 12, 1898.

THE BELMONT MINE 1900 REPORT.

Since the last inspection this property has been purchased by the Cordova Exploration Company, Ltd., of Newcastle upon-Type, England. The rights acquired are 300 acres in fee simple in Belmont Township, Peterboro County; 125 acres of mineral rights only in Marmora Township, Hastings County, contiguous; and 160 acres, including a valuable water power on Deer river, at the outlet of Deer lake, 2 miles n. w. of the. mine. Since the acquisition of this property, after prolonged testing by the Cordova Exploration Co., extensive preparations have been made for permanent operations a this mine, and it is proposed to erect a large air compressor plant at the Deer river falls, where an effective head of 90 ft. is available, the air to be piped to the mine for use in all situations where power is required. A large electric plant is part of the projected improvement, and it is probable that current will be transmitted to Deloro for electric lighting at that plant.

In the scheme for underground work ten shafts are enumerated, of which No. 4 and 5 are closed, 8 and 9 are located but not sunk, and No. 1, 2, 3, 6, 7 and 10 are being operated. Shaft No. 1 has been deepened from 135 ft. to 250 ft, and is still sinking. The manager, Mr. D. G. Kerr, has adopted the plan, new in Ontario but common in the large mining centres of the West and South, of carrying the timbers and skipway close down to the bottom of the shaft, and using telescope rails for the remaining 6 to 10 ft., so as to hoist from the bottom while sinking, In blasting he uses the side cut, shooting to the foot wall, with 4 unkeying shots, with a line of least resistance of 3 ft. 3 in., and 3 sticks of 50 per cent dynamite to each hole. Including key and following shots, 25 holes 1¼ in. diameter are employed for each 3 ft 3 in. cut, the cross section of the shaft being 16 ft. x 9 ft. The work is so skillfully done that no injury has ever been sustained by the timbers or skipway. The work of sinking has been greatly cheapened and facilitated since the introduction of this system. It is doubtful if a better example of scientific blasting has ever been seen in Ontario.

Shaft No. 2 has been deepened from 35 to 95 ft, and connected by levels with shaft No. 3. The latter has been carried down from 40 to 185 ft. Shaft No. 6 (new) has reached a depth of 85 ft. It is located 750 ft. n. e. from shaft No. 1, and has an inclination of 75° to the s. w. The cross section is 12 ft. x 8 ft. It is single compartment with a manway. The hoisting works consist of a head-frame, 12 ft x 14 ft. at base, and 20 ft. high to the sheave block.

Shaft No. 7 (new) is 425 feet north of shaft No. 1. it is vertical, 80 ft. deep, cross section 16 ft. x 9 ft. The hoisting works consist of a closed head-frame 17 ft. x 35 ft. at base and 35 ft. high. It is provided with a 30 h.p. double drum hoisting engine, actuated by compressed air piped from the central air compressor plant.

Shaft No. 10 (new) is 560 ft. east of shaft No. 1. It is inclined 75° to the south, is 35 ft. deep, and has a cross section of 14 ft x 10 ft. Hoisting is still being done by windlass.

The new levels are as follows: In shaft No. 1, at a depth of 200 ft., east drift 50 ft west drift 50 ft. A pump station has been established near the shaft on this level having a large sump 15 ft. deep, with a cross section of 15 ft. x 9 ft. The pump is a Northey duplex direct acting with a capacity of 250 gallons per minute. The motive power is compressed air at 85 lb. pressure. From shaft No. 2 the 50 ft. level extends 250 feet s. w. and 110 ft. s. e. to shaft No. 3. The 90 ft. level extends 260 ft. n. w. and to shaft No 3. From shaft No 3, in addition to the 50 ft. and 90 ft. levels from shaft No 2, is a level at 185 ft. extending 250 ft n. w., with an upraise started at a distance of 110 ft. from the shaft to connect with shaft No. 2 above. From shaft No. 7 at a depth 75 feet, is a level drifting n w. 20 ft. and s. e. 65 ft.

A new shaft house has been erected over shaft No. 3, having foundations 18 ft. x 35 ft and a height of 30 ft. A 30 h.p. double drum hoisting engine is being installed which will use compressed air as a motive power. The tramway from the mill to shaft No. 1 has been extended to No. 7 shaft, and will be continued around to shafts No. 6, 2, 3, 5 and 10 in the order named. The old mill adjacent to the No. 1 shaft house has been made over into a machine shop, and above this, on the same level as the shaft mouth is a new blacksmith shop. The air compressor plant installed by the Rand Drill Co. is located 400 ft e. n. e. from the mill, on lower ground than the other works, insuring perfect drainage of leading pipes. The building is of wood, 40 ft. x 60 ft with boiler room attached. The compressor is of the latest model, cross compound, both steam and air. The indicators showed high pressure steam, 125 lb., low pressure steam, 25 lb., high pressure air 85 lb., and low pressure air 20 lb. Steam is derived from 2 return tubular, 70 nominal h.p. boilers, using water from the coolers and fitted with electric damper regulators.

The explosives magazine is located 600 ft south of shafts No. 2 and 3, and 450 ft. east of the air compressor plant. Protective mounds insure reasonable safety. It is well constructed of wood with steel shingled sides, the expediency of using which is, however, questionable. The practice of storing caps and fuses in the same building was objected to in this case as in all others.

The only addition to the milling plant consists of a Fraser and Chalmers ball pulverizing barrel for regrinding the stamp mill tailings for re-amalgamation. A new carpenter shop has been erected 300 ft. s.e. of shaft No. 1, consisting of a 2 story building, 24 ft x 40 ft on the foundations. A residence for the staff and a new office and warehouse have been also erected. Instructions were given to board off all manways from hoisting compartments in shafts, and to put up the signal code at all landings stations and in engine rooms.

THE BELMONT MINE 1901 REPORT.

This property has been operated under option granted to the Cordova Exploration Company Limited of Newcastle upon-Tyne, from Mr. A. W. Carscallen of Marmora for several years. During this period development work has been actively in progress under the skillful superintendence of Mr. D. G. Kerr. At the same time a 10-stamp mill has been working upon ores taken from various mines on the property, the object being chiefly to test the value of the ore by millruns. The stoping consequently has not been extensive in any one part of the deposit. In September 1899 the property was purchased from Mr. Carscallen and production upon a larger scale will soon commence. All the improvements now in progress are of a permanent character, but intensive development of the deposit is still being prosecuted, which may lead to a further enlargement of the milling plant in the near future. The property acquired consists of 300 acres owned in fee simple in Belmont Township, Peterborough County; mineral rights in 125 acres in Marmora Township, Hastings County; mineral rights under the county roads, acquired from the Township councils; and 160 acres of land including water power on Deer river, at the outlet of Deer lake, 2 miles west of the mine.

Development work has been carried on in ten shafts, of which No's. 1, 2, 3, 6, 7 and 10 are in actual operation. Shaft No. 1 has attained a depth of 310 feet being an increase within the year of 175 feet. Hoisting is done by a skip using telescope rails at the lower end of the skipway to admit of hoisting rock from the bottom while sinking is in progress. Shaft No. 2 is 165 feet deep, being an increase of 130 feet. This shaft is connected by levels with No. 3 which is the main shaft for this mine, No. 2 being practically an air shaft, although ore and rock are at times hoisted through it. Shaft No. 3 had reached

a depth of 185 feet when sinking was discontinued. A new pump is now being installed to permit of going to deeper levels. Shaft No 6 has been sunk since the inspections of 1899, and is located 750 feet northeast from shaft No. 1. It has been carried to a depth of 85 feet, with a cross section of 12 by 8 feet, inclining 75 degrees towards the southwest. It is divided into two compartments for a hoist-way and man-way. The hoisting works consists of a head frame 12 by 14 feet at the base, and 20 feet high to the center of the sheave. Shaft No. 7 is also new. This is located 425 feet north of shaft No. 1. It is vertical, with a depth of 80 feet, and a cross section of 16 by 9 feet. The hoisting works are 17 by 35 feet at the base, and 35 feet high, and are equipped with a 30 h.p. double drum hoist actuated by compressed air taken from the central air compressor plant. Shaft No. 10 is likewise part of the recent development of the property. It is 560 feet east of shaft No. 5, the latter being 1500 feet southeast of shaft No. 1. The shaft inclines 75 degrees to the south, and has been sunk to a depth of 35 feet, maintaining a cross-section of 14 feet by 10 feet. No permanent hoisting works have yet been erected over these shafts.

In shaft No. 1 there has been no change in the 75-foot and 120-foot levels. A new level has been driven at a depth of 200 feet from the surface, extending 50 feet east and 50 feet west from the shaft. A level has also been driven at 300 feet distance from the top, 50 feet east and 30 feet west. A sump has been excavated near the shaft on both these levels, and on the 200 foot level a Northey Pump having a capacity of 250 gallons per minute has been installed, while a new pump of 150 gallons capacity is being set up on the 300-foot level. The motive power for these pumps is compressed air at 85 lb. pressure.

In shaft No 2 a level has been run at 50 feet from the surface, 260 feet northwest and 110 feet southeast to shaft No. 3; and at a depth of 90 feet is a level extending 350 feet northwest and 110 feet southeast to shaft No. 3. In the east drift is a new stope, 100 feet long, 10 feet high and 6 feet wide.

In shaft No. 3, at a depth of 25 feet is an incline connecting with the 50 foot drift southeast from shaft No. 2. At a depth of 95 feet in this shaft is the connection with the 90 foot drift southeast from No. 2 shaft and at 185 feet is a drift northwest 250 feet in which a raise has been started to connect with the bottom of shaft No. 2.

A level has also been started in shaft No. 7, extending 20 feet northwest and 65 feet southeast.

As the levels from these several shafts are extended they will connect with each other, linking the shafts into one connected mine. A trestle for a 24 inch gauge tramway track is being continued from shaft No. 1, which will extend to shaft Nos. 7,6,2,3,5 and 10, in the order named, thus making a large arc.

A new shaft-house has been erected over No. 3 shaft, with a head frame 18 by 35 feet at the base, and 30 feet high to the sheaves block. The skip in this hoist is operated by a 30 h. p. compressed air hoist.

The stamp mill is being quite thoroughly overhauled, and 10 additional stamps are being installed, as well as a cyanide plant for concentrates.

The requirement made for additional safety are being suitable attended to. The official signal code is being used at all shafts. It was advised that the powder man be required, among his other duties, to include that of preparing all primers in and about the mines. The company has been peculiarly unfortunate in losing four men by dynamite explosions during the year, two of these being the result of negligence on the part of the miners, and two the result of a premature discharge of explosive while loading a bole, the cause of the explosion being undetermined.

FROM CORDOVA GOLD MINES LIMITED REPORT 1902

Cordova Mine is in Belmont Township, Peterborough County. Province of Ontario, about 112 miles east of Toronto easily reached by Canadian Pacific Railway, nearest station Havelock, which is only 12 miles from Cordova and connected by good wagon road. Cordova is easily reached from Toronto in four to five hours.

Cordova can also be reached over Grand Trunk Railway via Trenton and Canadian Northern Railway, by way of Marmora; this latter Railway Company has a branch line to Cordova over which heavy freight is hauled, but no passenger service as yet; it will thus be seen that Cordova is well served with transportation facilities.

THE MINE MANAGERS RESIDENCE

MINE PROPERTIES

Cordova Mines, Limited, own 246.6 acres in Belmont Township in fee, upon which their principal mine workings and mining plants are located, and 130.5 acres in Marmora Township (adjoining the 246.6 acres in Belmont Township) in mineral right, making 377.1 acres in one block.

The Company also own in fee 300 acres at Deer Lake, upon which their Power Plant is situated. This is also mineral land, but up to the present undeveloped.

Cordova Mining Properties consist of:

Cordova Mining Properties consist of:	Acres
East 1/2 Lot 20, Belmont Township	115.8
East 1/2 of west 1/2 Lot 20, Con. 1, Belmont Township	66.0
Southeast 1/4 Lot 21, Con. 1, Belmont Township	58.0
Road allowance between Lots 20 and 21, Con. 1	6.8
West 1/2 Lot 25, Con. 3 Belmont Township	100.0
Lot 24, Con. 3, Belmont Township	200.0
In fee simple	546.6
Also west 1/2 Lot 20, Con. 1, Marmora Township	129.0
And road allowance between Marmora and Belmont	1.5
In mineral right	130.5
Total area owned by Cordova Mines Limited for mining purposes (about)	677.1

THE BELMONT MINE 1903 REPORT.

The Belmont Gold Mines, Limited, with head office in Newcastle-upon-Tyne, England, and Canadian offices at Cordova, Ont., was organized last fall as separate company to take over and conduct operations at the Belmont mine. The transfer of the property was made on 1st of January 1903, bv the parent concern, the Cordova Exploration Syndicate, of England. Mr. D. G. Kerr remains as manager. The Belmont property now covers 450 acres in one block in Belmont Township, Peterborough County, and the adjoining township of Marmora, Hastings County. A considerable portion of this has been surveyed into town lots, which are for lease to employees or others desirous of building at Cordova. The company itself has erected a number of private frame dwellings for rent to the employees. Altogether the town about the mine is assuming respectable proportions.

Last summer active interest was taken in adjoining lots by parties prospecting for the extensions of the Belmont lodes, and the success attained in the work leads to the expectation that more systematic development will follow this year.

Inspection of the mine was made on the 8th and 9th January, 1903. It was found that mining had during the year been confined mainly to stoping and raising the ore previously blocked out in the No. 1, No. 2, and No. 3 shaft workings without much drifting or other development either here or in the rest of the shafts, for the reason that until completion of the new hydraulic plant to furnish compressed air, insufficient power was available for more than getting out the supply of ore for the mill. A good deal of stripping was done over the surface the purpose of locating the various lodes in greater length.

No. 1 shaft; depth 410 feet (the same). First and second levels; no new development. Third level, west drift 190 feet (85 feet increase); east drift 135 feet (4 feet increase), with, at 40 feet east, a crosscut 40 feet south, 40 feet in width, from the end of which a drift runs southeast 170 feet. Fourth level, east drift 200 feet (11 feet increase). The stopes noted in the last Report as just opened have been extended, and crosscuts run through them on the different levels to both walls of the ore body. Along some of these crosscuts the stopes have been widened out to the full extent of the vein, which is thus seen to vary from 8 feet to nearly 60 feet in width. In several places the stopes measure from 30 to 50 feet in width, all reported to be pay ore. At some points, however, this large body is ,broken into two veins by the presence of a barren band of rock which has been incompletely or not at all metamorphosed with the rest of the ore.

The stope timbers are well loaded with ore ready for removal. All the rock is hoisted to the shaft house floor, washed sufficiently to roughly sort out the gangue, and then trammed around to the mill. The working levels are being solidly timbered and lagged overhead, in the wide stopes the square set system being adopted.

No. 2 shaft is still maintained with complete hoisting appliances as an auxiliary to No. 3 shaft, and for a ventilation way.

No. 3 shaft is continuing down, being at the above date 40 feet below the third level or 325 feet deep in all. First level; unchanged. Second level; the only development consisted in connecting the winze, sunk from a point 338 feet in the west drift, with the third level. Third level; east drift unchanged; west drift, 352 feet (75 feet increase), connecting at face with the above winze for good ventilation. The stopes between Nos. 2 and 3 shafts and those west of No. 2 have been enlarged and extended down to the third level. East of No. 3 shaft the stope between the first and second level now extends down to the third level, and is showing the ore body up as a chimney of

somewhat irregular outline about 40 feet wide by 90 feet long. There is reported to be about 18,000 tons of ore on the timbers in all these stopes.

No. 7 shaft was reopened in December 1902, and sunk a few feet deeper to allow of completing the timbering, which work is now in progress.

At the other shafts no resumption of development has yet taken place.

The hydraulic power plant has been entirely completed as per specifications given in my last report, with the result that now all the mine, mill and other machinery is operated by means of the compressed air furnished by it. The present duplex turbine connected with and operating the compressor is capable of generating only 1,000 h.p. of the total 1,300 h.p. capacity of the water power, and to develop the remaining 300 h.p. a T connection has been left on the flume beside the present terminal to attach another Leffel turbine; this would operate the dynamo at this point, which is now run by compressed air from the mine. This addition to the plant is expected during the present season. The old steam power plant at the mine has up to the present been left intact, and will so remain until such time as it can be sold.

Several alterations and additions to the surface and mining plant are proposed for this season, such as the doubling of the stamp mill capacity to a total of 60 stamps, and the removal of the crushing plant from the top of the mill back 200 feet or so to No. 1 shaft, to be there set up again, in a new combined shaft, crusher and sorting house, where all ore will be treated before entering the mill.

T. W. Fisher and W. Scott fill the positions of foremen with 170 employees under them.

THE 1906 REPORT

The gold mining industry of eastern Ontario remains in about the same condition as for the last few years. The Belmont and Deloro mines have not as yet resumed operations, although the high price of arsenic should tend in this direction at the latter. A little bullion was produced at the Craig and the Star of the East, but the mills at these mines are only run at intervals, as development work has not proceeded far enough in advance of stoping operations to ensure a uniform production. These spasmodic attempts at turning out gold are due, as has been pointed out in former reports, to the undue haste in the erection of stamp mills before the mine is sufficiently developed. This has been the chief cause of giving gold mining a set-back in all parts of Ontario, and it is chargeable in part to the flotation of stock

companies and the desire of the promoter to have something tangible on the surface to show the public, and also in part to the undue haste of shareholders to obtain dividends.

Gold mining in eastern Ontario dates back to 1867, when the Richardson Hill discovery at Eldorado caused a rush of miners and prospectors to this centre. Since that time gold has been found in North Hastings and Frontenac at many places, but no very extensive development work has been carried on, on any of the properties with the exception of the Belmont and Deloro mines.

THE 1913 REPORT

The Buffalo Union Furnace Company have been operating the Belmont mine, formerly known as the Ledyard mine, situated on the west half of lot 19 in the first concession of Belmont Township in the County of Peterborough. A 3-compartment vertical shaft has been sunk a depth of 230 feet. On the first level at 100 feet in depth drifts have been run northeast 100 feet and southwest 100 feet. On the second level at 170 feet, 50 feet of drifting has been done north and south of the shaft, and on the third level at 230 feet, about 25 feet of drifting.

Air for running the drills and hoist is obtained from the Cordova Mines Limited. Mr. Frank Platto is superintendent, employing 42 men.

GOLD MINES AND PROSPECTS

The Cordova Gold Mine

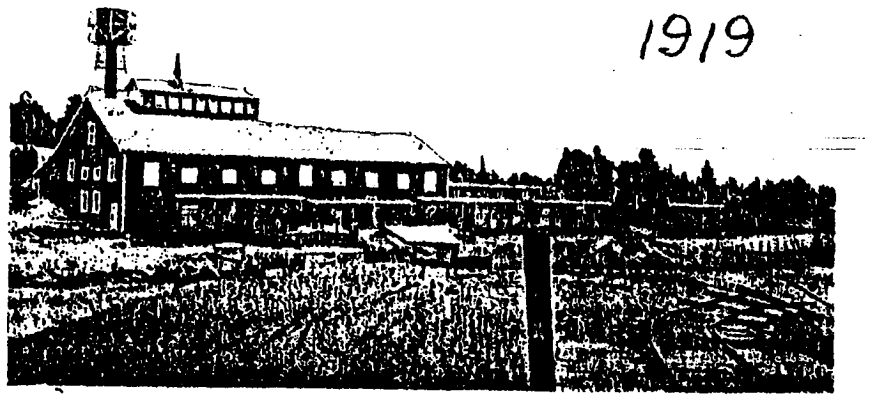
The Cordova gold mine is in the township of Belmont, at the eastern border of Peterborough county. The property was worked for several years by an English company, but operations ceased in the fall of 1903. It then lay idle until about three years ago, when the mine was unwatered and worked by Mr. Peter Kirkegaard, of Toronto. The property is equipped with a mill having 30 stamps of 850 pounds each, 6 Wilfly tables, and a cyaniding plant for treating the concentrates. A compressor, capable of generating 800 horse power, is located at the foot of Deer lake about two and a half miles north of the property, where a waterfall is utilized.

The ore-bodies occur in a coarse-grained gabbro-diabase which invades the Grenvllle and Hastings series. The veins are of quartz, with which are associated iron pyrites, feldspar and calcite. The wall

rock has been altered to a chlorite-schist, or chlorite-mica schist, sometimes 50 feet wide, there being a gradual transition between the fresh gabbro-diabase and the schist. The latter is impregnated with quartz veinlets, parallel to the schistosity. Consequently there is not a definite boundary line between the ore and the shistose wall rock. The ore body is low-grade, the hand-culled material which is treated in the mill averaging between $5.00 and $6.00 per ton.

The deposits may have been formed by hot solutions which followed the intrusion of the gabbro-diabase.

There are several shafts on the property, two of which have reached depths of four or five hundred feet, while some of the stopes connected with shaft No. 1 are twenty feet or more in width. Details of the underground workings will be found in the reports of the Bureau of Mines.



Electric Furnace Plant for producing ferro-chrome, at Cordova Mines

THE 1919 REPORT, Mines of Ontario Page 155 IV

Cordova Mines, Limited.

The gold mine of this company in Belmont Township, Peterborough County, was not worked in 1918, but the company erected an electric smelting plant at Cordova for the production of ferro-chromium. Owing to delay in the delivery of electrical equipment, the plant was not completed till February, 1919, by which time the market for ferro-chromium was such that it was not considered advisable to operate. The furnace had a capacity of 5,000 lb. of ferro-chromium a day.

Peter Kirkegaard is managing director of the Cordova Mines, Limited.

THE 1943 REPORT

The consolidated Mining & Smelting Company of Canada, Limited, acquired the Cordova mine in 1935 and carried on operations at the property until July 31, 1940. The workings at the close of operations were as follows: No. 1 shaft is 401 feet deep; No. 2 is 186 feet deep; and No. 3 or Main shaft is 1,050 feet in inclined depth with 9 levels. During 1938 a 2-compartment inclined winze, No. 912, was sunk from the ninth level to the tenth, 152 feet on the incline.

A 125 ton mill was built in 1939 and was operated from October, 1939, to July 31, 1940, treating 33,434 tons, from which 3,487 ounces of gold was recovered.

The writer has compiled the following account of the ore deposits from notes and plans supplied by L. V. Bell.

The gold deposits occur entirely within, but near the west margin of, an intrusive body of diorite (gabbro), which forms the northeast part of the gabbro basalt mass shown on map 52 A. To the west and north of the diorite mass crystalline limestone, paragneiss, conglomerate, and altered volcanic rocks are exposed.

The diorite is a medium to coarse-grained, usually massive rock composed of plagioclase (labradorite) and hornblende. Secondary minerals include carbonate, chlorite, serpentine, sericite, quartz, and apatite. In places local differentiation is indicated by more acid and basic phases, such as (1) pegmatite including pegmatitic diorite, (2) highly feldspathic rock or anorthosite, and (3) aplite. The first two occur within the diorite, and the third cuts the diorite as dikes. Diamond-drilling in the area of the mine indicated that the main diorite is cut by a later diorite similar to it in composition. A banding is also found in the diorite and is interpreted as a primary structure due to differentiation. The diorite mass as a whole is, therefore, composite in nature.

Near the western contact of the diorite are a series of shear zones striking east to southeast. The diorite where cut by the shear zones shows considerable alteration, partly to chlorite but mainly to biotite. In some of the shear zones gold-bearing vein material occurs and constitutes the deposits of the Cordova mine. Bell considers that there is a direct structural relationship between the shear zones and the contact of the diorite mass. Up to the present, however, none of the shear zones has been followed in the underground workings as far west as the contact of the diorite mass.

A number of shear zones occur in the vicinity of the mine, and although several of them have been partly explored, only three have been extensively explored by underground workings.

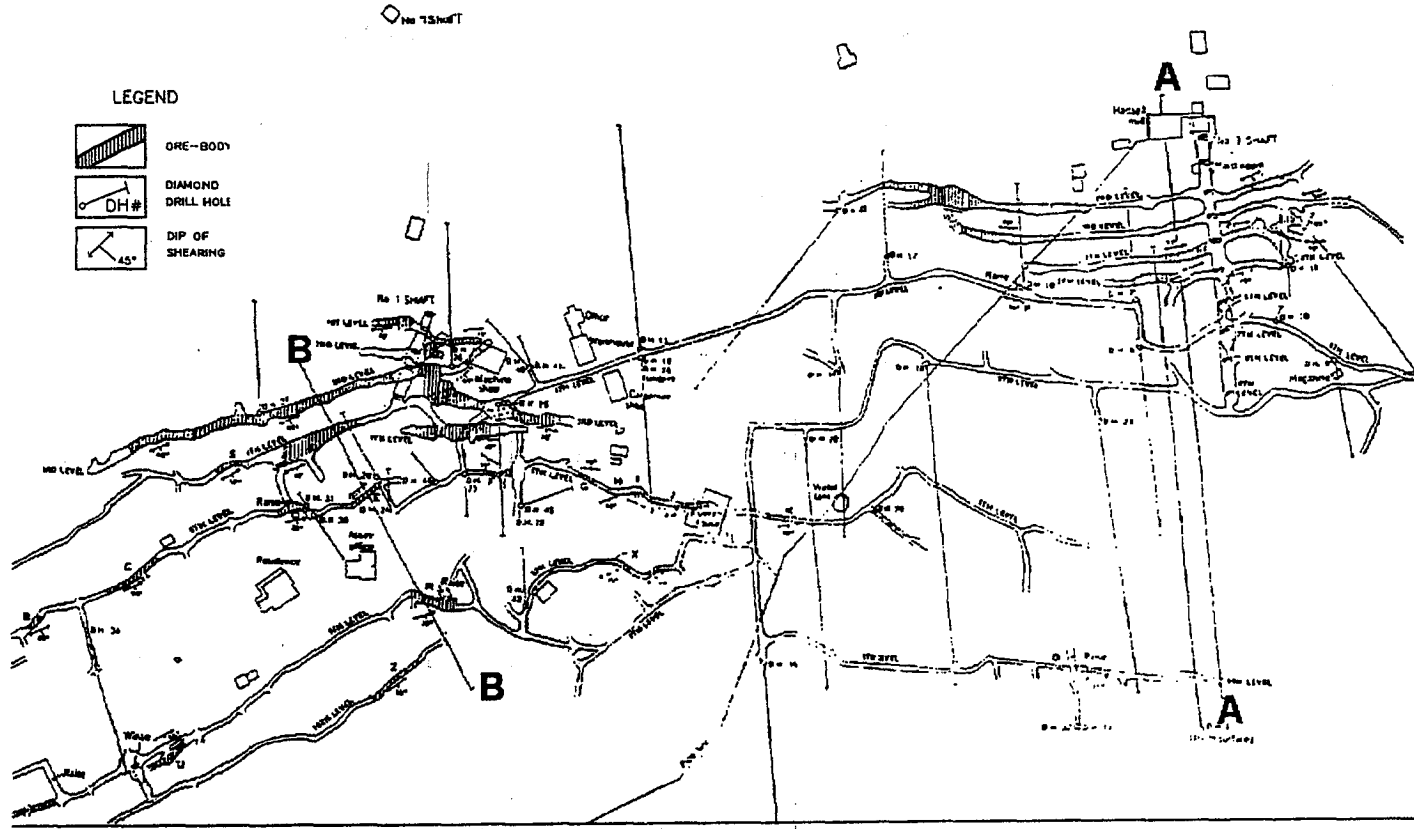
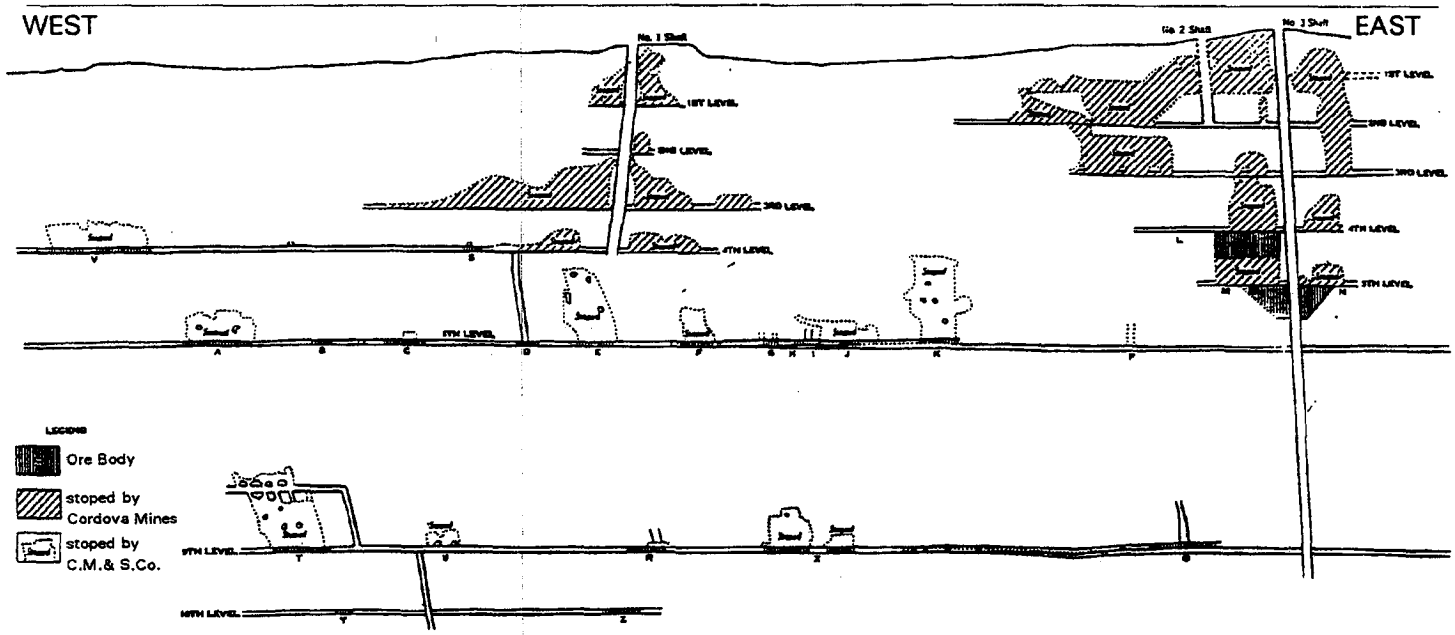


Fig. 2 - Composite Plan of Surface Buildings, Underground Workings, and Diamond Drill Holes, Cordova Mine, Belmont Township, Peterborough County.
(copied from a plan dated June 21, 1940, and published with permission from the Consolidated Mining and Smelting Company of Canada, Limited)

CORDOVA GOLD MINES

Shafts No. 1 - 2 - 3 and underground Stope development by Consolidated Mining & Smelting Company



Longitudinal vertical section of the Cordova Gold Mine, in Belmont Township, Peterborough County

Copied from plan dated June 30, 1940, and published with permission from Consolidated Mining & Smelting Company of Canada Limited

The shearing in any one zone is commonly irregular, owing to branching and contortion, but nevertheless is persistent along its strike. Bell believes there is a connection between the occurrence of the ore bodies and the irregularities in the pattern of shearing. The underground work indicates that at least one of the shear zones is much less persistent on its dip than it is along its strike. The width of the individual shear zones ranges from as little as a foot to more than 40 feet, the average being about 6 feet. The shearing across any one zone may be uniformly developed, but in some cases certain shear planes seem to have taken up most of the movement and have become major shear planes or "mud slips."

The shear zones show some silicification and slight mineralization throughout much of their exposed lengths, but only three, or possibly two, as extensively developed underground contain workable ore bodies. The ore bodies (see Figs. 2 and 3) developed from and west of No. 1 shaft strike from N. 60° (see Fig. 4) to 70° E. and N. 80° W. and generally dip from 60° to 70° S.E. In the vicinity of No. 3 shaft they strike N. 70° to 85° E. to N. 85° W., and the average dip is about 65° S. (see Fig. 5)

Bell reports that no definite control for the localization of the ore bodies has been found but that the following structural factors are significant. Many of the ore bodies in the vicinity of No. 1 shaft occur at or close to the intersection of two shear zones trending N. 80° W. and N. 65° E. The ore bodies also occur where there is contortion and variation in the shearing within the shear zones, as in old stope areas near both No. 1 and No. 3 shafts.

This irregularity may account for the wide ore bodies on the upper levels. Major shear planes occurring within the shear zones may, according to Bell, have acted as channels for the ore-bearing solutions.

Bell recognizes at least two types of vein material, only one of which makes ore. This type includes (1) replacement of the shear zones by vein material, (2) the development of a series or zone of closely spaced stringers or veinlets paralleling the planes of shearing, (3) the occurrence of ramifying veinlets in a more or less brecciated irregular replacement zone, and (4) the rarer occurrence of individual large lenses of massive vein material parallel with the shearing planes.

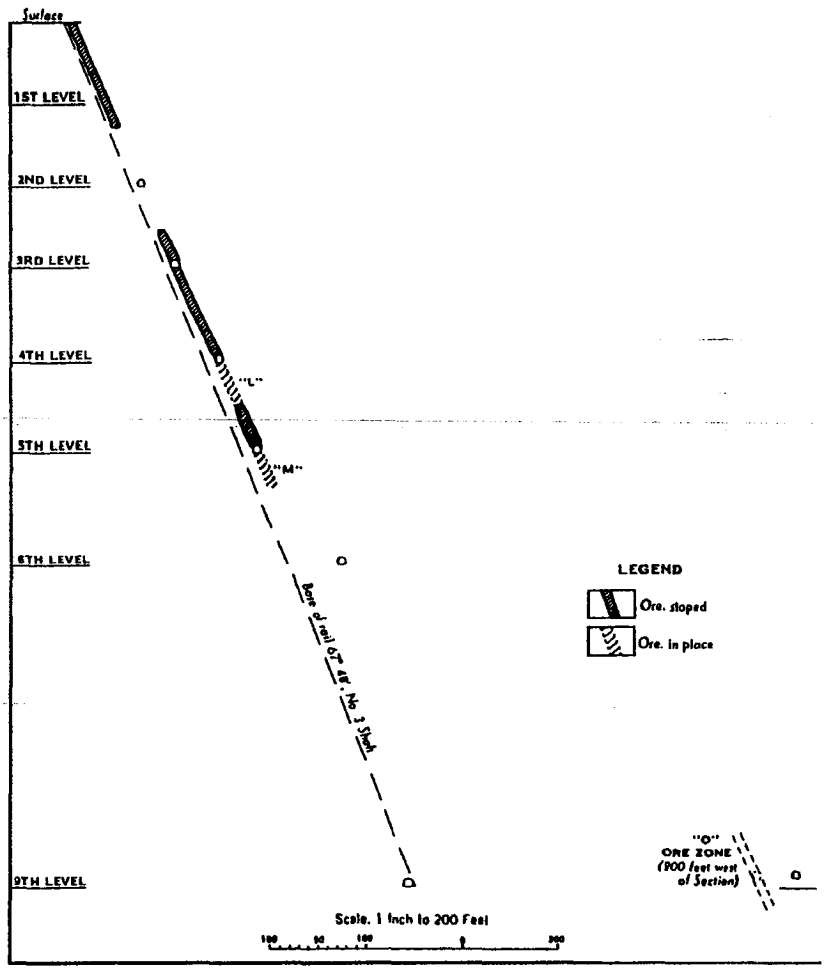


Fig. 5 Transverse vertical section A-A (see Fig. 2) 50 feet west of No. 3 shaft, Cordova mine. (Compiled from plans and published with the permission of the Consolidated Mining and Smelting Company of Canada, Limited.)

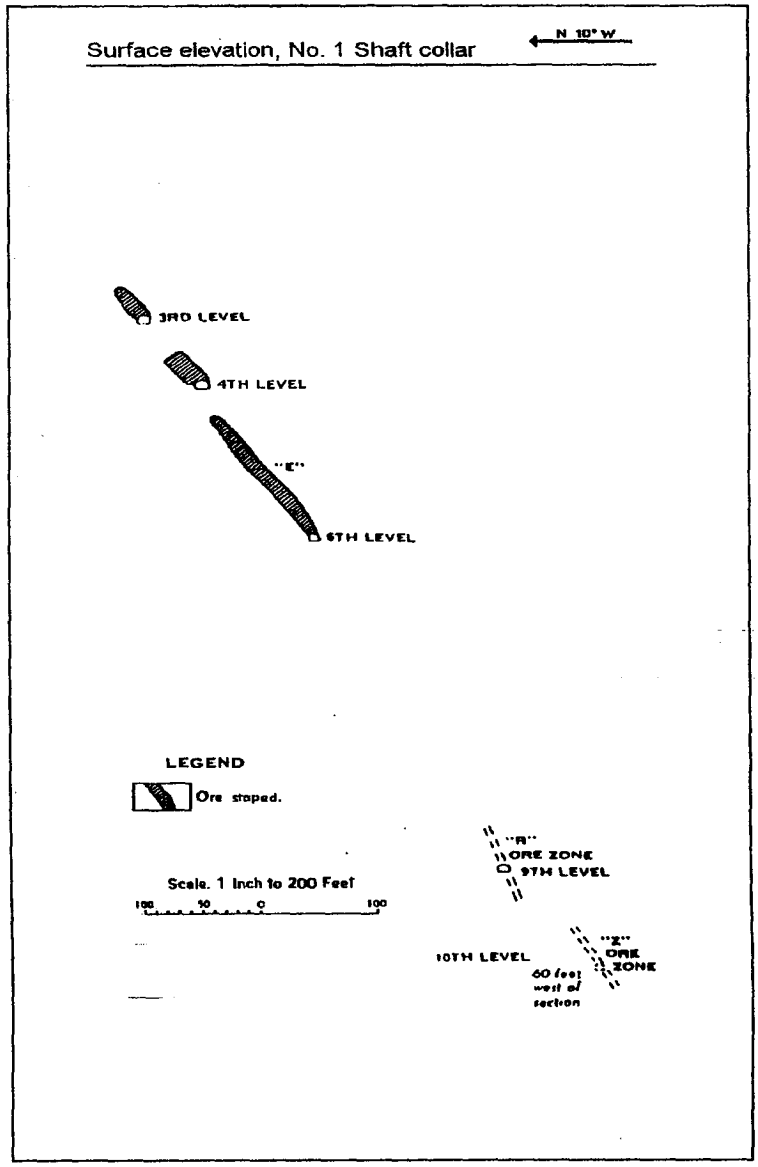


Fig. 4 Transverse vertical section B-B (see Fig. 2) west of No. 1 shaft, Cordova mine. (Compiled from plans and published with the permission of the Consolidated Mining and Smelting Company of Canada, Limited.)

The vein matter, owing to its emplacement along shear planes, usually exhibits a parallel banding, which is not so evident in the more richly mineralized ore bodies as in the irregularly brecciated ore bodies containing much disseminated fine pyrite. Pyrite is the predominant metallic mineral, but pyrrhotite does occur. In the better grade ore bodies pyrite may constitute locally as much as 50 per cent. of the ore. The gold is apparently confined to the pyrite, as no native gold was seen by Bell. A limited microscopic study of the vein material shows it to consist, in order of abundance, of carbonate, feldspar (including plagioclase and orthoclase), and quartz. The carbonate is definitely later than the feldspar and at least partly later than the quartz.

The second type of vein material, which occurs on the 9th level in the southeastern part of the mine, consists of lenses of carbonate and quartz mineralized with pyrrhotite. Gold is not present in economic amounts.

In conclusion it may be noted that underground work prior to 1935 had exposed a number of wide ore bodies on the upper levels, but the extensive underground development carried out between 1935 and 1940 by the Consolidated Mining and Smelting Company of Canada, Limited, disclosed a number of ore bodies of only moderate tonnage and grade. This company treated 33,305 tons for a recovery of 0.117 ounces of gold per ton ($4.50 per ton at $38.50 per ounce of gold). Bell states that there is no evidence to support a belief that ore bodies of larger size or better grade than those already known are likely to be found by additional development.

Chronological History of Ownership of the Mining Property at Cordova Mines Ontario 1893-1996

1890 H. J. Strickland of Peterborough discovered gold on E 1/2 Lot 20 Con 1 Belmont Township. Mrs. Brown, widow, occupant.

1891 Mrs. Brown took out Crown Patent then transferred all her interest to Mssrs. Carscallen, Strickland and Capt. O'Neill

1892 Property was let to Middleton Crawford for one year on a rental basis plus a royalty.

1893 Control transferred to the Moira Gold Mining Company.

1897 The Cordova Exploration Company Limited, of Spain, a wealthy group of English capitalists optioned the property with David Kerr as manager.

1899 The Cordova Exploration Company Limited purchased the property outright from A. W Carscallen.

1903 Belmont Gold Mines Limited was organized as a separate company to take over operations of the Belmont Mine from the parent, Cordova Exploration Syndicate.

1919 Cordova Mines Limited, Peter Kirkegaard, managing director, took over the property. There had been a major fire in 1915 with the property idle since then.

1935 Consolidated Mining and Smelting Company of Canada acquired control and developed the mine.

1940 Consolidated Mining and Smelting Company of Canada closed the mine down, and removed the mill. Harry Bowen becomes caretaker of the mine for C.M.& S.

1953 C.M.& S. sold the property to Harry Bowen.

1959 Harry Bowen optioned the property to C. Roger Young of Belmont Township.

Harry Bowen was killed in a car accident and his widow, Mary Brown became the owner of the property. S. Cameron Brown, a mining engineer and a retiree from Camflo Mines, married Mary Bowen, widow of Harry Bowen. Cameron Brown carried out additional exploration work on the property.

Mary Brown (nee Bowen) died and Cameron Brown be came the property owner.

1963 Cordova property was optioned to Orvana Mines. No further development took place and the option was cancelled.

1978 Ontario Dept. of Natural Resources capped the mine shafts and placed a lien against the property.

1979 Walter Hood optioned the property from Cameron Brown on behalf of the Cordova Gold Syndicate which planned to test the applicability of the new "Heap Leach" technology on the Cordova ore.

1980 The Cordova Gold Syndicate assigned the option to Lasir Gold Inc.

1982 Lasir Gold exercised the option and bought the property.

The Cordova Mining Syndicate and Lasir Gold determined that the ore from the mine was amenable to the newly developed "Heap Leach technique, which is now the predominant method for treating low grade gold ores worldwide. It is the basis of the success of American Barrick and others.

1989 Lasir Gold optioned the property, in sequence, to four different min ing groups without significant development other than a substantial examination and drilling program carried out jointly by affiliated companies, Gunnar Gold and Mill City Gold. This group devel oped a comprehensive mining and milling plan but unfortunately, due to adverse financial circumstances they encountered in 1990 they could not complete their obligations under the terms with Lasir Gold and their option was cancelled.

1996 The Cordova mining property continues under the present corpo rate interests and is being monitored, on a continuing basis, by the Ministry of Northern Development and Mining.