REPORT

On The

ALMA - PAYMASTER

GROUP

Lardeau Mining Division

West Kootenay District

British Columbia

Canada.

By:

Douglas B. Sterrett,
Geologist.

1930.

REPORT ON THE ALMA - PAYMASTER GROUP

INTRODUCTION - Six days during the middle of September 1930, were spent in making an examination of the Alma-Paymaster group of mining claims near Camborne, B.C., owned or controlled by the Lardeau Mines Exploration Limited of Vancouver,B.C. These claims lie in a belt approximately 5 miles long extending from the Alma claim on Poole creek about 5½ miles southeast of Camborne, northwesterly across the Lexington mountain divide and Lexington creek to the Paymaster claim on Incomappleux river above the mouth of Lexington creek.

Elevations on the claims range from 4200 feet above sea-level on Poole creek to 7400 feet on the divide to the east of Lexington mountain and down to 1800 feet on Incomappleux river. The approximate locations and elevations of some of the claims, cabins, ore showings, etc. are shown in profile in figure 1 taken from the prospectus of the Paymaster Mines, Ltd. with a few changes and additions.

With the construction of a few miles of road the claims would be easily accessible for development at each end. The interior claims could be reached by tram line from near the mouth of Lexington creek. If development of the end claims should show sufficient continuity and richness of the deposits the interior claims could be worked by long adits from the end claims.

At present the deposits can be reached for examination by fairly good trails. Equipment for prospecting and development can be taken to the Paymaster and easily and with a few trail improvements a portable compressor, diamond drill, etc. could be taken to the Alma end. Good cabins for test work are available at each end and near the middle of the group of claims. Examination of the lower claims at each end of the group may be made during about 6 months of the year (June to November) but the upper or middle claims should be seen during July, August or September to avoid delays from disagreeable weather or snow.

Timber is available for mining and construction purposes on some of the claims and in the region surrounding them at elevations ranging from 6000 feet and down. Glacier fed creeks with good flow and high grades can supply water power near the deposits for small operations and larger creeks or river in the region could be harnessed for larger development. With proper preparation mining and milling can be carried on throughout the year. Buildings, equipment, etc. can be safeguarded against possible snow slides by proper selection of sites.

Prospecting work to date has been limited and some of it has not been done to the best advantage. In all over 30 pits, cuts, trenches, and short tunnels have been made. None of these attained depths of more than 20 or 30 feet on the ore. A 240-foot tunnel was driven on the Paymaster claim but over half of this was in Slide rocks and the balance about parallel with the orebody and probably 150 feet from it. The early prospectors failed to grasp the relations of the ore to inclosing rock structure and the conditions met with in some of their workings discouraged them from further prospecting.

GEOLOGY - The deposits occur in a belt of limestone inclosed in a series of sericitic, chloritic and graphitic slates, phyllites, and schists, with interbedded quartz schists and quartzites. These rocks are called the "Lardeau Series" and are assigned to late Pre-Cambrian age by Walker and Bancroft (Memoir #161, Canada Geological Survey). The Lardeau Series of rocks is surrounded by more limestones and other schists and quartzites and the whole group has been folded into a great trough 15 to 20 miles wide and several times as long in a northwest - southeast direction. This trough is flanked and nearly surrounded by immense granite masses of later age.

The Lardeau Series has been much folded but because of the lack of outcrops, suitable key beds and sufficient time the details of this folding has not been worked out by the Government Geologists. Later block faulting has taken place and it is quite probable thrust faulting resulted from the earlier intense folding and crushing. In general the rock outcrops are steeply tilted beds of the various slates, Schists, Quartzite and Limestone, which have apparent regular northwest strikes. Locally these beds may show folds of various magnitude from small contortions to many feet across. The apparent multiplicity of limestone beds in the Lardeau Series is probably a duplication of one or a few beds by folding.

The lead ores and associated minerals found in the deposits of the Alma-Paymaster group occur in a belt of limestone inclosed in sericite and chlorite schists. These rocks strike N. 50° to 60° W and have a nearly vertical dip at the Alma end and dip about 50° N.E. at the Paymaster end. Casual inspection of the showings of ore and outcrops of cappings give the impression of regularity of deposits. A careful study, however, reveals folding in the limestone with ore deposition strongly influenced by the folding. Some of the folds are small but even these show a tendency to cause enlargements of ore bodies. Other structures are larger and in them there has been a considerable thickening of ore bodies. Still other folds of large magnitude are present and the possibility of greater ore enlargements in them should be tested out, as suggested in the report by the Government Geologists.

Owing to soil and forest covering and duplication by folding the thickness of the limestone band was not determined. It is probably at least nearly 100 feet thick and in places the outcrop measures 250 to 300 feet across.

The limestone is chiefly bluish-gray in color but along one contact (the southwest contact on the Alma claim) it has been more or less metamorphosed into white marble for a thickness of one to several feet. This is particularly the case where the contact is composed of bands of limestone interbedded with belts of schist.

The ore bodies occur in the limestone near or along this marbelized contact, replacing both the limestone and marble. They consist largely of siderite (ore the allied calcium-iron carbonate ankerite) with quartz, calcite, chlorite, pyrite, galena, sphalerite, and other ore and gangue minerals. This vein material is generally heavily brown stained from iron near the surface and the resulting brown gossan-like masses are called "capping" below.

The ore bodies are chiefly lenticular in shape ranging from less than a foot up to 20 or 30 feet thick. Where the inclosing formation has a uniform strike and dip the ore bodies are generally smaller and assume rather short thick lens shapes strung out in a line with or without connecting bands of gangue and ore. In places two or more nearly parallel belts of lenses occur.

DETAILS OF THE DEPOSITS - Beginning with the Alma claim the ore zone trends northwest and slantwise up and across the face of Lexington mountain. The mountain side is steep with slopes of 30° to 45° and locally breaks into cliffs. Figure 2 is a sketch map showing the trails, workings and exposures of ore at the Alma end. A strong band of limestone, probably over 100 feet thick, lies northeast of the line of ore showings and the schist - limestone contact. The ore bodies and contact are concealed in places for some hundreds of feet and the possible position of the contact is indicated between these in the sketch.

At (1) a tongue of limestone has been exposed in the trail some 225 feet southwest of the main belt of limestone. This tongue pinches from a width of 40 feet at the lowest exposure to nothing 100 feet higher up the slope. The top of this tongue of limestone is strongly marbleized and carries ore capping with galena and quartz. The ore capping ranges from 1 to 4 feet thick and extends down the northeast side of the limestone, as far as that is exposed. A strong fissure and solution channel follows the ore. This ore deposit has been called the "Tracy Ledge" and the tongue of limestone with which it is associated is undoubtedly the top of a fold in the main belt of limestone to the northeast. As such it indicates a major fold in the ore bearing limestone somewhere below. Figure 4 may be taken as a replica of the folding responsible for the tongue of limestone with which the Tracy Ledge is associated. The depth of the trough below Poole Creek valley can not be determined without further test work.

At (2) a short tunnel was driven on a small ore-body between the marble and limestone. It shows a discontinuity of the ore cropping in the cliff above but picks up the top of another lens of ore below which has not been tested. This lens showed considerable quartz and siderite with a fair amount of pyrite and a little galena; a sample, however, showed small value in it. Some 30 feet to the southeast a pit was made in a small lens which appears to be downward continuation of the ore in a small fold.

Below (2) limestone is exposed in the hillside but the contact has not been found. Above (2) for a distance of nearly 500 feet the outcrops of the schist-limestone contact and its possible ore is largely concealed by forest growth. A possible fold is indicated above 2.

At (3) a small pit has been made in a folded belt of marble and ore capping showing considerable galena. A channel sample taken across the ore -body 42 inches thick gave gold, .04 ounces, silver, 1.3 oz. lead, 11.0% with a total value of $10.08. This ore-body consisted of two galena rich streaks on each side of a siderite - chlorite mass 2 feet thick.

At (4) an outcrop of galena rich capping 10 feet wide is exposed. It is probable the crop represents an enlargement of the deposit in a favorable fold since the ore-body pinches to 2 feet thick in a crop 10 feet vertically lowerx. Nothing can be seen of the deposit above the larger crop.

At the next showing above (5) an old stripping shows over 4 feet of good looking capping carrying galena and sphalerite. From this there are outcrops of ore capping showing galena in places, to the next pit above (6) where folding conditions have produced a vein or deposit 8 feet across.

At (7) a short tunnel has been driven under a rich lens of ore bottomed in a synclinal trough. The downward continuation of the ore shows 20 feet vertically lower offset to the northeast by a fold. The capping of the ore-body is exposed above the tunnel with a thickness of 3 to 4 feet for a vertical distance of about 25 feet. A channel sample across the 54-inch thickness of the deposit just above the mouth of the tunnel gave gold, .04 ounces; silver, 11.9 ounces, and lead, 28.9% with a total value of $28.32.

Outcrops are concealed or fail for the next hundred feet above to a small pit 20 feet northeast of the schist-limestone contact where 2 to 3 feet of capping carrying galena is exposed in folded limestone. More outcrops are exposed along the schist-limestone contact to (8) where a 12-foot pit shows ore capping with good galena values across 8 feet. The marble apparently folds over across this ore-bddy. More ore capping outcrops in a belt of 10 feet to the northeast and on to the northwest along the trail to (9).

At (9) a ten-foot pit exposes 8 feet of vein matter in folded broken marble and limestone. The ore consists of massive siderite and quartz with galena and pyrite richest in a 2-foot belt along the northeast side. Two channel samples were taken here; one across 60 inches on the southwest side of the xxx vein gave gold, trace; silver, 1.8 oz; lead, 3.5% with a total value of $3.47. The other across 32 adjoining inches on the northeast side of the vein gave gold, .01 oz; silver, 3.1 oz; and lead, 11.7% with a total value of $10.71. This vein outcrops some 40 feet northwest and pinches out in a fold in the inclosing limestone as shown in figure 2. Another belt of lenses starts about 40 feet offset to this to the northeast extending on to (10).

At (10) a crosscut trench 30 feet long snows the capping of at least three belts of ore lenses with a width of 4 to 6 feet in the northeast belt. These lenses show galena where broken into. From (10 on to (12) the ore-bodies occur in two or three almost continuous belts of short thick lenses 1 to 4 feet thick connected by stringers of vein matter. In the pit at (110 the junction of two veins by folding gives a width of 12 feet of vein matter composed of siderite, quartz, chlorite, pyrite and galena. About 100 feet southeast of (12) two veins again come together giving a thickness of about 7 feet of vein matter with galena showing in the capping. The belts of ore lenses from (10) to (12) will probably contain an average thickness of at least 4 feet of ore through a length of 450 feet.

At (12) there is a nearly vertical fault plan striking slightly east of north. The horizontal displacement of the ore by this fault amounts to about 40 feet. The ore capping continue beyond the fault but were not examined there.

To the east of (12) the limestone outcop is 200 to 300 feet wide and a similar width is exposed where it crosses the Lexington Mountain divide to the northwest and over 1500 feet higher. Ore occurrences were not studied in this area though capping was seen in a few places. More detailed examination was made of 1½ miles of the belt beginning a few hundred yards northwest of the divide as shown in figure 3. Starting at an elevation of 7100 feet a belt of ore lenses 1 to 7 feet thick, averaging 3 feet, outcrops through a distance of 200 feet. Good galena showings were seen in some of the outcrops. For the next hundred yards outcroppings of capping show up at intervals through drift covering.

From this point about 1000 feet of the belt is covered by Moraine material extending nearly across the Kitsap claim. The first outcrop beyond the drift is a vein or lens of capping 105 feet long and 2 to 4 feet thick with galena showing in places. This lens bottoms at the northwest end but is replaced by another belt slightly offset to the southwest.

In a trench-like shaft, 15 feet depp, called the Kitsap shaft at the northwest end of that claim a body of capping over 15 feet across is exposed. This had a blanket like layer strongly impregnated with galena about 1 foot thick over the top giving the appearance of a rich galena deposit some 12 feet thick. This occurrence is explained by ore deposition in an overturned fold with ore richest along the wall. A sample cut across 11 feet of this deposit as nearly perpendicular to the wall as possible gave gold, .01 oz.; silver, 1.4 oz; and lead, 6.9% with a total value of $6.24.

From the Kitsap shaft on for the next 1500 feet northwest the outcroppings of capping, with galena showing in places, are nearly continuous with two or more belts through much of the distance. The capping bodies are large, in places 30 feet thick. The small amount of prospecting work done along these deposits has failed to reveal their relations to the inclosing rocks, the direction of continuity to depth or the percentage of galena to be expected below the partly oxidized or leached zone.

Undoubtedly this occurrence of nearly parallel belts of ore bodies is due to deposition in folds and not all of these will reach much depth vertically. These folds with their trough-like deposits will probably be found to have a pitch to the southeast along their strike in this area carrying the ore deeper in that direction into the slope of the plateau and under Lexington mountain. The folds are numerous and of such size that a number of fairly large ore deposits may be expected along them.

For the next mile to the northwest the soil and forest covering are heavier and the outcrops are more scattered but enough has been exposed to show a fair continuity of the deposits with the exception of about a thousand feet northwest of the Keystone Cabin (see figure 3). Beyond this the bodies of capping range up to 15 or 20 feet thick and show good continuity as far as examined.

Only a few exposures of ore-bodies are reported known for the next couple of miles in the heavily timbered country to the northwest until the Bellvue claim is reached. Here come ore-bodies outcrop in the cliff-like face of Goat mountain. Folding of the limestone band is quite evident in this area both on a large and small scale. The principal prospect here at an elevation of about 3500 feet exposes a trough over 20 feet wide filled with ore capping carrying a fair amount of galena and pitching 10° to 12° diagonally southeast into the mountain-side. The bottom of the trough of ore is seen in the cliff to the northwest. About 100 feet south of this pit the nature of the folding of the rocks is illustrated in miniature by the crumplings in marble banded with schist. One of these shown in the sketch in figure 4 is a replica of the folding throught to have produced the tongue of limestone with which the "Tracy Ledge" on the Alma claim is associated.

Major folding has also taken place as is shown by the duplication of the limestone and ore beds lower down the mountain side and the repetition of the limestone beds exposed between this and the Paymaster tunnel.

The ore occurrence on the Paymaster claim was not examined closely but the same belt of lenses of ore capping was seen outcropping in the face of the cliff above the tunnel with this difference that the limestone lines to the southwest of the ore and the formation dips to the northeast about 50°. A large showing of ore capping is reported on the cliff above. Before extensive development is done here the ore-bodies inclosing limestone and regional structure should be carefully studied and mapped. The information obtained might show a large fold with possible large ore-body between the tunnel and the Bellvue claim which could be worked from the Paymaster tunnel.

POSSIBILITIES - A hurried visit to the various outcrops and workings on the Alma end without plotting on a map gives one the impression of a uniform ore zone carrying one or more belts of ore-bodies near the schist-limestone contact. A rough estimate of the average thickness of ore through an elevation of a thousand feet even seems possible and with this the quantity of ore indicated in a right triangular block below and back of the extreme outcrops. A more careful study of the geology with the exposures plotted on a map, however, shows that sufficient data is not available to do this. In place of fairly continuous ore-bodies with nearly uniform average thickness the continuity is broken by folding conditions but the possibilities of enlargements and enrichments of the ore-bodies are thereby increased.

The writer believes the showings now exposed justify further expenditure and that such expenditure is likely to be rewarded by favorable results. A thousand or two dollars spent on the Alma end would go far towards strengthening or checking this belief.

At the Alma end the exposure from (5) to (12) figure 2 indicates a probable average thickness of 3 feet of ore at the surface through a length of 1000 feet and depth of 500 feet. If this average should persist into the Mountain below on equal depth and distance 75,000 tons of ore would be indicated between these points. From the assays made of samples from (7) and (9) and the galena seen in other pits in this belt it is evident the ore can be given a value of at least $10.00 per ton. The writer would expect local enlargements and enrichments of ore-bodies to increase the average thickness and richness of ore suggested above, since enlargements are seen in folds at the surface and enrichments in them as at (7). The possibilities of this property are very great if sufficient continuity of ore is proven or a key plan of location of ore-body enlargements in folds is established.

Regarding ore treatment a milling test made on a sample sent to Ottawa is reported to have shown the ores quite amenable to a good separation of the lead content and associated silver. The ores carry roughly one-third of an ounce of silver to the unit of lead and show gold values up to nearly $1.00 per ton. Some of these values are probably associated with pyrite. Simple mill tests and complete analyses of the metal content of the ores would determine whether the pyrite should be separated. All of the pyrite will not carry values worth saving for a sample of pyrite crystals taken from some half a dozen workings on the interior claims showed an assay only 0.03 oz. gold and 0.8 oz. silver.

RECOMMENDATIONS - Complete prospecting of the properties would involve a large amount of work which might be divided into three groups, the Alma end, the Paymaster end and the interior claims. As a first step a survey along the limestone - ore belt should be made with geological map on sufficiently large scale to show details of outcrops and structure. While this work is in progress preliminary prospecting should be started on the Alma end.

The first work here should be as large a job of surface stripping as can be reasonably done from the fault, at (12) figure 2, down the mountain slope along the ore zone. The water in the gulch along the fault can be used to great advantage in this stripping work especially in the spring or early summer season. A fairly clean job of stripping could be made down to (5) figure 2, a distance of a thousand feet horizontally and 500 feet vertically. This would permit an accurate measurement of the aggregate size of the ore-bodies exposed in this belt. Several pits, in addition to those already opened, blasted through the shallow partly oxidized zone would yield fresh samples from which the average mineral value could be deduced.

From (5) figure 2, stripping should be carried as far down the mountain and at as many places as possible along the ore belt. Where overburden is excessive crosscut trenches with parallel trenching on the better ore-bodies should be resorted to. Prospect pits and trenches should be made below (1) and (2) figure 2, and the distance betweem the two schist-limestone contacts measured with a view to determining at what depth these two limestone belts will join in a synclinal fold. It is possible this fold will not be a single trough but a small synclinorium containing several ore-bodies. The result of stripping in this area will show whether further work should be done here. Diamond-drilling might be required in the end to determine possible large ore-bodies in this trough.

Stripping in the area between (4) and (5), figure 2, is likely to show folding with consequent enlargements of ore-bodies.

If only small expenditure is to be made for further information to decide on the advisability of larger prospecting thefollowing is recommended on the Alma end. Follow the lens of low-grade ore showing in the bottom and turn of the tunnel at (2) figure 2, several feet to see if it will not show richer ore. A small winze to the northwest may be required to do this. Crosscut for the schist-lime contact and ore below (1) and(2). Strip above and below the 10-foot outcrop at (4). Prospect and trench between (4) and (5). Strip from (5) to (7). Trace ore capping above (7) as far as possible. Strip some between (9) and (10). Expose any promising outcrops easily reached by stripping between (10) and (12). Blast into fresh or only slightly oxidized ore in a number of capping outcrops exposed. Examine the outcrops showing to the northwest in the cliff-like mountain side beyond the fault at (12).

At the Paymaster end the present tunnel should be driven at right angles to the northeast from its face to cut the ore horizon at a probable distance of about 150 feet. When the latter is cut it should be drifted on or followed by raise or winze to prove extent and richness. If a promising body of ore is found exploration could be continued. As a preliminary, however, an instrumental survey should be made of the tunnel and outcrops above and the dip and strike of the ore zone carefully plotted to determine the distance necessary to drive the tunnel. Further geological study of the cliff-like mountain side above might give further data of use in deciding what work should be done, especially between the Paymaster and Bellvue claims.

The principal test work on the interior claims, especially those shown in figure (3) should be done by diamond drilling. A few pits, short tunnels, inclines or shallow shafts if properly directed might be desirable to prove direction, continuity and value of ore-bodies. These steps could be more intelligently planned after the preparation of an accurate geologic map on a large scale. A few small pits might have to be made to check the theories of geologic structure indicated on the map. The writer is confident that such work will save much misdirected prospecting in the zone where the ore capping outcrops are large and in parallel belts for it is probable most of these are in folds and their extension should be looked for to the southeast rather than vertically below.

(signed)

DOUGLAS B. STERRETT

Geologist.