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NOTES ON
LEAD OCCURRENCES IN CANADA
Compiled by
W. R. McClelland

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Notes On

LEAD OCCURRENCES IN CANADA

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Foreward

The world reserves of lead ores are shrinking and no major discoveries have been made in recent years to offset this. With the single exception of the Sullivan orebody at Kimberley, British Columbia, no outstanding deposits of lead have been found in Canada. There are, however, a number of small deposits and occurrences, some of which are producing and others which had been partially developed in the past. This review provides a condensed account of many of these occurrences. No attempt has been made to give detailed information, but the location, mineral association, previous development, and present status of the properties are briefly reviewed.

Lead ores seldom occur as such, but are usually associated with other base metals such as zinc and copper, the former being the most prevalent associated mineral. Silver is in many cases found with lead and the terms lead-silver or silver-lead ore indicate the predominant metal value of the deposit.

Occurrences of lead are found in Nova Scotia, New Brunswick, Quebec, Ontario, British Columbia, and Yukon. Production is largely confined to British Columbia and Quebec, the former province accounting for over 97 per cent of the total lead produced in Canada.

Nova Scotia

Only one of the lead occurrences in Nova Scotia was developed to the stage of production. This was at the Stirling mine, Richmond county, Cape Breton Island. Between 1935 and 1938, when it was closed, 9,335 tons of lead-copper concentrates was produced.

North Carleton, Yarmouth county. In 1923 American Smelting and Refining Company did some work on the property, but the results were disappointing.

Dunbrack Property, Musquodoboit Harbour, Halifax county. Argentiferous galena occurs in a fissure vein averaging $2\frac{1}{2}$ feet wide. Between 1909 and 1920 intermittent development was carried out and a shaft was sunk to a depth of 152 feet. Several hundred tons of 20% lead ore was indicated.

Leadvale, Colchester county. Argentiferous galena occurs in small veins between granite and carboniferous conglomerate. The property was developed during the last century and 100 tons of high grade ore was produced in 1884.

Gay's River, Hants county. Galena is found in small segregated crystals generally disseminated throughout beds of limestone. Grab samples indicated about 3% lead.

Pembroke (Glenbervie), Colchester county. Galena occurs similarly to that at Gay's River, but is less segregated. Some exploration was done and a shallow shaft was sunk. The last reported work was in 1930.

Smithfield, Guysborough county. Galena is found in two veins occurring in interstratified impure quartzite and slate. Two adits were extended into the deposit. The deposit is considered to be too small for economic development, but is of interest in that it may indicate the presence of more extensive deposits nearby.

Caledonia, Guysborough county. Between 1875-77 a vein of argentiferous galena was opened by a tunnel and a small shaft. A few tons of high grade ore was shipped, but nothing further has been done on the deposit.

Stirling Mine, Richmond county. The ore occurs in a shear zone and is composed of fine-grained sulphides-sphalerite, pyrite, galena, and chalcopyrite. The first work on the property is reported to have been carried out in 1904. In 1917 prospecting and diamond drilling was started with the object of developing the property as a zinc producer. A two-compartment vertical shaft to a depth of 400 feet was completed in 1926. In 1930 a 300-ton capacity mill was built. During the period of operation, 1935-38, 23,265 tons of zinc concentrate and 9,335 tons of lead-copper concentrate were produced. In 1942 the milling equipment was transferred to the New Calumet mine in Quebec.

Silver Mine, Loch Lomond, Cape Breton county. Argentiferous galena occurs in limestone which shows mineralization for a distance of 4 miles. Apart from a number of prospect pits and the extraction of several tons of ore, little work has been done on the property.

Faribault Brook, Cheticamp, Inverness county. Galena and sphalerite with lesser amounts of chalcopryrite occur in lenses in schist. Around 1898 the deposit was opened by a large pit and a 45-foot shaft. A small concentration plant was erected about this time. A test shipment of 10 tons was made in 1915.

McIntosh Prospect, Little Narrows, Victoria county. The occurrence is found in a shear zone in which replacements of limestone by galena, and to a much lesser extent by sphalerite occur. Lenses of galena are found up to 10 inches in diameter. In 1946 some stripping was done and numerous small trenches were dug. The mineralized lenses are separated by barren rocks and their frequency determines whether the rock is ore or not.

North River, Victoria county. A quartz vein, carrying galena, chalcopryrite, and zincblende cuts jointed porphyritic felsite. Some mining was done about 1876.

New Brunswick

None of the numerous lead occurrences in New Brunswick has reached the stage of economic development.

Teahan Prospect, Albert county. Galena and sphalerite occur in a fractured and faulted zone in thinly laminated, extremely fissile crumpled talcose or chloritic schist. Several trenches were dug on the property in 1927 and a sample ran 1.26% lead, 14.27% zinc, and 2.35% copper.

Lumsden Mine, Albert county. Galena, sphalerite, and chalcopryrite have been traced for about 500 feet along a mineralized zone, which consists of sheared volcanic rocks. Up to 1927 development consisted of two shafts, an adit, some tests pits, and trenching. Two drill holes were also put down. There appears to be no record of any recent activity.

Dominion No. 1, near Woodstock, Carleton county. Galena and sphalerite occur in a zone along contact of argillite and quartzite as stringers and as masses and disseminations in the argillite. In 1927 a shaft was sunk to a depth of 60 feet on the ore zone. The orebody was not considered large enough to do further work. The possibility of larger bodies occurring at depth has never been disproved.

Britton, near Woodstock, Carleton county. Considerable development was carried out on this lead prospect, including a shaft to 150 feet. Results were unsatisfactory and the property has been idle for many years.

Winding Hill, Stanley parish, York county. Galena occurs in much altered greyish to greenish interbonded quartzites and phyllites. The mineralized zone is about 30 feet wide. Samples analysed from 1.24% to 1.27% lead. Very little work has been done on the property, but the area is considered worthy of further prospecting.

Orvan Brook, Restigouche county, 23 miles west of Bathurst. This deposit was discovered in 1939. Galena occurs in a strong shear zone which has been explored and drilled for a distance of 6000 feet along the strike. A geophysical survey and 1297 feet of drilling were carried out in 1945.

Nigadoo, Gloucester township. Argentiferous galena occurrences near the contact of the Silurian rocks were investigated a number of years ago. The area warrants further prospecting.

Rocky Brook, also known as Gilbert Prospect, Gloucester county. Argentiferous galena occurs in a quartz vein with a total width of 20 feet. Some development was done in 1890 and 1891 and again in 1909. There is evidence of a mineralized zone along which orebodies possibly occur.

Elm-tree, Beresford Parish, Gloucester county. Argentiferous galena and sphalerite are found in a quartz vein with a width of from 6 to 7 feet. A shaft was sunk on the property in 1880 to a depth of 60 feet. In 1946, 14 drill holes were put down, covering a total of 2,700 feet. About 30,000 tons of ore is indicated to a depth of 160 feet.

Quebec

There are numerous deposits of lead in widely separated areas of Quebec, but production at present is confined to the New Calumet mine in Pontiac county and Golden Manitou mine in northwestern Quebec. In past years several other deposits were actively worked.

New Calumet Mine, Calumet Island, Pontiac county. Galena and sphalerite in average proportions of one part galena to three parts sphalerite occur as a series of lenticular deposits of the gash vein type within quartzite and gneiss, and also as impregnations in these rocks as well as in the crystalline limestones. The first exploratory work on this property was done in 1891, and some mining was carried out at the end of the last century. Intermittent activity continued for about the next 40 years, until about 1937 when a vigorous diamond drilling program was begun. A new shaft was sunk in 1943 and a 500-ton capacity mill was built. The proved ore reserve in 1946 was 944,964 tons with an average grade of 9.20% zinc, 2.70% lead, and 5.45 oz/ton silver. 208,860 tons of ore was mined in 1946 and 3,725 tons of lead in concentrates was produced.

Potton Mine, Owls Head, Potton township, Brome county. Galena is reported as occurring in a quartz vein 10 feet wide. The property was prospected in 1890 and some renewed activity was reported in 1947. The occurrence is on lot 8, range XI, on the shore of Lake Memphremagog.

Moulton Hill, Ascot township, Sherbrooke county. Galena occurs in this deposit associated with sphalerite and chalcopryrite. The deposit was developed during 1943 and 1944. The main 40° inclined shaft was sunk to 486 feet. A 250-ton capacity mill began operating in 1944. In that year 35,175 tons of ore was treated yielding 460 tons of lead as concentrates. Operations ceased in June, 1945. Estimated ore reserve is 200,000 tons, with an average grade of 1.7% copper, 2.7% lead, 7.8% zinc, 0.103 oz/ton gold, and 1.51 oz/ton silver.

Risborough, lots 1, 2, and 3, ranges XIV, XV, and XVI, Risborough township, Frontenac county. Galena associated with chalcopryrite, pyrite, and some zincblende occurs in a quartz vein cutting hard greyish sandstone with interstratified beds of black and grey slates. Exploratory work has been very limited and the only known development is a 30-foot shaft.

Marlow, lot 1, range VII, Marlow township, Frontenac county. Similar to the Risborough occurrence. Little, if any, exploratory work has been carried out.

Wright Mine, Ville Marie, lots 61, 62, and 63, range I, Duhamel township, Temiscamingue county. Argentiferous galena occurs in a brecciated zone of conglomerate. A 100-foot shaft was sunk on this property in 1888. The deposit was discovered by Sieur de Troyes in 1686. A mining plant was installed in 1890 and work was carried on until 1891. Since then operations were intermittent till 1925. For the following 22 years the property was idle. In 1947 diamond drilling was carried out with the intention of re-opening the mine. The ore reserve is estimated at 25,000 tons carrying 5.9% lead and 1.3% zinc.

Tetreault Mine, lots 37-42, range I, Montauban township, Portneuf county. This deposit of galena and sphalerite was for a number of years an important producer of lead and zinc. The occurrence was discovered in 1910 and mining operations began in 1911. Up to 1925 some 250,000 tons of ore was produced from intermittent operations. British Metal Corporation operated the mine for five years up to 1930. From 1930 to 1938 the mine was worked intermittently. During 1942-44 Siscoe Metals Limited operated the property on behalf of Wartime Metals Corporation. This was largely a final clean up of the available ore left in the mine. In this last period of operation 1,328 tons of lead and 6,343 tons of zinc were recovered in concentrates.

Three other occurrences are reported in Montauban township.

Laurentide, lot 7, range IV. Galena and zincblende occur

in well defined zones, each parallel to the strike of the sedimentary series. Within these series the ore is found as fillings of gash veins and impregnations in a micaceous quartzite. Two prospecting shafts were sunk prior to 1914.

Montauban, lots 43, 44 and 45, range I. The mineralization of galena and sphalerite is very irregular. In 1915 two shafts, 30 feet and 51 feet respectively were sunk. Work on the property stopped around 1917.

Shawinigan, block C, range II. Galena and sphalerite occur in irregular stringers of quartz traversing gneiss. Trenching over 1500 feet shows mineralization. In 1929-30 a 9 foot by 12 foot incline shaft was sunk to 60 feet. 1200 feet of diamond drilling was carried out. Surface showings indicate 20,000 tons of ore at nominal depth. Samples from the shaft gave assays of around 10% lead and 16% to 26% zinc.

Blais, Preissac township, Abitibi District. Galena and sphalerite occur in a vein of calcite, 4 feet wide, which has been traced for 1000 feet. A 45-foot shaft was sunk in 1942.

Firlotte, Joannes township, Rouyn-Noranda county. This occurrence of galena and sphalerite has been drilled. A sample shipment assayed 5.1% lead and 28% zinc.

Golden Manitou, Bourlamaque township, Abitibi county. Sphalerite, pyrite, chalcopryrite; and galena occur in a belt of sericite schists. Galena is only a minor constituent of the ore, sphalerite being the predominant economic mineral. Production began in 1942, and in 1946, 224,550 tons of ore was mined from which concentrates containing 856 tons of lead and 10,633 tons of zinc were obtained. Proved ore reserve is estimated at 735,302 tons, with an additional 750,000 tons indicated.

St. Fabien, lot 158, St. Fabien township, Rimouski county. Veins of calcite carrying cubes of galena are found in conglomerate and compact sandstone. A 50-foot shaft was sunk in 1926. The occurrence has been known for many years.

Christie (Candego Mine), Christie and Boisbuisson, township, North Gaspé county. Galena and sphalerite occur in numerous quartz and calcite veins cutting limestones, slates, and shales. The deposit was discovered in 1916 and previous to 1945 development consisted of surface stripping, a shallow shaft, and 1500 feet of diamond drilling. In 1946 an active development program was started and in the summer of 1947 a 50-ton capacity mill went into operation.

Federal Lead and Zinc, Lemieux township, North Gaspé township. This property comprises a large number of claims with a total area of 4,374 acres. The galena and sphalerite occur in veins and breccia zones which are folded and faulted. There are reported to be 150 veins exposed. The estimated ore reserve varies, depending

upon grade. Above the adit levels the estimate is placed at 1,000,000 tons. Exploratory work and drilling has been carried on intermittently since 1915.

Cross Point, Mann township, Bonaventure county. Mineralization consists of argentiferous galena locally associated with quartz and calcite, and occurring as replacements along fractures in the volcanics. Some trenching and drilling was carried out around 1927. Although this deposit appears to be too small for economic development, the surrounding region is favourable for prospecting.

Little Gaspé Cove, Cap des Rosiers township. Fissure vein deposits mineralized with galena, sphalerite, and chalcopyrite occur in stratified limestone. These deposits are similar to those in central Gaspé. A shallow shaft was sunk on the deposit many years ago.

The zinc and lead deposits of Gaspé peninsula constitute a potential source of these metals. Their long distance from the railway has retarded their development to the production stage.

Temiscamie River, Lake Albanel region, Mistassini district. A fault zone in which galena and sphalerite occurrences are found extends over a length of $3\frac{1}{2}$ miles. The discoveries in this area were made in late 1946 and exploratory work was carried out during 1947.

Richmond Gulf, near Little Whale River, on east shore of Hudson Bay. Galena occurs in magnesian limestone. In 1858-59 Hudson Bay Company mined about 9 tons of ore from numerous small openings 3 miles north of its post at Little Whale River. In 1947 a 250-square mile exploratory permit was granted by the Quebec Government to a company to explore and prospect this area. Mineralization appears to be more abundant on the south side of the river. A very extensive program of exploration and diamond drilling has been carried out during 1947 and 1948. The results have indicated so far that the deposits are somewhat shallow but extensive. The deposits are reported as epithermal.

Bachelor Lake Area, Abitibi District. The discovery of lead and zinc sulphides with high silver values was made in this area in 1947. Prospecting disclosed several exposures of massive sulphides and subsequent diamond drilling has indicated ore extending for a length of 700 ft. to a depth of 300 feet. The deposit is being diamond drilled further to determine the extent of the orebody. The area is the scene of very active prospecting and exploration.

Ontario

Lead mining was very active in eastern Ontario a number

of years ago, but in recent years has gradually declined. At present the sole production is from the Berens River mine in northwestern Ontario, where a small tonnage is recovered as a by-product.

There are numerous occurrences in the province, some primarily lead deposits, others associated with zinc or zinc and copper.

Crown King, lot 1, concession VII, Somerville township, Victoria county. Galena occurs in three parallel veins striking across crystalline limestones and micaceous sedimentary gneisses. The veins have been stripped at intervals for a distance of 200 feet.

Methuen Lead Vein, lot 2, range I, Methuen township, Peterborough county. Galena occurs in a lode cutting grey calc-schist. The average width of the lode is 18 inches and it has been traced for about 3 miles. A shaft was sunk on the property in 1868.

Union Creek Lead Mine, lot 20, range A, Galway township, Peterborough county. Galena and zincblende are found in a vein of barite and calcite. Many years ago a shaft was sunk to 100 feet and some lateral drifts were run. A few tons of ore have been mined at different periods. Last reported operation was in 1911.

Ore Chimney or Bey Mine, lots 34, 35, and 36, concession I, Barrie township, Frontenac county. The ore is a mixture of galena and sphalerite. Work on the property began in 1909 and a 340-foot shaft was put down with development at five levels. The mine was closed in 1915 and was again re-opened around 1931 for a short period. An option was taken on the property in 1943. The vein is reported to be about 2 feet wide with an average content of 1.7% lead and 2.0% zinc, and some gold and silver. There is an estimated 18,000 tons of ore above 500 feet.

Frontenac Mine, Loughborough township, Frontenac county. Galena and sphalerite occur in a calcite vein having an average width of 10 feet and reported as traceable for 6800 feet. The mine was opened and developed during the latter half of the last century. There are three shafts, the deepest being 310 feet. The mine produced intermittently up to around 1913. Some work was done about 1925 and the latest reported activity was in 1947.

Kingdon Mine, Galetta, Fitzroy township, Carleton county. The galena occurred in two fissure veins. This property was first opened up in 1884. No further work was done until 1914, when active development of the mine was started. Production of refined lead to the end of 1927 amounted to about 23,000 tons. The mine was closed in 1931. During the period of operation the ore was smelted in a Scotch hearth type furnace and the slag was re-treated in a small blast furnace.

Hollandia, lot A, concession V, Madoc township, Hastings county. The property is about 3 miles north of Bannockburn. The galena occurs in a calcite vein which pinches and swells. In places the vein has a width of 10 feet. It has been traced for 2,500 feet on the surface. The first work was done on the property in 1898. There are three shafts, the deepest of which is 150 feet. Intermittent operations were carried on up to 1907, when the mine was closed. At one period a blast furnace was installed and two carloads of pig lead was produced. The amount of ore mined has not been large and the property may be considered as a possible source for readily obtainable and comparatively low cost lead concentrate.

Katherine Mine, lot 7, west half, concession XI, Lake Township, Hastings county, about 3 miles from Millbridge. Galena occurs in veins in well-banded grey quartzites and sedimentary gneisses and mica schists. A shaft was sunk on the property many years ago to a depth of 125 feet. The vein has a known extension of a half mile. The property has been idle for many years. It is considered as a possible source for lead concentrate at comparatively low cost.

Ramsay Lead Mine, lot 3, concession VI, Ramsay township, Lanark county. Galena occurs in fissure veins. Other veins nearly parallel to these, and also carrying galena, occur in the vicinity. First work was in 1856, when two shallow shafts were sunk and a small furnace was built. Some drilling was done in 1925, but results were reported as disappointing.

Lots 2, 3, 4, and 6, Concession VIII, Leeds county. Veins carrying galena are found in crystalline limestones cut by red granite and dykes of white pegmatite. Some trial shafts were sunk on veins on lots 2 and 4. The vein on lot 2 has been traced for $\frac{1}{4}$ mile. The number and length of veins makes the area worthy of further investigation.

Bedford Lead Veins, lot 13, concession V; lots 16-19, concession VI; and lots 18, 19, 21, concession VIII, Bedford township, Frontenac county. Galena-bearing veins cut limestone and granite. One vein has been traced by pits and trenches for over 1,600 feet.

Barrie township, lots 9 and 12, concession VIII, Frontenac county. Veins mineralized with galena, pyrite, chalcopyrite, and zincblende occur in a steeply dipping series of Precambrian sediments. Four shallow shafts were sunk and some exploratory work was done in 1942 and 1943. Development has shown no ore of commercial value.

Chrysler Property, lot 2, concession II, Limerick township, Hastings county. Galena occurs in a calcite vein. The mineralized portion of the vein as exposed in the workings is narrow, but is so strong as to suggest that more work might open up shoots of commercial size.

Roberts Property, lots 4 and 5, Block B, Tudor township, Hastings county. A calcite vein 10 inches wide and on same strike as the Hollandia vein occurs well mineralized with galena. A 25-foot shaft was sunk on the property in 1925.

Several other galena occurrences are reported in Tudor township, but development has been very limited.

Storrington vein, near shore of Dog Lake, Storrington township, Frontenac county. A well-defined lead vein has been uncovered and appears to be on the strike of one of the lodes of the Frontenac mine.

Kirby Legge Mine, lot 10, concession III, Deroche township, Algoma District. Numerous galena-carrying veins occur in a shear zone. Maximum width is 3 feet, with an average of 1.5 feet. Development consists of stripping, trenching, and some test-pits. 15 drill holes have been put down ranging from 150 feet to 450 feet. In 1943 some work was done by Algoma Galena Company, Limited.

Kozak, Goudreau area, range 26, townships 27 and 28. The deposit is $1\frac{1}{2}$ miles west of the Algoma Central Railway. Mineralization is not confined to a definite vein or zone, but consists of patches or streaks scattered throughout the schist belt, which has been traced for 700 feet along the strike and at right angles to the same for 130 feet. Mineralization consists of particles or small bunches of zincblende, galena, pyrite, and chalcopyrite. Channel samples across the strike are said to have given good values in precious metals. Due to its size the property has some possibilities as a low-grade lead-zinc mine.

Vacheresse claims, range X, township 23, Algoma District. A six foot wide vein carrying galena and sphalerite has been traced for 1680 feet, 125 feet of which have been stripped. Samples ran from 4% to 12% zinc and 8.35% lead. Property might possibly prove to be a marginal deposit.

Bussineau, Ranger Lake area, Algoma district. Argentiferous galena and sphalerite occur in quartz veins or lenses up to 7 feet in width. These in turn are in a shear zone 15 to 70 feet wide. Some surface exploration work has been done indicating the deposit is a possible marginal source of lead and zinc. The silver content of the galena is high.

Cascade Mine, Jarvis township, Algoma district. Half mile directly north of old Victoria mine. Argentiferous galena and sphalerite occur in a shear zone which exceeds $\frac{1}{2}$ mile in length. A shaft was sunk many years ago some drifting was done, and a small mill was erected. Area is worth investigating.

Victoria mine, Jarvis township, Algoma district. Mineralization of argentiferous galena and sphalerite occurs along a shear zone. The property was first worked in 1875 and ore shipments

were made from 1878 to 1880. The main shaft is 410 feet deep with drifts driven at 50-foot intervals, and is 100 feet deep. 1057 feet of drifting is reported. Some work was done on the property in 1924-25. Property might be considered an emergency producer.

Jefferson, Genoa and Marion townships, Sudbury district. Galena and sphalerite occur in a bonded iron formation. Development is limited to some surface work and diamond drilling in 1925.

White River Lead Mine, township 169, Algoma district. Galena and chalcopryrite occur in a vein. Property was operated during 1927-28. An adit 175 feet long, and 354 feet of drifting and crosscutting comprise development carried out. The total lead reserve is estimated at around 650,000 pounds.

Lake Geneva Mine, lot 7, range VI, Hess township, Sudbury district. Galena and sphalerite are found in a vein striking northwest and dipping at surface at 45°W. The vein is in a complex series of quartzite - greywackes, banded tuff-like rocks, and an assortment of schists. A shaft was sunk in 1928 to a depth of 250 feet and was deepened to 400 feet in 1932. A 100-ton capacity mill was erected in 1931. The property was closed in 1937, but operations were resumed in 1941 and were continued until 1944 when the plant was dismantled. Total production was less than 2000 tons of lead and between 5000 to 6000 tons of zinc.

Errington Mine, Creighton and Balfour townships, Sudbury district. Galena, sphalerite, and chalcopryrite occur in an intimate mixture in an ore zone within a belt of Onwatin slate. Operations began in 1926, and in 1928, 32,092 tons of ore was milled. About 1,000,000 tons of ore was developed above 300 feet but the ore did not persist at depth and operations ceased and the mine was abandoned in 1932. The ore is complex and the occurrence of metallic sulphides varies widely. In 1942 it was reported that the recoverable lead and zinc above the 500-foot horizon is as follows:

lead : 17,800,000 pounds.
zinc : 130,000,000 pounds.

The average copper content of the ore is 1.33%.

Ruel Prospect, Felix, Marshay township, Sudbury district. The occurrence is a fine-grained intimate mixture of galena and sphalerite impregnating greenstone. Development was limited to a 60-foot shaft and to six surface trenches over a length of 250 feet.

Haycock Property, Klock township, Timiskaming district. Galena and zincblende occur in a calcite vein. Considerable development work has been carried out. The claim is 28 miles southwest of Haileybury.

McPherson Claims, (Between Errington and Sudbury Basin mines), Creighton and Fairbank townships, Sudbury district. Ore is similar in character and grade to that of the Errington mine. A few holes were drilled.

Vermilion Lake, 2 miles west of Errington mine, Sudbury district. Minerals are galena, sphalerite, and chalcopryite, and their occurrence is similar to the Errington. 1,100,000 tons is indicated to a little over 400 feet below the lake surface. Average grade; copper, 1.5%, lead 1.0%, and zinc 4.7%. Recoverable metals are estimated as follows:

lead : 3,935 tons.
zinc : 32,900 tons.

McKinnon Vein, Rainy River district, 10 miles south of Atikoken. Argentiferous galena and sphalerite occur in veins close to contact of greenstone schists and intrusive granite. There has been very little development.

Anderson, lot 12, concession 6, Dorion township, Thunder Bay district. Two galena-and-sphalerite-bearing parallel veins are found about 20 feet apart. The occurrences appear unimportant, but the structural conditions of the area are good and are worthy of further prospecting.

Dorion Mine, Dorion township, Thunder Bay district. Galena and sphalerite occur in a mineralized fault breccia zone 10 to 40 feet wide. It has been opened by a shaft, several pits, and an adit. Early work was not encouraging.

E. Lebel Claims, Dorion township, Thunder Bay district. In one of two pits a 3-inch vein of massive galena together with sphalerite occurs. This is said to be 13 inches wide at a depth of 20 feet.

Ogema, lot 5, range XI, Dorion township, Thunder Bay district. A 3-foot vein carrying galena cuts a high granite hill. The property was first opened in 1890 and was developed intermittently up to 1943. A shaft is sunk to a depth of 206 feet with levels at 90, 125, and 200 feet. Some drifting was done on the 125-foot level. Further drilling might be worth while.

Lots 9 and 10, Concession VII, Dorion township. Galena occurs in a fault breccia 2 to 7 feet wide and has been traced for $\frac{1}{4}$ mile. A 10-foot pit was sunk in which a 16-inch barite vein is disclosed showing abundant galena. The contact zone is worth further examination and prospecting.

Enterprise Mine, lot 6, McTavish township, Thunder Bay district. The deposit consists of a brecciated fault zone containing galena and chalcopryite. Some small shipments were made in 1875. Small pockets of rich galena occur in the zone, and near the shaft

a 12-inch quartz vein well mineralized with galena is found. Property is worth further investigation.

Silver Lake, 6 miles north of head of Thunder Bay. A fault zone 250 feet wide has been traced for three miles. Veins carry galena and sphalerite. There is a small shaft and a number of pits. Property merits further investigation.

Paresseux Rapids, lots 20 and 21, Paipoonge township, Thunder Bay district. A large galena-sphalerite-bearing vein 10 to 25 feet wide crosses Kaministikwia river. Zincblende in this deposit may be of sufficient amount to be economic.

Bourkes, north of half lot 6, concession IV, Maisonville township, Timiskaming district. Galena and sphalerite occur in narrow veins of the fissure filling type. Many years ago a 50-foot shaft was sunk and veins were stripped and trenched for 200 feet. Some development was done in 1947. Drilling is required to determine economic status of deposit.

Red Lake Area, Patricia portion Kenora district. Some of the numerous occurrences of galena have been drilled.

Berens River, Patricia portion Kenora district. From this deposit, which is primarily worked as a gold mine, a small tonnage of lead and zinc concentrates is produced as a by-product. The mine is developed by a three-compartment shaft to a depth of 1898 feet. There is a 225-ton capacity mill. This mine is the only active source of lead production in Ontario.

British Columbia

Lead occurrences, associated usually with zinc or silver or both, are widely distributed throughout British Columbia. Over 97% of the lead produced in Canada is mined in this province, the greater portion of which comes from the Sullivan mine at Kimberley. There are hundreds of occurrences, but only the more significant are briefly reviewed.

Black Panther mine, near the headwaters of the west fork of the Nitinat river, Alberni Mining Division, Vancouver Island. The deposit consists of veins carrying galena and sphalerite. Development comprises tunnels, underground drifts, and crosscuts. In 1941, 1,631 feet of drilling was carried out. There is a 25-ton capacity mill on the property and operations during 1947 were carried on by Nitinat Mines Limited.

Eureka, Treasure Mountain area, Similkameen Mining Division. Galena and sphalerite occur in persistent veins at surface and underground. There are six tunnels totalling about 4000 feet and a large number of open cuts and pits. Development has shown that all better grade ore lies within 100 feet of surface. However,

persistence of veins is an attractive feature of the locality.

Invermay, Skagit River area, New Westminster Mining Division, about 24 miles from Hope. Ore is galena and sphalerite. Deposit has been developed by 1,900 feet of tunnels and 2½ miles of tram lines. Some small operations were carried on during 1941-43.

In the Beaverdell area on Wallace Mountain, Greenwood Mining Division there are a number of silver-lead deposits, many of which have been worked. At present the Highland Bell mine is the principal producer. The deposits are largely mineralized shear zones containing argentiferous galena, native silver and sphalerite. The following are the principal properties: Highland Chief, Rambler Group (Highland Silver Mines Ltd.), Revenge, Sally Mine (Highland Bell, Limited), Bell and Beaver (Highland Bell, Limited), Tiger and Wellington (Silver Bounty Mines Limited).

Providence Mine, Greenwood, Greenwood Mining Division. The ore is lead-silver and sphalerite. Considerable development work has been done but recent drilling has not disclosed any further commercial ore.

Slocan, Ainsworth, and Nelson Districts.

In the Slocan, Ainsworth, and Nelson districts there are a large number of lead, silver, and zinc occurrences. During the period 1874 to 1926, inclusive, 204,465 tons of lead, 67,746 tons of zinc, and 47,332,539 ounces of silver were produced from mines in these districts. Between 1927 and 1940 activity in this area was very limited. There was renewed interest during the war and the higher prices of lead and zinc following the war resulted in the re-opening of many of the old mines and properties.

Slocan Mining Division

Bosun Mine, on Slocan lake. Narrow veins of argentiferous galena and sphalerite occur. Developed by seven levels, and was first operated in 1898. A further discovery of ore was made in 1947 on the 6th level and operations were resumed.

Canadian Group, near Sandon. Ore is galena and sphalerite. Developed by four tunnels. Was worked intermittently for many years. Average width of No. 1 vein is 43 inches with 37,000 tons blocked out, having an average analysis of 5.3% lead, 6.5% zinc, and 11.2 ounces per ton silver.

Enterprise Mine, on Enterprise Creek. Was developed and operated intermittently over a number of years. In 1942, reserve above the No. 7 level was estimated at 30,000 tons, carrying 12.5% lead, 27% zinc, and 17.5 oz. per ton silver.

Hewitt, near Silverton. Developed by 10-levels. Some renewed activity during 1946 and 1947.

Hope No. 2, on Lemon Creek. Ore is composed of lead, zinc, and iron sulphides. Some work was done between 1927 and 1929 and several hundred tons of ore was shipped in 1928.

Zincton (formerly known as Lucky Jim) Zincton. Ore is primarily zinc, but later development has opened veins of galena. Property has been worked intermittently since about 1892. Extensive development was resumed in 1940 and since 1941 it has been an active producer. In 1945, 102,457 tons of ore was mined. First lead shipments were made in 1947.

Mammoth Mine, on Avison Creek, 4½ miles from Silverton. Was first opened in the 1890's. Developed by numerous drifts, cross-cuts, and raises. In 1944 it produced 22,293 tons of ore. Several of the levels have been mined out.

Mary Ryan or Soho, Carpenter Creek. Vein occurs along sheared fracture in limestone near contact of slate-schist. Developed by 5 levels. The property appears to have been inactive since 1931.

Molly Hughes, New Denver. Ore is high grade silver with some lead. Was first worked in 1898 and intermittent operations were carried on to 1940. The ore is high in silica and is thus highly suitable for smelting.

Noble Five Mine, Sandon. Strong fissure veins up to 10 feet wide carrying galena and sphalerite cut argillites, quartzites, and beds of limestone. Property was first developed around 1892 and has since been worked intermittently. Was operated during 1943 and 1944. Deposit is considered as a source of high-grade lead and zinc of moderate size.

Ottawa, on Springer Creek. The ore is silver-lead. Was first worked at end of last century. There was some production in 1946.

Ruth-Hope, on Carpenter Creek, near Sandon. Deposit embraces six sheared fissure veins. The ore is mainly argentiferous galena. The mine was in almost continuous production between 1895 and 1942. It has extensive underground development and a renewed program of development was started in 1946.

Silversmith and Slocan Star, on Sandon Creek. The Slocan Star was discovered around 1891 and became the most important producer in Sandon district. Silversmith vein was discovered in 1918 and in 1923 was the second largest producer of lead and silver in British Columbia. Both veins are practically mined out.

Slocan - Rambler, near Three Forks. Galena, sphalerite, and silver occur in quartz veins. The mine has been developed by 14 levels, and for a long period was one of the largest producers in the Slocan area. Production between 1895 and 1927 amounted to 11,000 tons of lead and over 3 million ounces of silver. Operations ceased about 1937, but drilling in 1947 disclosed new veins averaging 8 to 12 inches wide with high values in silver, lead, and zinc.

Standard, on Emily Creek near Silverton. Between 1905 and 1926 the mine was a fairly large producer of silver, lead, and zinc. Operations were resumed in 1942. The mine is operated by Western Exploration Company Limited in conjunction with the Enterprise and Mammoth mines.

Sunshine Group, on silver Ridge, $3\frac{1}{2}$ miles from Sandon. Galena and sphalerite occur in veins. Developed by tunnel for 1600 feet. Exploratory work was carried out in 1947.

Van Roi Mine, on south side of Silverton creek. Lead-zinc-silver ore occurs in shoots in two developed veins. A third vein has been developed by drilling. There are 9 adit tunnels and extensive underground workings. To the end of 1926 some 262,000 tons of ore was mined. Reserve of probable ore is estimated at 220,000 tons.

Wakefield Group, adjoins Mammoth mine about 4 miles from Silverton. The vein is flat dipping, and was operated many years ago. Exploratory work was carried out in 1946.

Noonday Mine (Leadsmith), near Sandon. The vein carrying galena and sphalerite is persistent and occupies a well-defined fissure between massive walls of slate and has a width of from 3 to 4 feet. The mine has been developed at three levels and has had an intermittent production over a number of years. The last shipment reported was made in 1938. Development was resumed in 1946.

Alamo Group, at head of Howson Creek. The ore is galena and sphalerite with silver and the lode occupies a strongly fissured and brecciated zone. The property was discovered in 1896 and has been mined over a length of 1,500 feet and to a vertical depth of 750 feet. The zinc content of the ore is reported to increase with depth.

Queen Bess, on east slope of Howson Creek, near Sandon. Ore occurs in fissure zones and is largely argentiferous galena. The mine was for many years one of the principal producers in the Slocan district. During past 15 years operations have been intermittent. Reopening of this property is planned.

Silverite Mines, on west side of Carpenter Creek, $3\frac{1}{2}$ miles from Sandon. Property comprises about five claims. The veins carrying galena and silver are badly faulted. Examination of the extensive underground workings was resumed in 1946.

Silver Queen, on south side of divide separating Canyon and Snow Creeks. Galena and sphalerite occur in quartz veins. There is a 40-foot shaft and numerous tunnels and open cuts. No development has been reported for many years. Prospecting samples indicated fairly high silver.

Oakland, on north side of Silverton creek. Galena and sphalerite occur in a well defined fault zone. There are five short adits on the property.

Neepawa, Mabou, and Ohio Groups, on Enterprise Creek, 8 miles from Slocan lake. Deposit is in a shear zone in which galena and sphalerite occur in quartz veins and stringers. These properties are among the earliest discoveries in the Slocan district and at one time were actively worked. In 1946 activity was resumed and recent exploration has disclosed some interesting ore shoots on the Ohio property.

Keystone Charleston, Retallack. Veins occur carrying galena and sphalerite. Over 2000 feet of drifting, crosscutting, and raising has been carried out on the Keystone. Renewed activity in these old properties was reported in 1947.

Hartney, New Denver. Galena and sphalerite occur in a vein cutting argillites. No production has been reported since 1917. In 1946 the mine was dewatered preparatory to sampling the shaft.

Goodenough Group, near Sandon east of Noble Five Group. The galena and sphalerite are found in two parallel veins. Mine has been developed at four levels. Property has been idle for many years.

Black Colt, south side of Carpenter creek and $2\frac{1}{2}$ miles from Sandon. Galena and sphalerite occur in a vein. Development comprises two tunnels and several hundred feet of drifting and crosscutting. Reported to contain shoots of high-grade ore.

Ainsworth Mining Division

Kootenay Florence, Ainsworth. The ore is galena and sphalerite with some silver. Mine is developed to 9 levels and has been a steady producer since 1945.

Spokane Group, 3 miles from Ainsworth. Some development was carried out in 1944 and a small amount of high-grade lead ore was shipped.

Wellington Mine, 2 miles from Retallack. The ore is lead-zinc-silver. The deposit was discovered in 1892 and some small

shafts were sunk and tunnels were driven. There was little development until after 1920, when some 4000 feet of tunnelling was done. In 1946 exploratory work was resumed.

Whitewater, on Kaslo creek. A galena-sphalerite vein occupies a shear zone accompanying a quartz-porphry dyke. The mine has been extensively developed and has been operated intermittently over a number of years. In 1947 the mill treated 10,000 tons of ore.

Ainsmore Mine, Ainsworth. The ore is primarily galena. Mine is developed by 2 tunnels and several hundred feet of drifting.

Banker, Ainsworth Group, Ainsworth. The ore occurs in a fissure vein 6 to 8 feet wide. Mine is developed by a 200-foot shaft. Considerable development was carried out in 1928.

Daybreak, 12 miles west of Kaslo. Two veins occur along a sheared fault fracture and contain galena and sphalerite. Veins have been developed by a tunnel. There is no record of operations since 1935.

Utica Mines, on Paddy's creek at head of Ten Mile Creek. There are two principal ore zones, roughly parallel, varying in width from a few inches to 20 feet. Deposit is opened by five levels. Between 1910-21, 5,440 tons of ore was shipped. The estimated ore reserve is 84,000 tons with a grade of 7.4% lead, 8.7% zinc, and 41 oz/ton silver.

Bannockburn Group, on south side of Hall Creek. Galena and sphalerite occur in a vein in a gray or white marble that has been developed by open cuts and a small shaft and tunnel. Very little work has been done since early in the present century.

Kaslo Mines, on McGuire creek. Veins containing galena and sphalerite occur in quartzites, argillites, and grey schists. The deposit has received limited prospecting.

Voygeur, on Ten Mile Creek. Lead and zinc sulphides occur in shear zones and quartz stringers. Some development was carried out in recent years.

Scranton, on Pontiac creek. Galena and sphalerite occur in fissure veins. Between 1400 to 1500 feet of drifting and cross-cutting has been carried out. There was a renewal of activity in 1946.

Lucky Boy Group, on south slope of Goat Mountain, 14 miles west of Kaslo. Veins bearing galena and sphalerite occur in a strong zone of shearing. The deposit has been developed by an adit and two small shafts. Some work was done on the property in 1946.

Humboldt, one mile west of Rose Pass between Kootenay Lake and St. May river. Argentiferous galena and zincblende occur in a flat-lying quartz vein 4 to 6 feet wide. The several adits and shafts were reopened in 1946 to examine the property.

Buckeye, $2\frac{1}{2}$ miles from Ainsworth. Galena and sphalerite are found in three principal veins varying in width from 5 to 10 feet. Two inclined shafts about 40 feet deep have been sunk and a tunnel driven for 200 feet. Mine is easily accessible by good road and trail from Ainsworth. Considerable development would be required to prove extent of the orebody.

Bluebell Mine, at Riondel on eastern side of Kootenay Lake. Galena and sphalerite occur as replacements in limestones. Deposit has been developed by a 35° inclined shaft extending 850 feet and by horizontal workings on 6 levels. Between 1889-1927 production amounted to 500,000 tons averaging 2.7 oz/ ton silver, 6.7% lead, 7.8% zinc. Probable ore still available is estimated at 175,000 tons with 250,000 tons of tailings in the lake averaging 2.5% lead and 9.0% zinc considered as recoverable.

Nelson Mining Division

Arlington, south side of Rest Creek a few miles from Erie. Galena and sphalerite occur in a vein cutting rolling flat-lying argillites. The mine is developed to eight levels. There was a small production reported in 1946.

Reeves-McDonald, at confluence of Salmo and Pend d'Oreille rivers. The ore is galena and sphalerite. It is a replacement deposit. Development began in 1927 and continued for three years. Between 1930 and 1936 there was no active development. During 1937 and 1938 considerable underground work was carried out. In 1947 plans were made to bring the property into production on a 1000 tons per day basis. Mining began early in 1948 and milling was expected to start early in the fall. Reserve is estimated to be around 2,000,000 tons.

Lomond, formerly the International, is situated between the Reeves-McDonald property and the International Border. It is a lead-zinc replacement deposit. Between 1925 and 1927, some 2,500 feet of underground development was carried out. An active drilling programme was started in 1947.

Revelstoke, Lardeau, and Golden Mining Divisions

There are a large number of lead occurrences, many of which have been developed and from which there has been a small intermittent production.

Dunegan, at Fish River, Revelstoke Mining Division. Developed by 300 foot tunnel. Few tons was produced in 1925.

Excelda Mine, at head of Nicholson creek, 21 miles from Invermere. The ore is argentiferous galena. Operations were begun in 1935. Underground work was resumed in 1946 when tunnel was advanced 400 feet:

Giant, on west slope of Spillimacheen Mountain. Galena, sphalerite, and silver occur in lenses in a wide vein of barite. The old workings consisted of an open-cut and three tunnels. Reserve including ore on dump is estimated at around 80,000 tons. Over 4000 feet of drilling has been done. Activity was resumed in 1947.

Kicking Horse and Monarch Mines, Field, Golden Mining Division. The ore is argentiferous galena and sphalerite. These mines have been extensively developed and have been in operation at various times for a great number of years. The mill has a capacity of 300 tons per day and is currently producing a lead and a zinc concentrate.

Lanark, near Laurie, Revelstoke Mining Division. Galena and sphalerite occur in a bedded fissure vein. It was developed by four tunnels around 1896. The mine was operated about the turn of the century and again around 1916. After considerable drilling in 1925 it was abandoned.

Silver King and Silver Queen, near Camborne, Lardeau Mining Division. Silver-lead-zinc sulphides carrying small gold values occur in fissure veins. About 50 years ago a small shaft was sunk on the Silver Queen property, and some further development was done in 1904 and 1908. Some trial shipments were made in 1898 and 1899. No activity has been reported for many years.

Snowflake Group, on Clabon creek, Revelstoke Mining Division. Galena, sphalerite and silver occur in a dark slate formation. The workings consist of open-cuts and tunnels. Milling ore was reported to carry 6.6 oz. per ton silver, 6% lead, and 4% zinc. It has been closed since 1930.

True Fissure Mine, Ferguson, on Great Northern Mountain, Lardeau Mining Division. The ore is galena and sphalerite. Mine is developed by a number of considerable drifts and raises, and has been worked at intermittent periods since 1906 or 1907. Drilling was carried out in 1946. Ore reserve is estimated at 16,000 tons of proved and possible ore averaging 0.76 oz. per ton gold, 8.1 oz. per ton silver, 5.62% lead, and 13.88% zinc.

Waverley and Tangier Groups, Albert Canyon, Revelstoke Mining Division. The ore is argentiferous galena occurring in veins cutting limestone. The former is the most important group. The old underground workings are quite extensive and date back to 1897-1898 when the property was operated. There has been practically no development done since 1925.

Woolsey Group, on Clabon creek, Revelstoke Mining Division. The ore is galena and zincblende occurring in veins in carbonaceous slates. Development consists of several tunnels, one being 200 feet. There is no record of any work since 1928. A sample across $9\frac{1}{2}$ feet ran 6.6 oz. per ton silver, 6.0% lead, and 6% zinc. It has been considered a promising looking prospect.

There are a large number of silver-lead and lead-zinc occurrences in the Revelstoke Mining Division in addition to those already mentioned. Many of these were first opened at the end of the last century and little has been done since. The Annie, Bendigo, Big Horn, Donald, Elkhorn, Gladstone, Heronback Solomon, Isabella, Josephine, Jumbo, Key of Wealth, Laurier and Silver Bell Group, L.D., North Star, Sanquhar, Scotia, Elizabeth, and Edinburgh, Salmon, Silver Gland, Summit Lode, and Wonderful Group are representative claims which have been inactive for many years.

The Crystal Group, near Laurie station on the C.P.R. in Revelstoke Mining Division. Galena occurs in slate and schist. In 1920 the deposit was opened by an open cut and a tunnel. It is at an elevation of around 6,600 feet.

Round Hill, 6 miles northwest of Illicillewaet, Revelstoke Mining Division. The principal mineral is galena. Two shafts were sunk in 1896 and a tunnel was extended 150 feet in 1899. Early sampling indicated high grade silver-lead ore.

Silver Basin, at head waters of Bugaboo creek, in Golden Mining Division. The ore is galena and sphalerite. Development of the property was carried on between 1936 and 1942. It is opened by 2 tunnels.

Mineral King, north side of Toby creek, in Golden Mining Division. Galena and zincblende occur in a peculiar ore zone elliptical in form extending for 200 feet with maximum width of 60 feet. Development has been carried out by numerous open cuts and 2 adit tunnels, one 200 feet long. Exploratory work is required to determine extent of the orebody.

Isaac Mine, 12 miles from Brisco, in Golden Mining Division. Galena and sphalerite occur in a vein striking west of north following the strike of the formation. Vein width is from 18 inches to 2 feet. There are two inclined shafts, one to a depth of 56 feet. Between 1917-24, 327 tons of sorted ore was shipped averaging 30% to 40% lead. The mine has been idle for many years.

Teddy Glacier Mine, on middle fork of Sable Creek, in Lardeau Mining Division. Galena and sphalerite occur in fracture zones in quartz veins. Mine was operated in 1927. The ore is high-grade, but volume is small, and erratic mineralization renders exploration expensive.

Silver Cup, on north slope of Silver Cup Mountain, 5 miles from Ferguson in Lardeau Mining Division. Galena, sphalerite,

and argentiferous tetrahedrite occur in two principal veins 50 feet apart. Property is developed by 12 levels and about 2 miles of underground workings. Up to 1915, 10,000 tons of ore was shipped, valued at \$2,000,000. Renewed interest was taken in the mine and adjoining areas in 1946.

Lead Star, on Stepney branch of Sable creek, 5 miles from Camborne, in Lardeau Mining Division. Galena, sphalerite, and chalcopyrite occur in shear zones. There are three tunnels, totalling 580 feet and some open-cuts. Work was carried on between 1925-30. Some very good grade of ore was opened up, but no reserve has been estimated.

American, on Haskins Creek, Lardeau Mining Division. The ore is galena. Developed by tunnels and drifting between 1901 and 1903. A vein, 1 to 3 feet wide, carrying galena and carbonate was proved. Property has been inactive for many years.

Zenith Mines, on Tokum creek, Kootenay National Park, Golden Mining Division. Galena occurs along bedding planes in limestones and dolomites. Some tunnelling has been done. Indications are that a sizeable body of lead ore exists. The location of the deposit in a National Park has discouraged development.

Other Occurrences in British Columbia

St. Eugene Mine, Moyie, Fort Steele Mining Division. At one period this mine was the largest and most important lead producer in British Columbia. Operations were discontinued around 1929. In recent years a number of drill holes were put down to explore the structural and ore possibilities in the vicinity of the old workings.

Sullivan Mine, Kimberley, Fort Steele Mining Division. Largest lead-zinc mine in the world. It is the source of more than 90% of the lead produced in Canada.

Dardenelles Group, on Wildhorse creek, 10 miles from Fort Steele. Galena and pyrite occur in a quartz vein having a north-east strike and dipping into the hill at an angle of 20°. Many years ago a prospect shaft was sunk 55 feet. There has been no development in recent years.

Palmyra Group, on Spirit creek, 9 miles from Fort Steele. Galena occurs in a fissure vein 10 to 30 feet wide. The deposit has been developed by five tunnels and a shaft. The galena is reported to be fairly abundant in the vein.

H.P.H. Group, near Mahwitti Lake, north end of Vancouver Island, about 16 miles from Port Hardy. Galena and sphalerite occur

in replacement deposits in limestone. Deposit discovered in 1930 and developed by several shallow shafts and trenches. The showings comprise a comparatively large body of silver-lead-zinc mineralization occurring in irregular patches or lenticular zones.

Enterprise (Star), on southeast shore of Stump Lake, Nicola Mining Division. Galena, sphalerite, and tetrahedrite occur in quartz veins varying from 10 inches to 5 or 6 feet in width. Development consists of a shaft, 965 feet deep with 6 levels and some 10,000 feet of underground development. There is a 150-ton capacity mill on the property. Operations were carried out intermittently until 1942. The mine is being kept dewatered.

Cottonbelt, on Grace Mountain, 20 miles north of Shuswap Lake, Kamloops Mining Division. Galena and sphalerite occur in three parallel veins in a flat-dipping schist formation. Veins are reported to be from 4 to 12 feet in width. Average assays for Cottonbelt vein were reported in 1922 to be 20 oz. per ton silver, 9.0% lead, and 12.0% zinc. Development consists of surface trenches, some shallow pits, and a number of adits. Underground development is reported to comprise 1600 feet of drifting, crosscutting, and raising. Further development has been retarded by the high altitude and difficulty of access.

J. & L. Group, 24 miles north of Revelstoke on Carnes creek, Revelstoke Mining Division. The ore is a complex combination of lead, zinc, and iron sulphides associated with arsenic. The deposit is opened by a tunnel. Development has been retarded by the complex and refractory nature of the ore.

Twin Mountain, Adams Lake, Kamloops Mining Division. Galena and sphalerite occur in a dolomite zone cut by quartz lenses. Some trenching and stripping has been done.

Emerald, on Sweeney Mountain at eastern end of Tahtsa Lake, Omenica Mining Division. Galena and sphalerite occur in mineralized fracture zones. Development over a long period has been limited to some underground work and drilling. Diamond drill intersections have been taken as indicating 150,000 tons of ore averaging 15% combined lead and zinc and 5 oz. per ton silver. Property is a long distance from railway

Duthie Mine, 9 miles from Smithers, Omenica Mining Division. Argentiferous galena and sphalerite occur in a 16-foot wide ore zone. Reconditioning of the mine was under way in 1946.

Silver Cup, nine miles from Hazelton, Omenica Mining Division. The ore is silver-lead-zinc. Property is developed by 4 tunnels. A 75-ton capacity mill was erected in 1929. Property has been idle since 1930.

Silver Standard, 6 miles from Hazelton, on Glen Mountain, Omenica Mining Division. Galena and sphalerite occur in well

defined quartz veins. There is one main shaft and underground development has been carried out to the 500-foot level. Between 1910 and 1922 the mine was operated almost continuously. Activity was resumed in 1947 and 50-ton mill was proposed for erection in 1948. Ore reserve is estimated at around 41,000 tons of a very good grade.

Cronin Mine, 32 miles from Smithers, Omenica Mining Division. Galena and sphalerite are found in well-defined fissure veins and in a contact orebody. The mine has been opened by 5,000 feet of underground development. The indicated probable ore is 42,200 tons with an average grade of 16 oz. per ton silver, 8% lead, and 8% zinc.

Lorraine, northeast slope of Babine mountain, Omenica Mining Division. Galena, sphalerite, and chalcopryrite occur in veins cutting argillites. Development comprises an adit, a 40-foot shaft, and several open-pits. The adit is caved and the shaft is filled with water. Channel sampling gave very fair values in lead and zinc.

Portland Canal Mining Division

The lead occurrences in this area are usually of more importance for their silver content, and many years ago there was considerable silver mining activity. In recent years several of these old properties have again been opened for development.

Idaho Group, on south slope of Treble mountain, Bear River area. Argentiferous galena and native silver. Deposit is opened by a 500-foot tunnel. Up to end of 1924, 147,472 tons of ore was produced. There is an indicated and inferred reserve of 250,000 tons of ore with an average grade of 12 oz. per ton silver, 3% lead, and 3% zinc.

La Rose, on east slope of Klaydec mountain. Native silver and galena occur in a vein occupying a narrow shear zone. Developed by adit and underground workings. Actively worked between 1925-27, and since then property has been idle.

Portland Canal Mine, 3 miles from Stewart. Argentiferous galena is found in a vein forming part of a long fissured and silicified zone traceable for over 2 miles. There are three tunnels and several thousand feet of underground workings on the property. There has been little activity since 1925.

Toric Mine, on Kitsault river 17 miles, from Alice Arm. Native silver and galena occur as replacement deposits in a brecciated zone. After a long period of idleness operations were resumed in 1946.

Boundary Group, on Myrtle creek. Galena occurs with pyrite in quartz veins. A 40-foot tunnel and a series of open-cuts were made in 1911. No work has been done for many years. The vein is of sufficient size to warrant further investigation.

Bunker Hill Group, southeast side of Klaydec mountain, 8 miles from Alice Arm. Galena is found in a quartz vein 2 feet wide in a narrow shear zone. Little development has been done.

Canyon Claim, east of Kitsault river. Galena and chalcopryrite occur in a quartz vein in a shear zone 8 feet wide.

Chance Group, north of Trout creek, 19 miles from Alice Arm. Galena and silver minerals are found in two parallel brecciated zones about 100 feet apart. One open-cut exposes an 18-foot width of ore. Some drilling has been done.

Muskateer, on east bank of Kitsault river $3/4$ mile north of Toric mine. Galena occurs in a vein, 15 feet wide and has been traced for 250 feet. Development consists of some open-cuts and adits. The deposit is locally well mineralized with galena.

North Star, adjoins the old Dolly Varden property on the north. The vein is well mineralized locally with galena, pyrite, sphalerite, and silver minerals.

Tiger, a short distance north of the Toric mine. The vein carries galena, sphalerite, and silver minerals. In 1919 an adit was driven, and there was some further development in 1928. Operations ceased in 1929.

Wolf Group, south of Trout creek. Galena and silver are found in four large quartz veins varying in width from 4 to 50 feet. No development has been done, although mineral deposits of considerable size are indicated by exploratory work carried out.

Indian, on west side of Cascade creek, 16 miles from Stewart. The main vein, carrying galena, sphalerite, and silver extends in a general north-south direction along an intensely fractured zone. Over 5,000 feet of underground development was done, mostly between 1923 and 1925. Renewed interest was taken in the property in 1947. The inferred estimate of reserves is 32,000 tons having an average grade of 5.7 oz/ton silver, 0.13 oz/ton gold, 6.1% lead, and 7.1% zinc.

Spider Group, on Cascade creek, 22 miles from Stewart. The ore is complex carrying zinc, lead, copper, iron, and silver, and occurs in quartz veins. The deposit is opened by a 700-foot tunnel and 900 feet of underground development. Occurrence was originally located in 1918, and the most active work was done in 1920. It has been idle for many years.

Silver Tip Group, on south slope of Mount Dillsworth. Ore is silver-lead and zinc. Development comprises two long and several short adits with a total of 1400 feet of underground workings. It was actively developed between 1917 and 1920. The property was idle for many years until 1946.

Yellowstone Group, head of Cascade creek. Ore is silver-lead-zinc. Open cuts have disclosed vein 30 feet in width. Development is largely confined to surface trenching.

Woodbine and Kitchener, just above forks of Cascade creek on west side. The ore is silver-lead. About 1200 feet of diamond drilling was done in 1920. An open-cut discloses some fair looking ore. Property has been idle for many years.

Dunwell Group, 2 miles up west side of Glacier Creek. Galena and zincblende occur in a vein about 6 feet wide in a well defined fissure. The deposit was opened by two tunnels. In 1926-1927 a mill was erected and was operated until late in 1927. Operations were resumed in 1933 and were continued till 1937. About 27,000 tons of ore was treated and in 1933, 500 tons of high-grade ore was shipped.

Mountain Boy, on American Creek. Main showings consist of two wide and erratically defined replacement zones. Veins carry galena, bornite, argentite, and chalcocite. Tunnelling, cross-cutting, and drifting was carried out in 1929. In 1944 a prospect adit was driven 285 feet at a location 300 feet from the old camp.

Lead Mountain (formerly Lucky Date Group), north side of north fork of Bitter creek. Galena, sphalerite, and tetrahedrite occur in shear zones and quartz veins. Several open-cuts and adits have been driven. Channel sampling of numerous veins indicates high lead and zinc values across widths 7 to 9 inches.

Ruffner Group, 14 miles from Atlin, Atlin Mining Division. Deposit consists of sheared dykes mineralized with galena and other metallic sulphides and carrying gold and silver. Property is developed by a 75-foot shaft, three adits, and a number of open-cuts. Some ore was shipped in 1922 and 1927. Last reported activity was in 1932.

Yukon Territory

Most of the numerous lead occurrences in Yukon, are silver-bearing. The greatest activity has been in the Mayo district around Keno Hill. During the 1920's there were several producing mines in this area. In recent years many of these properties have been under development and production from at least one mine has been resumed.

Near the Windy Arm branch of Tagish lake there are several claims. The Venus was developed prior to 1916 by a 52-foot shaft and two adits. A 100-ton capacity mill was built and operated. Operations ceased in 1920. The Conrod claims have had little development. In the Wheaton district, the Wheaton Mountain, Tally-Ho Group, Becker and Cochrane, Mineral Hill and Mascot have received little attention since 1930. Union Mines, on the eastern face of Idaho hill, was staked in 1908. There are 12 veins, carrying galena, silver, and sphalerite. Nothing has been reported since 1910. Nevada Mines, is on the eastern face of Idaho hill. Many years ago a short crosscut was driven and some surface stripping was done.

In the Pelly River area there have been some recent discoveries of galena. On the Canusa Group, $\frac{1}{4}$ mile north of mile 121, Canal Road, a vein occurs along a sheared zone. The exposed quartz vein is 3 feet wide and carried about 8% galena. Another occurrence is reported on a mountain east of mile 99, Canal Road.

In the Mayo district there are a number of silver-lead occurrences in fissure veins and shear zones. The Calumet mine was developed by an adit 3,500 feet in length. The Elsa mine is developed to 400 feet and in 1935 a 150-ton capacity mill was built.

The Hector mine has a 150-foot shaft and shipped some ore in 1935-36. The Keno Hill comprising several claims produced 8000 tons of high grade ore in 1923. The Cnek property is opened by a 135-foot shaft, but there has been little activity since 1922. Silver values averaged 80 oz. per ton. The Silver King mine, on Galena creek is developed to 200 feet and was operated continuously between 1914-1917. Further work was done in 1935 and development was resumed in 1947. Wernecke Mines, on the western slope of Keno Hill, was the largest producer in this district. During the period 1921-1940, 41,767,312 ounces silver and 83,550,715 pounds of lead were produced. Lookout mine on Duncan creek, was opened around 1918. Argentiferous galena occurs in a fissure vein. It has been inactive for many years.

The Lookout Mountain, Shamrock Group, Silver Basin, and Gambler properties have not been actively developed.

A few occurrences of galena have been reported in the Chandindu area, north of Dawson.

In the Beaver River area some deposits of galena have been found. The Silver Hill property near the head of Ervin creek is said to have 13 orebodies. Grey Copper Hill is 4 miles north on the mouth of Carpenter river. Occurrences also are found on Davidson Mountains, Stand-to Hill, Rambler Hill, and Mount Cameron.

More complete information is available in the Bureau of Mines' records and in the Dominion and Provincial Government reports, and will be furnished on request to the Bureau of Mines.