PRELIMINARY REPORT

ON

MINE CENTRE AREA, ONTARIO

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Geological Survey

Bureau of Economic Geology

Department of Mines

Ottawa - Canada

January, 1935.

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During the 1934 field season, a study was made of the mineral deposits of Mine Centre area, Rainy River district, Ontario, where since 1893 gold-bearing quartz veins have been intermittently developed. The area studied is a rectangle, 12 miles east and west by 10 miles north and south, that includes part of Little Turtle lake on the north and Grassy lake on the south. Bad Vermilion lake occupies a central position within the area. The west boundary passes near Farrington station and the east boundary near Turtle station, both on the C.N.R. Mine Centre, the principal settlement, is 40 miles east of Fort Frances.

A considerable part of the area is characterized by low rocky hills and ridges. Between the hills are drift-covered lowlands that become more extensive towards the east and west boundaries of the area. The greater part of the area is forested with, for the most part, second growth.

Couchiching, banded mica schists with, in places, green schists and groups of beds of greywacke and slate occupy the southeastern corner of the area. The general strike of the strata is east- northeast and the beds are vertical or steeply inclined. The Couchiching rocks are bounded on the north by a belt of Seine sediments that passes through Shoal lake. The belt west of Shoal lake is about $\frac{1}{2}$ mile wide but expands east of the lake to a width of 4 miles. The Seine sediments are conglomerates, quartzites, greywackes and fragmental greenstones and are thought to lie in a syncline, with minor folds, whose axis strikes east-northeast.

Keewatin greenstones, iron formation, etc., extend northward to Little Turtle lake, close to the north edge of the

area. The Keewatin volcanic rocks surround Bad Vermilion lake and occupy a belt 7 miles broad in the western part of the area but decreasing eastward to a width of 4 miles. The northern edge of the Keewatin belt follows a nearly east-west course and marks the southern edge of a granite batholith. The granite invades the Keewatin rocks and these in the vicinity of the granite have been highly altered.

The Seine, Keewatin and Couchiching strata are invaded by small and large igneous bodies of various rock types. Two of these consist of quartz porphyry with granitic phases and are of special interest because most of the known gold-bearing quartz veins lie within or close to them. One of these bodies commences $\frac{1}{2}$ mile south of Mine Centre and continues with an average width of $\frac{1}{2}$ mile to the western edge of Mine Centre area. It follows a course that changes from west to southwest and that parallels and lies a short distance north of the north shore of Bad Vermilion lake. This body lies within the area of Keewatin rocks. The second body lies south of Bad Vermilion lake between it and Shoal lake. It commences $1\frac{1}{2}$ miles south of Mine Centre and with an average width of 1 mile, extends southwesterly for 5 miles beyond which it extends westward to and beyond the west boundary of Mine Centre area but in this western continuation it is composed of dioritic rocks related to the quartz porphyry. This second quartz porphyry body is in contact with Keewatin greenstones along its northwestern border and with Seine conglomerates along its southeastern border and is younger than both groups.

A third, comparatively large body of quartz porphyry lies in the Keewatin area between the above mentioned bodies and occupies an area of about 4 square miles extending southwest from

Bad Vermilion lake. Other but much smaller bodies of quartz porphyry lie east of Bad Vermilion and Shoal lakes. All the quartz porphyry bodies are presumably of the same age.

In Mine Centre area, more than 60 gold-bearing veins are known in the quartz porphyry mass southeast of Bad Vermilion lake, and at least 20 gold-bearing veins have been found in the quartz porphyry lying close to the north shore of the same lake. Some of these veins extend into the bordering Keewatin rocks and three are known to occur in the Keewatin rocks along the south shore of Little Turtle lake, not far south of the edge of the granite batholith. Others occur in Keewatin or Seine strata but most if not all these are in the immediate vicinity of bodies of quartz porphyry.

The majority of the veins occupy fissures that either strike at approximately right angles or parallel to the long axis of the quartz porphyry body with which they are associated. The veins in massive rocks have sharply defined walls and are fairly regular or branching. Those that lie in schists consist, in most cases, of almost continuous successions of elongated lenses that follow the foliation of the schists and, therefore, are straight for considerable distances but at intervals follow the curving courses of drag folds. Most of the veins are nearly vertical or are steeply inclined but where veins follow a folded structure they commonly widen and may dip at various angles. The majority of the veins are 2 feet or less wide but some are as much as 7 feet wide. Many of the veins, and especially the wider veins, are banded with schistose material. The main vein-filling is quartz which in the few veins on Little Turtle lake, near the granite batholith, is fine-grained. Elsewhere the quartz is either coarse-grained or coarse-grained distributed through fine-grained material. In some veins the quartz is accompanied by a ferruginous carbonate,

pyrite, pyrrhotite, chalcopyrite, galena and zinc blende. In the vein on the Isabella property, where gold is plentiful, the quartz is accompanied by siderite and cobalt-bearing mispickel. Molybdenite occurs in some veins. The gold values in any one vein are irregularly distributed but in some cases at least appear to be localized in shoots characterized by a certain association of minerals.

Saunardy. The Saunardy mine is on the south shore of Little Turtle lake, 2 miles west-northwest from Mine Centre. This property in 1895 was known as the Swedeboy mine, later it was named the Headlight, and in 1932 after being acquired by Messrs. A. E. Saunders and L. Arnold it was given its present name. It was worked, under the terms of an option in August and September, 1933. After the option was dropped, some ore was mined. In February, 1934, 13½ tons of selected material was shipped and yielded about 13½ ounces of gold. The property is underlain by Keewatin greenstones cut by narrow dykes of porphyry and of felsite. Quartz veins fill shrinkage cracks in the dykes and run at right angles to the dyke walls. These veins though mineralized in some places are too small to be of value. A second group of quartz veins lie either in the dykes or in the adjoining country rock. They are lenticular and parallel the dykes and the schistosity of the greenstone country rock. The principal mine working is on one such vein in chlorite schist. The vein strikes east, is vertical, and has an average width of 2 feet over a length of 100 feet. The vein material is fine-grained quartz mineralized in places with pyrite, pyrrhotite and chalcopyrite. Channel samples from the vein where exposed at the surface, and in the 80-foot shaft, and in a drift 80 feet long, are reported to have carried gold in amounts ranging from 0.01 to 2 ozs. to the ton.

Stellar. Stellar Gold Mines Company, Limited, (incorporated in 1934) owns a group of eight claims on the north shore of Bad Vermilion lake, 4 miles southwest of Mine Centre. The principal workings are on claim H.P. 137 where a quartz vein 2 feet wide has been traced for 200 feet. The country rock is quartz porphyry. In September, 1934, at the site of an old prospect shaft, 24 feet deep, the sinking of a vertical, three-compartment shaft was commenced. At the end of September it had reached a depth of about 50 feet. In the shaft, the vein follows an irregular course and has an average width of 2 feet. Vein matter consists of quartz in places mineralized with galena, zinc blende and chalcopyrite. Tiny grains of gold are visible at a few places. Several other veins occur on the property in some of which gold values have been found.

Claim F.F. 1166. This property, owned by A. E. Stone, lies 3 miles west-southwest from Mine Centre. The country rock is Keewatin greenstone intruded by quartz porphyry. Extensive strippings reveal several mineralized quartz veins and it is reported that some of these veins carry gold which in places is stated to be visible.

South Vermillion Gold Mines. South Vermillion Gold Mines Company, Limited, holds a group of claims on the north shore of Bad Vermilion lake, 2 miles west-southwest from Mine Centre. Prospecting for gold on these claims has been carried on for many years and several gold-bearing quartz veins have been found. In 1934 the present owners commenced mining operations on one of the larger veins close to the shore of the lake, on claim F.F. 1538. In July, 1934, a shaft being sunk on this vein had reached a depth of 20 feet. The vein is exposed at the surface for a length of 200 feet and traverses quartz

porphyry. The vein as exposed in the shaft is 3 feet wide is vertical, and consists of quartz banded with laminae of dark green chlorite and holding, in places, small amounts of pyrite and tiny grains of gold.

Golden Crescent. The Golden Crescent property consists of claims A.D. 2, 3 and 4, and K.237. It lies about 2½ miles south-southwest from Mine Centre. The property was staked in 1894 and in 1895 was known as the Campbell property. Prior to 1900, four shafts and two adits were made and for a brief period ore was treated in a 2-stamp mill. The property then lay idle for many years. In August, 1934, Golden Crescent Syndicate took an option on the property and commenced clearing the workings. The property extends across the northern contact of the quartz prophyry body lying southeast of Bad Vermilion lake. The northwest part of the ground is low, mainly drift covered and the outcrops there are of Keewatin greenstones and small masses of intrusive anorthosite. The southwest part is a rough, rocky upland whose northwestern edge is an escarpment that rises 100 feet above the bordering lowland. The upland is underlain by quartz porphyry, with granitic phases, and the contact with the Keewatin on the north follows the escarpment. Five veins are known on the property. The principal workings are on three veins known respectively as the Contact, Gem and Moose veins. The Contact vein is on claim A.D.3. It cuts quartz porphyry, strikes east, is vertical, and over a length of 100 feet has an average width of 2 feet. It consists of quartz with, in places, pyrrhotite. The Gem vein is on claim A.D.2. The principal workings are on this vein. It cuts quartz porphyry and extends a short distance into Keewatin rocks where it follows a zone of fissile schist. The vein strikes east-southeast, is vertical, and over a length of 300 feet has an average width of 2½ feet. It consists of quartz with some ferruginous carbonate and

small amounts of pyrite. The Moose vein is also on claim A.D.2 and is of the same general type as the Gem vein. It strikes southeast, is vertical, has been traced 700 feet, and over a length of 154 feet has an average width of 3½ feet.

Lucky Coon This property consists of claim P. 655 and lies southeast of the Golden Crescent property, 2½ miles southerly from Mine Centre. A considerable amount of development work was done years ago. Recently the veins as exposed at the surface have been sampled. The property is underlain by quartz porphyry with granitic phases and these rocks are crossed by a system of veins striking northwesterly. Vein matter from one vein (No. 5) has been submitted to a mill test. Many samples from the veins over a considerable area have been assayed. It is reported that the results indicate the presence of gold in considerable amounts but no ore body of commercial size has yet been discovered.

Golden Star Consolidated Mines. This company in 1934 acquired under option the following properties: Golden Star mine (claim A.L.114); Isabella property (claim A.L.113) Ferguson property (claims K.223 and 249 and A.L.110, 111 and 112). This group of claims is about 1¾ miles south of Mine Centre and lies at the northeastern end of the quartz porphyry body southeast of Bad Vermilion lake. The Golden Star mine produced prior to 1900, gold to the value of $161,000. In 1928 ore was extracted from a small opencut southeast of the old shaft and was treated in a 5-stamp mill erected in 1928. In 1934 the mine was dewatered and a survey was made of the workings but operations by Golden Star Consolidated Mines ceased before the making of assay plans of any of the veins on the property. A plan of the mine was published in 1899 in Part 2 of Volume 8 of the Annual Report of the Ontario Bureau of Mines. An inspection of the underground workings in

1934 showed that since the making of the plan referred to, vein matter had been removed from some places where the presence of ore was indicated on the old plan and that the workings had been considerably extended. At the sixth level, at a depth of 432 feet, a vein has been followed by a drift about 600 feet long. The shaft is reported now to reach a depth of 514 feet. These deeper workings are not shown on the published plan of 1899. No underground work on the other properties held under option was done in 1934 by Golden Star Consolidated Mines but ore found in the dumps on the Ferguson property was treated in a 5-stamp mill on the Golden Star and it is reported that gold to the value of about $3,000 was recovered. According to early accounts, several veins on the Ferguson property had been worked in 1897 and preceding years and a 3-stamp mill had been erected for the purpose of making a mill test. The property afterwards lay idle except for a short interval when it was worked under lease. On the Isabella property, a spectacular gold find was made in 1928 in a vein near the southwest corner of claim A.L.113 and the richly mineralized material was removed from a pit 10 feet long by 7 feet deep. Subsequently two other gold-rich pockets were found in the vein, one of which was removed in 1930 and the second in 1934.

The Golden Star mine (claim A.L.114) and the Isabella property (claim A.L.113) lie in the area of Keewatin rocks north of the edge of the body of quartz porphyry. The southern part of the ground under option, including the Ferguson property, is underlain by the quartz porphyry. The Keewatin rocks are mainly lavas in part highly altered and either schistose or recrystallized and massive. At the Golden Star mine a body of felsite about 12 feet wide and over 100

feet long invades Keewatin green schists along a fault zone that strikes northwesterly and dips southwesterly at a high angle. The Keewatin schists along the edges of the felsite body are largely replaced by carbonates. The Golden Star vein follows the fault zone. It commences in the felsite and has been traced continuously northwesterly into the Keewatin schists in which it continues. The part of the vein lying in the felsite consists of a system of branching veinlets whereas the part in the Keewatin schists appears to follow a single fissure and to consist of long, lenticular bodies each of comparatively uniform width and locally banded with thin laminae of black chlorite. The vein filling as now exposed consists of quartz with, at some places, ankerite and is locally sparingly mineralized with pyrrhotite, pyrite and chalcopyrite. The stopes in the mine indicate that ore was won from an ore shoot or series of shoots approximately 2 feet wide, 75 feet long and 432 feet deep.

On the Isabella property, the No. 2 vein occurs near the southwest corner of claim A.L.113 and lies in Keewatin schist. It is exposed over a length of 300 feet, has an average breadth of 2 feet, strikes E. 60°S. to E. 85°S. and dips southwest at angles of 60°to 65°. According to a report by Hawley (Ontario Department of Mines, Vol. 38, Part 6, 1929) the vein at the northwest end is divided by a 3-foot horse of carbonated schist impregnated with quartz veinlets. The quartz on the footwall side is 18 inches wide. On the hangingwall side the vein widens from 1 to 4 feet in a depth of 12 feet and consists of quartz with lenses of ankerite both mineralized with cobalt-bearing mispickel and coarse grains and tiny seams of gold. A pocket of this richly mineralized matter was removed in 1928 from a pit 10 feet long and 7 feet deep. Adjacent vein material

is said to hold only very low values in gold. Another gold-rich pocket of the same mineral character was found 100 feet southwest from the first and between 20 and 24 feet underground. It was mined out in 1930. A third gold-rich pocket was removed in 1934. It outcropped about 30 feet southwest of the first discovered pocket and consisted of a seam $\frac{1}{4}$ inch wide and less than 1 foot long lying within the quartz vein where it was 2 feet wide.

On the Ferguson property a system of narrow quartz veins strike northwesterly in quartz porphyry. They are of quartz and some ferruginous carbonate and locally are mineralized with galena, zinc blende, chalcopyrite and gold.

Pacitto. This property consists of claims P. 667 and A.L.159 and lies $\frac{1}{2}$ mile northeast of the Golden Star. The claims are underlain by Keewatin greenstones and Seine conglomerate intruded by a lenticular mass of quartz porphyry. Several small quartz veins occur in faults striking easterly. Visible gold is said to have been found in some of these small veins.

Hopkins. This property consists of claims E.76 and 77 and lies 5 miles south of Mine Centre on the eastern edge of the quartz porphyry body southeast of Bad Vermilion lake. Prior to 1934 considerable stripping had been done on 5 veins and a pit 50 feet deep had been sunk on the Sulphide vein on the northern part of the property. In 1934, P. E. Hopkins acquired the property under option and in September, 1934, a shaft was commenced on No. 1 vein. This vein lies in quartz porphyry, strikes north and is vertical. From a point 200 feet north of the Foley Mine road it has been traced northward for 33 feet in which distance it narrows and swells but has an average width of 2 feet. Northward it is concealed for

85 feet beyond which it has been traced for 250 feet as a series of almost continuous lenses having an average width of 2 feet. Systematic sampling of the vein as exposed is reported to indicate that the deposit is sufficiently rich in gold to warrant development.

Foley. This property is owned by the bond holders of British Canadian Mines Ltd., and consists of claims A.L.74, 75 and 76 and lies 5½ miles south of Mine Centre, near the eastern edge of the quartz porphyry body southeast of Bad Vermilion lake. Much development work has been done on the property and prior to 1900 it produced gold to the value of $75,000. Much work was done during the years from 1920 to 1927 but no gold was produced. The work however revealed at the south shaft the presence of an ore body 20 inches wide, 200 feet long and at least 70 feet deep. Commencing in August, 1934, this body was mined to a depth of 70 feet. The ore was treated in a 2-stamp mill and in September gold with a reported value of $2,135 had been obtained from 80 tons of ore. The operation was continuing.

The southern part of the Foley mine property, in a zone up to 1000 feet wide that borders Shoal lake, is underlain in part by conglomerate of the Seine series cut by dykes of lamprophyre and granitic rocks and in part by a complex of intrusives. The remaining northern three quarters of the property is underlain by quartz porphyry with granitic phases. Gold-bearing quartz veins, including seven principal ones that have been developed by workings, occur in the quartz porphyry. One group of these veins occurs as a parallel series striking almost due north, a second group roughly parallel, but somewhat more irregular, strikes northwesterly. The veins are narrow varying from mere stringers to others with widths of a few feet

and are remarkably persistent, some being traceable on the surface for as much as 200 yards. The veins consist chiefly of quartz with locally some ferruginous carbonate, and at places are mineralized with galena, zinc blende, chalcopyrite, pyrite and native gold. The results of sampling are reported to show that gold values are widely distributed through the veins and that within short distances in individual veins the values are exceedingly variable. In 1934 an ore body of potential commercial value was known to occur in the vein at the south shaft. In the lamprophyre and conglomerate near Shoal lake narrow veins of quartz and ferruginous carbonate occur and some of these are mineralized with molybdenite, chalcopyrite and pyrite.

Claims E.258 and E.261. These claims are owned by the Bank of Montreal and lie 5½ miles west-southwest from Mine Centre. They lie just west of the Foley mine property, within the body of quartz porphyry southeast of Bad Vermilion lake. During 1933 the Great Northern Mining Company who held a lease of the property, extracted a few tons of ore from open cuts on two veins. A number of veins have been found. They have a general northerly strike but in places strike northwest. Gold has been found in five veins but no considerable quantity has been found at any one place.

Sharon. This property consists of 10 claims owned by W. A. Gray and D.C. McKenzie. It lies 6½ miles south-southwest of Mine Centre, within and not far from the south-western termination of the quartz porphyry body southeast of Bad Vermilion lake. A considerable amount of exploratory surface work has been done in recent years. One of the several quartz veins on this property, that strikes northwesterly on mining location H.P. 30 has been found to be well mineralized

in a shoot with an average width of 3 feet in a length of 200 feet. It consists of quartz and ankerite togothor with zinc blende, galena, chalcopyrite and native gold. The results of sampling are reported to show gold values of ore quality in the shoot.

Dinosaur. This property, owned by Mrs. A. Liezert, lies 4½ miles southeast of Mine Centre, within the belt of Seine sediments. It consists of claims F.F. 682 and 685. In 1895 it was known as the Bull-Price property and several gold-bearing veins had been discovered. Since then a minor amount of stripping and test-pitting has been done. The property is underlain by greenstone schists and conglomerate of the Seine series intruded by small lenses of quartz porphyry about whose borders a distinctive felsite and sericite schists have developed. Several narrow quartz veins occur in the sericite schist and in places in them visible gold has been found. On the east side of claim F.F. 685 a lens of quartz, 18 feet wide and 50 feet long, is exposed.

Other Properties. A large number of claims in addition to those mentioned, have been prospected from time to time since 1893 and the discovery of many gold-bearing veins has been reported. On some claims as for example, the Decca, Emperor and Manhattan, extensive mining operations were undertaken. These properties have lain idle for many years. Conditions on the various properties vary from those obtaining where mineralized veins have been found and no work done, to those holdings where veins have been extensively developed and then abandoned.