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GOLD DEPOSITS EAST OF FLIN FLON, MANITOBA

(Report and Figure)

BY

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Illustration

Figure 1. Gold prospects east of Flin Flon, Manitoba.

GOLD DEPOSITS EAST OF FLIN FLON, MANITOBA

INTRODUCTION

Since 1931 gold has been discovered at a number of localities less than 15 miles east and northeast of Flin Flon, Manitoba. Most of the gold occurrences are in the vicinity of Tartan, Mikanagan, and Alberts Lakes. Surface developments up to 1933 at Tartan Lake have been described by Wright and Stockwell[1]. The field work on which the present report is based was undertaken in 1941, since when there has been little or no activity in the district except for diamond drilling in 1944 on the Wally group of claims west of Alberts Lake.

[1] Gold occurrences of Flin Flon District, Manitoba and Saskatchewan; Geol. Surv., Canada, Sum. Rept. 1933, pt. C, pp. 1-12 (1934).

None of the gold occurrences, at the time of examination, had been sufficiently developed to indicate an orebody of economic size or grade, and in general the gold content of the deposits is low, and their dimensions are small. However, the broad distribution of gold in the district, and its relationship to prominent geological features, constitute favourable conditions for the occurrence of commercial deposits. The district, therefore, merits careful investigation.

GENERAL GEOLOGY

Most of the gold occurrences east of Flin Flon are in the southern half of the Mikanagan Lake map-area[2] in rocks of Archaean (Early Precambrian) age (See Figure 1 A). The section west of Mikanagan Lake is underlain by a thick assemblage of greenstones that is duplicated in a syncline extending southeast from Tartan Lake. Most of the greenstones are basic lavas with narrow beds of tuff and breccia between the flows. Along the inner part of the syncline the greenstones are overlain by andesitic tuff, argillite, and dacitic tuff and breccia.

[2] Bateman, J.D., and Harrison, J.M.: Mikanagan Lake, Manitoba (map and descriptive notes); Geol. Surv., Canada, Paper 44-22, 1944.

East of Mikanagan Lake the rock formations constitute a fault block that has been thrust northward. Within this block the rocks are intricately deformed and the structures resemble those around Flin Flon to the west. The formations comprise greenstones, andesite, dacite, rhyolite, and their associated tuffs and breccias.

All the volcanic formations have been invaded by bodies of basic intrusive rocks that are now considerably altered. The largest of these lies between the arms of Tartan Lake and consists of several basic rock types, one successively intrusive into the other, the final product being an aplitic albite granite. The different types cut one another in such profusion that extensive areas of intrusion breccia have resulted. The greater part of these rocks is conveniently termed metagabbro and metadiorite. Other bodies of altered gabbro in the area are less complex in composition. Both volcanic rocks and basic intrusions are cut by dykes and small bodies of porphyry.

GEOLOGICAL DISTRIBUTION OF THE GOLD DEPOSITS

Gold occurs with quartz veins in the volcanic rocks, the basic intrusive rocks, and the porphyry. Most of the deposits, however, occur within or near the margins of the basic intrusive bodies. The veins lie in faults or shear zones that in some instances are localized beside porphyry dykes. Such favourable structures are best developed near the western nose of the large basic intrusion that lies between the arms of Tartan Lake, near the northwest shore of Mikanagan Lake, and in the tongue of volcanic rocks that extends from Mikanagan through Bartley Lakes. Along shear zones in the basic intrusions the rocks are altered to schists that are hardly distinguishable from the greenstone (volcanic) schists.

In the fault block east of Mikanagan Lake gold occurs in or near the basic intrusive body southwest of Alberts Lake. The known distribution of gold suggests that the most promising prospecting localities in the southern half of the Mikanagan Lake map-area are in narrow belts of volcanic rocks between some of the basic intrusive bodies, or near the noses of such intrusions. Shear zones and faults, particularly where they pass from the basic intrusions into the volcanic rocks, should be favourable for the occurrence of gold, providing that there has been movement on them later than the time of introduction of the porphyry dykes. Most of the structures suitable for gold deposition are zones of weakness, and, hence, are marked at the surface by depressions.

GENERAL CHARACTER OF THE GOLD DEPOSITS

The gold occurs with quartz veins or stringers in shear zones or in quartz-filled tension fractures related to such zones. Except for the occurrences east of Mikanagan Lake the shear zones are impregnated with rusty weathering carbonate and, generally, sericite is developed along with the chloritic alteration of the country rock. On the Honeysuckle claim, however, there is a notable development of secondary biotite in the gold-bearing shear zone. In the fault block east of Mikanagan Lake the gold, in most instances, is accompanied by silicification of the wall-rocks.

Those occurrences within the basic intrusive complex between Tartan and Mikanagan Lakes are characterized by pyrite, chalcopyrite, and tourmaline, whereas those in or near the border of the intrusion are characterized by arsenopyrite with pyrite and chalcopyrite. In the vicinity of Alberts Lake pyrite is the principal mineral with which the gold is associated. The presence of gold is almost certainly indicated by arsenopyrite, which is generally disseminated in the country rock and occurs less commonly in the quartz. Gold is also present in the country rock where it is mineralized with arsenopyrite.

DESCRIPTIONS OF PROPERTIES

Tartan Lake Section

Tartan Lake is 8 miles northeast of Flin Flon and may be reached from there by aircraft or by a canoe route north from Manistikwan and Embury Lakes, which involves several short portages. Gold occurs in the complex basic intrusion that lies between the arms of Tartan Lake and also in the surrounding schists, which are powerfully sheared adjacent to the western nose of the basic intrusive mass.

Ruby Group. The Ruby group, known as the Kirkland-Hudson (former Kirkland-Ferguson) property, lies between Ruby Lake and the narrows separating the arms of Tartan Lake. The property consists of six surveyed claims and two fractions, and is controlled by Mr. Albert Kirkland of Flin Flon. The original gold discovery was made by Messrs. Wm. Ferguson and Albert Kirkland in June 1931, at which time the Ruby 1 and Ruby 2 claims were staked. In August of the same year the Victor and Victor 1 claims were staked south of the Ruby and the Arcola and Arcola 1 to the north. In 1932 the Ruby 3 and Ruby 4 fractions were added. Early in July of that year the property was optioned to Consolidated Mining and Smelting Company who did some trenching, and the option lapsed in the early autumn. In February 1933 the property was again optioned, this time to the Hanson Construction Company, who removed more than 200 tons of gold ore from an open-cut on the vein. The first lot of 100 tons and a second lot of 50 tons were shipped to the Flin Flon smelter and are reported to have returned respectively $5.15 and $4.10[1] a ton in gold. The option lapsed in August 1933, and in September of the following year the property was optioned again, this time to Mr. John Callinan of Toronto, who assigned the interest to Heney-Maloney Gold Mines. The latter company surveyed the claims and did 1,500 feet of diamond drilling between January and February 1935, and the option was allowed to lapse in July of that year. In June 1936 the property was reoptioned to Mr. John Callinan and, after a small amount of surface trenching was completed, the option was dropped in February 1937. A plan of the surface workings is shown in Figure 1-B.

[1] Presumably at the current price of gold in 1933.

Gold occurs in a mineralized zone that has an average width of 12 feet, and is exposed in trenches and test pits for a total length of 170 feet. The open-cut, which is filled with water, is 60 feet long and as deep as 24 feet. The zone strikes north 65 degrees east, dips steeply southward, and is covered with deep overburden both east and west of the workings. It consists of a quartz vein with associated quartz stringers in altered schistose tuff. With the quartz are small carbonate stringers that weather rusty and are probably ankerite. The quartz and associated schists are sparingly mineralized with pyrite and chalcopyrite, and a very small amount of pyrrhotite and arsenopyrite. The gangue minerals include black tourmaline, ankerite, sericite, and green mica. The wall-rock is partly silicified and is impregnated with rusty weathering carbonate, and the rock included in the mineralized zone is locally brecciated and cemented with quartz and carbonate. Some visible gold was observed.

The enclosing schists plunge to the east, and it is likely that an ore shoot would rake in the same direction. This observation is made in the light that most of the drill holes probed the zone towards the west.

Monica Group. The Monica group consists of three unsurveyed claims east of the Ruby group and on the peninsula between the arms of Tartan Lake. The two northern claims are underlain by greenstone schists and associated bedded tuffs; but the principal gold occurrence is on the southern claim in the basic intrusive complex. The country rock is epidotized metagabbro in which there is a prominent system of joints striking north 16 degrees west and dipping eastward at 62 degrees. The mineralized zone is along a fault that strikes north 67 degrees east and has a vertical to steep southerly dip. It has been exposed in test pits for a total length of 240 feet, as far as the west boundary of Monica 2 claim, and throughout this distance it averages 12 to 15 feet in width. Most of the test pits are reported to have been sunk by Ventures, Limited, in November 1936, under a working arrangement with the proprietors.

Shearing movements along the mineralized fault zone have set up a system of tension fractures extending outwards both to the north and south, tapering in the metagabbro. The fractures are filled with massive quartz veins containing some metallic minerals. The metagabbro adjacent to the main zone is altered and resembles a greenstone schist with slickensided surfaces along the walls. Within the zone much of the rock is altered to a thinly foliated carbonate-sericite schist consisting of alternating lamellae of rusty weathering carbonate, sericite, and siliceous material cut by quartz veins and stringers. The following is a description of the seven test pits along the zone from east to west.

The most easterly pit, 4 feet deep, exposes the zone across a width of 10 feet, where it strikes north 83 degrees east with vertical dip. The zone consists of a network of quartz-carbonate stringers and associated carbonatized crush-breccia in the schists. The quartz contains tourmaline, which also occurs in the adjacent schists. There are no sulphides in the quartz, but the schist is sparingly impregnated with coarse, cubic pyrite.

Pit No. 2, 60 feet west, is 30 feet long and as deep as 12 feet. In it there are three mineralized sections that, from north to south, are respectively 3, 2, and 6 feet wide, each separated from the others by massive greenstone. The zones consist of networks of quartz-carbonate stringers and tourmaline in sericitic schist mineralized with coarse, cubic pyrite and small, irregular areas of massive pyrite. Slickensided linear elements on the wall-rocks pitch west at 15 to 20 degrees.

Pit No. 3, 25 feet west, is 20 feet long and 6 feet deep. The zone there consists of horses of greenstone-like material alternating with sheared and brecciated zones of carbonate-sericite schist containing quartz stringers and tourmaline. The latter mineral also occurs as thin seams on the surfaces of cross fractures. Pyrite is sparingly present as coarse cubes and narrow sulphide lenses in the schist. Extending south from the pit is a vein filling a tension fracture that dips 74 degrees east and tapers in the massive metagabbro. The quartz has a banded appearance, is sparingly mineralized with chalcopyrite, and is reported to carry gold.

Pit No. 4, 15 feet to the west, is 25 feet long and 10 feet deep. The north half consists of fractured schist carrying quartz-tourmaline stringers; and a cross-vein of almost solid tourmaline extends north from the shear zone into the country rock, dipping 80 degrees east. Slickenside casts on the tourmaline pitch 10 degrees west. In the south half of the pit there is rusty, carbonate-sericite schist carrying quartz, tourmaline, and carbonate stringers. The schist and associated carbonatized greenstone is impregnated with pyrite.

Pit No. 5, 25 feet farther west, is 20 feet long. The mineralized zone is exposed in it over a width of 6 to 10 feet, and in pit No. 6, 50 feet to the west, the zone is 15 feet wide. It consists of sericite schist and rusty weathering carbonate lightly impregnated with pyrite. There are small masses and veinlets of carbonate in the schist, but very little quartz and tourmaline.

Pit No. 7 lies 70 feet west of No. 6 and is on the boundary between Monica 2 and the Killarney claim. This pit, which was sunk in 1930, is 12 feet long and 6 feet deep. It exposes sericite schist in which a cross-vein, 12 to 16 inches wide, emerges and strikes off into the north wall. There is little evidence of mineralization. At this locality the pitch of the fault steepens to about 60 degrees west.

Gold is reported to have been found throughout the length of the zone, but the writer has no information on its distribution or content.

Killarney Claim. The Killarney claim, controlled by Messrs. Patton and Creighton of Flin Flon, is situated at the narrows separating the arms of Tartan Lake and lies between Ruby 1 and Monica 2 claims. On this claim gold is reported to occur along the western extension of the Monica zone, 100 feet west of Monica 2 boundary. Here, two test pits, sunk several years ago, have disclosed a 3-foot quartz vein in fractured greenstone-like rock. The vein, which strikes northeasterly, carries pyrite, chalcopyrite, and tourmaline.

The principal gold occurrence on the Killarney claim lies some distance farther west and consists of a series of en échelon quartz veins from 2 to 8 feet wide, cutting across the schists at an angle of north 10 degrees west and dipping west at 75 degrees. The veins occupy a system of tension fractures related to the mineralized fault zone on Monica 2 claim. The quartz is a massive, white variety that carries a little tourmaline. Nothing is known about the distribution or content of gold reported to occur in the veins.

Dublin Group. The Dublin group consists of three unsurveyed claims lying to the south and east of the Killarney and Monica 2 claims. Gold has been found on the Dublin claim near the east shore of the south arm of Tartan Lake. At this locality a shear zone in the metagabbro is exposed by a test pit for a width of 25 feet. The zone strikes north 70 degrees east and dips vertically to steeply south. In it quartz veins and stringers with some ferruginous carbonate stringers cut chlorite-sericite schist. Some of the intervening rock is silicified. The quartz contains sericite, carbonate, and tourmaline; and both the quartz and schist are sparingly mineralized with pyrite. Assays are reported to have indicated a very low gold content. Elsewhere on the claims is an easterly striking zone of sericitic schist containing a little pyrite and chalcopyrite with quartz. Low gold values are reported.

Muskoka Group. The Muskoka group consists of four unsurveyed claims and a fraction that were staked in 1930. The property lies east of the south arm of Tartan Lake adjoining the Dublin claims on the south. Mineralization occurs in a zone of crenulated schist in metagabbro that is from 20 to 60 feet wide. It is well mineralized over a width of 3 to 6 or more feet with chalcopyrite, pyrite, tourmaline, and carbonate in quartz stringers and schist. Nearby is a quartz vein, 1 to 4 feet wide, cutting greenstone schist in the metagabbro. The quartz contains a little chalcopyrite, pyrite, and some sericite. Both occurrences are reported to carry gold.

Muskoka Claim. The Muskoka is a surveyed claim lying between the Dublin and Muskoka groups. On it is a gold-bearing zone striking north 70 degrees east. The zone contains quartz, carbonate, and sericite, with chalcopyrite, some massive pyrite, and tourmaline.

Mikanagan Lake Section

Mikanagan Lake lies about 3 miles southeast of Tartan Lake, and may be reached via Bartley Lake over a canoe route involving two portages. Gold has been found at two localities near the west shore of Mikanagan Lake, and at a third locality three-quarters of a mile northwest of the lake. The gold is associated with the bodies of complex basic intrusions in which most of the deposits at Tartan Lake occur.

X.L. Group. The X.L. group consists of twenty-one unsurveyed claims adjacent to the central part of Mikanagan Lake. The claims were staked in 1941 on a gold discovery known as the Munson-Stewart showing, which is located on a small point at the west shore of the lake. Near this locality the basic intrusion interfingers with greenstone. The intrusive rock is feldspathized and brecciated, containing small subangular fragments from pea size up to an inch in diameter. This material is pink to white weathering and is either pink or grey on fresh surfaces. It is a fine-grained metadiorite. The associated greenstone weathers olive to pea green and is silicified.

Prominent fractures in the metadiorite trend from south 38 degrees east to south 47 degrees east and dip 80 degrees southwest, corresponding to the strike and dip of schistosity in the greenstone. Quartz stringers, which occur mostly in the metadiorite, strike between north 57 degrees east and north 63 degrees east. They occur en échelon and form a short mineralized lens that strikes across the tongue of metadiorite for an exposed length of 90 feet and a maximum width of 20 feet. In this lens the metadiorite is impregnated with rusty weathering carbonate, and the adjacent greenstone is feldspathized and waxy green in appearance. The quartz stringers are up to a foot wide and irregular in trend. The quartz is well mineralized with pyrite that is present in small masses, whereas the intervening metadiorite is impregnated with needles of arsenopyrite and a small amount of cubic pyrite. Apparently the gold is associated with arsenopyrite, and the average of several assays of channel samples reported to the writer is in the order of 0.16 ounce in gold a ton over widths up to 15 feet.

In summary, the gold occurs in a zone of quartz stringers with arsenopyrite that is disseminated through the intervening metadiorite. The latter forms a tongue along the altered border of the large basic intrusive mass between Tartan and Mikanagan Lakes.

Hotshot Group. The Hotshot group consists of fourteen unsurveyed claims, staked in 1940, and situated at the north end of Mikanagan Lake. It is owned by Messrs. Wilbur McKinnon, R. Puls, and Wm. Walstrom of Flin Flon. The principal gold-bearing vein lies along the contact between greenstone and a small body of albite granite (Figure 1 C). Strong shearing in the greenstone has altered it to a carbonatized sericite-chlorite schist adjacent to the vein. The albite granite is a fine-grained pink to white rock related to the basic intrusive complex. The vein is exposed in four test pits for a length of 135 feet, striking easterly and dipping steeply south. Quartz is from 10 to 40 inches wide and the full width of the mineralized zone is from $3\frac{1}{2}$ to 12 feet.

The most westerly test pit is 30 feet long and crosses the vein; but the walls have sluffed and the pit was filled with water (1941) so that it was not possible to determine the width of the vein. On the dump, however, there is considerable quartz and rusty sericitic schist, the latter breaking into thin slabs consisting of alternate lamellae of carbonate, sericite, and quartz. The quartz is a massive, milky variety containing thin films of sericite along fractures and a little rusty weathering carbonate. Fractures in the quartz contain chalcopyrite, and a little arsenopyrite occurs with the associated sericite and carbonate. Sulphide minerals are sparingly present, but chalcopyrite is more abundant in pit No. 2 (from the west). At this locality a little pyrrhotite was observed. In the third pit the zone includes three veins, each about a foot wide, that dip under the albite granite, but converge upwards to form a mineralized zone 5 feet wide at the surface and 12 feet wide at the bottom of the pit, which is 6 feet deep. The adjacent albite granite is altered to a carbonate-sericite schist. The quartz is a milky variety containing a very little arsenopyrite, which occurs as films along fractures, and some chalcopyrite. Massive arsenopyrite is present in the foot-wall greenstone schist, and needles of this mineral together with a little pyrite impregnate the carbonate-sericite schist between the veins. Farther east the vein is 12 inches wide and, with associated quartz stringers in rusty carbonate schist, forms a mineralized zone 3½ to 4 feet wide.

In summary, the vein lies in a carbonatized shear zone. Chalcopyrite is confined to the quartz-vein material, and arsenopyrite occurs mostly in the associated schists. Most of the quartz was introduced as a fracture filling. Low values in gold are reported.

Less than a quarter of a mile southeast, on a point extending south into the lake, is another gold-bearing quartz vein in altered greenstone. The vein, which is 6 inches wide, strikes south 45 degrees east and dips 86 degrees southwest. It is exposed in trenches and test pits for a length of 60 feet. Massive arsenopyrite 3 to 4 inches in width occurs in the quartz, and disseminated arsenopyrite occurs in the greenstone schist adjacent to the quartz over a width of 2 to 3 feet. Four chip samples taken by the writer averaged 0.08 ounce in gold a ton across 13 inches.

Jodie Group. The Jodie group consists of four claims about three-quarters of a mile northwest of Mikanagan Lake. The property is entirely within the basic intrusive complex. Gold has been reported in a quartz vein associated with small porphyry dykes that cut the basic intrusive rocks. At this locality there is an arc-shaped mineralized shear zone 13 to 32 inches wide that has been exposed in five test pits for a length of 50 feet. The zone dips northwards, and the pink feldspar porphyry on the hanging-wall and aplitic quartz porphyry on the foot-wall are altered to rusty weathering carbonate-sericite-chlorite schists. A hanging-wall vein of porcellaneous quartz is separated from a foot-wall vein of glassy quartz by a thin, black, slickensided selvage. The quartz contains a little chalcopyrite, pyrite, and ferruginous carbonate.

Alberts Lake Section

Alberts Lake is 3 miles east of Mikanagan Lake, and may be reached by a canoe route with two portages leading from the end of Sourdough Bay, Athapapuskow Lake. Gold is reported to occur in altered gabbro, rhyolite, and greenstones west of the lake.

Wally Group. The Wally group consists of thirty-three claims adjacent to the southwest shore of Alberts Lake. Several test pits observed on the property were sunk on quartz veins in gabbro, rhyolite, quartz-feldspar porphyry, and greenstone. The veins are from 1 to 3 feet wide and are exposed only over short distances. A little pyrite is

present, and the wall-rocks are silicified. The property, together with the adjoining Max claim, was acquired by Consolidated Mining and Smelting Company, Limited, in 1944 and, between September 15 and October 28, 1,447 feet of diamond drilling was done.

Section West of Tartan Lake

This section lies within the Flin Flon map-area[1] west of

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[1] Geol. Surv., Canada, Map 632A, Flin Flon.

Mikanagan Lake and 7 miles northeast of Flin Flon. Two of the several gold occurrences in this section were visited.

Honeysuckle Claim. This is one of a group comprising the Tartan Lake property of Brunne and Copper Lake Telluride Mines, Limited, and is situated northwest of the lake. The principal gold occurrence is on the surveyed Honeysuckle claim, and may be reached by a trail, three-quarters of a mile long, leading from the northwest bay of Tartan Lake.

At the time of the writer's visit a gold-bearing quartz vein had been explored by means of ten test pits, a small open-cut, and eight diamond-drill holes for a length of about 1,100 feet. The vein is again exposed 400 feet farther west. A smaller, but similar, gold-bearing vein is present half a mile east of the Honeysuckle claim, the intervening area being largely drift covered. In 1944 an option on the property was acquired by Draper Dobie and Company, who plan approximately 2,000 feet of diamond drilling to check earlier results.

The main vein is 4 to 5 feet wide, strikes east, and dips vertically to 80 degrees south. The country rock is greenstone consisting largely of altered basic flows with a little andesitic tuff, and mineralization is confined to a sheared and fractured zone in these rocks. Throughout most of the zone there is a pinch-and-swell type of quartz vein on the hanging-wall and, in addition, there are numerous small lenses of quartz as well as a little carbonate. The enclosing sericite-chlorite schists are lightly impregnated with ferruginous carbonate, and the mineralized zone is black owing to an abundance of secondary biotite. Within this zone are scattered crystals of arsenopyrite, and it is with this mineral rather than with the quartz that the gold is associated.

In the most westerly test pit, which is 7 feet wide and 8 feet deep, there is strong shearing that strikes east and dips 67 degrees north. Associated small drag-folds pitch east at 20 degrees. The greenstone is altered to a crenulated sericitic schist that is dark with biotite where the shearing is most intense. This part of the zone contains an interconnected system of quartz lenses and stringers, and the intervening sericite-biotite schist is silicified.

The main part of the zone, more than 400 feet to the east (See Figure 1 D), strikes north 87 degrees east and has a vertical to steep south dip. It has been explored by seven test pits and a small open-cut and, at the time of the writer's visit, by nine diamond-drill holes. This work investigates a fracture zone 2 to 5 feet wide containing lenses of quartz up to 3 feet wide; but most of the quartz occurs as irregular, knotty stringers. The associated schist is mineralized with needles of arsenopyrite and rusty weathering carbonate.

The west test pit of this section is 7 feet wide and 4 feet deep, disclosing a shear zone 4 feet wide with an irregular quartz vein 6 inches wide on the south side. A little arsenopyrite occurs in the schist.

In the next pit to the east (No. 6) the greenstone is altered to a black, crenulated schist that contains small, irregular knots of quartz. This material is bordered by lighter sericitic schists that, in turn, are bordered by chlorite schists. The inner and most intensely sheared part of the zone, across a width of 3 feet, is mineralized with rusty weathering carbonate and disseminated arsenopyrite. Part of the quartz is a glassy variety and part a cherty replacement type. Most of the arsenopyrite occurs near the quartz.

Pit No. 5 is about 7 feet square. Along the south wall, across a width of 6 to 18 inches, there are several quartz stringers in crenulated schist. North of this, 4 feet of black biotite-carbonate schist carries arsenopyrite. Small drag-folds that pitch east at 20 degrees have moved the south side west with respect to the north side.

An open-cut, lying to the east, is 58 feet long. The north wall of the cut dips south at 70 degrees, the south wall being steeper. In the east face a vertical, pinch-and-swell quartz vein up to 12 inches wide lies on the south side of the shear zone. It is reported that about half of the material removed from the cut is "ore".

Pit No. 4, 5 feet deep, contains a quartz vein 6 to 14 inches wide, which, with additional quartz stringers on either side of the vein, constitutes a mineralized zone 4 feet wide. Crenulations in the wall-rock schists pitch east at 20 degrees.

Pit No. 3 is 4 feet square, and exposes a width of 8 to 12 inches of quartz with, to the north, 3 feet of black schist cut by quartz stringers and impregnated with arsenopyrite and carbonate.

Pit No. 2 is 6 feet wide and 7 feet deep. Along the south wall a massive quartz vein, $1\frac{1}{2}$ to $2\frac{1}{2}$ feet wide, is followed to the north by 2 feet of mineralized black schist.

Pit No. 1 is 9 feet deep and contains a pinch-and-swell quartz vein, 2 to 14 inches wide, with a foot of crenulated schist to the south and 2 feet of mineralized black schist to the north.

The mineralized zone is again exposed 270 feet to the east of Pit No. 1 in two test pits, between which it is separated by a horse of rock. On the north side of the horse the shear zone is 5 feet wide, with knotty quartz stringers across the central 2 feet. The black schist is sparingly mineralized with arsenopyrite. South of the horse the shear zone is narrow and contains a few quartz lenses and a little arsenopyrite.

About 300 feet farther east is a test pit, 7 feet deep, in which the zone is exposed for a width of 15 feet. A quartz vein, 2 feet wide at the surface, pinches out about halfway down the east face of the pit; but a narrower vein to the south, together with quartz stringers, carries down through the schist. Disseminated arsenopyrite is confined to the southern 5 feet of the pit.

In summary, the shear zone extends for at least 1,500 feet and is possibly much longer, as a similar but smaller mineralized zone has been found more than half a mile east on the projection of the strike of the main vein. Throughout most of the main part of the zone there is at least one pinch-and-swell quartz vein that lies along or near the hanging-wall (south side). Mineralization extends over a width of 2 to 5 feet.

It consists of disseminated arsenopyrite, which, with carbonate and secondary biotite, impregnates the black biotitized schist. Gold occurs in this material rather than in the quartz, but the content is believed to be low and irregular.

Glendale Group. The Glendale group consists of seven unsurveyed claims west of Tartan Lake, and may be reached from there by a trail a mile long. Gold occurs on the property in a steeply dipping fault near Glendale Lake. The fault zone, which strikes easterly across greenstones, contains a brecciated quartz vein. Post-vein movement on the fault (fault striations pitch 35 to 60 degrees east) produces a rubble of quartz pebbles and boulders in a finely granulated matrix that was replaced, subsequently, by carbonate, arsenopyrite, and a little gold. The matrix oxidizes to a greenish colour.

A short distance south of the vein there is a narrow zone of graphitic schist in a broad band of argillite. The schist contains some quartz and disseminated pyrite, and is reported to carry a little gold.