

GEOLOGY OF TRAIL

Summary Report of the Dominion Geological Survey.

GABBROS AND ORE BODIES

McCConnell's Views as to the Relation of the Rocks to Ore Bearing Veins—Replacement Veins Equally Permanent With True Fissures.

During the past year very notable progress has been made in the development of the mineral resources of Canada, both in the way of actual work and in attracting the attention and interest of capital. British Columbia has begun to evidence its value as a permanent producer of the precious metals, in a manner long foreseen by those who have paid attention to its geological structure and position. In Ontario, wherever the Huronian system is developed and has been examined, valuable mines—more particularly those of gold—are being discovered and opened up. In Nova Scotia renewed interest has been shown in gold mining, and with improved machinery and methods the output is likely soon to be greatly increased. Other mineral industries throughout the country, whether already established or in course of development, share in general appreciation.

In British Columbia the supplementary work necessary to complete the topographical and geological information for the Shuswap map-sheet was completed. A small, rugged, mountainous country in the northeast corner of this sheet was left unvisited, as it was thought to be more important for Mr. McElroy to join Mr. McConnell in the mapping of the West Kootenay. Mr. G. McConnell geologically investigated a tract of country to the south of Sloan and Alouette, including the Treadwell, Toad Mountain, Kossland, and Trail mining centres. As already stated, the region generally is divided between igneous and sedimentary rocks, chiefly of volcanic origin, and granitic rocks, largely of plutonic origin. Fossils, believed to be of carboniferous age, were found in some parts of the stratified series. The gabbros occur in association with an eruptive mass of gabbro, about four miles long by one in width, and the definition of its area is of importance, as the principal ore bodies appear on or about its periphery. It is proposed to prepare, as soon as possible, a preliminary geological map of that part of the West Kootenay district which has already been covered.

McCConnell's Report.

The following are extracts from the report of R. G. McConnell:

"The region examined forms part of the southern continuation of the Selkirk range, and is everywhere a rugged and mountainous character. It is traversed by several large and deep valleys running in different directions, the principal ones being those of the Columbia river, the Stikine, the Slokan, the Beaver and the Salmon. Draining into these are numberless small streams, usually of no great length, which rise in the higher peaks and summits and descend through the country in a westerly or south-westerly direction. The present rough condition of the country is mainly due to the slow but persistent wearing action of their present courses, on rocks of differing hardness, the processes having continued long enough to obliterate all traces of the earlier configuration. "The most prominent range south of the Kootenay mountains is the Selkirk range, which extends westward from the head of the Columbia river, an apparently endless succession of deep branching valleys and lofty ridges crowned at intervals with sharp peaks and crests, are everywhere met with. "The whole country, or rather has been, covered with heavy forests, for since mining operations began, destructive fires have raged every summer over large areas. The forest is principally coniferous, but is relieved by a few broad-leaved trees.

Geology of the District.

"The most notable feature in the geology of the district examined, is the marked predominance of rocks of igneous origin. Two great series are represented, of which the older consists mostly of porphyries, diabases, gabbros, tuffs and agglomerates, and the younger of granites. "The granites belong to the same mass so largely developed in the country north of Kootenay and outlined in my summary last year. The normal type is a medium-grained, pinkish granite, consisting mostly of biotite, hornblende, quartz, orthoclase and plagioclase; but great variations in both texture and composition are frequent. In places and over considerable areas the development of a typical augen-granite, with variations in the proportion of its constituents, the granite passes into hornblende-granite, granodiorite and mica-syenite. The latter, cut by dykes from the more acidic varieties occurs largely along the Kootenay river west of Nelson.

"The granites, except for some small outliers of schists, are found in their various phases along the Kootenay river, from the lower Columbia to near the mouth of Bear creek. The southern portion of the area crosses the Columbia river, and extends south for some distance along Lookout mountain ridge, and thence westward from Lookout mountain north to China creek, the granites occur in a band from one to two miles in width, following the river and extending occasionally spurs to the west, one of which partly encircles the Kootenay-Columbia and another extends westward beyond the edge of the latter stream in a narrow area of gabbro and granite extending to an irregular-shaped mass from three to ten miles in width northward to Hall creek. Besides the main granitic area, numerous bosses and reefs of granite, evidently of the same age, break through the older rocks throughout the district. The largest of these crosses the Nelson & Fort Sheppard railway near Salmon siding and extends eastward into the still unknown country between the Salmon and Kootenay rivers.

Porphyries and Associated Rocks.

"The older system of predominantly porphyritic rocks, through which the gray granitic breaks, occurs under so many forms and in such different degrees of preservation that it is highly probable that the rocks of the series is a greenish augite porphyry often passing into a porphyrite. The ground mass of this rock is usually diabasic, and in many places the augite crystals of the porphyry disappear and it passes into a fine-grained diabase. The porphyrites, while often massive and uniform in texture and appearance, usually show a more or less brecciated structure on weathered surfaces. The embedded fragments and the groundmass, except for slight differences in coloration, appear microscopically almost identical. Besides the augite porphyries and diabases, massive eruptive rocks are also represented by gabbros, small areas of which are met with in the north fork of the Salmon, and by the grayish porphyries with plagioclase phenocrysts of Toad Mountain and Spokane mountains. Fragmental volcanic rocks, consisting of tuffs and agglomerates occur on the ridges south of Spokane mountains and also on the ridges south of Lake and Bald mountains and in other places in the district. The agglomerates are calcareous in places and are interbedded occasionally with bands of fossiliferous limestone. The fossils, collected are imperfectly preserved, but are probably Carboniferous in age.

"Slates and Dykes. "The eruptive series of rocks include bands and patches of dark fissile slates, which appear in most cases to be residual portions of the formations and which the igneous rocks were erupted from. The slates, which are a few feet or more in thickness, can be traced for any distance along the strike. Slates holding small

limestone bands occur on Hall creek, on the north fork of the Salmon, on Trail creek and in other places. "The granites and other rocks of the district are cut by numerous dykes and bosses, most of which belong to about the same period, but showing extreme variations in texture and composition. Specimens showing a range of textures, from a fine-grained to a coarse-grained condition, are met with. The dykes are of various widths, and the eruptive series is extremely irregular, and owing to the large proportion of the surface being covered by drift and forests, and the limited time at our disposal, it was found impossible in many cases to trace out junctions except in an approximate manner. A brief statement of the distribution and character of this group so far as known will, however, be given, before of the economic interest, inasmuch as it contains the gold-bearing porphyritic ores which have made the district famous. The principal rocks of the series are now being examined microscopically by Mr. Ferrier, and some of the names given may be altered when his investigation is completed.

Distribution of Gabbros.

"At Rossland, the central member of the group is a fine to coarse-grained gabbro, apparently passing in a couple of places into a uraltic granite. The gabbros occupy an irregular-shaped area with a length of about four miles and a width of one mile. They extend from Deer Park mountain eastward to the westward base of Lookout mountain and bordering porphyrites, commencing at the northwest corner of the area, runs south through the Cliff War Eagle, the Koi claims, then turning to the west, circles around a spur from the main area which covers the base of Deer Park mountain and continues eastward in a sinuous line, passing about a quarter of a mile north of the Crown Point, and in the northern edge of the area runs from the Cliff mine eastward to the Spokane mountains, then bends more to the south, skirting the southern base of the Kootenay-Columbia mountains. "The gabbros are not precisely defined, and in some places they pass into a variety of augite and dioritic porphyrites, and in other places into gabbros and porphyrites. The gabbros are nowhere sharply defined, and in some places they pass into a variety of augite and dioritic porphyrites, and in other places into gabbros and porphyrites. The gabbros are nowhere sharply defined, and in some places they pass into a variety of augite and dioritic porphyrites, and in other places into gabbros and porphyrites.

Relation to Ore Bodies.

"The gabbros and bordering porphyrites are important from an economic standpoint, as most of the ore bodies at present being worked are situated either on or close to their line of junction. In passing outwards from the gabbro area, a section taken at almost any point, shows a bordering zone of highly altered porphyrites, and beyond this zone an alternating series of porphyrites, tuffs and agglomerates, associated in places with fossiliferous limestone, make their appearance. The gabbros and tuffs occur with the porphyrites on Red Mountain, on Kootenay-Columbia mountains and south of the gabbro area, and in some places they are associated with the porphyrites. Agglomerates make up the main mass of Spokane mountains and also of the Spokane mountains and porphyrites on Granite, Spokane, Grouse and Lookout mountains, and on the ridge immediately east of Bear creek.

Volcanic Origin of Rocks.

"The roughly concentric arrangement of the Trail creek rocks, and the gradual passage outwards from a holocrystalline central area through semi-crystalline rocks to bedded volcanic fragments, suggest an ancient (though now deeply eroded) volcanic cone situated near the present site of the volcanic rocks, from which lavas and ashes deluged the surrounding district. The presence of small basins of the Columbia river, the stones with the agglomerates and tuffs, also make it probable that a shallow sea existed at the time of the eruption, and that the eruptions were intermittent and continued during a lengthened period. "The porphyrites on Lookout mountain are much fresher looking than those on Red Mountain, and may belong to a later period. An area of uraltic granite and wholly argillaceous rocks occurs on Sheep Creek between the western base of Deer Park mountain and O. K. mountain. "From Rossland, porphyrites and associated rocks, often crystalline, and in some places they are replaced by bands of argillites, were traced northward across Rock and Murphy creeks to China creek, where they are cut off by the gray granites.

East of the Columbia.

"East of the Columbia river, porphyrites and other igneous rocks similar to those at Rossland have a wide distribution. They are found along the Columbia river from the boundary north to near the mouth of Bear creek, where they are replaced by granites, and thence were followed in a northerly direction along the line of the Nelson & Fort Sheppard railway to within a couple of miles of the Kootenay river. The width of the band was not ascertained, as the country east of the Nelson & Fort Sheppard railway was not examined except at a couple of points. From the railway west to the granitic area, a wide range of porphyrites, tuffs and agglomerates, associated in places with fossiliferous limestone, make their appearance. The gabbros and tuffs occur with the porphyrites on Red Mountain, on Kootenay-Columbia mountains and south of the gabbro area, and in some places they are associated with the porphyrites. Agglomerates make up the main mass of Spokane mountains and also of the Spokane mountains and porphyrites on Granite, Spokane, Grouse and Lookout mountains, and on the ridge immediately east of Bear creek.

Examination of Mines.

"No systematic examination of the mines in the district treated of was made during the past season, as Mr. Carlyle, recently appointed Provincial mineralogist of British Columbia, was devoting his time to this particular work, and it was thought best, in consequence, to give all possible attention to the geological structure of the country. A bulletin descriptive of the Trail Creek mines has already been published by Mr. Carlyle, and another, which will embrace those of the Slokan, Toad Mountain, and other parts of the district, is in course of preparation. A large number of mines and prospects in different parts of the district were, however, examined in connection with the geological work, and with a view to the elucidation of their character and the classes to which they may be referred. The results of these examinations are given below.

Distribution of Ore Bodies.

"The auriferous iron and copper sulphide ores of Trail Creek occur almost exclusively in the massive members of the eruptive series, and most of the important ore bodies which have so far proved productive are situated either on or close to the line of contact between the gabbros and surrounding porphyrites and diabases. The Le Roi, War Eagle, Cliff, and a number of other leads west of Centre Star pulch, cut through the line of junction almost at right angles, while the Cozy is situated a short distance to the left of it, in the porphyrites, and the Centre Star workings almost immediately east of it, in the gabbro. The Monte Cristo and Deer Park claims occur close to the same line, the Kootenay-Columbia, a few hundred feet to the north of it, in a band of porphyrites, and the Crown Point, Homestake, Gopher, and other leads in the south belt, a short distance to the south of it. In the diabases and porphyrites, the ore bodies are, however, not altogether confined to the neighbourhood of the gabbro area, but are also found in the bands of massive porphyrites, which alternate with the surrounding igneous rocks and tuffs. The Jumbo is situated on one of these belts, as is also the Cozy, the Giant, and the Eagle. A considerable number of small, but productive, auriferous iron and copper sulphide ores characteristic of the Trail Creek region, but are inversely situated, as a rule, on belts which appear to belong to a later date.

Trail Creek Ore.

"The ores of the massive eruptive rocks, as stated above, consist principally of auriferous iron and copper sulphide ores. Of these porphyritic or magnetic iron-pyrites is by far the most abundant. This mineral constitutes the common Rossland ore and also occurs in quantity, among other places, on Bear creek, Champion creek, the north fork of the Salmon and at Waterloo. It is found also from a fine to a medium grain, but it is also disseminated through the country rock. The massive variety usually holds blobs of quartz, and grains and irregular patches of other sulphides, which appear to belong to a later date. The pyrrhotite contains gold and silver in vary-

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The Red Eagle Gold Mining Co.'s Properties CONSIST OF THE Red Eagle and Red Pole Mineral Claims, Composed of about 75 acres.

The Red Eagle. The Red Eagle mineral claim is situated on the east slope of Deer Park mountain, between the Mayflower and Curlew claims. There are three known ledges crossing this property. These veins are known as the South vein, the Curlew vein and the Mayflower vein. The South vein, which has produced some of the richest surface ore ever discovered in the district, is six to eight feet wide with a 24 inch pay streak, assays from which gave returns of \$18 to \$285. This vein was but recently discovered by workmen grading for a tramway across the claim for the sawmill company, and is generally regarded as the most important of recent discoveries in the south belt. This vein is traceable across the entire width of the claim a distance of over 1400 feet. On the Curlew ledge an open cut has been made exposing a vein of ore four feet wide, from which assays of from \$14 to \$161 per ton have been secured. This vein has been exposed by a number of shallow pits and crosscuts for several hundred feet. The Mayflower ledge, from which this well known mine is now shipping such high grade ore, crosses the Red Eagle claim for a distance of 300 feet.

The Red Pole. The Red Pole is situated one-half mile south of the Red Eagle and east of the Silver Bell mine. The Silver Bell ledge crosses the Red Pole mineral claim. Assays from this vein have shown over \$100 per ton of gold and silver.

Treasury Shares. The company have secured the survey and are applying for the Crown grant, and will continue developing the property all winter, and fully expect to be able to find pay ore to cover the development almost from the surface. But to prepare for all mining emergencies and to fully equip the property with machinery we have placed 500,000 shares in the treasury, a limited amount of which we offer to the public at the rate of 10 cents, and when the p id limit is reached the company will close their books and reopen in the course of ten days at an advanced rate for further stock.

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Pure Gold Mining Co., Ltd. Incorporated under the Laws of the British Columbia. Capital Stock 1,000,000 Shares. 400,000 Shares set apart for development purposes. The company owns 3 full claims on CHRISTINA LAKE in the Trail Creek mining district and is vigorously pushing development of these properties, having six men employed. The ledge on the surface is over 40 feet wide and runs through the claims for about 2,000 feet. The first block of development stock is offered at 5 Cents per Share. Prospectus, by-law, etc. can be had of all Rossland agents, or A. P. HUNTER, Sec'y, Box 240, Rossland. Or to S. G. READ, (Agent for Ontario) Brantford, Ont. ASSAY \$20.64. THE ROSSLAND MINER. DAILY AND WEEKLY. Give the Mining News of Kootenay Correctly and Completely.

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