

stance made by the well-known analytical chemist, Mr. Holdich, revealed the fact that it is principally composed of minute *angular* fragments of iron-stained silica.

The analysis is :

Silica	55.00	per cent.
Alumina	8.60	"
Lime Carbonate	23.00	"
Magnesia Carb.	6.95	"
Iron Peroxide	5.00	"
Combined water not estimated.		

Angular fragments, again, seem to be contrary to what would naturally be expected to be found in a substance formed by glacial action, where the smallest grains would be exposed to prolonged attrition not conducive to the retention of sharp angles. As an abrasive this "mud" is valuable, as it rapidly polishes metal to a very fine surface. A volcanic "mud" flow from some extensive fissure or vent, is one hypothesis advanced to account for this occurrence. Igneous action is still apparent in the immediate vicinity in the form of hot springs, the two principal of which are situated at Fairmont and Sinclair, many miles apart. Here very hot water is being discharged, constantly depositing calcareous sinter on the Rocky Mountain slopes. These springs are said to possess medicinal virtue and are much patronized by both white settlers and Indians. Up Toby Creek is to be found a "soda" spring now easily accessible by the fine wagon road lately built by the government for the mines. This water is clear, cold, and sparkling and makes a delightful drink, preferable to most manufactured mineral waters. It is highly effervescent, and according to the analysis made by the Mines Department, Victoria, contains:

Sulphate of Calcium	Quantities not given
Sulphate of Magnesium	Solids 205 grs. per gallon
Carbonate of Sodium	Chlorine 1.25 grs. per gallon
Carbonate of Iron	
Chloride of Sodium	

The amount of sulphate of calcium is said to preclude its use as a marketable commodity. It is a luxury to travellers up Toby Creek nevertheless. The whole district is rich in salts, resulting in numerous small "alkali" lakes, these being formed by sulphur water leaching out the salts from the soil and conveying them in solution to depressions, where, fully exposed to the sun, a natural concentration takes place. In Toby and Horse Thief creeks can be seen highly decomposed shales, their planes of cleavage almost vertical and rich in sulphate of magnesia. Other shales contain nodules of pure anhydrous sulphate of alumina. Should there ever be a demand for this substance, there is no lack of it here. Some shales sent to the Mines Department, Victoria, contained, according to report obtained, aluminite. One part of Toby Creek canyon only accessible in mid-winter on the frozen creek, beautiful specimens of selenite are found in the shale. This selenite exhibits the usual characteristic arrow-headed crystals.

Both Toby and Horse Thief creeks contain placer gold, but judging from its appearance it is evidently there as a result of natural concentration from a more ancient channel. The gold is smooth and rolled flat by the passage of boulders over the bed rock upon which it lies. Further south at the well-known Wild Horse creek near Fort Steele, gold has been profitably obtained from the placer for many years.

The ancient channel will one day be found in the Windermere district, its existence is placed almost beyond doubt by discoveries that have already been made. Along the base of the Selkirk range west of Canterbury is to be seen a remarkable and extensive dyke of that form of felsite known as keratophyre (Keras, Gr., a horn)

owing to the excess of soda it contains. This is identical with the famous rock in the Tokotea district, New Zealand, from which so much gold has been taken. The keratophyre is composed of :

Silicia, Si O ₂	59.35
Alumina, Al ₂ O ₃	21.30
Ferrous oxide FeO	10.06
Lime CaO	1.58
Magnesia MgO	0.48
Potassium Oxide K ₂ O	0.34
Sodium Oxide Na ₂ O	7.08

100.79

This dyke in the Windermere district contains ledges rich in copper, associated with extensive bodies of barytes. Samples of the dyke are to be seen in the Museum, Victoria. Through one of the passes in the Rocky mountains into the Kootenay valley, many square miles of country, practically untrdden by man, is open for the adventurous traveller to explore, making the Windermere district his headquarters for supplies. Beautiful specimens of ore have been brought out of this unknown part. At the Museum, Victoria, can be seen specimens of sodalite brought over the Rockies by prospectors under the impression it was some form of copper, its fine blue colour being the cause of the excusable mistake.

Perhaps enough has been said to impress those having mineralogical knowledge and leisure with the fact that the Windermere district possesses many attractions, enough to warrant a visit at least and a few months investigation. Botanists also would find a rich field to explore in this fertile valley, medicinal plants being especially prominent, such as digitalis, aconite, pulsatilla, etc. In the mountains just below the line of perpetual ice and snow, can be seen the most lovely flowers during the summer, at an elevation of 8,000 to 9,000 feet. Here hunters can find the ptarmigan, wild goats and sheep, deer and the different kinds of bear.

The government has recognized the importance of the Windermere district and has spent unusually large sums of money on roads during the past two years. The leading mines have also contributed heavily toward the expense of road making.

A METHOD OF MINING LOW-GRADE ORES IN THE BOUNDARY CREEK DISTRICT.†

By FREDERIC KEEFER, M.A., ANACONDA, B. C.

IT is usually the case in new districts presenting a variety of new conditions, that a good deal of preliminary work must be done to determine the best methods of mining and treating ores. This has been true in the Boundary District, the ores of which, as a rule, are of very low grade, occurring in deposits of great extent without well-defined walls.

It is the purpose of this paper to describe the methods of mining at the Mother Lode mine in Deadwood Camp, near Greenwood, and the reasons which have led up to their adoption.

The ore deposit here outcrops at intervals for a distance of about 2,000 feet, the width in explored portion averaging perhaps 140 feet, although the absence of any defined walls prevents exact measures being given. The dip is about 70 degrees easterly, and pitch toward the south at an angle yet undetermined. Only the ground to the north of the shaft, which is located centrally, has been explored as yet. At the beginning of stoping operations, the ore body had been developed by

†From a paper read before the March meeting of the Canadian Institute of Mining Engineers.