

In the immediate vicinity of Burns lake rock-exposures are somewhat scattered, as a great deal of the surface is covered by soil, clay, etc. The rocks that are exposed would seem to be mainly Hazelton formation, with a considerable percentage of intrusive rocks in the form of dykes or stocks which may or may not also belong to this formation. The rocks believed to be Hazelton formation rocks are volcanics, tuffaceous rocks, argillites, and possibly some sandstones.

In the vicinity of Francois lake Dawson classified the formations exposed as belonging to the Porphyrite series. This name described a series of dominantly volcanic rocks which form the lower horizon of the Hazelton formation. The name "Hazelton formation" was applied by Leach to replace Dawson's "Porphyrite group," the "me to include the whole conformable series of volcanics and sediments."

Reviewing the available literature regarding the Burns Lake-Francois Lake area, it would seem that the rock formations of this area are mainly volcanic and tuffaceous measures, with some metamorphic sediments—not a promising area, therefore, for oil prospecting.

In this connection it may be pointed out that one supposed evidence of oil in this area, which has locally been supposed to be of importance, consists of gas-bubbles rising around the shores of Burns, Francois, and other smaller lakes. It is fairly evident, however, that this gas is only marsh-gas "rising from" the decaying vegetation such as can be seen "round almost any swamp. Thin films of iridescent iron oxide and traces of vegetable-oil on swamps similarly are not evidence of underlying oil reservoirs.

An excellent reconnaissance report on the country lying between Hazelton and the Groundhog coalfield is contained in G. S. Malloch's report on the Groundhog field in the 1912 Summary Report of the Geological Survey. From this report it is apparent that the Hazelton formation is practically continuous from Hazelton to the Groundhog coalfield, and that in places, particularly in the coalfield, it is conformably overlain by the Skeena coal-bearing series. Going northerly from Hazelton, the volcanic flows of the Hazelton formation gradually disappear, giving way to tuffaceous rocks, and finally these fade out and the formation consists almost entirely of sedimentary measures. Plant remains are abundant throughout the formation and a marine horizon yielding poorly preserved fossils was recognized near the base of the upper third of the formation. Quoting from the report: "The top of the Hazelton formation in the measured section consists of grey shales with larger grains of black shaly material and often divided by thin lines of bituminous matter parallel to the bedding-planes; shales predominate throughout, and no great amount of tuffaceous material is present except at the base of the section, which ended with a bed of tuffaceous sandstone 40 feet thick."

From the foregoing it is apparent that in the country lying north of Hazelton to the Groundhog coalfield there is a large area of sedimentary rocks, but the question of whether or not these rocks contain any horizons which would be probable sources of oil, awaits more detail examination.

For the present the question of a source of oil in the rocks of this district is the important one, as the considerations of suitable reservoir and cap-rocks are of secondary importance. It is probable, however, that such suitable containing horizons would be found. Anticlinal and dome structures are, of course, frequently observed in the formations of this district, as the mountain-building forces have produced much folding and also faulting of the measures.

So far as is known, no definite seepages of crude oil have been found anywhere throughout the district.

FRASER LAKE SECTION.

The occurrence of coal of a lignitic variety along the southern shore of Fraser lake has been known for many years. In the summer of 1920 a number of coal lenses were staked by T. J. Kettle, covering some coal-outcrops about 2 miles from the eastern end of Fraser lake and situated close to the edge of the lake on the southern side. Owing to the coal reserve force at that time these lenses were not secured at once, but it is believed that they are now granted. A company known as the Fraser Lake Collieries, Limited, was formed to take over these lenses, and some development was carried out last year and the first part of 1921. The stock of the company was subscribed for locally by residents of Endako, Fort Fraser, and other towns in the district. Mr. Kettle has been in charge of the preliminary work of the company.

The coal formation consists of shales, some sandstone, and thin bands of lignite separated by shale-partings of varying thickness. The whole formation appears soft and crumbly, and from its general appearance looks like a comparatively recent one. The bands of lignite vary from a few inches up to 3 feet in thickness, but in places there is from 4 to 5 feet of coal and shale bands bedded together.

Three shafts have been sunk, which are 28, 33, and 12 feet deep. The first two shafts pass through coal-bearing strata in which there are alternate bands of coal and black shale. The third shaft has not yet reached any coal-bands. The best section of coal which was seen in the shafts was 5 feet, of which 13 inches was shale occurring in four bands.

The following samples were taken:—

Description.	Moisture.	Vol. Com.		Fixed	Ash.
	Per Cent.	Per Cent.	Per Cent.	Carbon	
Across 5 feet of coal-seam, excluding 13 inches of shale.	13.7	29.8	29.8	26.7	
Grab sample from dump, No. 1 shaft.	17.2	36.9	34.2	11.7	
Grab sample from dump, No. 2 shaft.	5.1	19.7	49.8	25.4	

The area of coal formation exposed at this point is apparently not extensive. The railway closely parallels the lake-shore at this point and affords a good section of the formation in a number of rock-cuts. The coal-outcroppings are only a few hundred feet from the railway. To the west of the coal formation a short distance a rock-cut on the railway shows a massive granitic rock, while to the east of the showings there are basaltic dykes making intrusive contacts with the sedimentary formation. Still further east volcanic ash and tuffaceous rocks come in. The actual area of coal formation that can be seen is quite small, although the field may have an extension to the south—that is, away from the lake.

The property was examined in August and it is not known if further development has been carried out since that time. If development of the property is to be carried out, the first thing that should be done is to make a thorough geologic examination of the surface to see if the possible coal area is sufficient to justify underground development. The analyses of the coal show that on the average it would be classed as a lignite, and, further, that the percentage of ash is somewhat high.