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OIL IN WESTERN CANADA

By Ronald C. Campbell-Johnston, Mining Engineer.

Indications and Circumstantial Evidences of Large Oil Reservoirs in Alberta and British Columbia.

That oil in commercial quantities will be found in restricted parts of both Alberta and British Columbia, is the intuitive judgment of skilled mining Engineers. This short letter is penned to cursorily educate the investing public concerning the circumstantial evidence at hand bearing on this prediction. Although the writer proposes to curtly explain the intricacies of oil finding, yet he is not anxious to turn out capable oil geologists from its simple perusal.

Geology, the study of the earth's crust, is the talismanic secret for locating oil pools, and requires a life-long practical study. To save financial loss and to eliminate the unnecessary gambling, haphazard methods prevalent in locating boreholes for oil, the employment of a technical geologist is a sine qua non. Nothing authentic can be intelligently determined as to the whereabouts or extent of petroleum fields, without being sure of its origin.

Today there is conclusive evidence that terrestrial vegetation constitutes the progenitor. This raw material when heated and distilled under environments hermetically sealed, so retaining all the fluids, gases and aqueous volatiles, is transmuted into petroleum. When on the other hand a leak or fault in the rock formation occurs to allow the escape of these essential ingredients, then coal as a hardened residue is the alternative. The greater the event under pressure then anthracite rather than bituminous varieties are created. In predicting a deep-seated oil flow, the raw material constituted by terrestrial vegetation, must have primarily existed in great abundance.

In Alberta, classed under the Cretaceous series in geology, we see the Montana group of sandstones and shales, mostly formed from marine origin, proven by their fossil contents. Next in greater depth we have the Colorado group of rocks, all from marine environments. Then comes the Dakota group of sandstones of fresh water deposition, carrying a limited amount of coal in places. Lastly for our purpose we have the Kootanie group of sandstones and shales, all prolific in land plants and terrestrial vegetation. Underlying these are the Jurassic Fernie group of shales and sandstones of submarine origin. Here then is the secret to the whole problem, namely that the Kootanie group are the special oil-bearing series, to be correlated by their fossilised land plants. These rocks underlie great areas in both Alberta and British Columbia.

Next we have to ascertain the requisite environments to form expansive oil fields, generated under the prescribed conditions. First depth of superimposed formation, say three thousand feet and more, is essential to create a natural retort hermetically sealed. Then the area must be free from geological faults, to prevent volatilisation of gasoline to leave only inspissated tar sands. Furthermore, a roof should be present, covering the porous oil-storing sandstones, and impervious, as a shale, to exhalations of oil, gas, steam and fluids. Another requisite is a dome-shaped anticline, under whose canopy the soil can concentrate and rest, originally trapped by subterranean waters.

The axis of the anticline, probably north and south, by its down-sloping sides east and west, comprise the boundary of an oil pool. Those boreholes which enter these anticlines are a paying concern, whereas holes missing them and finding only a syncline are barren of oil. Oil pools do not continue indefinitely over long distances in length and breadth.

From the facts narrated, Alberta and British Columbia both possess in spots these favorable circumstantial evidences to cause the mining engineer to predict oil with emphasis. Yet the boreholes around Calgary have not reached the Kootanie group of rocks. They have tapped pockets of secondary enriched oil, forced as through a filter into the higher strata from some anticline not perfectly impervious to its passage, under severe pressure. This product obtained, however, is not typical of the main viscid body, perhaps below, in the Kootanie sedimentaries.