A Possible New Fuel Oil Industry for Canada

By James Ashworth.

For quite a number of years a small coalfield has been known to exist about fifty miles north of Kamloops. It was visited and reported on by Dr. Dawson, who stated that the seams were too thin for operation. The exposures so far discovered are all at Chu Chua in one creek called Coal Creek. Since Dr. Dawson's visit, another seam of coal of workable thickness has been discovered, and to some extent worked. The coal, when tested on the Canadian Pacific Railway, was reported as having given very satisfactory results. At that time, there was no railway transit to and from Chu Chua, but now the Canadian Northern Pacific Railway passes through the district and through the coalfield. A workable seam of cannel coal has also been discovered, but never opened up. Later still, another seam of coal has been disclosed by a freshet, and will doubtless receive attention from one of the syndicates which have been formed to test the possibilities of the coalfield. The coal previously worked proved to be of a hard bituminous and coking quality, though at present it is not known whether the coke will be sufficiently hard for metallurgical purposes.

Cannel coal is also known in the Crow's Nest Pass coalfields and oil shales will probably be found when they are systematically looked for.

As a consequence of the excessive demand for mineral oil for war purposes, the ordinary sources of supply have proved insufficient to meet the demands of the market, and, therefore, other sources must be energetically prospected. One other source, which is receiving close attention in Great Britain and the United States to-day, is to extract oil from cannels, bastard cannels, shales, torbanites, blackband ironstone, coal, lignites and peats. In Scotland, large tonnages of oil shale have been and are being converted into fuel oil and for other purposes. The fuel oil yield is not more than 60 per cent. of the total yield of, say, 20-30 gallons per ton. Very few cannels yield as much as 50 gallons of oil per ton, but many of them will produce 40, and some of the Utah shales as much as 80 gallons per ton. The yield of sulphate of ammonium is very considerable, and may, with high-temperature carbonization, reach 60 lbs. per ton of cannel. Paraffin wax may also be extracted.

Experiments made on coal for the Nitrogen Products and Carbide Co. in Lancashire, with the Glover-West vertical retorts, showed that if 4.2 tons per 24 hours were put through at a temperature of 1,411 degrees Cent., and 2.6 tons per 24 hours, at a temperature of 1,194 degrees Cent., that more tar oil was produced per ton at the lower temperature. Good cannels should, therefore, be treated for oil in low temperature retorts.

At a meeting of the Manchester Geological Society, on the 12th of March, a paper was read by Mr. J. Drummond Paton, on the recovery and use for oil and power purposes from wastes, shale and lower grades of coal. The process advocated was to carbonize the coal, cannel, shale, etc., in a short period of time, so that the lighter gaseous hydrocarbons (which condensed as tar oils) were not destroyed by a high temperature. The apparatus used was the Tozer concentric retort, working under a high vacuum of 20 inches of mercury. Carbonization was perfected in four hours. The crude oils (water free) varied from 16 to 80 gallons per ton of coal carbonized. The purified oils were of the paraffinoid series, and the light oils were excellent for motor spirit and resembled petrol in their efficacy.

Napthalene and anthracene were entirely absent. The tar acids were practically phenols and cresyllic acids, and were produced at temperatures of from 900 deg. to 1,200 deg. Fahr.

The yield of gas was from 5,000 to 6,000 cubic feet per ton, and its heating value about 800 B.T.U. per cubic foot. The cannel gave 6,000 to 8,000 cubic feet of gas per ton. The residual coke retained from 7 to 10 per cent. of a volatile inflammable non-smoking gas, which burned with a lambent, smokeless flame, yielding great heat, with an approximate calorific value of 13 500 B.T.U.'s per cubic foot.

Very inferior coals yielded good fuel results, but for a high yield of oil, cannels and shales were certainly preferrable.

It was found that a thickness of 2½ inches in the retorts was the best basis for carbonization. The same material which gave the low temperature distillates also gave the benzoid series.

The United States Department of Mines has made a practical search for oil shales, and their development and conversion into oil is now practically established.

It is important, therefore, to note the difference between coal and cannel coal and between these and oil shales—the first when of a bituminous quality will usually produce good coke as one of its residuals, but cannel and the oil shales do not produce a metallurgical coke, though the residue of some of them may be used to heat retorts and stoves. Cannel coal and oil shales were, before the discovery of petroleum, largely used as the source of mineral oil.

Cannel coal being the resultant of the oxidation of water-laid deposits consists mainly of plant spores, pollen and the remains of water plants, animals and fish. As a source of oil, the cannel which contains the least water and the highest percentage of hydro carbons is the most desirable.

It is recognizable by its velvety appearance and its peculiar conchoidal fracture, is jointy and hard, does not blacken the hands, and is almost immune from weather effects. In the best cannel, the fixed carbon is much less in percentage than the volatile content. Cannel deposits, having been collected and formed in basins or lagoons, are not so regular in formation as is coal, and yet cannel and coal may be found in close contact and as part of the same seam. The illuminating value of gas made from cannel is greater than that made from coal, and the yield of oil per ton is also very much greater. One high-class cannel in the Wigan Coalfield, England, is known as Curley or Birds-eye Cannel, from its peculiar fracture. In the shales overlying cannel it is often possible, when the shale weathers and splits into thin sheets, to find very interesting fish remains.

Cannel coal, when scratched, gives a brown streak and its specific gravity being lower than coal, it naturally results that the lighter it is, the more valuable it becomes.

When examined under the microscope, it shows that plant spore cases and waxy resinous matter are its main constituents. Where the seam has been changed