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No. 65

REPORT ON MANGANESE BOGS

UPPER NORTH BRANCH, CANAAN RIVER, N.B.

1.
Location

Deposits of manganese ore are located along the shores of the Canaan River, the Upper North Branch and the Middle North Branch of the Canaan River.

The present investigation has been confined to the four deposits which occur on the west bank of the Upper North Branch. As shown in the plan these bogs are four in number, extending throughout a distance of about 3500 feet in a general northerly (magnetic) direction from the junction of the Upper North Branch and the main Canaan River.

The area in general is about half way between the Intercolonial and the Transcontinental systems of the Canadian Government Railways.

Ownership

F.E. Jonah of Moncton has a "working license" on this ground, and a "license to search" over the rest of 10 square miles in a block along the river.

2.
Accessibility

The nearest railway facilities are at Canaan Station on the Intercolonial Railway, a distance of about 4½ miles, from

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the southerly end of Bog No. 4. This distance is measured along a bush road, marshy in places, but generally flat, with a good hard sand and sandy clay bottom, which connects the bogs with Canaan Station. With comparatively small expenditure of money, this road could be made into a good truck road for use in the summer season. It constitutes a fairly good winter road in its present condition.

3.

Topography, Character of Country, Timber, etc.

The ground on which the bogs are located is all gently sloping towards the river bottom with gradients varying from 5 to $12\frac{1}{2}$ feet in 100 feet. The lower edge of the bogs is generally not more than 10 to 15 feet above the level of the river.

Bogs No. 1, No. 2 and No. 3 are largely of the meadow type, covered with marsh grass. In places there is scrubby spruce and tamarac (2"-6" in diameter) and a few alders.

Bog No. 4 is largely timber-covered with a small meadow area in the centre. The timber is spruce and tamarac (4"-8" in diameter) over most of the bog, running into poplar, birch and spruce (6"-12" in diameter) at the top.

4.

Character of the Manganese Bogs in General

These manganese bogs are situated on valley slopes, below the orifices of a series of mineral springs, with which the manganese is genetically associated. The water from the springs has apparently deposited manganese dioxide through a process of oxidation or bacterial action, on top of the original surface of sand, gravel or clay. The manganese deposits are therefore fan-shaped with the points of the fans at the mouths of the springs, and with their thickest portions directly below the mouths. Laterally, and at the lowest portions the manganese ore gradually pinches to nothing. The deposits are consequently like mere blisters

blisters, which have pushed the soil upward thus making room for themselves between the hard bottom and the grass roots.

The bogs by which is meant the material between the grass roots and the footwall of sand, clay or gravel vary in thickness from less than a foot to upwards of seven feet. Since the bog material has been deposited upon the old surface, it follows that where the old surface had depressions, the bog material is ordinarily thickest.

In some of the bogs, for instance in No. 4, the only manganese dioxide that can be observed occurs in a somewhat hard compact layer immediately beneath the grass and tree roots. Below this layer to the bottom of the bog, the material appears to consist entirely of brown peat, varying in character from logs and roots of considerable thickness scarcely affected by the carbonizing processes, to the finest woody residue which has been greatly altered by these processes. In this type the manganese and peaty beds are quite distinct, and there is an abrupt change at the contact. Occasionally a little manganese dioxide is also found below the peat, lying immediately on the footwall of the bog.

In some of the other bogs, for instance in No. 1, manganese dioxide occurs throughout the whole thickness of the bog - in places it is relatively pure, occurring by itself, while in others it is mixed with both hard and soft types of

bog iron, and with peat. These characteristics are shown in the vertical longitudinal trench sections. In this type, there are no abrupt changes in the character of the material; everything is transitional.

5.
Method of examination

The bog areas were carefully surveyed and blocked off into fifty foot squares with a transit instrument. A base line was chosen running parallel to the largest axis of the bogs and the lines running parallel to this base were designated by an alphabetical letter while the cross lines were numbered numerically. Stakes were driven at the corners of each square thus blocked out and marked according to the above system of location.

Bogs numbers one and two are laid off in the same coordinates but bog number four was laid off in a separate set on account of its longest axis being oriented in a different direction.

A contour map of the bogs was also made by the aid of a hand level using a contour interval of five feet.

b. Sampling

The samples were taken with a peat Auger (see sketch) This auger consists briefly of a $1\frac{1}{2}$ inch hollow pipe having a closed and solid pointed end. The pipe is slotted for 6 inches so that when it is twisted it acts like an auger and cuts a core which is collected in the hollow portion of the pipe and held there.

The method of using this auger was as follows - The auger was first shoved into the ground, care being taken not to turn it while doing so. When the auger had penetrated its entire length it was given a few turns which was sufficient to fill the cup after which it was pulled up and the core extracted by means of a special shaped tool. This procedure was re-

repeated every 6 inches until the bottom of the bog was reached. By this method a complete core was obtained from every bore hole.

The entire core from each bore hole drilled in the above manner was collected and placed in cans having a penny-lever air-tight cover and shipped to the Ore Dressing & Metallurgical Division of the Mines Branch, Ottawa for analysis.

c. Trenching

A trench or ditch was dug on each bog along the lines shown in the accompanying map. These trenches were excavated to the floor of the bog in order to determine its nature and whether or not the manganese could be readily separated from it by shoveling. In general there was a well defined line between the manganese and the floor or footwall of these bogs and the footwall was free from boulders or large pebbles. (see the sections along these trenches)

d. Determination of specific weights

A second reason for trenching the bogs was to obtain the weight per cubic foot of the material in place. Samples were cut from the walls at fifty foot intervals, along the trenches, large enough to fill a cubic foot box. Then samples were obtained by cutting off slices of the material extending from the top to the bottom of the trench, thus obtaining a representative sample of the material extending from the top to the bottom of the bog.

A small scale was carried from place to place and as soon as the cubic foot box was filled its weight was obtained. After the sample was weighed it was turned out onto a sheet of galvanised iron and quartered down to a sample weighing approx-

imately

imately 5 pounds which was immediately placed in an air-tight can and shipped to Ottawa for the determination of its moisture content and analysis. The weights per cubic foot of wet bog material were found to vary from 58 pounds to as high as 76 pounds.

6.
Description of Bog No. 1

This is the most northerly of the bogs that have been drilled. It is of the meadow type, but contains running down its centre a patch of scrubby tamarac and spruce with some alders. The manganese dioxide occurs immediately at the grass roots, at a depth varying from 3" to 1 foot.

This deposit was laid off in squares, 50 feet to a side, and a complete sample was taken with a peat auger from the surface to the footwall, at the corner of every square. A trench was dug along the line shown in the plan, and was cut as nearly as was feasible, down to the footwall:

Average length of bog (= average on N-S coordinates) = 228'

" width " " (= " " E-W ") = 190'

Area of bog = 43,300 sq. ft.

The ore in this bog is of the mixed type. In places there are streaks of relatively pure manganese dioxide, sometimes soft, and sometimes hard and gritty; but these grade off into peaty material mixed with manganese dioxide and some iron oxide on the one hand; and on the other hand into material largely limonitic with bunches of manganese dioxide and peat. Some high grade ore occurs here and there immediately on the footwall of the bog. (See Section 1)

7.
Description of Bog No. 2

This bog begins about 100 feet southeast of No. 1 and continues in the same direction for about 500 feet. The most northerly

northerly third of the bog is timbered, partly with light spruce, tamarac and poplar, and partly with heavier trees (6" - 12" in diameter). A streak of ground carrying no values runs from the top to the bottom of the bog, as shown in the plan. The remaining portion (the southerly two-thirds) is of the meadow type, with here and there a few alders and scrubby tamarac and spruce.

This deposit was laid off in 50 foot squares, on the same coordinates as Bog No. 1; and peat auger samples were taken at each corner for the whole thickness of the bog. Trenches were dug along lines 8 and 13.

Average length of bog (on N-S coordinates) = 336'
 " width " " (" E-W ") = 158'
 Area of bog = 53,075 sq.ft.

The ore in this bog is partly mixed similar to that of Bog No. 1 and partly similar to that of Bog No. 4. In the more northerly timbered section, the manganese dioxide is more or less segregated, being largely confined to a bed immediately below the grass and tree roots. Brown peaty material takes up most of the space between the bottom of the manganese bed and the footwall sand and clay. (See Section on Line 12).

In the more southerly meadow portion of the bog, the ore is considerably mixed (Section Line No. 8). In places streaks of high-grade ore run across the bog from the bottom to the top, while near the easterly and westerly edges, two to four feet of peaty material lie on the sand and gravel. These streaks grade both laterally and vertically into the mixed type of hard and soft bog iron with both soft and gritty bog manganese.

Samples were cut every 50 feet along the sides of the two trenches on this bog, from the grass roots to the sand or clay at the bottom. These samples were used for the determination of the specific weight of the material trenched.

8.
Description of Bog No. 3

This is a small circular deposit of the meadow type, lying between Bog No. 2 and Bog No. 4. It has a gradient of about 12½ per cent.

The deposit was sampled with a peat auger on the corners of 50 foot squares, but owing to its small size and the low grade character of the ore material, it was not trenched.

Radius of bog : 80 feet

Area of bog : 21,000 sq.ft.

9.
Description of Bog No. 4

This is the largest and most southerly of the bogs. With the exception of a small central area, which is a meadow, the bog is timbered with tamarac and spruce in the lower portions (2"-8" in diameter), and with birch, poplar and spruce (4"-12") in the upper portions.

The deposit was laid off in 50 foot squares on a set of coordinates corresponding with its greatest dimensions. Peat auger samples were taken at the corners of the 100 foot squares - one sample (marked (a) for the upper manganiferous portion of the hole, and another sample (b) for the lower peaty portion.

Average length of bog (on N-S coordinates) = 428'

" width " " (" E-W ") = 317'

Area of bog : 135,600± sq.ft.

In this bog, the manganese dioxide occurs almost exclusively in an upper narrow bed, varying in thickness from one or two inches to about 20 inches. Below this to the footwall sand and clay is a thick bed of brown peaty material which appears to carry little or no values. Samples were taken of the two beds separately to determine whether or not the peaty material contains any manganese dioxide.

Trenches were dug along Lines 102 and 106 and samples were cut every 50 ft. along the sides of the trenches, and were used in the determination of the specific weights of the manganese and peaty layers. These trenches disclosed the fact that there is

is an abrupt change at the base of the manganese bed, into an almost exclusively peaty material.