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**MINES BRANCH**

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# AUSTIN BROOK IRON-BEARING DISTRICT

## NEW BRUNSWICK

BY

EINAR LINDEMAN, M.E.

OTTAWA

GOVERNMENT PRINTING BUREAU

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13223—1

No. 105.

Dr. EUGENE HAANEL,
Director of Mines Branch,
Department of Mines,
Ottawa.

SIR,—I beg to submit, herewith, the following report on work done in the Austin Brook iron-bearing district.

I have the honour to be, Sir,
Your obedient servant,

(Signed) **E. Lindeman.**

Ottawa, March 1, 1911.

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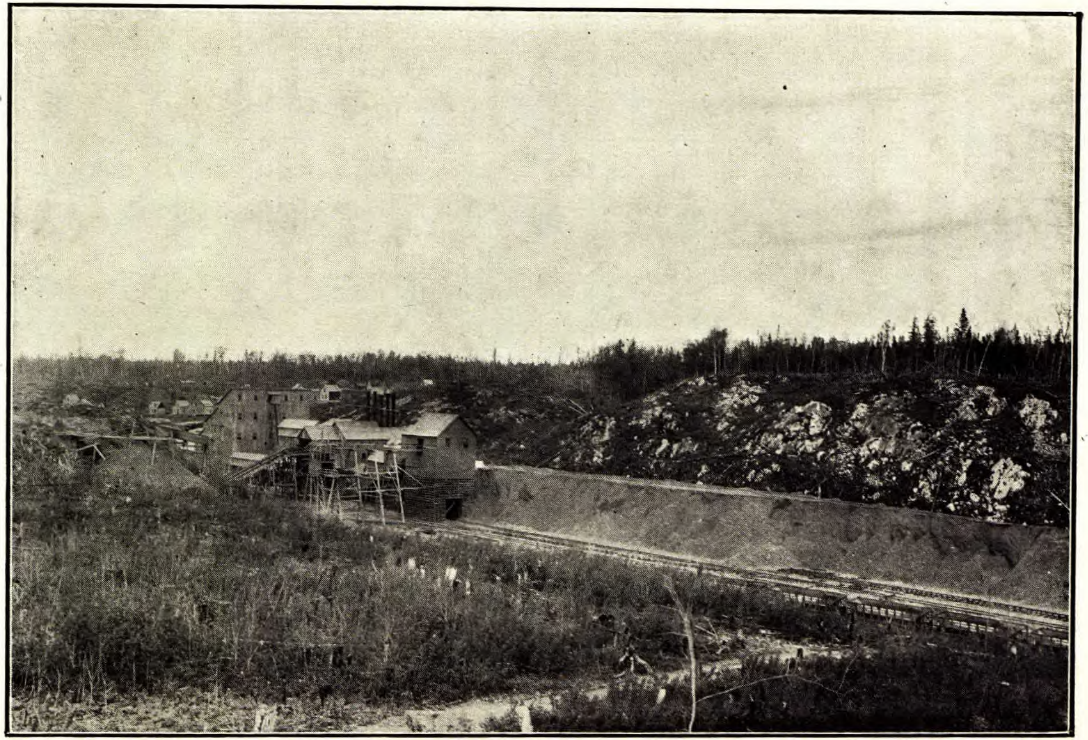

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Austin Brook mining camp, N. B.

# THE AUSTIN BROOK IRON-BEARING DISTRICT, NEW BRUNSWICK.

## INTRODUCTORY.

Field work by the Mines Branch, in the Austin Brook iron-bearing district, New Brunswick, was commenced in the autumn of 1906, when a magnetometric survey, covering an area of about one square mile, was made by the writer. This survey led to the discovery of several ore deposits not previously known. During the months of June and July, 1910, this survey was extended by the writer, with the assistance of Mr. W. M. Morrison.

The total area covered by the two seasons' field-work is about 2 square miles. Inasmuch as a preliminary report, and magnetometric map covering the area surveyed in 1906, have already been issued by the Mines Branch, the objective of the present report is to give, in more detail, the results obtained during the two field seasons indicated above. Two maps have been prepared to accompany the report: one shows the distribution of the isodynamic lines of the vertical magnetic intensity; while the other shows the geology of the area. The magnetic observations were taken with a Thalen-Tiberg magnetometer, the distance between the points of observation varying from 25 to 100 feet, depending on the local complication of the magnetic field. On the geological sheet, an attempt has been made to outline the various ore deposits, as indicated by the magnetometric survey ; but since the greater part of the area occupied by the ore bodies is drift covered, it has been possible to verify their outline only in a few places, by the actual observation of outcrops and contacts. Hence they are not, as a rule, well defined.

## LOCATION.

The iron ore deposits are situated in the county of Gloucester, about 23 miles southwest of the town of Bathurst, in the vicinity of Austin brook, a small tributary of the Nipisiguit river. The elevation of the district is about 350 to 500 feet above sea-level. Its main topographical feature is the Nipisiguit valley, with generally steep banks, rising to a height of 100 to 140 feet above the river. Back from the river, the country becomes comparatively flat, with occasionally a few outstanding small hills, generally having a northerly and southerly trend. The greater part of the area is drift covered, or occupied by muskegs, and is thickly wooded with spruce, cedar, balsam, poplar, birch, and maple.

### HISTORY.

The first discovery of ore was made in 1897, by Mr. Wm. Hussey of Bathurst. In 1902, this gentleman—together with Mr. T. Burns of Bathurst—secured "Rights to Search" upon several 5 mile locations in the district. During 1903, representatives of the Dominion Iron and Steel Co. visited the property, and some trenching and test-pitting were done. In the autumn of 1906, at the request of O. Turgeon, M.P., the writer was instructed by the Director of the Mines Branch to make a magnetometric survey of the district. The result of this survey showed that the field contains a number of magnetic iron ore deposits, some of which are of large extent. In order to fully ascertain the quality of these ore bodies, the Provincial Government of New Brunswick was petitioned for the use of the diamond drill belonging to the Province. The petition was granted, and during the year 1907 seven drill-holes were put down. The records of five of these holes are given in the following pages. In November of 1907, the Austin Brook property passed into the control of the Canada Iron Corporation, Limited. A branch line, connecting the property with the Intercolonial railway at Blacks Cut, about 4 miles south of Bathurst, has been built, the distance from the mine to Blacks Cut being about 17 miles.

An ore dock for the transhipment of the ore has been completed by the Company at Newcastle. It consists of a 13,000 ton ore pocket. The ore is delivered from the pocket through a series of chutes into a horizontal bucket conveyer, operated on a track. This conveyer delivers the ore into an outer 150 ton pocket, situated on a dock. From this pocket the ore is loaded into the vessel by means of a self-trimming chute. The ore dock has a storage capacity of 13,000 tons, and its loading capacity is 3,000 tons per hour. The railway haul from the mine to Newcastle is 57 miles. During the last two years the following shipments have been made :—

| | |
|---|---|
| 1910 .................... | 5,336 short tons |
| 1911 .................... | 31,120 " " |

## GEOLOGY.

The greater part of the area under consideration is underlain by quartz porphyry, generally of schistose structure; owing to the intense folding and shearing to which it has been subjected. Its general strike is about north and south, with a steep dip towards the west. Associated with the porphyry are bands of chloritic and sericitic schists, which may be merely alteration phases of the porphyry. Generally, the porphyry shows distinct phenocrysts of feldspar and quartz, in a dense grey matrix.

In the southern and western part of the area eruptive rocks of basic character are found intruding into the porphyry. These rocks may be classed as gabbro or diabase. They are usually of a greenish grey colour, with a granular to fine texture. Other intrusions in the porphyry are numerous quartz veins. These are also very common in the ore, but are rarely seen in the gabbro. They vary in size from a fraction of an inch up to several inches in width.

Sedimentary rocks, consisting of black and grey slates, highly tilted, and conformable to the porphyry, outcrop on the banks of the Nipisiguit river at Great falls, about 1½ miles below the mouth of Austin brook; but have, so far, not been observed within the area under consideration. Similar rocks are also exposed about one mile above Austin brook; and farther up the Nipisiguit river, at the Narrows, fragments of black slates were seen embedded in the porphyry. The porphyry seems, therefore, to be intrusive in this slate formation, the geological age of which is early Palæozoic, probably Ordovician.[1]

## CHARACTER OF ORE.

The ore of the district consists of a very fine-grained siliceous magnetite, mixed with a considerable amount of hematite. It is often found interbanded with jasper and a green slaty gangue material, which give the deposits a conspicuous bedded structure. Veins of quartz are also—as already mentioned—of common occurrence, and generally follow the bedding planes of the ore. The metallic iron content of the various layers varies, therefore, considerably, ranging from 59 down to 35 per cent: the average being about 43 to 47 per cent.

The average phosphorous content is about 0·8 per cent, with the sulphur ranging from 0·03 to 0·1 per cent; but locally

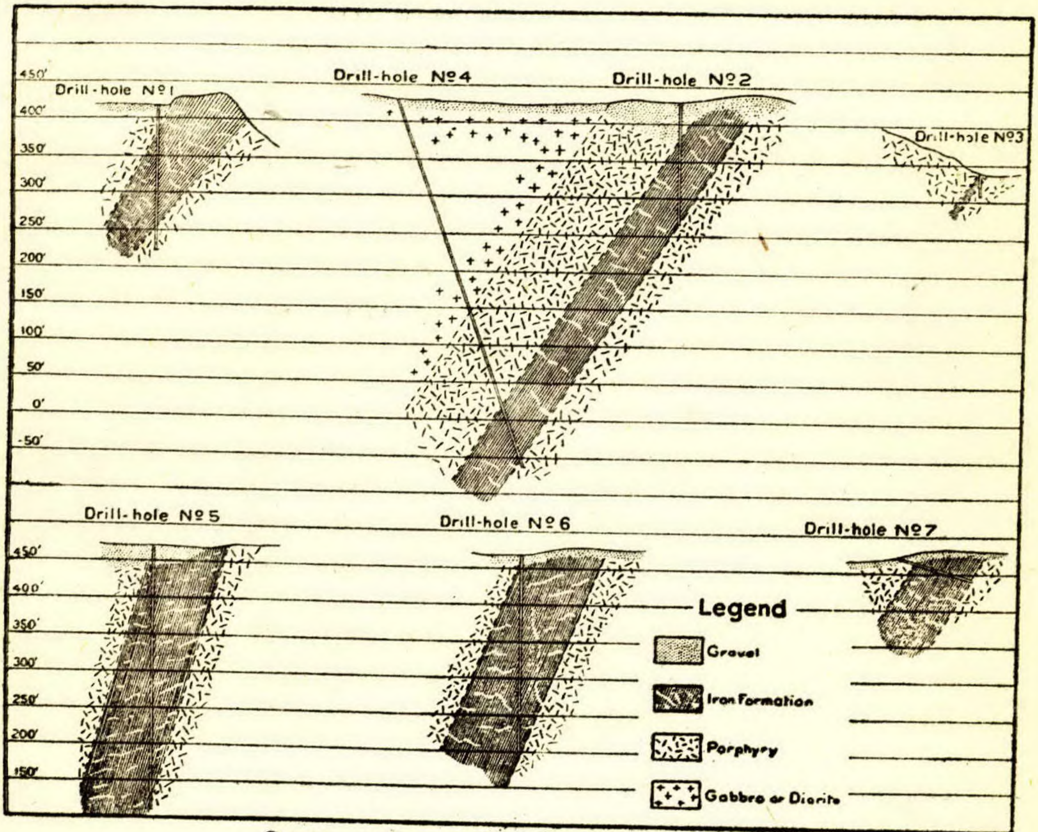
[1] See Summary Report of the Geological Survey for 1909, p. 218.

the sulphur content is much higher. This is especially the case near the contact of the ore with the country rock, where layers of iron pyrites, varying in thickness from a fraction of an inch up to several feet, often occur.

The following tables give a number of analyses representing average samples taken by the writer :—

TABLE No. 1.

| No. of sample | Metallic iron % | Insoluble % | Phosphorus % | Sulphur % | Manganese % | Notes |
|---|---|---|---|---|---|---|
| 1. | 43·7 | 26·3 | 0·64 | 0·05 | 1·00 | Average sample from deposit No. I, about 230 feet south of its northerly end. |
| 2. | 42·5 | 34·6 | 1·20 | 0·03 | Not determined. | Average sample from deposit No. I, about 100 feet north of Nipisiguit river. |
| 3. | 46·0 | 21·6 | 1·21 | 0·05 | Not determined. | Average sample from deposit No. 1. Group II. |
| 4. | 46·6 | 24·7 | 1·04 | 0·02 | 1·8 | Average sample from the southerly end of deposit No. 2. Group II. |
| 5. | 43·4 | 25·2 | 0·82 | 0·02 | Not determined | Average sample from the northerly end of deposit No. 2. Group II. |
| 6. | 43·6 | 33·1 | 0·40 | 0·007 | 0·5 | Average sample from deposit No. 4. Group II. |
| 7. | 44·5 | 28·5 | 0·83 | 0·03 | Not determined. | Average sample from Group III. |
| 8. | 47·5 | 22·7 | 0·65 | 0·05 | 1·2 | Average sample from Group III. |




***Sections through Diamond Drill-holes***

***Scale***

100 50 0 100 200 300 400 500 feet

Fig. 1.

Table 2 gives the record of four drill holes. The cores were shipped to the laboratory of the Mines Branch, at Ottawa, and analysed there by Mr. H. A. Leverin. With few exceptions, the average length of core represented by each analysis is 10 feet. The core of hole No. 7 was analysed at the laboratory of the Canada Iron Corporation, and the results—kindly placed at the disposal of the writer by Mr. Fulton, superintendent of the mine—are given in Table 3.

TABLE No. 2.

| Designation of drill hole. | Direction of drill hole. | Angle of drill hole. | Depth. | Analysis. | | | | Remarks. |
|---|---|---|---|---|---|---|---|---|
| | | | | Iron. | Insoluble. | Phosphorus. | Sulphur | |
| | | | Feet. | % | % | % | % | |
| Drill hole No. 1. | .......... | 90° | 0– 35 | ........ | ........ | ........ | ........ | Hanging wall, porphyry and schist. |
| | | | 35– 40 | 48·0 | 17·5 | 0·95 | 0·11 | Iron formation. |
| | | | 40– 50 | 50·5 | 15·5 | 1·01 | 0·10 | |
| | | | 50– 60 | 45·6 | 21·2 | 0·87 | 0·07 | |
| | | | 60– 70 | 45·5 | 18·4 | 0·69 | 0·43 | |
| | | | 70– 80 | 50·9 | 16·2 | 0·49 | 0·09 | |
| | | | 80– 90 | 51·6 | 8·0 | 0·86 | 0·70 | |
| | | | 90–100 | 39·6 | 24·7 | 0·85 | 0·10 | |
| | | | 100–110 | 51·6 | 12·3 | 0·79 | 0·05 | |
| | | | 110–120 | 44·5 | 20·9 | 0·75 | 0·08 | |
| | | | 120–130 | 41·3 | 27·7 | 0·57 | 0·13 | |
| | | | 130–140 | 53·9 | 12·6 | 0·74 | 0·65 | |
| | | | 140–150 | 57·2 | 11·9 | 0·87 | 0·69 | |
| | | | 150–160 | 49·8 | 16·6 | 0·94 | 0·78 | |
| | | | 160–162 | 55·7 | 8·4 | 0·76 | 1·30 | |
| | | | 162–192 | ........ | ........ | ........ | ........ | Footwall, porphyry and schist. |
| Drill hole No. 2. | .......... | 90° | 0– 49 | ........ | ........ | ........ | ........ | Gravel, etc. |
| | | | 49– 50 | 49·9 | 25·6 | 0·74 | 0·03 | Iron formation. |
| | | | 50– 60 | 58·1 | 17·1 | 0·55 | 0·15 | |
| | | | 60– 70 | 58·7 | 13·3 | 0·70 | 0·03 | |
| | | | 70– 72 | 49·7 | 23·6 | 0·91 | 0·17 | |
| | | | 72– 82 | ........ | ........ | ........ | ........ | Schist. |
| | | | 82– 90 | 44·5 | 12·4 | 0·83 | 0·27 | Iron formation. |
| | | | 90–100 | 51·7 | 19·0 | 0·60 | 0·27 | |
| | | | 100–110 | 50·1 | 19·6 | 0·88 | 0·04 | |
| | | | 110–120 | 48·3 | 16·0 | 0·72 | 0·19 | |
| | | | 120–130 | 50·1 | 16·4 | 0·71 | 0·10 | |
| | | | 130–140 | 52·0 | 14·6 | 0·97 | 0·58 | |
| | | | 140–150 | 45·1 | 10·1 | 1·08 | 18·21 | |
| | | | 150–160 | 35·0 | 15·2 | 0·53 | 32·97 | |
| | | | 160–162 | 44·1 | 6·9 | 0·50 | 37·08 | |
| | | | 162–172 | ........ | ........ | ........ | ........ | Footwall, porphyry and schist. |

TABLE No. 2—*Continued.*

| Designation of drill hole. | Direction of drill hole. | Angle of drill hole. | Depth. | Analysis. Iron. | Insoluble. | Phosphorus. | Sulphur. | Remarks. |
|---|---|---|---|---|---|---|---|---|
| Drill hole No. 4. | S. 80° E. | 70° | Feet. 0– 8 | ........ | ........ | ........ | ........ | Gravel. |
| | | | 8–434 | | | | | Hanging wall, gabbro, porphyry, and quartz. |
| | | | 434–444 | 44·2 | 28·0 | 0·38 | 0·04 | Iron formation. |
| | | | 444–454 | 42·5 | 24·0 | 0·73 | 0·09 | |
| | | | 454–464 | 48·5 | 17·3 | 0·98 | 0·05 | |
| | | | 464–474 | 45·4 | 16·1 | 1·00 | 0·06 | |
| | | | 474–484 | 46·7 | 16·2 | 1·08 | 0·08 | |
| | | | 484–494 | 50·8 | 14·8 | 0·87 | 0·15 | |
| | | | 494–504 | 50·1 | 15·3 | 1·13 | 0·75 | |
| | | | 504–514 | ........ | ........ | ........ | 19·4 | |
| | | | 514–527 | ........ | ........ | ........ | 10·8 | Footwall, porphyry. |
| Drill hole No. 5. | .......... | 90° | 0– 23 | ........ | ........ | ........ | ........ | Peat and gravel. |
| | | | 23– 32 | 50·5 | 17·8 | 0·90 | 0·09 | Iron formation. |
| | | | 32– 42 | 52·2 | 10·7 | 1·61 | 0·03 | |
| | | | 42– 52 | 52·1 | 13·8 | 1·03 | 0·04 | |
| | | | 52– 62 | 52·8 | 14·1 | 0·52 | 0·04 | |
| | | | 62– 72 | 55·8 | 10·5 | 0·90 | 0·04 | |
| | | | 72– 82 | 48·8 | 18·0 | 1·04 | 0·06 | |
| | | | 82– 92 | 50·2 | 18·0 | 0·96 | 0·06 | |
| | | | 92–102 | 41·7 | 22·5 | 0·37 | 0·04 | |
| | | | 102–112 | 43·0 | 20·5 | 0·81 | 0·04 | |
| | | | 112–122 | 39·5 | 23·1 | 1·22 | 0·03 | |
| | | | 122–132 | 51·1 | 15·0 | 0·98 | 0·04 | |
| | | | 132–142 | 54·1 | 15·0 | 0·53 | 0·06 | |
| | | | 142–152 | 42·7 | 17·6 | 0·90 | 0·35 | |
| | | | 152–162 | 41·7 | 18·5 | 0·64 | 0·12 | |
| | | | 162–172 | 45·1 | 18·0 | 0·88 | 0·07 | |
| | | | 172–182 | 47·0 | 17·5 | 1·18 | 0·11 | |
| | | | 182–192 | 47·9 | 16·8 | 0·73 | 1·38 | |
| | | | 192–202 | 38·2 | 21·8 | 0·96 | 1·49 | |
| | | | 202–212 | 47·9 | 12·6 | 0·62 | 0·90 | |
| | | | 212–222 | 51·6 | 13·8 | 0·91 | 0·14 | |
| | | | 222–232 | 49·5 | 16·6 | 0·96 | 2·43 | |
| | | | 232–242 | 53·5 | 13·4 | 0·81 | 0·08 | |
| | | | 242–252 | 56·5 | 12·6 | 0·67 | 0·08 | |
| | | | 252–262 | 55·3 | 7·9 | 0·70 | 0·13 | |
| | | | 262–272 | 48·5 | 15·3 | 1·09 | 0·13 | |
| | | | 272–282 | 42·6 | 19·1 | 0·71 | 0·09 | |
| | | | 282–292 | 48·0 | 17·3 | 0·81 | 0·03 | |
| | | | 292–302 | 45·6 | 21·1 | 0·78 | 0·07 | |
| | | | 302–312 | 51·5 | 13·7 | 0·98 | 0·05 | |
| | | | 312–322 | 52·3 | 13·0 | 1·07 | 0·03 | |
| | | | 322–332 | 54·9 | 13·3 | 0·93 | 0·06 | |
| | | | 332–342 | 50·7 | 14·6 | 0·78 | 0·37 | |
| | | | 342–347 | 59·5 | 6·5 | 0·72 | 0·20 | |
| | | | 347–353 | ........ | ........ | ........ | 18·2 | |

TABLE No. 3.

| Designation of hole. | Direction of hole. | Angle of hole. | Depth of hole. | Metallic iron. | Insoluble. | Phosphorus. | Manganese. | Sulphur. | Alumina. | Lime. | Magnesia. | Remarks. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Feet. | % | % | % | % | % | % | % | % | |
| Drill hole. No. 7. | N. 75°E. | 15° | 0– 10 | ...... | ...... | ...... | .... | ...... | .... | .... | .... | Gravel. |
| | | | 10– 29 | ...... | ...... | ...... | .... | ...... | .... | .... | .... | Hanging wall, porphyry. |
| | | | 29– 40 | 36·3 | 25·0 | ...... | .... | ...... | .... | .... | .... | Iron formation. |
| | | | 40– 45 | 52·9 | 12·3 | ...... | .... | ...... | .... | .... | .... | |
| | | | 45– 50 | 55·1 | 17·3 | 0·51 | 1·0 | 0·10 | 1·0 | 1·3 | 0·7 | |
| | | | 50– 55 | 53·8 | 19·7 | 0·49 | 0·8 | 0·07 | 0·4 | 1·5 | 0·5 | |
| | | | 55– 61 | 51·3 | 18·8 | 0·50 | 1·1 | 0·37 | 0·3 | 1·3 | 0·6 | |
| | | | 61– 62 | ...... | ...... | ...... | .... | ...... | .... | .... | .... | No core. |
| | | | 62– 63 | 55·1 | 12·6 | ...... | .... | ...... | .... | .... | .... | Iron formation. |
| | | | 63– 65 | ...... | ...... | ...... | .... | ...... | .... | .... | .... | High in sulphur. |
| | | | 65– 71 | 52·5 | 19·2 | 0·81 | 1·2 | 0·11 | 0·1 | 1·9 | 0·4 | Iron formation. |
| | | | 71– 78 | 52·7 | 17·5 | 0·73 | 1·2 | 0·10 | 0·1 | 1·8 | 0·4 | |
| | | | 78– 83 | 53·5 | 15·9 | 0·71 | 2·0 | 0·13 | 0·2 | 1·7 | 0·3 | |
| | | | 83– 88 | 28·6 | 30·9 | ...... | .... | ...... | .... | .... | .... | |
| | | | 88– 92 | 48·2 | 17·7 | ...... | .... | ...... | .... | .... | .... | |
| | | | 92– 99 | 55·6 | 13·0 | ...... | .... | ...... | .... | .... | .... | |
| | | | 99–106 | 54·2 | 14·1 | ...... | .... | ...... | .... | .... | .... | |
| | | | 106–109 | 46·6 | 28·5 | ...... | .... | ...... | .... | .... | .... | |
| | | | 109–129 | ...... | ...... | ...... | .... | ...... | .... | .... | .... | Porphyry and iron pyrites. |

13223—p. 8 Open-cut on No. 1 deposit, Austin Brook, N. B.

## DISTRIBUTION OF ORE BODIES.

As far as present knowledge goes, the ore occurs as elongated lenses in the quartz porphyry, and shows, in common with this, a prominent parting of schistosity, the plane of schistosity being parallel to that of the country rock. The ore bodies lie in three main groups, which for reference have been numbered I, II, and III.

Group I is situated west of Austin brook, and consists of one ore body, the total length of which is about 2,150 feet. The northern end of this deposit is well exposed, rising abruptly to a height of 75 feet above Austin brook. Farther south it is covered by gravel of considerable depth, but outcrops again about 100 feet from the Nipisiguit river, where its contact with the schistose porphyry is well exposed. The horizontal width of the ore body is, where drill hole No. 1 was sunk, 106 feet. This hole was put down vertically on the hanging wall about 250 feet south of the northern end of the deposit. It struck the ore body at a depth of 35 feet, and continued in the iron-bearing formation to 162 feet, when the foot-wall was reached, giving a calculated thickness to the ore body of about 85 feet. Drill hole No. 2 was sunk vertically, about 700 feet south of No. 1. After going through gravel, etc., it struck the ore body at a depth of 49 feet, and reached the foot-wall at 162 feet, giving a calculated thickness to the iron-bearing formation of about 60 feet. Drill hole No. 3 was located on the hanging wall of the deposit, about 150 feet from Nipisiguit river, and drilled vertically to a depth of 49 feet, giving a calculated width to the iron-bearing formation of about 8 feet. Drill hole No. 4 was sunk 380 feet west of No. 2, at an angle of 70°, the bearing of the hole being S. 80° E.

The total depth attained by the hole was 527 feet. It struck the iron-bearing formation at a depth of 434 feet, and continued in it to 514 feet, when the foot-wall was reached, giving a calculated thickness to the iron-bearing formation of about 64 feet.

Group II lies east of Austin brook, and is made up of several ore lenses, which for reference have been numbered 1, 2, 3, and 4.

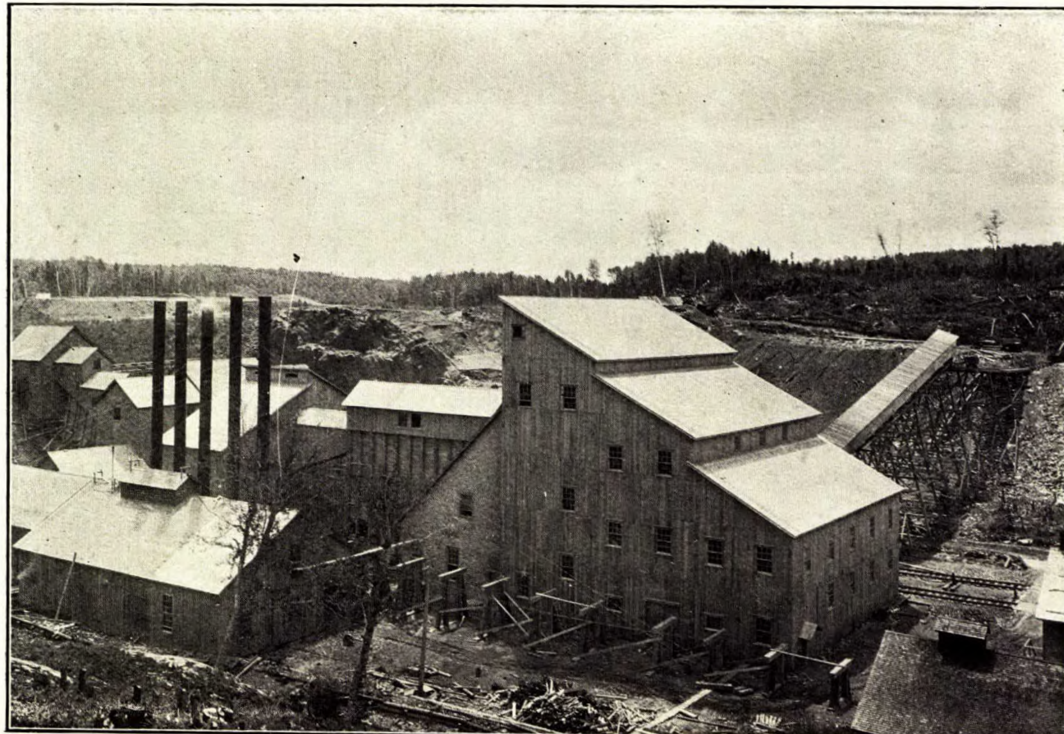
No. 1 deposit outcrops on the hillslope towards the Nipisiguit river, but is, according to the magnetic survey, of inconsiderable extent. No. 2 deposit outcrops on the eastern bank of Austin brook. The southern end of the deposit is well exposed, showing a width of 42 feet, with well defined walls.

Farther north the deposit is covered by gravel, and few outcrops are available; but judging from the magnetic survey, we may assume the length of the deposit to be about 250 feet. At the north end, its width is about 19 feet. No. 3 deposit lies in a gully about 180 feet north of No. 2, and is completely concealed by humus, except along the east bank, where its contact with the porphyry is exposed in a few places. The total length of the ore body is estimated at about 350 feet. No. 4 deposit is located east of No. 3. It has a length of about 400 feet. At the southern end of the deposit the width was proved by stripping to be 30 feet, but is decreasing towards the north.

North of groups I and II, there is no indication of iron ore for a distance of about 1,600 feet, then group III is encountered. This is for the most part covered by swamp, and it is only at its southern end that a few outcrops of ore can be seen. According to the result of the magnetometric survey, this iron-bearing area extends in a northerly direction for about 4,400 feet. It does not, however, consist of one continuous ore body, but is made up of a great number of ore lenses, which vary considerably in size. On the main deposit, which lies in the southern half of the area, drill holes No. 5 and No. 6 have been sunk vertically. In No. 5 ore was encountered at a depth of 23 feet, and the core was continuously in ore to 347 feet. Drill hole No. 6 was sunk to a depth of 276 feet, showing, however, very lean ore, thickly streaked with jasper. The average width of the deposit at the surface is about 100 feet, and its total length according to the magnetometric survey may approximately be estimated at about 830 feet. About 150 feet north of this deposit another ore lens is situated, on which drill hole No. 7 was sunk. This ore body has a total length of about 400 feet, with a maximum width at the surface of about 90 feet. Besides these two ore bodies the magnetometric survey indicates the presence of a number of others which are all covered by humus, and on which no diamond drilling, so far, has been done.

## EXTENT OF ORE BODIES.

So far, the development work done on the deposits has been very slight, hence the data for estimating the ore tonnage is only meagre; nevertheless an attempt has been made to calculate the probable area occupied by the ore bodies. As this estimate largely depends on the evidence furnished by the few diamond drill holes put down, and the magnetometric survey, it does not pretend to be anything but a very rough approximation.



13223—p. 11. Concentrating mill at Austin Brook, N. B.

The probable ore areas are as follows :—

| | | |
|---|---|---|
| Group I............... | 122,000 | sq. feet. |
| Group II.............. | 17,000 | " " |
| Group III............. | 175,000 | " " |
| Total............ | 314,000 | " " |

MINING OPERATIONS.

From what has been said in regard to the extent of the various ore deposits, it is evident that a large quantity of ore is available in this district, which can be mined under very favourable conditions. The principal difficulty to be overcome, however, is to get a concentration process adaptable to the ore, a large percentage of which—as the foregoing analyses indicate—is, in its natural state, of too low grade to be marketable.

After some experimenting the operating concern has adopted a jigging process, and a mill has been erected to treat 70 tons of crude ore per hour. This has lately been described by Messrs. W. F. C. Parsons and E. M. Archibald, engineers of the Canada Iron Corporation—in the Canadian Mining Journal, from which the following particulars are taken:—

"The present mining operations are confined to No. 1 deposit, which, rising about 75 feet above Austin brook, is being worked as an open quarry with a face of about 60 feet. The ore is loaded by a steam shovel into 2¼ ton cars, and trammed a short distance to the foot of an inclined trestle. On this trestle an up-and-down car haul is operated, consisting of two endless chains. The loaded cars conveyed to the top of the trestle deliver the ore through a revolving tipple into a hopper, from which it passes directly to a No. 8 K Gates crusher, where it is crushed to pass a 3½ inch ring, and then delivered on to a 24 inch belt conveyor discharging into the boot of a steel bucket elevator, which elevates it to the top of another building, where it is discharged on a small grizzly in order to remove the fines. Thence the ore passes through a revolving screen 4 feet in diameter and 6 feet long with 2 inch round holes. The undersize from this goes directly to a conveyor belt discharging into a large storage bin. The oversize passes into a set of Taylors rolls 54 inch diameter and 24 inch face. The opening between the rolls is 1 inch. The product from the rolls is elevated by a steel bucket elevator to a second screen 4 feet in diameter, 6 feet long, and with 2 inch holes, from which any oversize is returned directly to the rolls. The undersize going to an 18 inch conveyor belt, which discharges into the storage bin. From the storage bin the ore is discharged through a revolving drum feeder into a 70 feet high bucket elevator, which in turn carries it to the top of the concentrating mill. The course of the ore in the concentrating mill is best shown by the accompanying flow sheet. The ore having been discharged from the bucket elevator is flushed into a series of revolving screens by a heavy stream of water and classified into five sizes—oversize of $1\frac{1}{4}$, $\frac{3}{4}$, $\frac{1}{2}$, $\frac{1}{4}$, and undersize of $\frac{1}{4}$ inch. The oversize from the $1\frac{1}{4}$ and $\frac{3}{4}$ inch screens goes to three 900-B jigs. The concentrates produced by the three jigs are discharged on to a conveyor belt and conveyed to the loading bin. The tailings are run through a set of Taylors rolls (26), 42 inch diameter, 16 inch face, having an opening between the rolls of $\frac{3}{8}$ inch, thence elevated by a bucket elevator to the third revolving screen (14), where it joins with the original feed, which passed through the two first trommels. The oversize from the $\frac{1}{2}$ inch trommel passes to 900-B jig (22, 23). The concentrate is discharged to the conveying belt for removal to the loading bin, and the tailings re-treated on one compartment (24) of No. 5 900-B jig.

The oversize of the $\frac{1}{4}$ inch screen goes to the second compartment (25) of No. 5 900-B jig, the tailings from which are re-treated on a 3 compartment jig (28). The undersize from the $\frac{1}{4}$ screen is treated on 29 and 30, both 4 compartment Hartz jigs. The hutch product and concentrates of the last compartments of these jigs are considered as middlings and are flushed back to the bucket elevator, and, returning through the $\frac{1}{2}$ inch trommel, are treated for a second time. The average iron content of the ore from the mine is given by the officials to be about 45 per cent. In order to overcome to some extent the high loss of iron in the tailings some slight rearrangement of the flow sheet has lately been made by which (28) the three compartment Hartz jig becomes a primary jig and (24-25) become a secondary jig, the concentrates from which are run to a separate stockpile, with an average iron content of about 46 per cent. The water consumption of the mill is about 2000 gallons per minute. The water is used over and over again and only about 500 gallons of fresh water per minute are added to maintain a certain degree of purity. The fresh water is pumped to the

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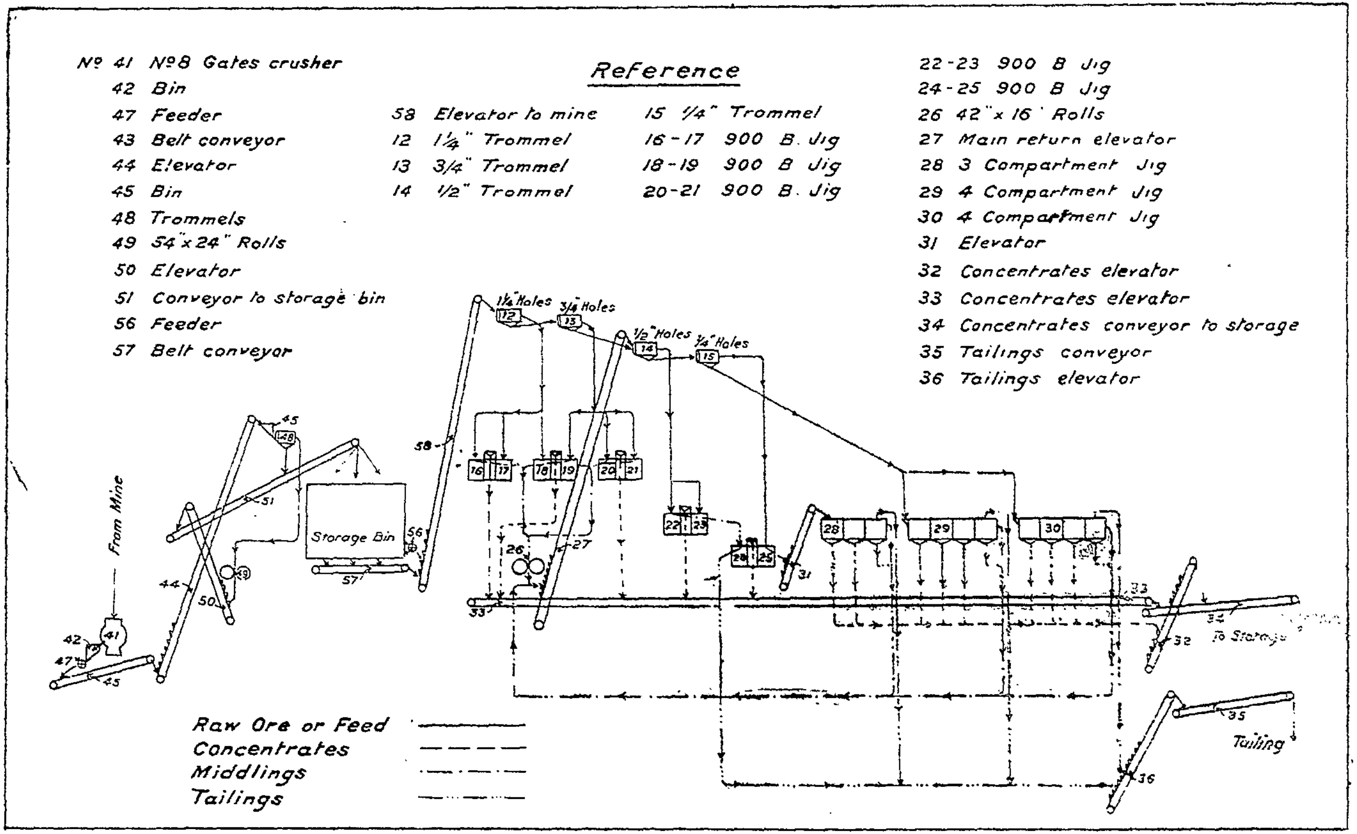


FIG. 2. Flow sheet of concentrating plant at Austin Brook. The Canada Iron Corporation, Limited.

top of the mill into the trommel house by a Knowles 12 × 12 × 10 inch duplex steam pump, while the circulating water is being handled by an 8 inch single stage American Wellworks centrifugal pump, the circulating water being elevated from the settling tanks in the basement to a large launder located just above the highest jig level.

The 900-B jig is 14 feet long, 14 feet wide, and 10 feet high, with two separate jigging compartments, and a centre compartment, containing an elevator which recovers the concentrates produced, elevates and discharges them to the belt conveyor. The sieve is 60 × 60 inches, supported on grate bars, and supports a bed of ore, ranging from 6 inches to 12 inches, depending on the size of material being jigged. The plunger is of a heavy cast iron construction, 54 inches in diameter, working in a heavy iron cylinder with four inlet water valves 8 × 10 inches. An adjustable eccentric provides for a variation in the length of the stroke. A 4 inch stroke at 100 r. p. m. is necessary to properly stratify a bed of 2 inch ore. The plunger shaft is fitted with tight and loose pulleys to enable the jig to be put out of commission without affecting other jigs. A worm conveyor carries the hutch product, or what passes through the holes in the bed screens, to the centre compartment, where it is delivered to the concentrates elevator. The heavier material on the jig bed rapidly works its way to the bottom and is drawn off at the front of the jig through a draw-off valve, 48 inches long, while the lighter material passes over an apron on the top of the bed. The draw-off valve is capable of wide adjustment. The concentrates after passing the draw-off valve fall down a 45° slope to the elevator boot in the centre compartment.

The three compartment Hartz jig has a sieve bed 30 × 42 inches and runs at 125 r. p. m.

The four compartment Hartz has a sieve bed of 32 × 42 inches and runs at 180 r. p. m. and the concentrates are drawn off at the bottom of each bed by an adjustable draw-off valve.

The power plant of the mine consists of five tubular boilers rated at 125 H.P. each, one Inglis Corliss compound 16 × 32 × 36 inches steam engine, which operates the bank-head apparatus and crushing machinery, one 18 × 20 inch Robb Corliss engine operating the mill, and one Allis-Chalmers air compressor with a capacity of 1290 cubic feet per minute of free air at 120 r. p. m."

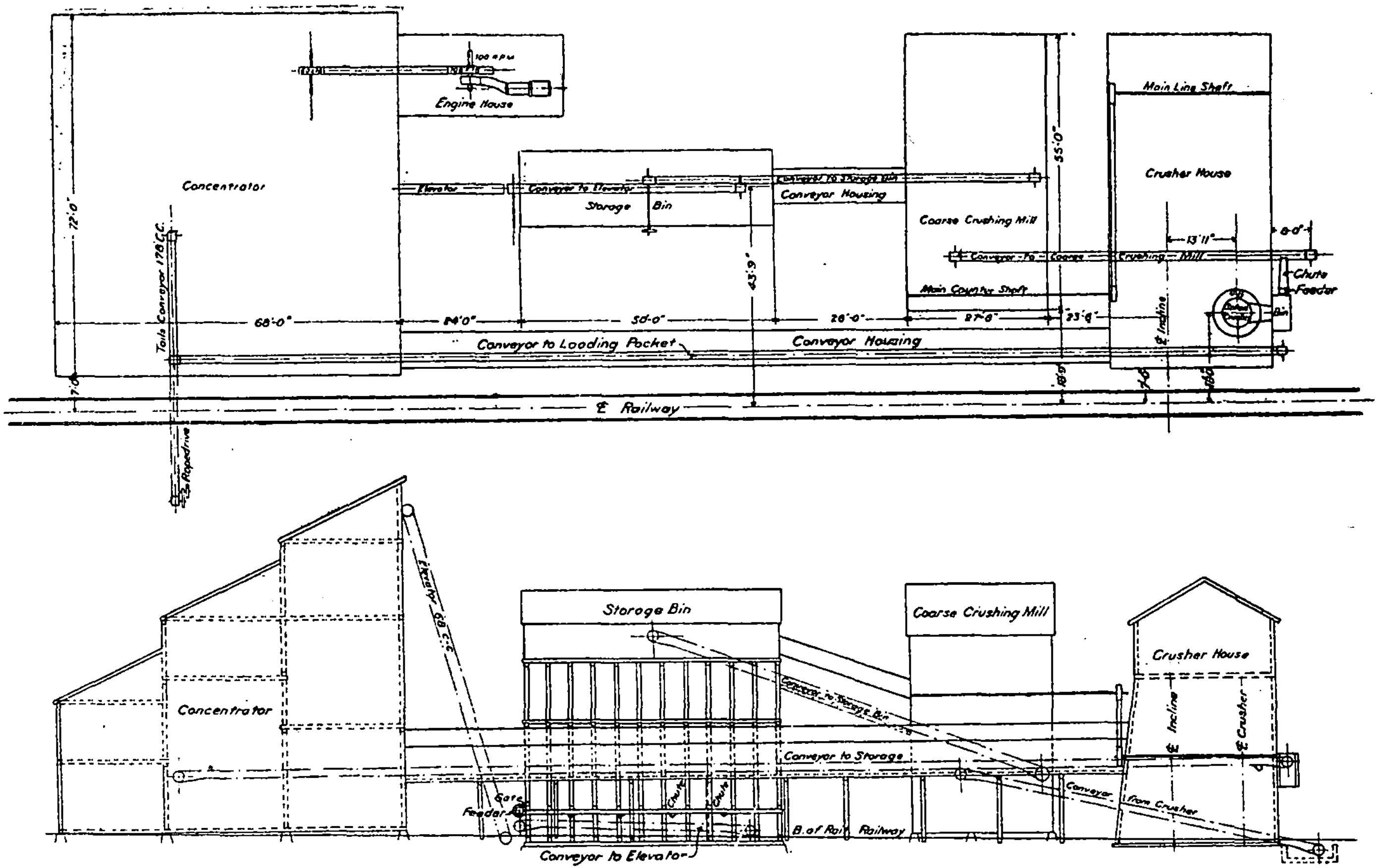


FIG. 3. General layout of concentrating plant at Austin Brook, N.B.

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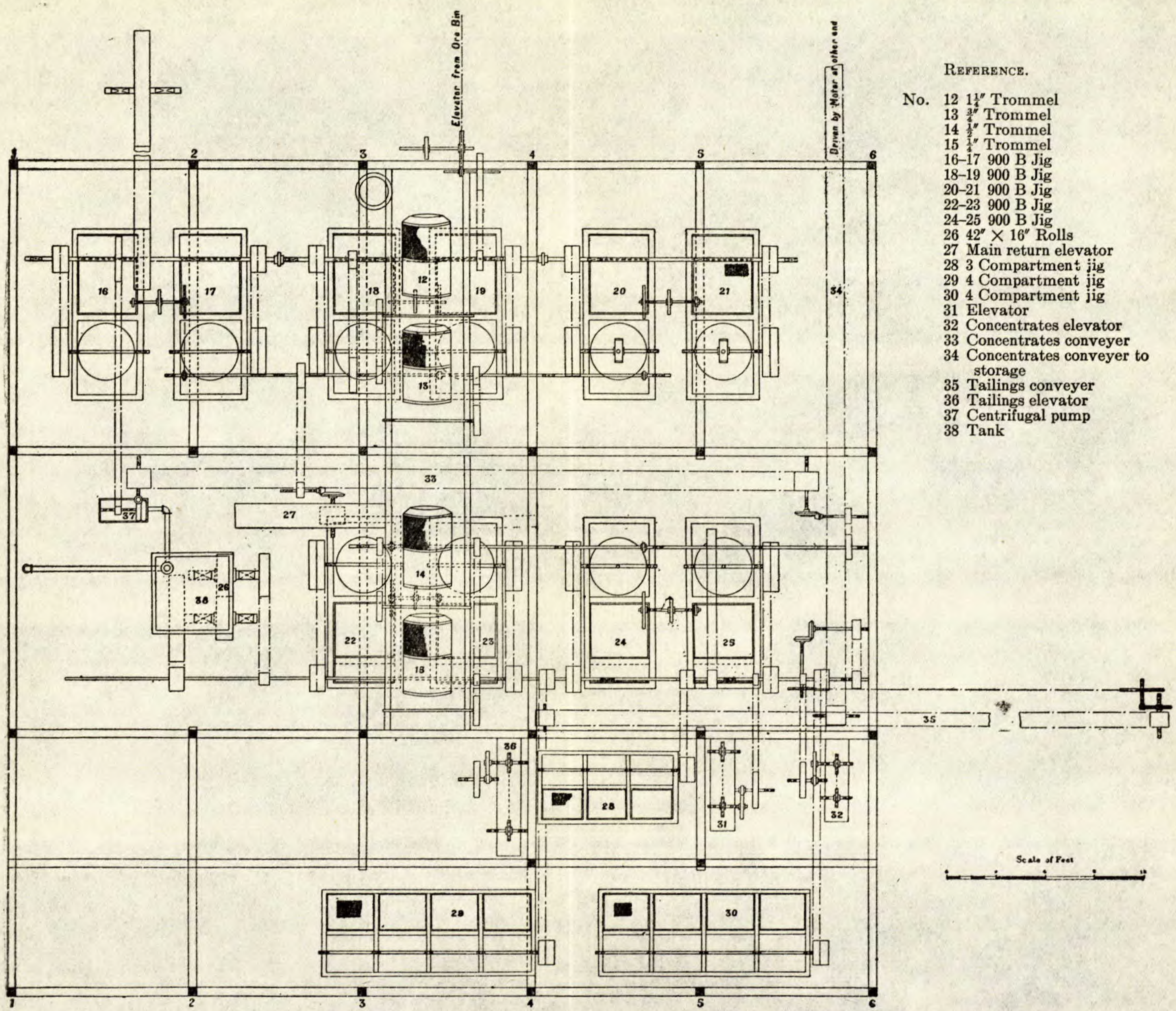


Reference.

No. 12 $1\frac{1}{4}''$ Trommel
13 $\frac{3}{4}''$ Trommel
14 $\frac{1}{2}''$ Trommel
15 $\frac{1}{4}''$ Trommel
16–17 900 B Jig
18–19 900 B Jig
20–21 900 B Jig
22–23 900 B Jig
24–25 900 B Jig
26 $42'' \times 16''$ Rolls
27 Main return elevator
28 3 Compartment jig
29 4 Compartment jig
30 4 Compartment jig
31 Elevator
32 Concentrates elevator
33 Concentrates conveyer
34 Concentrates conveyer to storage
35 Tailings conveyer
36 Tailings elevator
37 Centrifugal pump
38 Tank

Fig. 4. Plan of concentrating mill at Austin Brook. The Canada Iron Corporation, Limited.

**Legend.**

**No. 56** Feeder
**57** Belt conveyer
**58** Elevator to mill
**12** 1½" Trommel
**13** ¾" Trommel
**14** ½" Trommel
**15** ¼" Trommel
**18–19** 900 B Jig
**22–23** 900 B Jig
**29** 4 Compartment jig
**33** Concentrates conveyer
**36** Tailings elevator

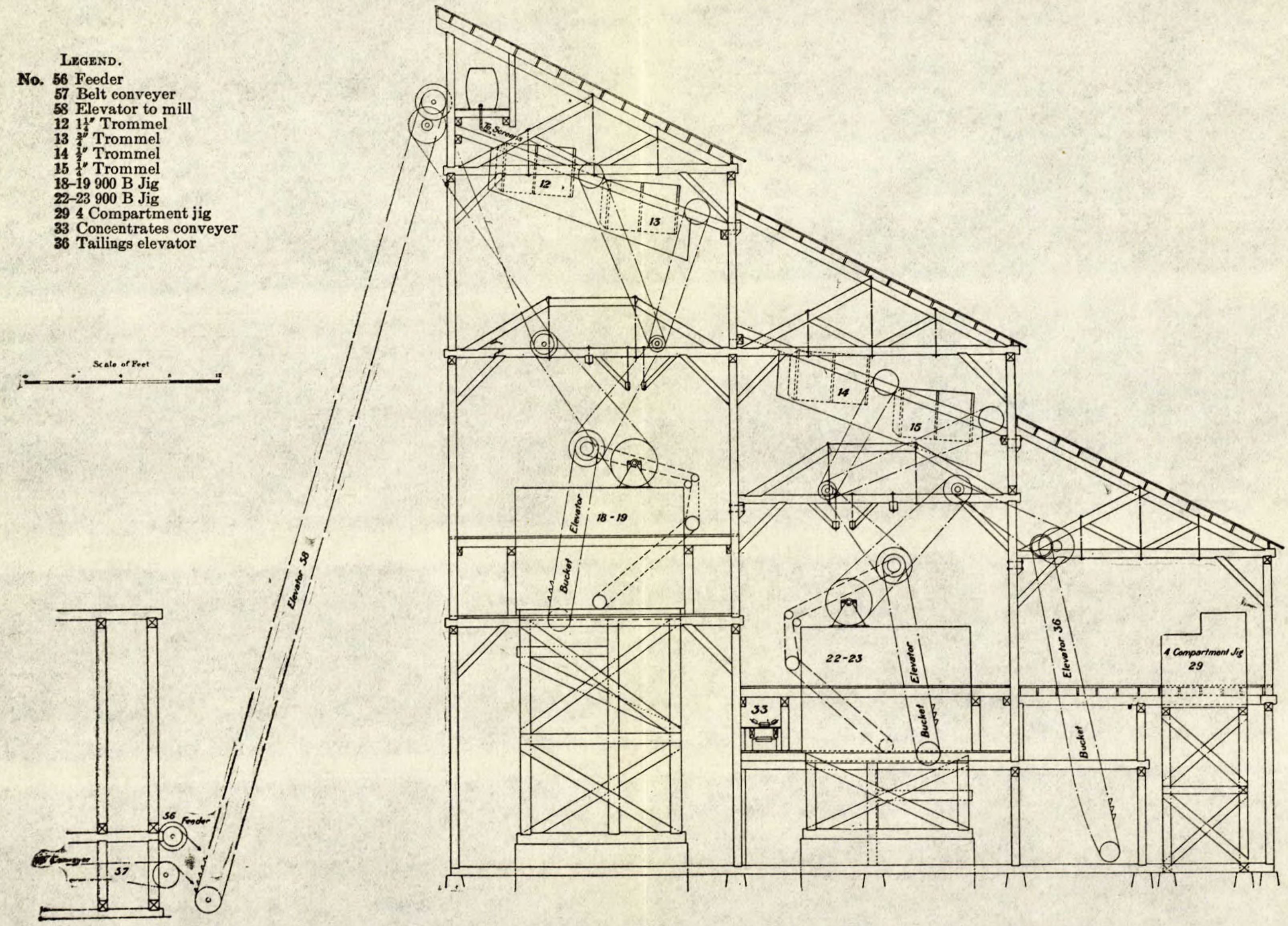


**Fig. 5.** Section between 3 and 4 (Fig. 4) of concentrating plant at Austin Brook. The Canada Iron Corporation, Limited.

CANADA

# DEPARTMENT OF MINES

HON. LOUIS CODERRE, MINISTER; A. P. LOW, LL.D., DEPUTY MINISTER;

MINES BRANCH

EUGENE HAANEL, PH.D., DIRECTOR.

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## REPORTS AND MAPS OF ECONOMIC INTEREST

PUBLISHED BY THE

MINES BRANCH

### REPORTS.

1. Mining Conditions in the Klondike, Yukon. Report on—by Eugene Haanel, Ph.D., 1902.

2. Great Landslide at Frank, Alta. Report on—by R. G. McConnell and R. W. Brock, M.A., 1903. (Out of print.)

3. Investigation of the different electro-thermic processes for the smelting of iron ores, and the making of steel, in operation in Europe. Report of Special Commission—by Dr. Haanel, 1904. (Out of print.)

4. Rapport de la Commission nommée pour étudier les divers procédés électro-thermiques pour la réduction des minerais de fer et la fabrication de l'acier employés en Europe—by Dr. Haanel, (French Edition), 1905. (Out of print.)

5. On the location and examination of magnetic ore deposits by magnetometric measurements—by Dr. Haanel, 1904.

7. Limestones, and the Lime Industry of Manitoba. Preliminary Report on—by J. W. Wells, 1905. (Out of print.)

8. Clay and Shales of Manitoba: Their Industrial Value. Preliminary Report on—by J. W. Wells, 1905. (Out of print.)

9. Hydraulic Cements (Raw Materials) in Manitoba: Manufacture and Uses of. Preliminary Report on—by J. W. Wells, 1905. (Out of print.)

10. Mica: Its Occurrence, Exploitation, and Uses—by Fritz Cirkel, M.E., 1905. (Out of print: see No. 118.)

11. Asbestos: Its Occurrence, Exploitation, and Uses—by Fritz Cirkel, 1905. (Out of print: see No. 69.)

12. Zinc Resources of British Columbia and the Conditions affecting their Exploitation. Report of the Commission appointed to investigate—by W. R. Ingalls, 1905. (Out of print.)

16. *Experiments made at Sault Ste. Marie, under Government auspices, in the smelting of Canadian iron ores by the electro-thermic process. Final Report on—by Dr. Haanel, 1907. (Out of print.)

17. Mines of the Silver-Cobalt Ores of the Cobalt district: Their Present and Prospective Output. Report on—by Dr. Haanel, 1907. (Out of print.)

18. Graphite: Its Properties, Occurrence, Refining, and Uses—by Fritz Cirkel, 1907. (Out of print.)

19. Peat and Lignite: Their Manufacture and Uses in Europe—by Erik Nystrom, M.E., 1908. (Out of print.)

20. Iron Ore Deposits of Nova Scotia. Report on (Part I)—by Dr. J. E. Woodman.

*A few copies of the Preliminary Report, 1906, are still available.

21. Summary Report of Mines Branch, 1907–8. (Out of print.)

22. Iron Ore Deposits of Thunder Bay and Rainy River districts. Report on—by F. Hille, M.E.

23. Iron Ore Deposits, along the Ottawa (Quebec side) and Gatineau rivers. Report on—by Fritz Cirkel. (Out of print.)

24. General Report on the Mining and Metallurgical Industries of Canada, 1907–8.

25. The Tungsten Ores of Canada. Report on—by Dr. T. L. Walker.

26. The Mineral Production of Canada, 1906. Annual Report on—by John McLeish, B.A.

26a. French translation: The Mineral Production of Canada, 1906. Annual Report on—by John McLeish.

27. The Mineral Production of Canada, 1907. Preliminary Report on—by John McLeish.

27a. The Mineral Production of Canada, 1908. Preliminary Report on—by John McLeish. (Out of print.)

28. Summary Report of Mines Branch, 1908. (Out of print.)

28a. French translation: Summary Report of Mines Branch, 1908. (Out of print.)

29. Chrome Iron Ore Deposits of the Eastern Townships. Monograph on—by Fritz Cirkel. (Supplementary Section: Experiments with Chromite at McGill University—by Dr. J. B. Porter).

30. Investigation of the Peat Bogs and Peat Fuel Industry of Canada, 1908. Bulletin No. 1—by Erik Nystrom, and A. Anrep, Peat Expert.

32. Investigation of Electric Shaft Furnace, Sweden. Report on—by Dr. Haanel.

47. Iron Ore Deposits of Vancouver and Texada islands. Report on—by Einar Lindeman, M.E.

55. Report on the Bituminous, or Oil-shales of New Brunswick and Nova Scotia; also on the Oil-shale Industry of Scotland—by Dr. R. W. Ells.

58. The Mineral Production of Canada, 1907 and 1908. Annual Report on—by John McLeish.

NOTE.—*The following preliminary Bulletins were published prior to the issuance of the Annual Report for* 1907–8.

31. Production of Cement in Canada, 1908. (Out of print.)

42. Production of Iron and Steel in Canada during the Calendar Years 1907 and 1908.

43. Production of Chromite in Canada during the Calendar Years 1907 and 1908.

44. Production of Asbestos in Canada, during the Calendar Years 1907 and 1908.

45. Production of Coal, Coke, and Peat in Canada, during the Calendar Years 1907 and 1908. (Out of print.)

46. Production of Natural Gas and Petroleum in Canada during the Calendar Years 1907 and 1908.

59. Chemical Analyses of Special Economic Importance made in the Laboratories of the Department of Mines, 1906–7–8. Report on—by F. G. Wait, M.A., F.C.S. (With Appendix on the Commercial Methods and Apparatus for the Analysis of Oil-shales—by H. A. Leverin, Ch. E.).

Schedule of Charges for Chemical Analyses and Assays.

62. Mineral Production of Canada, 1909. Preliminary Report on—by John McLeish.

63. Summary Report of Mines Branch, 1909.

67. Iron Ore Deposits of the Bristol Mine, Pontiac County, Quebec. Bulletin No. 2—by Einar Lindeman and Geo. C. Mackenzie, B.Sc.

68. Recent Advances in the Construction of Electric Furnaces for the Production of Pig Iron, Steel, and Zinc. Bulletin No. 3—by Dr. Haanel. (Out of print.)

69. Chrysotile-Asbestos: Its Occurrence, Exploitation, Milling, and Uses. Report on—by Fritz Cirkel. (Second Edition, enlarged.)

71. Investigation of the Peat Bogs, and Peat Industry of Canada, 1909–10; to which is appended Mr. Alf. Larson's Paper on Dr. M. Ekenberg's Wet-Carbonizing Process: from Teknisk Tidskrift, No. 12, December 26, 1908—translation by Mr. A. Anrep, Jr.; also a translation of Lieut. Ekelund's Pamphlet entitled 'A Solution of the Peat Problem,' 1909, describing the Ekelund Process for the Manufacture of Peat Powder, by Harold A. Leverin, Ch.E. Bulletin No. 4—by A. Anrep (Second Edition, enlarged). (Out of print.)

81. French Translation: Chrysotile-Asbestos, Its Occurrence, Exploitation, Milling, and Uses. Report on—by Fritz Cirkel.

82. Magnetic Concentration Experiments. Bulletin No. 5—by Geo. C. Mackenzie.

83. An investigation of the Coals of Canada with reference to their Economic Qualities: as conducted at McGill University under the authority of the Dominion Government. Report on—by J. B. Porter, E.M., D.Sc., R. J. Durley, Ma.E., and others—
    Vol. I—Coal Washing and Coking Tests.
    Vol. II—Boiler and Gas Producer Tests.
    Vol. III—
      Appendix I
        Coal Washing Tests and Diagrams.
    Vol. IV—
      Appendix II
        Boiler Tests and Diagrams.
    Vol. V—
      Appendix III
        Producer Tests and Diagrams.
    Vol. VI—
      Appendix IV
        Coking Tests.
      Appendix V
        Chemical Tests.

84. Gypsum Deposits of the Maritime Provinces of Canada—including the Magdalen islands. Report on—by W. F. Jennison, M.E. (Out of print.)

88. The Mineral Production of Canada, 1909. Annual Report on—by John McLeish.

    NOTE.—*The following preliminary Bulletins were published prior to the issuance of the Annual Report for* 1909.

    79. Production of Iron and Steel in Canada during the Calendar Year 1909. (Out of print.)

    80. Production of Coal and Coke in Canada during the Calendar Year 1909. (Out of print.)

    85. Production of Cement, Lime, Clay Products, Stone, and other Structural Materials during the Calendar Year 1909.

89. Reprint of Presidential address delivered before the American Peat Society of Ottawa, July 25, 1910. By Dr. Haanel.

90. Proceedings of Conference on Explosives.

92. Investigation of the Explosives Industry in the Dominion of Canada, 1910. Report on—by Capt. Arthur Desborough. (Second Edition.)

93. Molybdenum Ores of Canada. Report on—by Dr. T. L. Walker.

100. The Building and Ornamental Stones of Canada. Report on—by Professor W. A. Parks.

102. Mineral Production of Canada, 1910. Preliminary Report on—by John McLeish.

103. Summary Report of Mines Branch, 1910. (Out of print.)

104. Catalogue of Publications of Mines Branch, from 1902 to 1911; containing Tables of Contents and List of Maps, etc.

105. Austin Brook Iron-bearing district, New Brunswick. Report on—by Einar Lindeman.

110. Western Portion of Torbrook Iron Ore Deposits, Annapolis county, N.S. Bulletin No. 7—by Howells Fréchette, M.Sc.

111. Diamond Drilling at Point Mamainse, Ont. Bulletin No. 6—by A. C. Lane, Ph.D., with Introductory by A. W. G. Wilson, Ph.D.

118. Mica: Its Occurrence, Exploitation, and Uses. Report on—by Hugh S. de Schmid, M.E.

142. Summary Report of Mines Branch, 1911.

143. The Mineral Production of Canada, 1910. Annual Report on—by John McLeish.

NOTE.—*The following preliminary Bulletins were published prior to the issuance of the Annual Report for* 1910.

114. Production of Cement, Lime, Clay Products, Stone, and other Structural Materials in Canada, 1910. (Out of print.)

115. Production of Iron and Steel in Canada during the Calendar Year 1910. (Out of print.)

116. Production of Coal and Coke in Canada during the Calendar Year 1910. (Out of print.)

117. General Summary of the Mineral Production of Canada during the Calendar Year 1910. (Out of print.)

145. Magnetic Iron Sands of Natashkwan, Saguenay county, Que. Report on—by Geo. C. Mackenzie.

150. The Mineral Production of Canada, 1911. Preliminary Report on—by John McLeish. (Out of print.)

151. Investigation of the Peat Bogs and Peat Industry of Canada, 1910-11. Bulletin No. 8—by A. Anrep.

154. The Utilization of Peat Fuel for the Production of Power, being a record of experiments conducted at the Fuel Testing Station, Ottawa, 1910-11. Report on—by B. F. Haanel, B.Sc.

167. Pyrites in Canada: Its Occurrence, Exploitation, Dressing, and Uses. Report on—by A. W. G. Wilson.

170. The Nickel Industry: with Special Reference to the Sudbury region, Ont. Report on—by Prof. A. P. Coleman, Ph.D.

197. French translation: Molybdenum Ores of Canada. Report on—by Dr. T. L. Walker.

198. French translation: Peat and Lignite: Their Manufacture and Uses in Europe—by Erik Nystrom, M.E., 1908.

201. The Mineral Production of Canada during the Calendar Year 1911. Annual Report on—by John McLeish.

NOTE.—*The following preliminary Bulletins were published prior to the issuance of the Annual Report for 1911.*

181. Production of Cement, Lime, Clay Products, Stone, and other Structural Materials in Canada during the Calendar Year 1911. Bulletin on—by John McLeish.

182. Production of Iron and Steel in Canada during the Calendar Year 1911. Bulletin on—by John McLeish.

183. General Summary of the Mineral Production in Canada during the Calendar Year 1911. Bulletin on—by John McLeish.

199. Production of Copper, Gold, Lead, Nickel, Silver, Zinc, and other Metals of Canada, during the Calendar Year 1911. Bulletin on—by C. T. Cartwright.

200. The Production of Coal and Coke in Canada during the Calendar Year 1911. Bulletin on—by John McLeish.

202. French translation: Graphite: Its Properties, Occurrence, Refining, and Uses—by Fritz Cirkel, 1907.

216. The Mineral Production of Canada, 1912. Preliminary Report on—by John McLeish.

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156. French translation: The Tungsten Ores of Canada. Report on—by Dr. T. L. Walker.

184. Magnetite Occurrences along the Central Ontario Railway. Report on—by E. Lindeman.

196. French translation: Investigation of the Peat Bogs and Peat Industry of Canada, 1909–10; to which is appended Mr. Alf. Larson's paper on Dr. Ekenburg's Wet-Carbonizing Process: from Teknisk Tidskrift, No. 12, December 26, 1908—translation by Mr. A. Anrep; also a translation of Lieut. Ekelund's Pamphlet entitled "A Solution of the Peat Problem," 1909, describing the Ekelund Process for the Manufacture of Peat Powder, by Harold A. Leverin, Ch.E. Bulletin No. 4—by A. Anrep. (Second Edition, enlarged.)

203. Building Stones of Canada—Vol. II: Building and Ornamental Stones of the Maritime Provinces. Report on—by W. A. Parks.

224. Summary Report of Mines Branch, 1912.

233. French translation: Gypsum Deposits of the Maritime Provinces of Canada—including the Magdalen islands. Report on—by W. F. Jennison.

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NOTE.—*Lists of manufacturers of clay products, stone quarry operators, and operators of limekilns, are prepared annually by the Division of Mineral Resources and Statistics, and copies may be had on application.*

MAPS.

†6. Magnetometric Survey, Vertical Intensity: Calabogie Mine, Bagot township, Renfrew county, Ontario—by E. Nystrom, 1904.

†13. Magnetometric Survey of the Belmont Iron Mines, Belmont township, Peterborough county, Ontario—by B. F. Haanel, 1905.

†14. Magnetometric Survey of the Wilbur Mine, Lavant township, Lanark county, Ontario—by B. F. Haanel, 1905.

†33. Magnetometric Survey, Vertical Intensity: Lot 1, Concession VI, Mayo township, Hastings county, Ontario—by Howells Fréchette, 1909.

†34. Magnetometric Survey, Vertical Intensity: Lots 2 and 3, Concession VI, Mayo township' Hastings county, Ontario—by Howells Fréchette, 1909.

†35. Magnetometric Survey, Vertical Intensity: Lots 10, 11, and 12, Concession IX, and Lots 11 and 12, Concession VIII, Mayo township, Hastings county, Ontario—by Howells Fréchette, 1909.

*36. Survey of Mer Bleue Peat Bog, Gloucester township, Carleton county, and Cumberland township, Russell county, Ontario—by Erik Nystrom, and A. Anrep.

*37. Survey of Alfred Peat Bog, Alfred and Caledonia townships, Prescott county, Ontario—by Erik Nystrom, and A. Anrep.

*38 Survey of Welland Peat Bog, Wainfleet and Humberstone townships, Welland county, Ontario—by Erik Nystrom and A. Anrep.

*39. Survey of Newington Peat Bog, Osnabrook, Roxborough, and Cornwall townships, Stormont county, Ontario—by Erik Nystrom, and A. Anrep.

*40. Survey of Perth Peat Bog, Drummond township, Lanark county, Ontario—by Erik Nystrom, and A. Anrep.

*41. Survey of Victoria Road Peat Bog, Bexley and Carden townships, Victoria county, Ontario —by Erik Nystrom and A. Anrep.

48. Magnetometric Map of Iron Crown claim at Klaanch river, Vancouver island, B.C.—by Einar Lindeman.

49. Magnetometric Map of Western Steel Iron claim, at Sechart, Vancouver island, B.C.—by Einar Lindeman.

50. Vancouver island, B.C.—by Einar Lindeman.

51. Iron Mines, Texada island, B.C.—by E. H. Shepherd, C.E.

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NOTE.—1. Maps marked thus * are out of print.
2. Maps marked thus † have been printed independently of reports, hence can be procured separately by applicants.

52. Sketch Map of Bog Iron Ore Deposits, West Arm, Quatsino sound, Vancouver island, B.C.

*53. Iron Ore Occurrences, Ottawa and Pontiac counties, Quebec, 1908—by J. White, and Fritz Cirkel.

†54. Iron Ore Occurrences, Argenteuil county, Quebec, 1908—by Fritz Cirkel.

†57. The Productive Chrome Iron Ore District of Quebec—by Fritz Cirkel.

†60. Magnetometric Survey of the Bristol mine, Pontiac county, Quebec—by Einar Lindeman.

61. Topographical Map of Bristol mine, Pontiac county, Quebec—by Einar Lindeman.

†64. Index Map of Nova Scotia: Gypsum—by W. F. Jennison.

†65. Index Map of New Brunswick: Gypsum—by W. F. Jennison.

†66. Map of Magdalen islands: Gypsum—by W. F. Jennison.

70. Magnetometric Survey of Northeast Arm Iron Range, Lake Timagami, Nipissing district, Ontario—by Einar Lindeman.

†72. Brunner Peat Bog, Ontario—by A. Anrep.

†73. Komoka Peat Bog, Ontario—by A. Anrep.

†74. Brockville Peat Bog, Ontario—by A. Anrep.

†75. Rondeau Peat Bog, Ontario—by A. Anrep.

†76. Alfred Peat Bog, Ontario—by A. Anrep.

†77. Alfred Peat Bog, Ontario: Main Ditch profile—by A. Anrep.

†78. Map of Asbestos Region, Province of Quebec, 1910—by Fritz Cirkel.

94. Map showing Cobalt, Gowganda, Shiningtree, and Porcupine districts—by L. H. Cole, B.Sc.

95. General Map of Canada showing Coal Fields. (Accompanying report No. 83—by Dr. J. B. Porter.)

96. General Map of Coal Fields of Nova Scotia and New Brunswick. (Accompanying Report No. 83—by Dr. J. B. Porter.)

97. General Map showing Coal Fields in Alberta, Saskatchewan, and Manitoba. (Accompanying Report No. 83—by Dr. J. B. Porter.)

98. General Map of Coal Fields in British Columbia. (Accompanying Report No. 83—by Dr. J. B. Porter.)

99. General Map of Coal Field in Yukon Territory. (Accompanying Report No. 83—by Dr. J. B. Porter.)

†106. Austin Brook Iron Bearing District, Bathurst township, Gloucester county, N.B.—by E. Lindeman.

†107. Magnetometric Survey, Vertical Intensity: Austin Brook Iron Bearing District—by E. Lindeman.

†108. Index Map showing Iron Bearing Area at Austin Brook—by E. Lindeman.

112. Sketch Plan showing Geology of Point Mamainse, Ont.—by Professor A. C. Lane.

†113. Holland Peat Bog, Ontario—by A. Anrep.

119–137. Mica: Township Maps, Ontario and Quebec—by Hugh S. de Schmid.

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NOTE.—1. Maps marked thus * are out of print.
2. Maps marked thus † have been printed independently of reports, hence can be procured separately by applicants.

†138. Mica: Showing Location of Principal Mines and Occurrences in the Quebec Mica Area—by Hugh S. de Schmid.

†139. Mica: Showing Location of Principal Mines and Occurrences in the Ontario Mica Area—by Hugh S. de Schmid.

†140. Mica: Showing Distribution of the Principal Mica Occurrences in the Dominion of Canada—by Hugh S. de Schmid.

†141. Torbrook Iron Bearing District, Annapolis county, N.S.—by Howells Fréchette.

†146. Distribution of Iron Ore Sands of the Iron Ore Deposits on the North Shore of the River and Gulf of St. Lawrence, Canada—by Geo. C. Mackenzie.

†147. Magnetic Iron Sand Deposits in Relation to Natashkwan harbour and Great Natashkwan river, Que. (Index Map)—by Geo. C. Mackenzie.

†148. Natashakwan Magnetic Iron Sand Deposits, Saguenay county, Que.—by Geo. C. Mackenzie.

†152. Map Showing the Location of Peat Bogs investigated in Ontario—by A. Anrep.

†153. Map Showing the Location of Peat Bogs investigated in Manitoba—by A. Anrep.

†157. Lac du Bonnet Peat Bog, Ontario—by A. Anrep.

†158. Transmission Peat Bog, Manitoba—by A. Anrep.

†159. Corduroy Peat Bog, Manitoba—by A. Anrep.

†160. Boggy Creek Peat Bog, Manitoba—by A. Anrep.

†161. Rice Lake Peat Bog, Manitoba—by A. Anrep.

†162. Mud Lake Peat Bog, Manitoba—by A. Anrep.

†163. Litter Peat Bog, Manitoba—by A. Anrep.

†164. Julius Peat Litter Bog, Manitoba—by A. Anrep.

†165. Fort Francis Peat Bog, Ontario—by A. Anrep.

166. Magnetometric Map of No. 3 mine, Lot 7, Concessions V and VI, McKim township, Sudbury district, Ont.—by E. Lindeman. (Accompanying Summary Report 1911.)

†168. Map showing Pyrites Mines and Prospects in Eastern Canada, and Their Relation to the United States Market—by A. W. G. Wilson.

†171. Geological Map of Sudbury Nickel region, Ont.—by Prof. A. P. Coleman.

†172. " Victoria mine—by Prof. A. P. Coleman.

†173. " Crean Hill mine—by Prof. A. P. Coleman.

†174. " Creighton mine—by Prof. A. P. Coleman.

†175. " showing Contact of Norite and Laurentian in vicinity of Creighton mine—by Prof. A. P. Coleman.

†176. " of Copper Cliff offset—by Prof. A. P. Coleman.

†177. " No. 3 mine—by Prof. A. P. Coleman.

†178. " showing vicinity of Stobie and No. 3 mines—by Prof. A. P. Coleman.

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Note.—1. Maps marked thus * are out of print.
2. Maps marked thus † have been printed independently of reports, hence can be procured separately by applicants.

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†185. Magnetometric Survey, Vertical Intensity: Blairton iron mine, Belmont township, Peterborough county, Ontario—by E. Lindeman, 1911.

†185a. Geological Map, Blairton iron mine, Belmont township, Peterborough county, Ontario —by E. Lindeman, 1911.

†186. Magnetometric Survey, Belmont iron mine, Belmont township, Peterborough county, Ontario —by E. Lindeman. 1911.

†186a. Geological Map, Belmont iron mine, Belmont township, Peterborough county. Ontario— by E. Lindeman, 1911.

†187. Magnetometric Survey, Vertical Intensity: St. Charles mine, Tudor township, Hastings county, Ontario—by E. Lindeman, 1911.

†187a. Geological Map, St. Charles mine, Tudor township, Hastings county, Ontario—by E. Lindeman, 1911.

†188. Magnetometric Survey, Vertical Intensity: Baker mine, Tudor township, Hastings county, Ontario—by E. Lindeman, 1911.

†188a. Geological Map, Baker mine, Tudor township, Hastings county, Ontario—by E. Lindeman, 1911.

†189. Magnetometric Survey, Vertical Intensity: Ridge iron ore deposits, Wollaston township, Hastings county, Ontario—by E. Lindeman, 1911.

†190. Magnetometric Survey, Vertical Intensity: Coehill and Jenkins mines, Wollaston township, Hastings county, Ontario—by E. Lindeman, 1911.

†190a. Geological Map, Coehill and Jenkins mines, Wollaston township, Hastings county, Ontario —by E. Lindeman, 1911.

†191. Magnetometric Survey, Vertical Intensity: Bessemer iron ore deposits, Mayo township, Hastings county, Ontario—by E. Lindeman, 1911.

†191a. Geological Map, Bessemer iron ore deposits, Mayo township, Hastings county, Ontario— by E. Lindeman, 1911.

†192. Magnetometric Survey, Vertical Intensity: Rankin, Childs, and Stevens mines, Mayo township, Hastings county, Ontario—by E. Lindeman, 1911.

†192a. Geological Map, Rankin, Childs, and Stevens mines, Mayo township, Hastings county, Ontario—by E. Lindeman, 1911.

†193. Magnetometric Survey, Vertical Intensity: Kennedy property, Carlow township, Hastings county, Ontario—by E. Lindeman, 1911.

†193a. Geological Map, Kennedy property, Carlow township, Hastings county, Ontario—by E. Lindeman, 1911.

†194. Magnetometric Survey, Vertical Intensity: Bow Lake iron ore occurrences, Faraday township, Hastings county, Ontario—by E. Lindeman, 1911.

†204. Index Map, Magnetite occurrences along the Central Ontario railway—by E. Lindeman, 1911.

†205. Magnetometric Map of Moose Mountain iron-bearing district—by E. Lindeman.

NOTE.—1. Maps marked thus * are out of print.
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Canada
DEPARTMENT OF MINES
MINES BRANCH

Hon. W. B. Nantel, Minister; A. P. Low, LL.D., Deputy Minister
Eugene Haanel, Ph.D., Director
1912

GEOLOGICAL MAP


H. E. Baine, Chief Draughtsman

To accompany Report Nº 105

Nº 106

# AUSTIN BROOK
# IRON BEARING DISTRICT
## GLOUCESTER COUNTY
## NEW BRUNSWICK

Surveyed by E. Lindeman
Assisted by W. M. Morrison

Scale: 400 Feet to 1 Inch = 1/4800

# Canada

## DEPARTMENT OF MINES

MINES BRANCH

HON. W. B. NANTEL, MINISTER; A. P. LOW, LL.D., DEPUTY MINISTER

EUGENE HAANEL, PH.D., DIRECTOR

1912

MAGNETOMETRIC MAP


H.E. Baine, Chief Draughtsman

To accompany Report No. 105

No. 107

# AUSTIN BROOK
# IRON BEARING DISTRICT
## GLOUCESTER COUNTY
### NEW BRUNSWICK

Surveyed by E. Lindeman
Assisted by W. M. Morrison

Scale: 400 Feet to 1 Inch = $\frac{1}{4800}$

Feet 400 300 200 100 0 400 800 1200 Feet

CANADA

DEPARTMENT OF MINES

MINES BRANCH

HON. W. TEMPLEMAN, MINISTER; A. P. LOW, LL.D., DEPUTY MINISTER.
EUGENE HAANEL, PH.D., DIRECTOR.

1911


FIG 1. MAP SHOWING LOCATION OF AUSTIN BROOK IRON BEARING DISTRICT
GLOUCESTER COUNTY, NEW BRUNSWICK.

No. 108

Scale of Miles

10 0 10 20 30