CHAPTER II

DESCRIPTION OF INDIVIDUAL MANGANESE DEPOSITS

HANTS COUNTY

1. Lake
2. Brown
3. Goshen
4. Lantz
5. Tomlinson
6. Sturgis
7. Feuchtwanger
8. Dresser Minerals Limited
9. Wheaton Brook
10. Stephens
11. Shaw and Churchill
12. South Bank, Walton River
13. Wildcat
14. Whale Cove
15. Whale Creek
16. Jennison
17. Wheadon
18. Parker
19. Tennycape
20. Cape Tenny
21. Faulkner
22. Scott
23. Thompson
24. Reynolds
25. MacDonald
26. Minasville School
27. Densmore's Mills
28. Hibernia

GENERAL

Manganese deposits have been known and worked in Hants County, especially along the south shore of Minas Basin, since 1862. There are 34 occurrences of manganese and with one exception these occur at the base of the Windsor Group, usually at the actual continuous contact with the underlying Horton Group rocks. At other places they occur in inliers or outliers in either of these geological formations.

Most of the manganese deposits occur between Cheverie and Minasville. There are 25 known occurrences along the Windsor-Horton contact in this region. This contact is 25 miles in extent and can be located within a zone 400 feet wide, often less.

Since 1862 the numerous small occurrences of manganese along the south shore of Minas Basin have produced approximately 8,000 tons of manganese ore. Production figures indicate that over one-half of this total came from Tennycape Mine.

The object of this study of the manganese deposits is to obtain and record information relative to the deposits and to collect samples for chemical investigations with a view to establishing geological and other criteria of value in judging the possible extension of ore occurrences.

In this study 28 of the manganese deposits were investigated. These localities are numbered in succession from west to east. The location of the various manganese occurrences in Hants County is shown on figure 1 (in pocket) and on the location map (Fig. 3) embodied in the report.

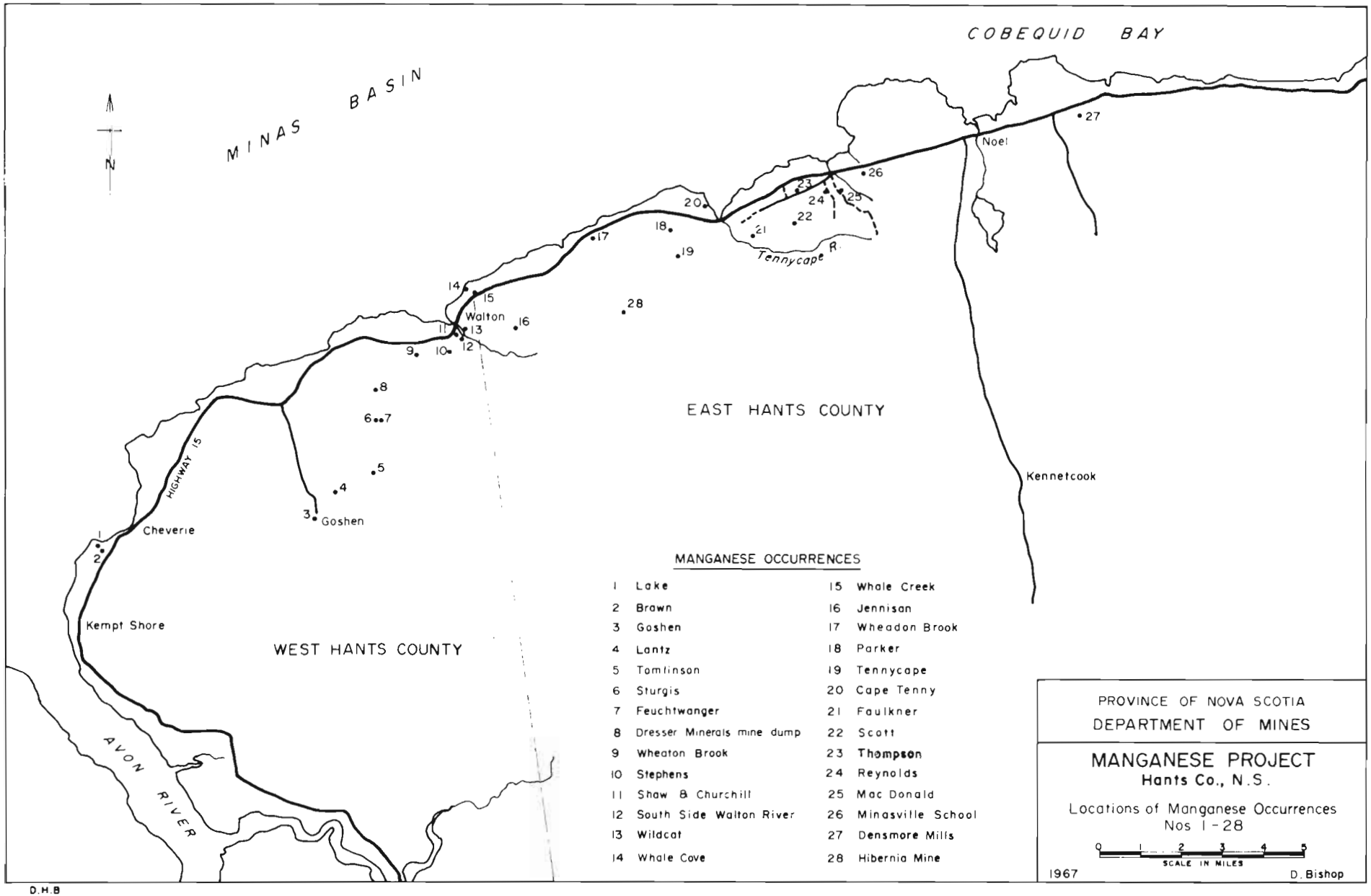

COBEQUID BAY
MINAS BASIN
N
Noel
Walton
Tennycape R.
EAST HANTS COUNTY
WEST HANTS COUNTY
HIGHWAY 15
Cheverie
Goshen
Kempt Shore
Kennetcook
AVON RIVER
MANGANESE OCCURRENCES
1 Lake
2 Brown
3 Goshen
4 Lantz
5 Tomlinson
6 Sturgis
7 Feuchtwanger
8 Dresser Minerals mine dump
9 Wheaton Brook
10 Stephens
11 Shaw & Churchill
12 South Side Walton River
13 Wildcat
14 Whale Cove
15 Whale Creek
16 Jennisan
17 Wheadon Brook
18 Parker
19 Tennycape
20 Cape Tenny
21 Faulkner
22 Scott
23 Thompson
24 Reynolds
25 Mac Donald
26 Minasville School
27 Densmore Mills
28 Hibernia Mine
PROVINCE OF NOVA SCOTIA
DEPARTMENT OF MINES
MANGANESE PROJECT
Hants Co., N.S.
Locations of Manganese Occurrences
Nos 1 - 28
0 1 2 3 4 5
SCALE IN MILES
1967
D. Bishop
D.H.B

FIGURE 3.

*(1) LAKE MANGANESE OCCURRENCE

Lat: 45° 09' 18"
Long: 64° 11' 06"
N. T. S. 21 H/1 E

LOCATION

This manganese occurrence is located west of the main highway to Walton, about a mile southwest of Cheverie, Hants County (Fig. 3 and 4).

GEOLOGY

The old workings consisted of an easterly trending open-cut into the seacliff, 80 feet long, 30 feet wide and 25 feet deep. The shaft is 30 feet west of the end of the open-cut. It is reported to have been sunk to a depth of 19 feet and was 12 feet square. The rock of the cliffs is a brownish, limestone conglomerate of the Pembroke Formation of Lower Carboniferous age. The ore minerals consist of manganese oxides - mainly pyrolusite and manganite with a little psilomelane. These minerals occur along joints and in the matrix of the limestone conglomerate as indicated on (Pl. 1, Fig. 1). The ore frequently encircles the fragments or runs along the bedding planes of the unbroken part of the bed. White to brownish calcite is plentiful. A number of east trending faults occur in the area of the shaft (Macumber). In places the faults carry some barite, siderite and hematite.

*Numbers refer to location of deposits on figure 1 in pocket.

There are no adequate records of production from this deposit. According to reports, it is estimated that not over 100 tons of high grade manganese oxides were won from this deposit.

The samples collected for analytical work by atomic absorption methods are chip and grab samples taken at the open-cut and at the Macumber shaft. Table 1 gives the result of analytical work on samples from the Lake manganese prospect, semiquantative spectrographic analyses of 4 samples from the property are listed in the tables in the appendix.

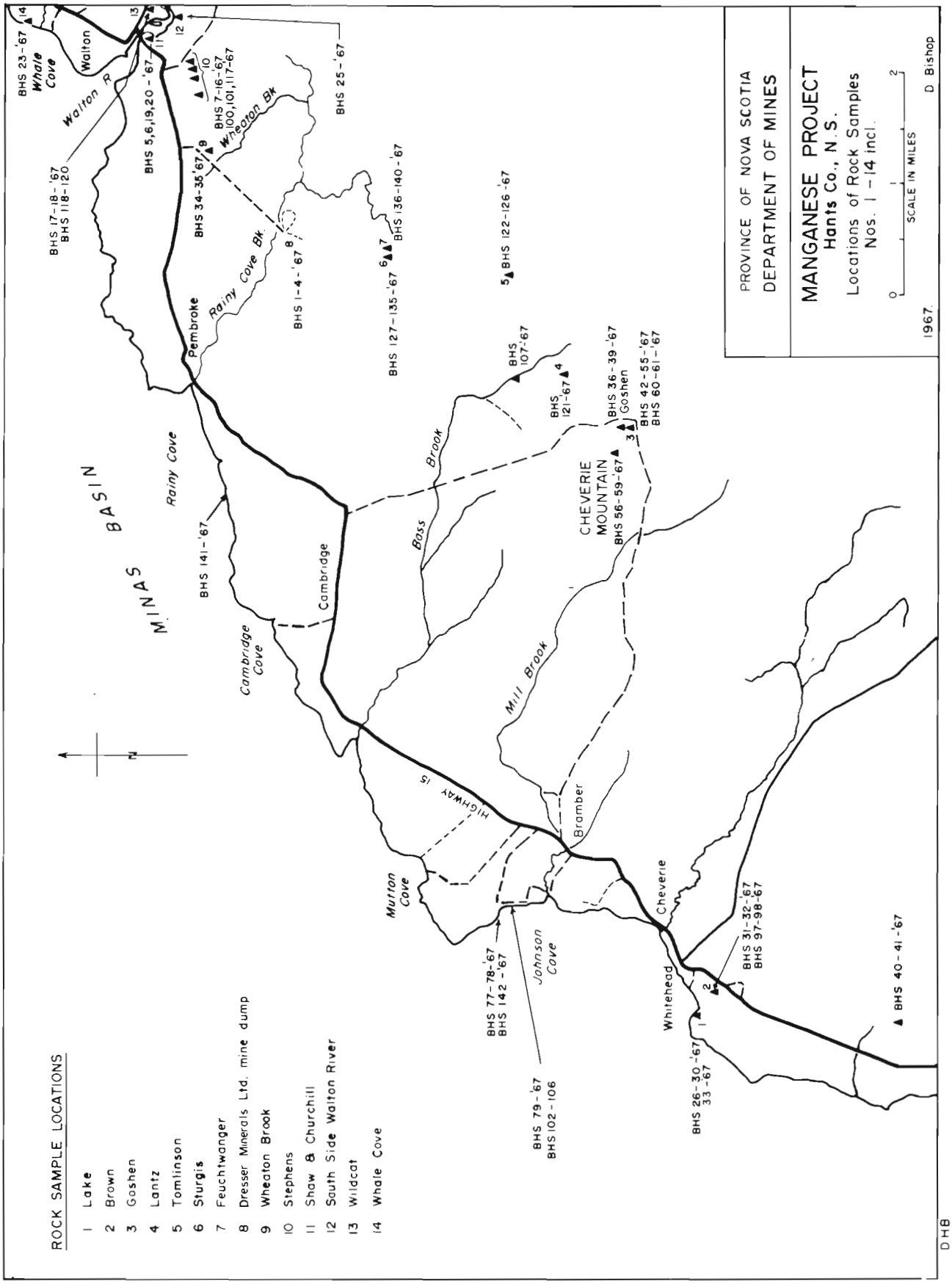

ROCK SAMPLE LOCATIONS
1 Lake
2 Brown
3 Goshen
4 Lantz
5 Tomlinson
6 Sturgis
7 Feuchtwanger
8 Dresser Minerals Ltd. mine dump
9 Wheaton Brook
10 Stephens
11 Shaw & Churchill
12 South Side Walton River
13 Wildcat
14 Whale Cove
PROVINCE OF NOVA SCOTIA
DEPARTMENT OF MINES
MANGANESE PROJECT
Hants Co., N.S.
Locations of Rock Samples
Nos. 1 - 14 incl.
SCALE IN MILES
1967.
D Bishop
DHB
BASIN
MINAS
Walton
Whale Cove
Walton R.
Wheaton Bk.
Rainy Cove Bk.
Rainy Cove
Pembroke
Cambridge
Cambridge Cove
Bass Brook
Mill Brook
Mutton Cove
Johnson Cove
Bramber
Cheverie
Whitehead
CHEVERIE MOUNTAIN
Goshen
HIGHWAY 15
BHS 23-'67
BHS 17-18-'67
BHS 118-120
BHS 5,6,19,20-'67
BHS 34-35'67
BHS 7-16-'67
BHS 100,101,117-67
BHS 25-'67
BHS 1-4-'67
BHS 127-135-'67
BHS 136-140-'67
BHS 122-126-'67
BHS 107-'67
BHS 121-'67
BHS 36-39-'67
BHS 42-55-'67
BHS 60-61-'67
BHS 56-59-'67
BHS 141-'67
BHS 77-78-'67
BHS 142-'67
BHS 79-'67
BHS 102-106
BHS 26-30-'67
33-'67
BHS 31-32-'67
BHS 97-98-'67
BHS 40-41-'67

FIGURE 4.

TABLE 1

Major and Minor Elements of the Lake Manganese

Elemental Content in Percentages, except Silver

SAMPLE NO.	LOCATION	Mn	Pb	Zn	Cu	Ba	Sr	Sb	Ni	Mo	S	Ag(ppm)
BHS-26-67	Macumber Shaft, south wall	2.0	.03	.008	.004	8.5	.01	.16	.04	.01	1.09	3.5
BHS-27-67	Pod of pyrolusite	57.0	-	.15	.031	.35	.02	.05	.05	.01	.35	1.0
BHS-28-67	1/4" vein of pyrolusite	55.4	-	.08	.065	.50	.02	.05	.05	.01	.78	1.0
BHS-29-67	Chip sample	7.5	-	.026	.007	-	-	-	-	-	-	3.0
BHS-30-67	Pembroke limestone	0.5	-	.004	.006	-	-	-	-	-	-	4.0
BHS-33-67	Pod of Manganite	58.5	-	.04	.027	.05	.005	.05	.04	.01	.13	1.0

(2) BROWN MANGANESE OCCURRENCE

Lat: 45° 09' 00"
Long: 64° 11' 00"
N. T. S. 21 H/1 E

LOCATION

The Brown manganese occurrence lies about 500 feet north of the highway and immediately to the west of the Macumber farm road. The Brown workings have been bulldozed over but they consisted of a small open-cut, some 60 feet long, excavated partly into the side of a hill. On the top of the hill, 20 to 30 feet above a small pond, are a number of small slumped pits. Bedrock is exposed in the face of the open-cut, and in a few outcrops on top of the hill (Fig. 3 and 4 for location).

GEOLOGY

The Lake and Brown manganese occurrences are located on the west limb of a shallow syncline of Windsor and Horton rocks. The dip usually ranges from horizontal to 5 degrees, but locally may be as high as 10 or 15 degrees. Along the Macumber road leading south to the beach are knobs of Pembroke limestone conglomerate. The Pembroke Formation in the vicinity of the workings has numerous pods of pyrolusite and manganite and minor amounts of psilomelane.

Thirty-seven soil samples were collected along a grid in the vicinity of the ridge of Pembroke limestone and the Brown workings. The copper content averaged 14 ppm with a maximum of 40 ppm; zinc averaged 49.7 ppm with a maximum of 300 ppm and lead averaged 87 ppm with a maximum of 1200 ppm.

TABLE 2

Major and Minor Content of Samples at Brown Workings

Elementol Content in Percentoges

SAMPLE NO.	LOCATION	Mn	Pb	Zn	Cu	Bo	Sr	Sb	Ni	Mo
BHS-31-67	Left of driveway of the Brown workings	37.5	.03	.07	.074	-	-	-	-	-
BHS-32-67	"	42.5	-	.07	.066	2.44	0.06	.05	.045	.015
BHS-97-67	Pembroke lime-stone in ridge south of drive	0.35	-	.007	.010	-	-	-	-	-
BHS-98-67	"	0.35	-	.007	.006	-	-	-	-	-

REFERENCES

Hanson, G.
1932: Manganese deposits of Canada: Geol. Surv. Can., Econ. Geol. Ser. No. 12, p. 51.

Weeks, L. J.
1948: Londonderry and Bass River map-areas, Colchester and Hants Counties, Nova Scotia; Geol. Surv. Can. Mem. 245, p. 74.

(3) GOSHEN MANGANESE

Lat: 45° 10' 00"
Long: 64° 05' 00"
N. T. S. 21 H/1 E

LOCATION

This occurrence can be reached from Highway No. 15 at Cambridge Creek by travelling south for 3.1 miles (Fig. 3).

GEOLOGY

Figure 5 was prepared from a compass and pace survey to locate the numerous trenches and to plot the sample locations. The trenches west of the Goshen road are water filled and little outcrop can be observed. However, with the workings farther to the west, considerable blocks and dumps exist with pits found in the bedrock.

The mineralization occurs at the contact of the Cheverie sandstone and the Lower Windsor limestones. Mineralization consisting of limonite, barite and manganese oxides occur in fault zones.

In 1961, Consolidated Mining and Smelting Company bulldozed the mineralization down to fresh bedrock. The excavation exposed considerable siderite with some barite and a little disseminated pyrite.

The following table details the analytical data from samples taken from the various trenches in the Goshen area. Semiquantative spectrographic analyses of two samples (BAC-7-67 and BAC-13-67) are given in the tables that form an appendix to this report.

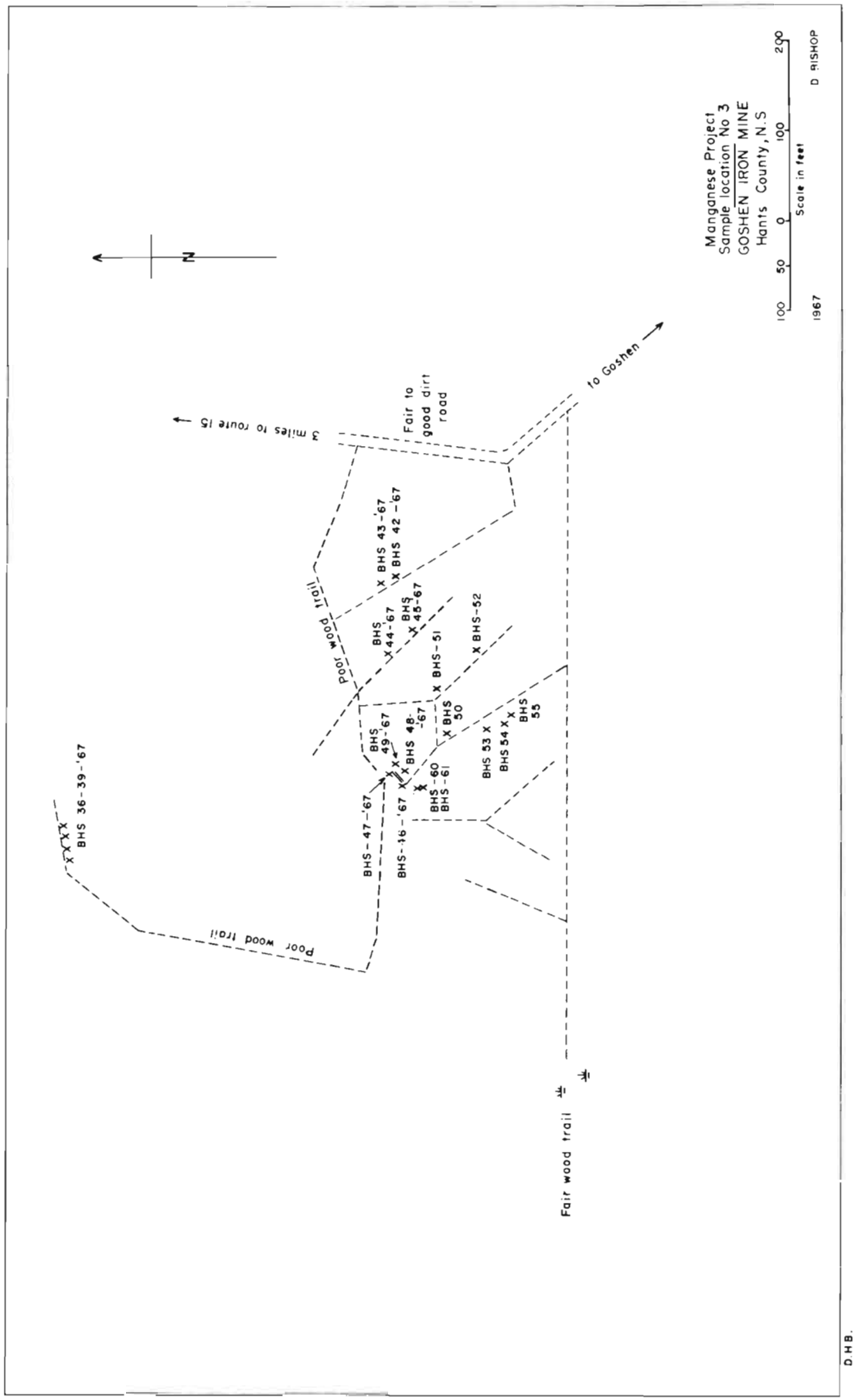

Manganese Project
Sample location No 3
GOSHEN IRON MINE
Hants County, N.S
100 50 0 100 200
Scale in feet
1967
D RISHOP
N
3 miles to route 15
Fair to good dirt road
to Goshen
Poor wood trail
BHS 36-39-'67
BHS-47-'67
BHS-16-'67
BHS 49-67
BHS 48--67
BHS-60
BHS-61
BHS 50
BHS-51
BHS-52
BHS 44-67
BHS 45-67
BHS 43-'67
BHS 42-'67
BHS 53
BHS 54
BHS 55
Poor wood trail
Fair wood trail
D.H.B.

FIGURE 5.

TABLE 3

Major and Minor Element Content of Ores and Rocks from the Goshen Deposit

Elemental Content in Percentages

SAMPLE NO.	LOCATION	Mn	Pb	Zn	Cu	Ba	Fe	Ag(ppm)	SAMPLE TYPE
BHS-42-67	Pit No. 1	5.5	.03	.004	.015	29.8	31.0	2	
BHS-43-67	"	3.3	.03	.010	.010	27.7	21.5	1	
BHS-44-67	Pit No. 2 Sandstone	2.1	.03	.008	.012	-	20.0	1	
BHS-45-67	"	26.0	.03	.11	.024	18.5	2.7	1	
BHS-46-67	Pit No. 3 barite, limonite, siderite	3.1	.03	.005	.001	26.2	24.0	1	
BHS-47-67	"	3.65	.03	.007	.015	19.9	23.0	1	
BHS-48-67	"	3.2	.03	.005	.005	28.2	19.0	1	
BHS-49-67	"	2.35	.03	.007	.006	.49	16.5	2	
BHS-50-67	Pit south of Pit No. 3	1.1	.03	.013	.002	27.5	23.0	2	
BHS-51-67	"	4.95	.03	.008	.010	13.6	31.0	2	
BHS-52-67	"	7.55	.03	.014	.015	6.98	32.0	2	
BHS-53-67	"	3.3	.10	.002	.05	23.3	2.35	2.5	
BHS-54-67	"	3.1	.03	.010	.008	28.4	17.5	1	
BHS-55-67	"	1.7	.03	.009	.027	43.7	7.05	1.2	
BHS-36-67	Pit north af Goshen Pits	.85	.03	.005	.002	-	8.5	2	
BHS-37-67	"	1.25	.03	.003	.003	-	11.0	2	
BHS-38-67	"	.10	.05	.015	.015	-	23.0	2	
BHS-39-67	"	.10	.03	.014	.008	-	33.5	10	

TABLE 3 - continued

BHS-56-67	From a trench exposing barite in Cheverie sandstone, 1500 feet northwest of Goshen	.05	.03	.002	.001	54.4	.7	1	Barite
BHS-57-67	"	1.1	.03	.004	.001	-	6.05	2	Sandstone, wall rock
BHS-58-67	"	.05	.03	.002	.001	54.5	2.0	1	Barite with iron
BHS-59-67	"	.05	.03	.008	.001	-	5.0	1	Sandstone, wallrock

REFERENCE

Boyle, R. W.
1964: Geology of the barite-gypsum-lead-zinc-copper-silver deposits of the Walton-Cheverie area, Nova Scotia, Geol. Surv. Can., Paper 62-25.

(4) LANTZ MANGANESE

Lat: 45° 10' 24"
Long: 64° 04' 00"
N. T. S. 21 H/1 E

LOCATION

The Lantz mine is some 4,000 feet northeast of the Goshen iron prospect, Hants County (Fig. 4).

GEOLOGY

Two pits occur in the area. In the pits Macumber limestone with minor flexures filled with white calcite is exposed. The limestone strikes N.65°E, and dips to the southeast from 30 to 35 degrees. No manganese was seen, but Smitheringale (1928) stated that early reports mention that some fine specimens of pyrolusite were obtained from the old workings. Six soil samples taken in the vicinity of the pits gave a low content of copper, lead and zinc.

No mineralization is now exposed. A chip sample was obtained from the exposure of Macumber limestone. The metal content in percentages is as follows: Mn,.05; lead,.03; zinc, .002; copper, .003; iron, 0.5; silver, 4 (ppm).

(5) TOMLINSON MINE

Lat: 45° 10' 35"
Long: 64° 03' 00"
N. T. S. 21 H/1 E

LOCATION

The Tomlinson mine is over two miles west of Walton and about three miles south of Pembroke, Hants County (Fig. 4).

GEOLOGY

The workings, consisting of a few trenches and a shaft, are in ferruginous sandstone of the Cheverie Formation of Horton age. The pits reveal no mineralization, and only good exposures of the sandstone are found in pits No. 1 and No. 4. The formations strike N.20°E. and dip 70 degrees to the southwest. Several dumps in the area reveal the mineralization to be hematite, limonite and minor manganese oxides. No barite, or gossan indicating sulphides was observed.

Five samples were taken at random from the dumps as no mineralization was noted in the pits. The results of the analytical data are tabulated below:

TABLE 4

Major and Minor Element Content of Samples from Tomlinson Workings

Elemental Content in Percentages

SAMPLE NO.	Mn	Pb	Zn	Cu	Fe	Ba	Sr	Mo	Ni	Sb	S	As	Ag (ppm)
BHS-122-67	.40	.03	.001	.002	5.5	-	-	-	-	-	-	-	1
BHS-123-67	.3	.03	.007	.012	31.2	0.1	.012	.01	.04	.05	.41	006	2
BHS-124-67	.1	.03	.006	.007	19.9	-	-	-	-	-	-	-	1
BHS-125-67	.05	.03	.008	.013	29.8	-	-	-	-	-	-	-	2
BHS-126-67	27.8	.03	.022	.052	14.75	0.5	.065	.01	.03	.05	.51	.005	2

REFERENCE

Hanson, G.
1932: Manganese deposits of Canada; Geol. Surv. Can. Econ. Geol. Ser. No. 12, pp. 49 - 50.

(6) STURGIS MANGANESE OCCURRENCE

Lat: 45° 11' 42"
Long: 64° 02' 48"
N. T. S. 21 H/1 E

LOCATION

The Sturgis Mine is located 3,500 feet south of Dresser Industries barite-sulphide mine and three miles southwest of Walton, Hants County (Fig. 3). The mine was worked intermittently from 1877 to 1882, but very little, if any, ore was shipped. In 1918 considerable exploration work was done and about 17 tons of manganese ore was removed from the shafts and large pit. Three shafts and a large pit exist on the property.

GEOLOGY

The shafts are mainly in Cheverie sandstone although some Macumber limestone on the dumps indicates that some of the workings may have been partly in this formation. The minerals seen on the dumps consisted of pyrolusite and limonite in irregular veinlets developed in joints and crushed zones in reddish grey quartzite. It is quite evident that the mineralized zones occur in fractured zones related to north and northwest striking faults. The brecciated nature of the sandstone

and replacement by manganese minerals is shown on (Pl III, Fig. 5 and 6).

Figure 6 shows the location of the samples collected for analytical work. The results are tabulated in Table 5. Semiquantitative spectrographic analyses are available for two samples from the Sturgis property and are listed in the tables that form an appendix to this report.

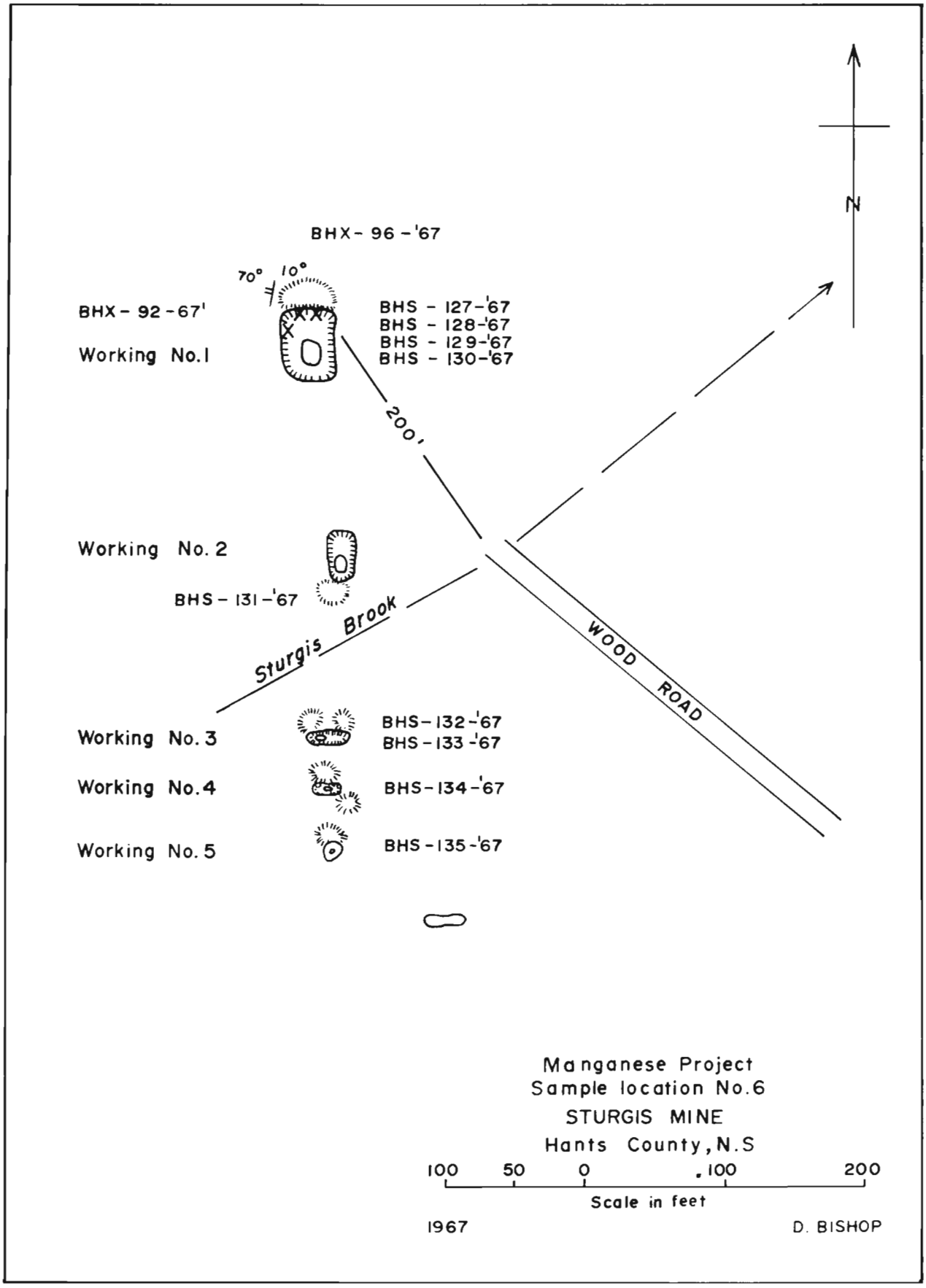

N
BHX - 96 - '67
70°
10°
BHX - 92 - 67'
Working No. 1
BHS - 127 - '67
BHS - 128 - '67
BHS - 129 - '67
BHS - 130 - '67
200'
Working No. 2
BHS - 131 - '67
Sturgis Brook
WOOD ROAD
Working No. 3
BHS - 132 - '67
BHS - 133 - '67
Working No. 4
BHS - 134 - '67
Working No. 5
BHS - 135 - '67
Manganese Project
Sample location No. 6
STURGIS MINE
Hants County, N.S
100 50 0 100 200
Scale in feet
1967
D. BISHOP

FIGURE 6 -

TABLE 5

Major and Minor Element Content of Sturgis Manganese

All values in Percentages, except silver

SAMPLE NO.	Mn	Zn	Cu	Pb	Fe	Ag (ppm)
BHS-127-67	48.0	.013	.002	.03	1.0	1
BHS-128-67	12.9	.005	.001	.03	1.2	1
BHS-129-67	.75	.001	.001	.03	.6	1
BHS-130-67	11.1	.016	.002	.03	.05	.5
BHS-131-67	18.4	.003	.002	.03	1.05	1
BHS-132-67	11.0	.005	.004	.03	2.95	.5
BHS-133-67	19.1	.008	.002	.03	6.85	1
BHS-134-67	17.9	.007	.004	.03	5.95	1
BHS-135-67	19.0	.001	.001	.03	3.50	2

REFERENCES

Hanson, G., 1932: Manganese deposits of Canada; Geol. Surv. Can. Econ. Geol. Ser. No. 12, p. 49

Boyle, R. W. 1972: The geology, geochemistry and origin of the barite-manganese and lead-zinc copper-silver deposits of the Walton-Cheverie area, Nova Scotia, Geol. Surv. Can., Bull. 166, p. 23.

(7) FEUCHTWANGER PROPERTY

Lat: 45° 11' 42"
Long: 64° 02' 45"
N. T. S. 21 H/1 E

LOCATION AND WORKINGS

The Feuchtwanger property is south of Pembroke and about three miles west of Walton, Hants County. The workings are located south of the Dresser Industries barite and base metal deposit and only 300 feet east of the Sturgis workings (Fig. 4). The property was worked from 1885 to 1894. No figures of the production are available.

The workings at the Feuchtwanger property consist of three shallow shafts and several pits in Macumber and Pembroke limestone and the underlying Cheverie sandstone. The two shafts are said to be 30 feet deep, and from the bottom of one, a drift extends some 60 feet.

GEOLOGY

The manganese occurs in thinly laminated limestone of Windsor age striking northeast and dipping 60 degrees southeast. The ore occurs as stringers up to five inches wide and as small pockets and nests and consists of pyrolusite. Limonite is associated with the ore and is replaced by the pyrolusite. Other minerals associated with the manganese are barite and gypsum.

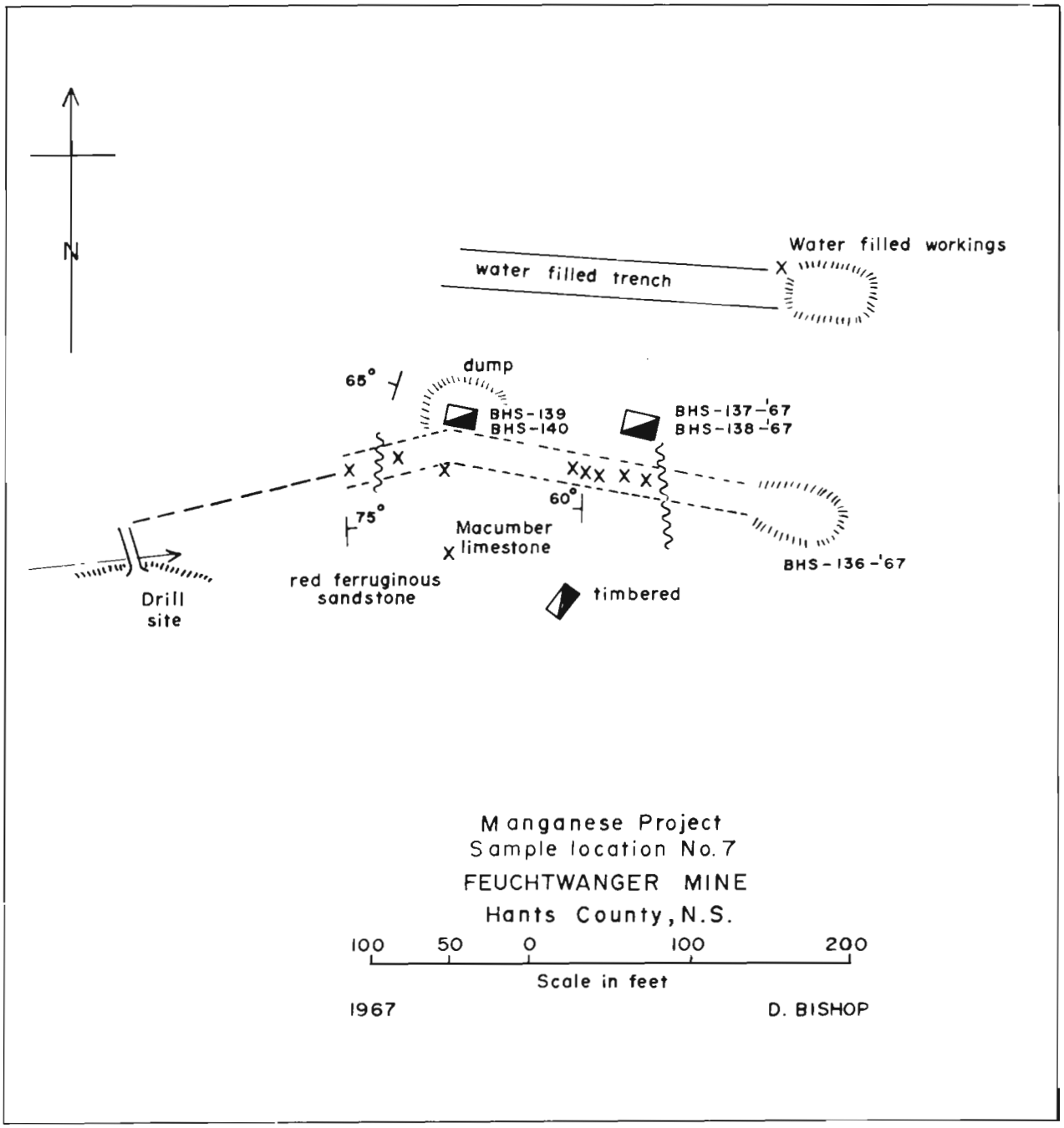

N
Water filled workings
water filled trench
dump
65°
BHS-139
BHS-140
BHS-137-'67
BHS-138-'67
60°
75°
Macumber
limestone
BHS-136-'67
Drill
site
red ferruginous
sandstone
timbered
Manganese Project
Sample location No. 7
FEUCHTWANGER MINE
Hants County, N.S.
100 50 0 100 200
Scale in feet
1967
D. BISHOP

FIGURE 7.

TABLE 6

Major and Minor Element Content of Feuchtwanger Manganese and Barite

Elemental Content in Percentages

SAMPLE NO.	Mn	Pb	Zn	Cu	Ba	Fe	Ag (ppm)
BHS-137-67 (Barite)	.05	.03	.002	.002	52.7	.7	.5
BHS-138-67 (Shaft No. 2)	18.2	.03	.06	.049	5.2	27.9	1
BHS-139-67	.41	.03	.005	.004	-	2.0	3
BHS-140-67	.38	.03	.003	.001	47.22	.6	3.5

REFERENCES

Boyle, R. W.
1972: The geology, geochemistry and origin of the barite, manganese and lead-zinc-copper-silver deposits of the Walton-Cheverie area, Nova Scotia, Geol. Surv. Can., Bull. 166, p. 23.

Hanson, G.
1932: Manganese deposits of Canada, Geol. Surv. Can., Econ. Geol. Ser. No. 12, p. 48

(8) DRESSER MINERALS LIMITED

Lat: 45° 12' 24"
Long: 64° 02' 30"
N. T. S. 21 H/1 E

LOCATION

Several samples of manganese-bearing rock were collected from the dump at the barite-sulphide deposit of Dresser Minerals Limited near Walton, Hants County. The mine and quarry are about 2 1/2 miles southwest of Walton and can be reached by a gravel road that connects with the main highway through Walton (Fig. 4).

The geology of the deposit is described in detail by Boyle (1972). In the various hypogene manganese oxide occurrences the minerals including pyrolusite and manganite occur as rounded and irregular nodules in the vuggy parts of the Pembroke Formation. These nodules are often associated with calcite (see Pl. II, Fig. 6). In the Macumber Formation and the Cheverie rocks most of the manganese oxides are in fractures or cement the fragments of brecciated zones. Much of the manganese is associated with siderite. The manganese oxides accompany hematite along the upper extension of the footwall fault. The following table lists the elements determined by atomic absorption method.

TABLE 7

Major and Minor Element Content of Manganese from Dump Rock at Dresser Minerals Mine

Elemental Content in Percentages, except silver

SAMPLE NO.	Mn	Pb	Zn	Cu	Ag (ppm)	
BHS-1-67	57.40	.03	.14	.038	1.0	pyrolusite
BHS-2-67	60.90	.03	.14	.041	1.0	pyrolusite
BHS-3-67	6.40	.10	.03	.010	2.0	barite
BHS-4-67	17.40	.10	.04	.04	1.0	calcite

Spectrographic analyses were made of six samples collected from the dump at the barite-sulphide deposit of Dresser Minerals Limited. They are compiled in the tables that form an appendix to this report.

REFERENCE

Boyle, R. W.
1972: The geology, geochemistry and origin of the barite, manganese and lead-zinc-copper-silver deposits of the Walton-Cheverie area, Nova Scotia, Bull. 166, pp. 23-27

(9) WHEATON BROOK

Lat: 45° 13' 10"
Long: 64° 01' 50"
N. T. S. 21 H/1 E

WORKINGS

A small shaft was sunk in the red to reddish brown weathering Pembroke limestone conglomerate. The old working is 30 feet long, 20 feet wide and 10 feet deep. A small dump exists on the east side, the fragments have very minor manganese staining (Fig. 8).

Boyle (1963) reported that a lead-zinc-silver anomaly was found in stream sediments of Wheaton Brook which passes just to the west of the workings. The Pembroke limestone exposed on Wheaton Brook is the westward extension of the limestone ridge of the Stephens property. It is possible that mineralization could be related to the east-west fault that passes to the south of Wheaton Brook.

Two chip samples were taken along the walls of the shaft. The results are as follows:

TABLE 8

Trace Element Content of Wheaton Brook Manganese

Elemental Content in Percentages

SAMPLE NO.	Mn	Pb	Zn	Cu	Fe	Ba	Ag (ppm)
BHS-34-67	.10	.03	.002	.007	.5	-	4.5
BHS-35-67	.20	.03	.003	.004	.7	8.0	3.5

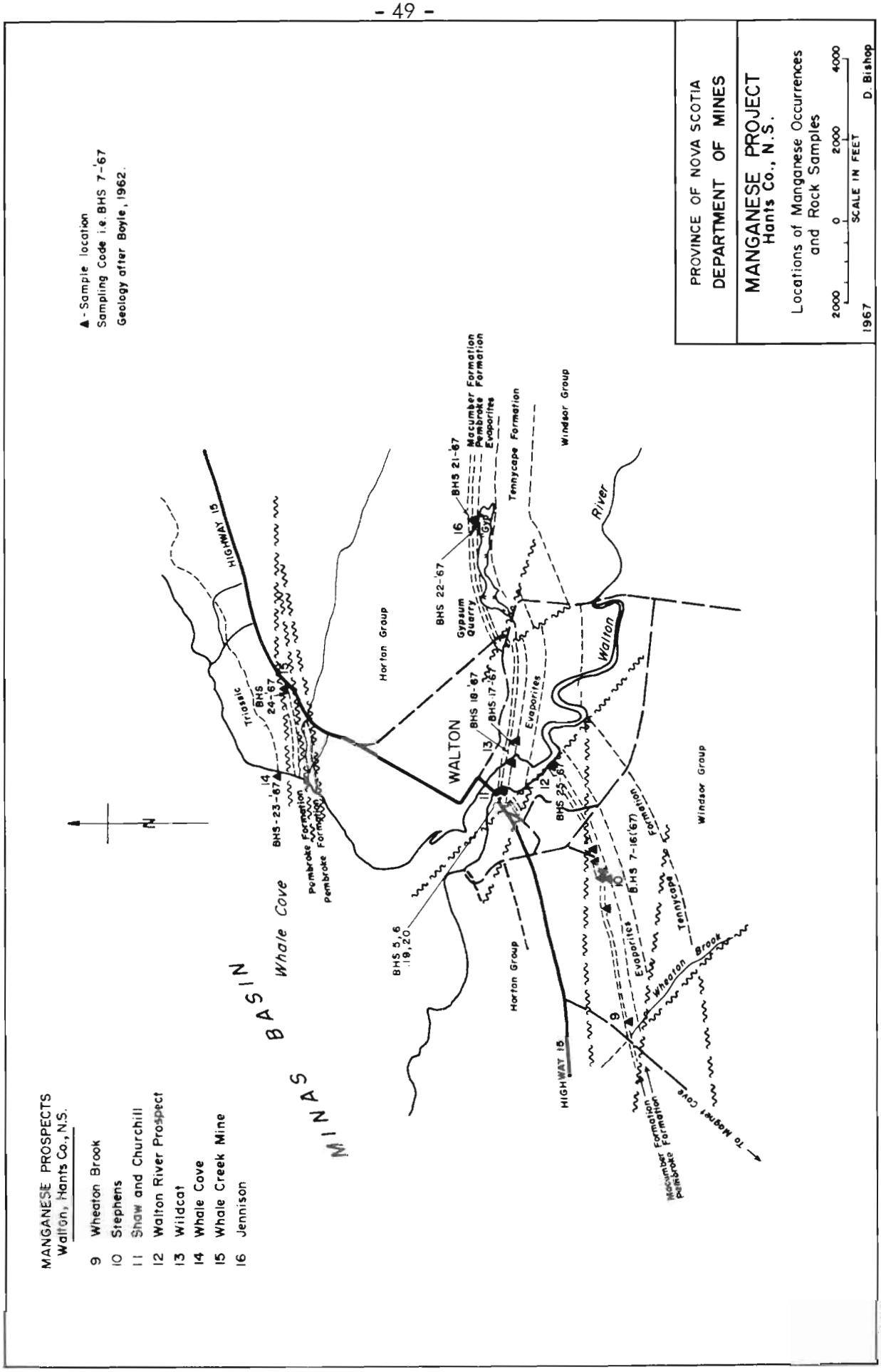

MANGANESE PROSPECTS
Walton, Hants Co., N.S.
9 Wheaton Brook
10 Stephens
11 Shaw and Churchill
12 Walton River Prospect
13 Wildcat
14 Whale Cove
15 Whale Creek Mine
16 Jennison
▲- Sample location
Sampling Code i.e. BHS 7-'67
Geology after Boyle, 1962.
PROVINCE OF NOVA SCOTIA
DEPARTMENT OF MINES
MANGANESE PROJECT
Hants Co., N.S.
Locations of Manganese Occurrences and Rock Samples
2000 0 2000 4000
SCALE IN FEET
1967
D. Bishop
BASIN
MINAS
Whale Cove
WALTON
HIGHWAY 15
Triassic
Pembroke Formation
Horton Group
Windsor Group
Evaporites
Gypsum Quarry
Tennycape Formation
Macumber Formation
Pembroke Formation
Wheaton Brook
River
Walton
To Noel
BHS 24-'67
BHS-23-'67
BHS 18-'67
BHS 17-'67
BHS 22-'67
BHS 21-'67
BHS 25-'67
BHS 7-16('67)
BHS 5,6
19,20

FIGURE 8 -

(10) STEPHENS MINE

Lat: 45° 13' 00"
Long: 64° 00' 42"
N. T. S. 21 H/1 E

LOCATION AND WORKINGS

The Stephens mine is three quarters of a mile southwest of the village of Walton, Hants County (Fig. 8).

The old workings, now inaccessible, consisted of three inclined shafts, a vertical shaft and several pits and open-cuts in a distance of 2,000 feet along the Macumber and Pembroke limestone formations (Fig. 9). About 50 tons of manganese ore has been mined from the deposits.

GEOLOGY

The geology of the area is well described by Smitheringale who says that "the strata are thinly bedded laminated limestone overlain by brownish grey, apparently massive limestone about 10 feet thick and this is overlain in turn by a conglomerate containing small, rounded pebbles of quartz, chert and limestone. This series exhibits many local crinkles and warpings, particularly in the laminated member. The rocks are probably basal members of the Windsor Group underlain by the Horton Formation."

The ore minerals consist of manganite and pyrolusite in irregular pockets and along joint planes in limestone and limestone conglomerate. The majority of the

manganese occurs in the reddish Pembroke limestone breccia and conglomerate and is associated with dogtooth spar. Crystals of the dogtooth spar are up to two inches in length, lining cavities a foot or more in length. The general strike of the limestone is N.70°E. with a dip of 40 degrees to the southeast. In places fractures and joints that appear to be related to east striking faults controlled the mineralization.

TABLE 9

Major and Minor Element Content of Limestone around Old Stephens Mine

Elemental Content in Percentages, except silver

SAMPLE NO.	Mn	Pb	Zn	Cu	Fe	Ag (ppm)
BHS-7-67	.20	.03	.004	.002	-	5.5
BHS-8-67	.45	.03	.0035	.002	-	3.0
BHS-9-67	.75	.03	.004	.001	-	3.5
BHS-10-67	.40	.03	.003	.001	-	3.5
BHS-11-67	.25	.03	.002	.001	-	3.5
BHS-12-67	.025	.03	.002	.001	-	2.5
BHS-13-67	.35	.03	.002	.001	-	2.5
BHS-14-67	.75	.03	.002	.001	-	2.0
BHS-15-67	1.28	.03	.002	.001	-	2.0
BHS-16-67	1.40	.03	.003	.002	-	2.0
BHS-100-67	.19	.03	.003	.002	.56	.5
BHS-101-67	.39	.03	.004	.002	.95	2.5
BHS-117-67	.10	.03	.003	.002	.50	3.0

Five samples were collected from the dump for spectrographic analyses. The results are given in the appendix to this report.

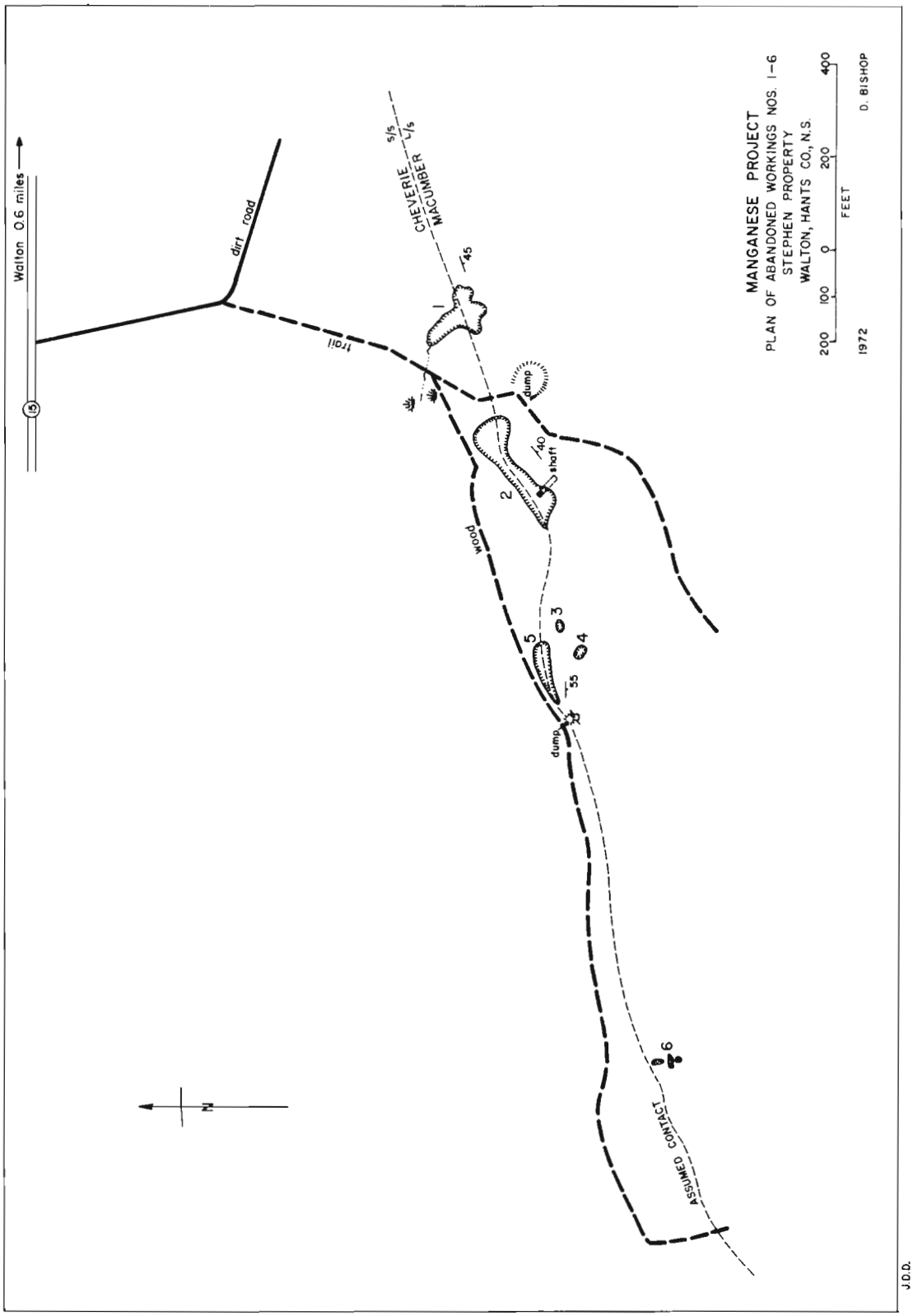

MANGANESE PROJECT
PLAN OF ABANDONED WORKINGS NOS. 1-6
STEPHEN PROPERTY
WALTON, HANTS CO., N.S.
200 100 0 200 400
FEET
1972
D. BISHOP
Walton 0.6 miles
15
dirt road
trail
CHEVERIE
MACUMBER
S/S
L/S
45
40
55
shaft
dump
dump
wood
1
2
3
4
5
6
N
ASSUMED CONTACT
J.D.D.

FIGURE 9

REFERENCE

Boyle, R. W.
1972: The geology, geochemistry and origin of the barite, manganese and lead-zinc-copper-silver deposits of the Walton-Cheverie area, Nova Scotia, Geol. Surv. Can., Bull. 166, p. 27

(11) SHAW AND CHURCHILL MINE

Lat: 45° 13' 30"
Long: 64° 00' 30"
N. T. S. 21 H/1 E

LOCATION

The Shaw and Churchill mine is on the west bank of Walton River directly opposite Walton and within 75 yards of the main road between Walton and Pembroke, Hants County (Fig. 4).

GEOLOGY

The workings, now water filled, consisted of a large open pit in Macumber and Pembroke limestone. Work on the property began in 1881 and continued in a small way for about two years. About 250 tons of chemical-grade manganese oxides is said to have been produced from the deposit.

At low tide, on the south bank, and east of the bridge over Walton River, the contact is visible of the Cheverie Sandstone (Horton age) and the overlying Macumber and Pembroke limestones. The beds strike east and dip 55 degrees to the south. There is a 45-foot section of Macumber and Pembroke limestone exposed at

this point. The Macumber limestone is about 20 feet thick and is contorted and fractured.

The ore minerals consisted of porous and crystallized manganite with a little pyrolusite, both occurring as irregular masses, pods and stringers in the limestone. Some calcite and barite accompanied the manganese oxides in places. The mineralization was probably localized in subsidiary fractures and breccia zones associated with the northwest striking fault, which passes through the area.

Four samples were collected from barite and manganese stringers for analyses.

TABLE 10

Major and Minor Element Content of the Mineralization in the Pembroke Limestone

Elemental Content in Percentages except Silver

SAMPLE NO.	Mn	Pb	Zn	Cu	Sr	Sb	Ni	Ag
BHS-5-67	.2	.03	.004	.005	-	-	-	2 ppm
BHS-6-67	2.5	.03	.003	.007	10.5	.13	.05	2 ppm
BHS-19-67	.18	.03	.003	.001	30.5	.05	.025	1 ppm
BHS-20-67	54.4	.03	.035	.064	2.5	.09	.04	1 ppm

A semiquantitative spectrographic analysis was made on one sample (BAC-1-67) from the Shaw and Churchill property. The main elements as indicated in the table in the appendix are manganese and barite.

REFERENCES

Boyle, R. W.
1972: The geology, geochemistry and origin of the barite, manganese and lead-zinc-copper-silver deposits of the Walton-Cheverie area, Nova Scotia, Geol. Surv. Can., Bull. 166, p. 28

Hanson, G.
1932: Manganese deposits of Canada; Geol. Surv. Can. Econ. Geol. Ser. No. 12, p. 46.

(12) SOUTH BANK, WALTON RIVER

Lat: 45° 13' 04"
Long: 64° 00' 02"
N. T. S. 21 H/1 E

GEOLOGY

Macumber and Pembroke limestone is exposed near the Walton River. The Macumber limestone is a reddish, sandy limestone, cut by veinlets of calcite. Dog-tooth spar lines the cavities and the wider veins exhibit comb structure. Hematite and barite are present. The beds strike N.55°E. and dip 75 degrees southeast. Farther upstream an outcrop of Pembroke conglomerate is exposed. It contains many cavities filled with white dogtooth spar and calcite veinlets (see Fig. 4 and 8 for location of the showing).

TABLE 11

Trace Element Content of the Limestone at

South Bank, Walton River

Elemental Content in Percentages, except Silver

SAMPLE NO.	Mn	Pb	Zn	Cu	Ag (ppm)
BHS-25-67	.45	.03	.07	.007	4.0

Three soil samples were taken in the vicinity of the old workings. The average copper content being 3ppm; zinc 26 ppm and lead 20 ppm.

(13) WILD CAT PROSPECT

Lat: 45° 13' 06"
Long: 64° 00' 01"
N. T. S. 21 H/1 E

LOCATION

This occurrence, originally known as Miner Brown's tunnel, is southeast of Walton on the south side of a rocky knoll that marks the Macumber and Pembroke Formations (Fig. 8). Several small pits are found in the Macumber limestone. On the south side of the ridge, an adit extends into the Pembroke limestone conglomerate for roughly 70 feet. Several small pits and cuts have been made on the north side of

the ridge, which contain pyrolusite and manganite with associated dogtooth spar.

GEOLOGY

The adit strikes N .20° E. and was driven at the base of the ridge about 40 feet high. The ridge trends N .60° W. and is covered with moderately dense spruce growth. The contact of the Macumber and Pembroke is exposed at the northwest end of the ridge.

There is no indication of any manganese minerals, barite or sulphides, either in the adit or in the nearby rock outcrops. There are numerous pits on the north side of the rocky knoll. Small pods and streaks of manganese minerals were observed in place. Minor coating and stains of manganese with veinlets of white calcite occur in the Macumber limestone 130 feet northwest along the base of the ridge from the adit.

TABLE 12

Major and Minor Element Content of Manganese

Oxides and Limestone

Elemental Content in Percentages

NUMBER	DESCRIPTION	Mn	Pb	Zn	Cu	Fe	Ba	Ag (ppm)
BHS-17-67	From mouth of adit, limestone	.10	.03	.002	.001	-	-	2
BHS-18-67	130 feet north west of adit	1.16	.03	.003	.001	-	-	2
BHS-118-67	Manganese oxides from cuts on north side of ridge	.12	.03	.005	.009	.3	-	4
BHS-119-67	"	17.0	.03	.012	.037	.4	7.55	1.5
BHS-120-67	"	10.3	.03	.005	.023	.3	-	5.5

The average of the soil samples taken on the ridge are: copper - 7.5 ppm; Pb - 26.6 ppm and zinc - 13.0 ppm.

REFERENCE

Boyle, R. W.
1972: The geology, geochemistry and origin of the barite, manganese, and lead-zinc-copper-silver deposits of the Walton-Cheverie area, Nova Scotia, Geol. Surv. Can., Bull. 166, p. 28.

(14) WHALE COVE

Lat: 45° 00' 14"
Long: 64° 00' 00"
N.T.S. 21 H/1 E

LOCATION

The property lies about a mile northeast of Walton, Hants County, and along the sea cliffs east of Whale Creek (Fig. 8).

GEOLOGY

East of Whale Creek, along the sea cliffs, is a complex fault zone, with down faulted blocks of Pembroke limestone in the Horton Formation. The zone trends east-west with minor manganese and barite mineralization occurring along the cliffs and shore at low tide level.

TABLE 13

Major and Minor Element Content of Horton Bluff Formation, Whale Cove

Elemental Content in Percentages

SAMPLE NO.	Mn	Pb	Zn	Cu	Ba	Sr	Sb	Ni
BHS-23-67	1.55	.03	.003	.011	8.95	.14	.14	.06

(15) WHALE CREEK MINE

Lat: 45° 14' 30"
Long: 63° 59' 54"
N. T. S. 11 E/4 W

LOCATION

The Whale Creek occurrence is about a mile northeast of Walton, Hants County (Fig. 10).

GEOLOGY

According to Boyle (1972), the workings, now inaccessible, consisted of an adit 70 to 80 feet long, driven in a small hillside of buff weathering fissile limestone. Two to three tons of ore, said to have been pyrolusite in small veinlets and pods were taken from the deposit. The area has been covered so that the original workings are obliterated. At the top of the hill, rusty weathering, fractured and contorted red argillite and shales mark the location of an east-striking fault zone.

Farther west along the cliffs and on the flats are minor occurrences of manganese minerals and barite.

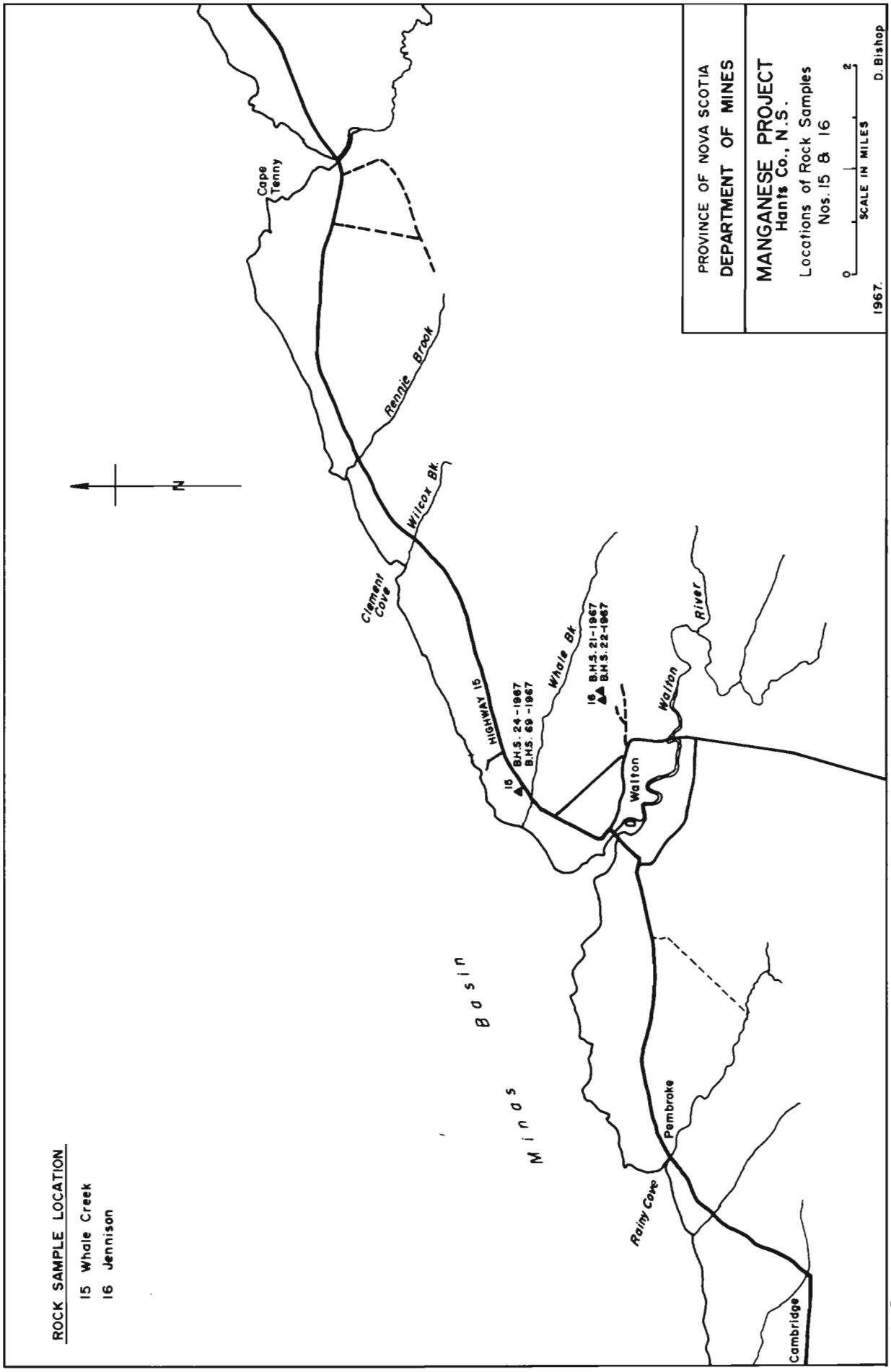

ROCK SAMPLE LOCATION
15 Whale Creek
16 Jennison
N
Cape Tenny
Rennie Brook
Wilcox Bk.
Clement Cove
HIGHWAY 15
15 B.H.S. 24-1967 B.H.S. 69-1967
Whale Bk.
16 B.H.S. 21-1967 B.H.S. 22-1967
Walton
Walton
River
Basin
Minas
Pembroke
Rainy Cove
Cambridge
PROVINCE OF NOVA SCOTIA
DEPARTMENT OF MINES
MANGANESE PROJECT
Hants Co., N.S.
Locations of Rock Samples
Nos. 15 & 16
0
2
SCALE IN MILES
1967.
D. Bishop
D.H.B.

FIGURE 10

TABLE 14

Major and Minor Element Content of Rock and Manganese Oxides

From Whale Creek

Elemental Content in Percentages

SAMPLE NO. & DESCRIPTION	Mn	Pb	Zn	Cu	Ba	Sb	Ni	Ag (ppm)
BHS-24-67 Chip sample of limestone	1.0	.03	.03	.005	7.55	.12	.05	2.5
BHS-69-67 Pyrolusite & Calcite	5.05	.08	.002	.006	4.95	.01	.015	3.0

REFERENCE

Boyle, R. H.
1972: The geology, geochemistry, and origin of the barite, manganese and lead-zinc-copper-silver deposits of the Walton-Cheverie area, Nova Scotia, Geol. Surv. Can., Bull. 166, p. 29.

(16) JENNISON PIT

Lat: 45° 13' 42"
Long: 63° 58' 30"
N. T. S. 11 E/4 W

LOCATION

The Jennison pit is about a mile northeast of Walton and one half mile west of the gypsum quarry (Fig. 10).

GEOLOGY

Manganese ore has been reported in workings known as "Jennison pit" at the contact between Windsor limestone and rocks of Horton age. Nothing remains of the workings except a few fragments of limestone. Some pits in the area show exposures of Pembroke limestone. Chip samples were taken from two exposures of the Pembroke limestone for analytical work.

TABLE 15

Elemental Content of Pembroke Limestone in Percentages

SAMPLE NO. & DESCRIPTION	Mn	Pb	Zn	Cu	Ag (ppm)
BHS-21-67 Pembroke limestone	.21	.03	.007	.001	1
BHS-22-67 Pembroke limestone	.14	.03	.002	.001	1

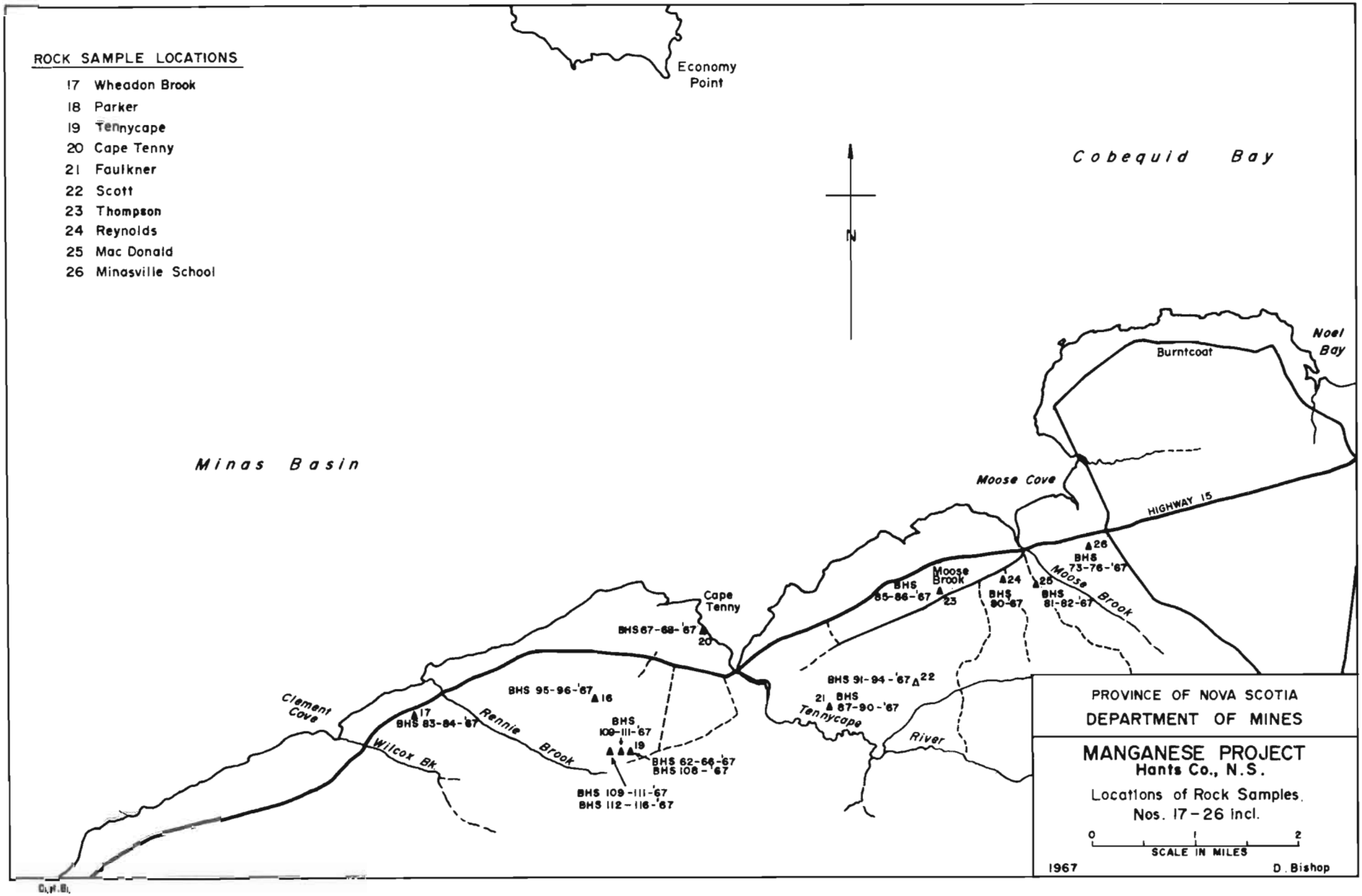

ROCK SAMPLE LOCATIONS
17 Wheadon Brook
18 Parker
19 Tennycape
20 Cape Tenny
21 Faulkner
22 Scott
23 Thompson
24 Reynolds
25 Mac Donald
26 Minasville School
Economy Point
Cobequid Bay
N
Noel Bay
Burntcoat
Minas Basin
Moose Cove
HIGHWAY 15
Moose Brook
Cape Tenny
Clement Cove
Rennie Brook
Wilcox Bk
Tennycape River
BHS 73-76-'67
BHS 85-86-'67
BHS 80-'67
BHS 81-82-'67
BHS 67-68-'67
BHS 95-96-'67
BHS 83-84-'67
BHS 109-111-'67
BHS 62-66-'67
BHS 108-'67
BHS 109-111-'67
BHS 112-116-'67
BHS 91-94-'67
BHS 87-90-'67
PROVINCE OF NOVA SCOTIA
DEPARTMENT OF MINES
MANGANESE PROJECT
Hants Co., N.S.
Locations of Rock Samples
Nos. 17-26 incl.
0 1 2
SCALE IN MILES
1967
D. Bishop

FIGURE 11

(17) WHEADON PROPERTY

Lat: 45° 14' 40"
Long: 63° 56' 10"
N. T. S. 11 E/5 W

LOCATION

The Wheadon property is just south of the road about halfway between Rennie and Wilcox brooks, Hants County. The old workings are about 75 yards from the barn on Mr. Wheadon's farm. It is said that about two tons of pyrolusite were obtained from this property.

GEOLOGY

The rocks in the area consist of reddish to buff coloured Triassic conglomerate, overlying siltstones and mudstones of the Horton Bluff Formation of lower Carboniferous age. The manganese occurs interstitially and as stringers in the conglomerate above the Horton-Triassic contact. The mineralization is of minor importance and the area exposed less than 100 feet in length.

TABLE 16

Major and Minor Element Content of the Conglomerate and Horton Bluff Formation

Elemental Content in Percentages

SAMPLE NO. & DESCRIPTION	Mn	Pb	Zn	Cu	Ag (ppm)
BHS-83-67 Conglomerate	1.33	.03	.002	.004	2
BHS-84-67 Horton Bluff Formation	.94	.03	.0015	.006	2

REFERENCE

Hanson, G.
1932: Manganese deposits of Canada, Geol. Surv. Can., Econ. Geol. Ser. No. 12, p. 45

(18) PARKER MINE PROPERTY

Lat: 45° 15' 45"
Long: 63° 54' 12"
N. T. S. 11 E/5 W

LOCATION

The Parker mine is half a mile northeast of the Tennycape mine or about two miles west of Tennycape, Hants County. The mine was worked about 1882 by William Stephens

of Tennycape, who removed some 50 tons of very good ore. The workings consist of a water-filled pit some 90 feet in diameter and two trenches 600 feet and 800 feet northeast of the pit (Fig. 11).

GEOLOGY

The rocks in the vicinity of the mine are limestones of Windsor age on the axis of a syncline that probably plunges to the west. Fifty feet east of the pit an outcrop 30 feet long exposes buff-coloured Macumber, shaly limestone with infolded, reddish Pembroke limestone conglomerate in the middle.

No rock is exposed in the two trenches to the northeast. The dumps afforded the only opportunity to examine the mineralization and country rock. Pyrolusite mineralization appeared to be confined to the Pembroke Formation which is buff to reddish buff limestone conglomerate carrying sub-angular fragments of the Macumber Formation. The pyrolusite occurs as coatings and small blebs on the blocks and fragments.

If the syncline plunges to the west, it is possible more ore might be encountered near the surface while the fold is still shallow. The ore occurred as a large pocket in limestone and consisted of very pure pyrolusite.

TABLE 17

Major and Trace Element Content of Manganese Ore and Wallrock

Elemental Content in Percentages

SAMPLE NO. AND TYPE	Mn	Fe	Cu	Ba	Zn	Pb	Ag (ppm)
BHS-95-67 Pyrolusite	53.5	.5	.057	.6	.03	.0025	1
BHS-96-67	.19	2.05	.004	-	.005	.03	3

A spectrographic analysis was made of a sample of the manganese mineralization from one of the dumps (Sample BHS-95-67). The main elements indicated are manganese and iron with trace amount of copper. See table in appendix.

REFERENCES

Hanson, G.
1932: Manganese deposits of Canada; Geol. Surv. Can., Econ. Geol. Ser. No. 12, p. 69.

Weeks, L. J.
1948: Londonderry and Bass River map-areas, Colchester and Hants Counties, Nova Scotia, Geol. Surv. Can., Mem. 245, pp. 69-70.

(19) TENNYCAPE MINE

Lat: 45° 15' 18"
Long: 63° 53' 48"
N. T. S. 11 E/5 W

LOCATION

The Tennycape mine is one and one half miles southwest of the town of Tennycape, on Minas Basin, in Hants County. The workings are on the north side of Rennie Brook near its source (Figs. 11 and 12).

The Tennycape mine was the largest producer of manganese in Nova Scotia, about 4,000 tons of oxides were produced from 1880 to 1900. It is recorded that early production was from boulders of manganese ore in the soil overlying the deposit, sometime during 1862. Between 1870 and 1875, several open-cuts in the limestone yielded a high grade manganese ore. One large lens is reported to have produced approximately 1,000 tons of ore. From 1879 to 1889, annual production was about 130 tons. In 1917-1918 an American Company dewatered and sampled the mine, but nothing further was done and the property has since lain idle.

GEOLOGY

The Tennycape mine deposit is located on the north limb of a syncline in rocks of Horton and Windsor age, which is cut off about 1,000 feet to the southwest by a fault. The oldest rocks on the property belong to the Cheverie Formation (upper Horton) and consist of red, sandy, slightly micaceous shales with a dip of 35 degrees to the south.

Overlying these rocks is the Macumber Formation, 16 feet thick, and composed of shaly limestone. This rock is well bedded, and is seen to be unconformable with the Cheverie Formation.

Overlying the Macumber on the cliff faces back of the eastern cuts and also about 55 feet from the portal in Peddler's Cove are the red-brown to buff coloured conglomerates and breccias of the Pembroke Formation. Rocks of this formation consist of massive, commonly crystalline limestone matrix containing pebbles of pre-Macumber rocks and of the Macumber shaly limestone.

It is thought that the limestone horizon is at least 250 feet thick, and that it is overlain by gypsum. Gypsum has been quarried within half a mile of the mine and the gypsum horizon is only a short distance above the manganese bearing limestone. The rocks strike roughly east and dip 40 degrees south.

DEVELOPMENT WORK

The development work at the Tennycape mine is reviewed by Hanson, "the first development work consisted of making a large open-cut 500 feet long and 50 feet wide, and then sinking shafts in the bottom of the open-cut. From the shaft stringers of ore were followed by drifts, and the ore was stoped out. Later, a main shaft, a short distance south of the open-cut, was sunk to 160 feet and a short cross-cut was driven north to the footwall of the ore and then connected with earlier workings. Other shafts were sunk along the strike of the limestone, but these were not all connected underground with the main workings. The underground workings extend 400 feet east and a shorter distance west from the main shaft."

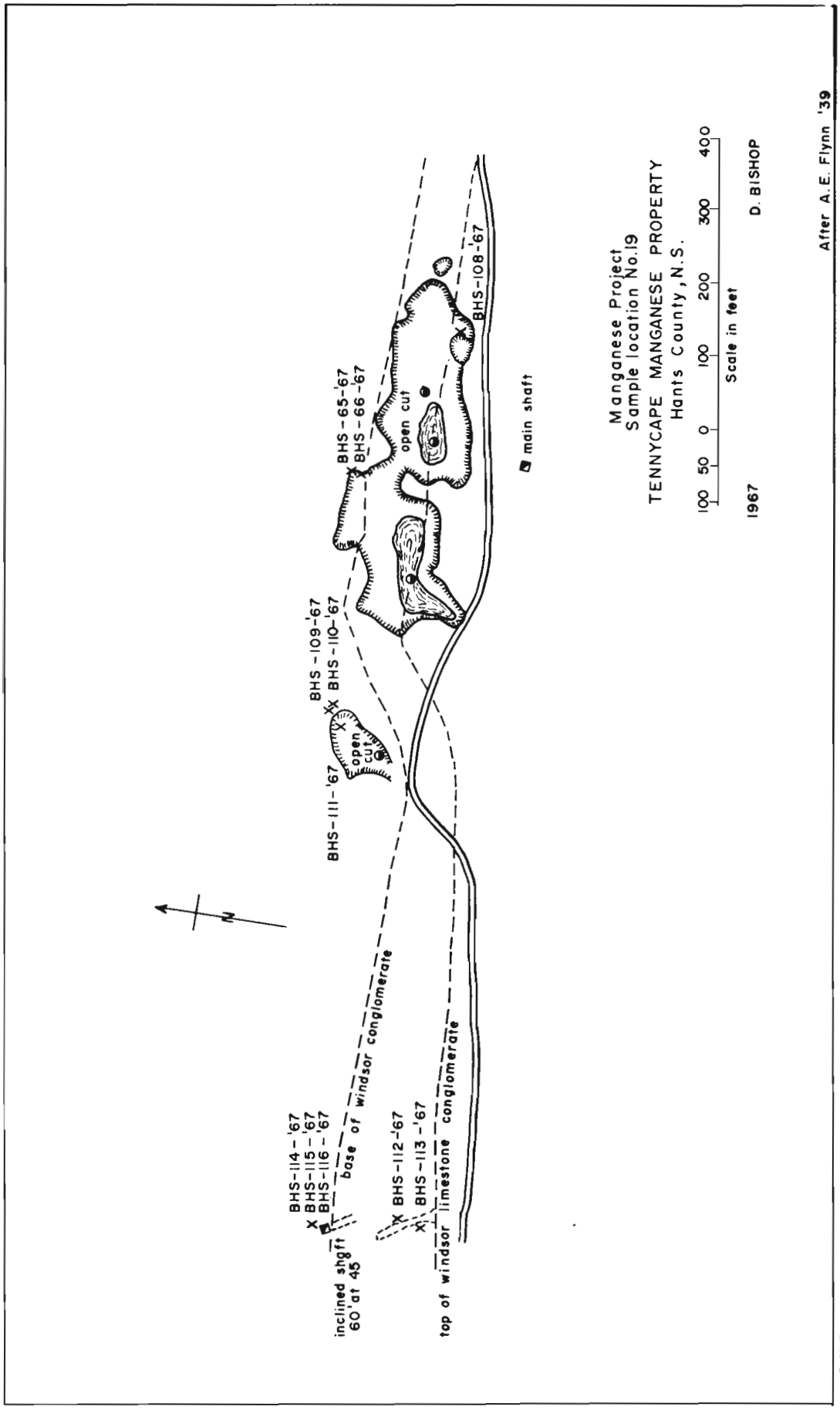

Manganese Project
Sample location No.19
TENNYCAPE MANGANESE PROPERTY
Hants County, N.S.
100 50 0 100 200 300 400
Scale in feet
1967
D. BISHOP
After A.E. Flynn '39
D.H.B.
N
main shaft
open cut
open cut
BHS-65-'67
BHS-66-'67
BHS-108-'67
BHS-109-'67
BHS-110-'67
BHS-111-'67
BHS-112-'67
BHS-113-'67
BHS-114-'67
BHS-115-'67
BHS-116-'67
inclined shaft 60' at 45°
base of Windsor conglomerate
top of Windsor limestone conglomerate

FIGURE 12.

The ore was hand cobbed and sorted to some extent into two grades. Ore was also crushed at the mine, and the crushed ore concentrated and sorted on shaking tables to a marketable grade and put into barrels for shipment.

THE MANGANESE DEPOSITS

Some of the workings are caved but the deeper ones are full of water, so that recent observers have not been able to study the mode of occurrence of the deposits.

The deposits at Tennycape mine were composed essentially of pyrolusite, with some manganite and psilomelane, associated with calcite, limonite, barite and selenite. They occurred as lenses, stringers and blebs in the Pembroke limestone conglomerate, and as fracture fillings in the shaly limestone (see Pl. IV, Fig. 7, page 229). The stringers varied in thickness from a fraction of an inch to 10 inches. The veinlets in the limestone possessed no regularity. Near the calcareous shale many of the stringers widened and joined to form pockets which in some places coalesced making a blanket-like deposit of considerable lateral extent parallel to the bedding.

The best ore was found as nodules and pockets in the limestone conglomerate. One massive body, yielded more than 1,000 tons of manganese minerals. Manganese was also found in the shaly limestone, and today manganese minerals may be seen as small stringers filling fractures in this rock on the cliff face back of the eastern open-cuts.

Pyrolusite was the most common manganese mineral, but a little manganite was also observed. The best ore was said to have been found in the lower 40 feet of the limestone conglomerate, or that part of the conglomerate immediately above the Macumber Formation.

The manganese minerals replaced the limestone conglomerate, giving rise to lenticular and nodular bodies that may be unconnected with other nearby bodies. The shaly limestone was not as favourable to replacement as the younger rock, and the manganese was confined to the filling of openings that existed before the advent of the manganese bearing solutions.

Penrose dealing with the origin of the brecciation of the limestone suggests that the bed of gypsum overlying the brecciated limestone may have been formed from anhydrite and that the resulting increase in volume brecciated the less rigid rocks nearby. There would be considerable solution and redeposition which would tend to purify the manganese.

ORE ON THE DUMP

The mine dump at Tennycape was surveyed and sampled by Professor A. E. Flynn of the Nova Scotia Technical College in 1939 for the Nova Scotia Department of Mines. From this study, it was calculated that the dump at the main eastern workings held 35,000 tons of rock. The average manganese content of the rock on the dump was computed to be 1.88 percent. This would indicate a total manganese content of 660 tons for the entire dump, or slightly more than 1,000 tons of pyrolusite.

Several samples were collected from the various dumps and shafts for analytical investigation. The results of the analytical work are listed in the following table:

TABLE 18

Major and Trace Elements Determined of Manganese and Rocks from Tennycape Property

Elemental Content in Percentages except silver

SAMPLE NO.	Mn	Pb	Zn	Cu	Ba	Ag (ppm)
BHS-62-67 (Pyrolusite)	30.1	.03	.015	.027	5.94	1
BHS-63-67 (Pyrolusite dump)	45.5	.03	.07	.021	3.0	2
BHS-64-67 (Main open-cut)	31.0	.03	.003	.012	-	1
BHS-65-67 (Limestone)	1.6	.03	.002	.002	-	2.5
BHS-108-67 (Hematite, calcite)	.5	.03	.005	.005	-	1.5
BHS-109-67 (Manganese veinlets)	19.0	.03	.05	.025	-	1.5
BHS-110-67 (Pyrolusite)	40.8	.03	.03	.020	-	4
BHS-111-67 (Limestone, Manganese)	10.5	.03	.08	.007	-	4
BHS-112-67 (Peddler's Cove)	.72	.03	.022	.007	-	4
BHS-113-67 (Calcite)	1.0	.03	.03	.007	-	3.5

TABLE 18 - continued

SAMPLE NO.	Mn	Pb	Zn	Cu	Ba	Ag (ppm)
BHS-114-67 (Barite)	.49	.03	.06	.008	33.4	3
BHS-115-67 (Barite, calcite)	.58	.03	.08	.008	19.4	3
BHS-116-67 (Barite, calcite)	.80	.03	.11	.007	2.73	3

Six samples were submitted for spectrographic analyses. The main constituents identified are manganese, iron and barite with trace amounts of copper and cobalt (see table in appendix for details).

REFERENCES

Flynn, A. E.
1939: Survey of Minas Basin manganese deposits, N. S. Dept.of Mines, Ann. Rept., pt. 2, pp. 101-113.

Hanson, G.
1932: Manganese deposits of Canada: Geol. Surv. Can., Econ. Geol. Ser. No. 12, p. 41.

Weeks, L. J.
1948: Londonderry and Bass River map-areas, Colchester and Hants Counties, Nova Scotia; Geol. Surv. Can., Memoir 245, pp. 64-68.

(20) CAPE TENNY

Lat: 45° 16' 20"
Long: 63° 53' 42"
N. T. S. 11 E/5 W

LOCATION

This deposit lies on the west bank of the estuary of Tennycape River, about 2,300 feet along the shore from the highway bridge over the river. There is no record of production from this deposit (Fig. 11).

GEOLOGY

The rocks in this area consist of Horton sediments overlain unconformably by low-dipping Triassic conglomerate. The older rocks strike east, dip 50 degrees south, and are crumped and sheared. The Triassic rocks strike east, dip 10 to 15 degrees north, and consist of sandstone, grit and conglomerate.

The manganese occurs in the form of pyrolusite and is confined chiefly in the coarser, poorly sorted conglomerate beds (Pl. IV, Fig. 8). Other manganese minerals are manganite, and psilomelane. They occur as small masses resembling pebbles, as fine crystalline aggregates, as films around boulders and pebbles, and as replacement of the carbonate cement. Vugs lined with calcite crystals occur and in some of them the calcite is coated by small, hair-like crystals of manganite.

The largest mineralized area is 90 feet by 10 feet in size, the largest dimensions following the dip of the beds which is 10 degrees. The deposit was sampled in 1939 by A. E. Flynn. Analyses were made of a channel sample (60 pounds) across the mineralized

area, and a picked sample (10 pounds) of ore. The results are as follaws:

	Channel Sample Percent	Picked Ore Percent
Total manganese	5.7	12.3
Total MnO_2	7.6	17.3
Insoluble	78.4	70.0

In 1967, a selected sample of the pyrolusite and a channel sample af 2.5 feet were taken across the mineralized bed. Due to the limited extent of the deposit, it is of no economic potential. The results of the analytical data are presented below:

TABLE 19

Major and Minor Element Content of the Manganese

Elemental Content in Percentages except silver

SAMPLE NO.	Mn	Pb	Zn	Cu	Fe	Ag (ppm)
BHS-67-67 Pyrolusite	35	.05	.011	.022	1.5	1
BHS-68-67 Channel sample	15	.03	.024	.015	2.5	1

(21) FAULKNER PROPERTY

Lat: 45° 15' 45"
Long: 63° 51' 20"
N. T. S. 11 E/5 W

LOCATION

The Faulkner property is one mile southeast of the highway bridge over Tennycape River, Hants County. Access is over a secondary road from Tennycape (Fig. 11).

WORKINGS

The workings consist of a vertical shaft, about 35 feet deep sunk in 1907. Five old pits lie less than 120 feet to the west and south of the vertical shaft, and 800 feet east of it is another caved shaft or pit.

GEOLOGY

The manganese occurrence lies on the northern limb of a syncline composed of Horton and Windsor rocks. The ore occurs at, and above, the contact of the Macumber shaly limestone and Pembroke limestone conglomerate.

The Macumber Formation consists of bedded shaly limestone dipping south at angles between 65 and 85 degrees. Most of the workings are along the contact between these rocks and the Pembroke Formation. It is estimated that the Pembroke Formation is less than 400 feet thick in this area.

A small dump lies north of the limestone ridge. Pyrolusite and manganite occur here in the Pembroke conglomerate as stringers and associated with calcite as vug fillings (Pl. V, Figs. 9 and 10).

Records indicate that 1,200 pounds of ore was removed from this occurrence in 1887. In 1907, the shaft was sunk to a depth of 35 feet and is reported to have produced a ton of manganese ore.

There is no evidence to justify an assumption that potential manganese ore bodies exist in the area.

Four chip samples were taken from the outcrop, 30 feet west of the shaft. The results are as follows:

TABLE 20

Major and Minor Element Content of Limestone West of Shaft

Elemental Content in Percentages except silver

SAMPLE NO.	Mn	Pb	Zn	Cu	Ba	Sr	Sb	Ni	Mo	S	Ag(ppm)
BHS-87-67	.6	.03	.002	.004	-	-	-	-	-	-	2.5
BHS-88-67	1.9	.03	.002	.006	9.3	.005	.1	.01	.01	.65	2.5
BHS-89-67	1.45	.03	.002	.004	-	-	-	-	-	-	2.0
BHS-90-67	4.15	.03	.003	.021	-	-	-	-	-	-	2.0

REFERENCES

Flynn, A. E.
1939: Survey of Minas Basin Manganese deposits, N. S. Dept. of Mines Ann. Rept., pt. 2, p. 1.

Hanson, G.
1932: Manganese deposits of Canada; Geol. Surv., Can., Econ. Geol. Ser. No. 12, p. 40.

(22) SCOTT MINE

Lat: 45° 15' 55"
Long: 63° 50' 10"
N. T. S. 11 E/5 W

LOCATION AND WORKINGS

The Scott Mine is one and one half miles southwest of Minasville, Hants County. The workings are on the Arthur Laffin property. It is reached by a poor wood road, extremely swampy in places (Fig. 11).

The property was worked by Captain Scott about 1887. The workings occur in the Macumber and Pembroke Formations, directly above the contact with the Horton Formation. The most westerly pit is cut in a bank about 60 feet south of the brook. A smaller pit occurs about 130 feet to the east.

GEOLOGY

The manganese mineralization lies in Windsor rocks near their contact with those of the Horton Group. In the more westerly pit, a buff to reddish sandy limestone of the Pembroke Formation is poorly exposed. It contains fragments of the Macumber

limestone. An outcrop of Cheverie sandstone (Horton) is exposed 40 feet to the north along the bank of the brook.

Soil samples were taken at random in the vicinity of the pit. The average of all soil samples taken is as follows: copper 6.2 ppm, zinc 18.7 ppm and lead nil.

TABLE 21

Major and Minor Element Content of Limestone Near Old Water-Filled Pits

Elemental Content in Percentages except silver

SAMPLE NO.	Mn	Pb	Zn	Cu	Ag (ppm)
BHS-91-67	.25	.05	.003	.007	2.5
BHS-92-67	1.05	.03	.004	.012	2.0
BHS-93-67	.20	.05	.002	.004	2.5
BHS-94-67	2.16	.03	.004	.006	2.0

A spectrographic analysis was made on a sample of the manganese bearing limestone. Traces of beryl, cadmium and chromite occur associated with the manganese.

REFERENCE

Weeks, L. J.
1948: Londonderry and Bass River map-areas, Colchester and Hants Counties, Nova Scotia; Geol. Surv. Can., Memoir 245, pp. 70-71.

(23) THOMPSON PROPERTY

Lat: 45° 16' 40"
Long: 63° 49' 50"
N. T. S. 11 E/5 W

LOCATION

The Thompson manganese occurrence is located approximately one mile southwest of Minasville (Fig. 11).

WORKINGS

The workings consist of two open-cuts about 70 feet by 20 feet, several pits and a shaft 25 feet deep.

GEOLOGY

The area is underlain by a brick red, medium to fine-grained micaceous sandstone and sandy shale. Outcrop is scarce though the overburden is light.

Several exposures of bedrock were examined by trenching. The micaceous sandstone is thinly bedded and parts easily along bedding planes. A stain of manganese is visible on some of the fracture surfaces. Records indicate that cherty limonite with small amounts of specularite and psilomelane was observed on the dumps, but none of the material was observed in place. There is no record of any production from this deposit.

A representative sample of the pyrolusite and psilomelane was collected along the rock exposure for analysis.

TABLE 22

Major and Minor Element Content of the Manganese Mineralization

Elemental Content in Percentages except Silver

SAMPLE NO.	Mn	Zn	Cu	Pb	Ag (ppm)
BHS-86-67	5.15	.004	.015	.03	1

REFERENCE

Hanson, G. W.
1932: Manganese deposits of Canada, Geol. Surv. Can., Econ Geol. Ser. No. 12, pp. 49-50.

(24) REYNOLDS PROPERTY

Lat: 45° 16' 47"
Long: 63° 49' 00"
N. T. S. 11 E/5 W

GENERAL INFORMATION

The Reynolds property is located one quarter mile south of Minasville on the farm of Wallace Reynolds (Fig. 11).

The original shaft was sunk on an incline to a depth of roughly 50 feet. Thirty feet down is a drift to the east 30 to 40 feet long that followed a manganese oxide filled vein three inches wide. Three tons of ore was removed.

There is no rock exposed in the vicinity of the shaft. The rock exposed in the ditch near the driveway is reddish, fine-grained, micaceous sandstone without prominent bedding. The sandstone horizon strikes N 72° E, and dips 50 degrees to the southeast. The fragments in the vicinity of the shaft are red to grey coarse-grained sandstone stained with manganese.

TABLE 23

Trace Element Content of Manganese Stained Sandstone

Elemental Content in Percentages except Silver

SAMPLE NO.	Mn	Pb	Zn	Cu	Ag (ppm)
BHS-80-67	.45	.03	.003	.015	1

(25) MACDONALD PROSPECT

Lat: 45° 16' 42"
Long: 63° 48' 40"
N. T. S. 11 E/5 W

LOCATION

The workings are 2,100 feet south of the highway bridge over Moose Brook in the village of Minasville (Fig. 11). The workings consist of two slumped, dry pits, one water filled shaft and a trench 40 feet in length. A small shipment of manganese ore was made in 1891.

In the larger pit on the east side of the road, a red, fine-grained micaceous sandstone and shale is well exposed. The beds strike N.65° E. and dip 50 degrees southwest. Minor irregular patches of manganese staining occur along the bedding planes. No manganese mineralization was seen in place. A bulldozed area directly east of the pit exposed red sandstone fragments. Here, several pieces of pyrolusite were found in the soil. A trench 40 feet long, cuts the Cheverie sandstone and shale 200 feet north of the pits. According to Fletcher the ore occurred in 'veins and blotches varying from 1/2 inch to five inches in thickness and holding also crystals of calcite!'

TABLE 24

Major and Minor Element Content of Pyrolusite and Manganese

Elemental Content in Percentages except Silver

SAMPLE NO.	Mn	Pb	Zn	Cu	Ag (ppm)
BHS-81-67 (Pyrolusite)	52.5	.05	.007	.018	2.0
BHS-82-67	1.27	.03	.061	.006	1.0

See table in appendix for data on spectrographic analyses.

REFERENCES

Fletcher, H.
1893: Geol. Surv. Can., Sum. Rept., p. 42.

Hanson, G.
1932: Manganese deposits of Canada; Geol. Surv. Can., Econ Geol. Ser. No. 12, p. 40.

Weeks, L. J.
1948: Londonderry and Bass River map-areas, Colchester and Hants Counties, Nova Scotia, Geol. Surv. Can., Memoir 245, pp. 75-76.

(26) MINASVILLE SCHOOL PROSPECT

Lat: 45° 17' 00"
Long: 63° 48' 40"
N. T. S. 11 E/5 W

LOCATION AND WORKINGS

The Minasville School property is situated 2,640 feet south of the Minasville School house. It is reached by a poor wood road from the school house (See Fig. 11).

The workings consist of two shafts, pits and trenches. The western shaft is at least 27 feet deep.

GEOLOGY

The area is underlain by red sandstone and shale of the Cheverie Formation of Lower Mississippian (Horton) age. The strata strikes N.35°E. and dips steeply to the southeast.

The largest trench is 35 feet long and 8 feet wide. The walls of the trench show steeply dipping red sandstone. The dump around the trench consists of large angular blocks of sandstone stained with manganese. Coatings and veinlets of pyrolusite occur on and in fractures of the sandstone but the overall tenor of the rock is low. A timbered shaft at the most westerly working is about 10 feet by 6 feet. It is inclined toward the southeast, no doubt following a seam of manganese ore along the bedding planes. Considerable pyrolusite was observed on the dump near the westerly pit. The stringers of manganese ore ranged from half an inch to one inch in thickness and no doubt it represents hand picked material won from these workings.

Four chip samples were taken from the area. Samples BHS-73-75 are selected samples of the pyrolusite veined material and BHS-76 is a representative of the dump material.

TABLE 25

Major and Minor Element Content of Pyrolusite

Elemental Content in Percentages except Silver

SAMPLE NO.	Mn	Pb	Zn	Cu	Fe	Ag (ppm
BHS-73-67	45.0	.03	.005	.023	1.7	1
BHS-74-67	52.0	.05	.005	.034	-	3
BHS-75-67	31.1	.03	.006	.011	-	1
BHS-76-67	4.73	.03	.004	.006	-	1

Soil samples taken in the area at random around the workings averaged not more than 10 ppm for copper, zinc and lead. The results of two spectrographic analyses are tabulated in the appendix to this report.

REFERENCE .

Weeks, L. J.
1948: Londonderry and Bass River map-areas, Colchester and Hants Counties, Nova Scotia, Geol. Surv. Can., Memoir 245, p. 76.

(27) DENSMORE MILLS

Lat: 45° 18' 18"
Long: 63° 41' 30"
N. T. S. 11 E/5 E

LOCATION

The Densmore Mills property is about 3,000 feet east and 600 feet south of the junction of the Hennigar road and highway No. 15. The workings are located on a ridge of quartzose sandstone approximately 400 feet south of the residence of Mr. William Neil (Fig. 3). It was reported that the shaft was sunk some 60 feet in 1890 or 1895 and a little manganese shipped.

The rock exposed in the area is sandstone, a member of the Cheverie Formation of Lower Carboniferous age. The formation strikes N.70° E. and dips 80 degrees to the southeast. The rock is traversed by two well-defined joint patterns, trending east-west and north-south, with steep dips to the south and west.

Manganese oxides, mainly pyrolusite, occur as tiny grey radiating crystals and stringers up to 1/2 inch wide as coatings on the joint surfaces and replacements in the sandstone cement. The average manganese content of the rock is low.

Two chip samples were taken from the walls of the vertical cut and a selected sample of the pyrolusite. The analytical data are presented below:

TABLE 26

Partial Analyses of the Manganese Mineralization

from Densmore Mills Property

Elemental Content in Percentages except Silver

SAMPLE NO.	Mn	Pb	Zn	Cu	Ag (ppm)
BHS-70-67	2.03	.03	.003	.012	1
BHS-71-67	2.50	.03	.002	.015	1
BHS-72-67	22.2	.03	.005	.042	1

The results of soil samples were averaged as follows: copper 10 ppm; zinc 8 ppm and lead 18 ppm.

REFERENCES

Fletcher, Hugh
1893: Geol. Surv. Can., Sum. Rept. 1893, Ann. Rept. 1892-93, pt. A, p. 63.

Hanson, G.
1932: Manganese deposits of Canada, Geol. Surv. of Can., Econ. Geol. Ser. No. 12, p. 67

Weeks, L. J.
1948: Londonderry and Bass River map-areas, Colchester and Hants Counties, Nova Scotia, Geol. Surv. Can., Mem. 245, p. 77.

(28) HIBERNIA PROPERTY

Lat: 45° 13' 10"
Long: 63° 55' 10"
N. T. S. 11 E/4 W

The Hibernia property is about 2 miles southwest of the Tennycape mine, or about 3 1/2 miles southwest of the town of Tennycape, Hants County (See Figs. 3 and 13).

The rocks exposed in the area are the Macumber and Pembroke limestone with the Cheverie sandstone to the north and gypsum to the south.

The Macumber limestone is a reddish weathering, purplish-grey, laminated limestone which becomes fractured and grades upward into a limestone breccia of the Pembroke Formation. The Pembroke Formation contains rounded pebbles and cobbles of mixed rock types embedded in a sandy lime matrix. It strikes N.40° E. and dips 40 degrees to the southeast.

The only mineralization observed is calcite and small stringers and staining of manganese. The manganese minerals, consisting of psilomelane and a little pyrolusite, occurs in the cracks and seams of the shale, around the pebbles, and in joints in the conglomerate.

TABLE 27

Element Content of the Macumber Limestone and Pyrolusite

Elemental Content in Percentages except Silver

SAMPLE NO.	Mn	Pb	Zn	Cu	Ag (ppm)
BHS-143-67	1.0	.03	.014	.007	1.5
BHS-144-67	6.24	.03	.020	.034	0.5
BHS-145-67	2.46	.03	.010	.012	1.0

Production of manganese ore from this property has been about two tons.

REFERENCE

Hanson, G.
1932: Manganese deposits in Canada, Geol. Surv. Can., Econ. Geol. Ser. No. 12, p. 45.

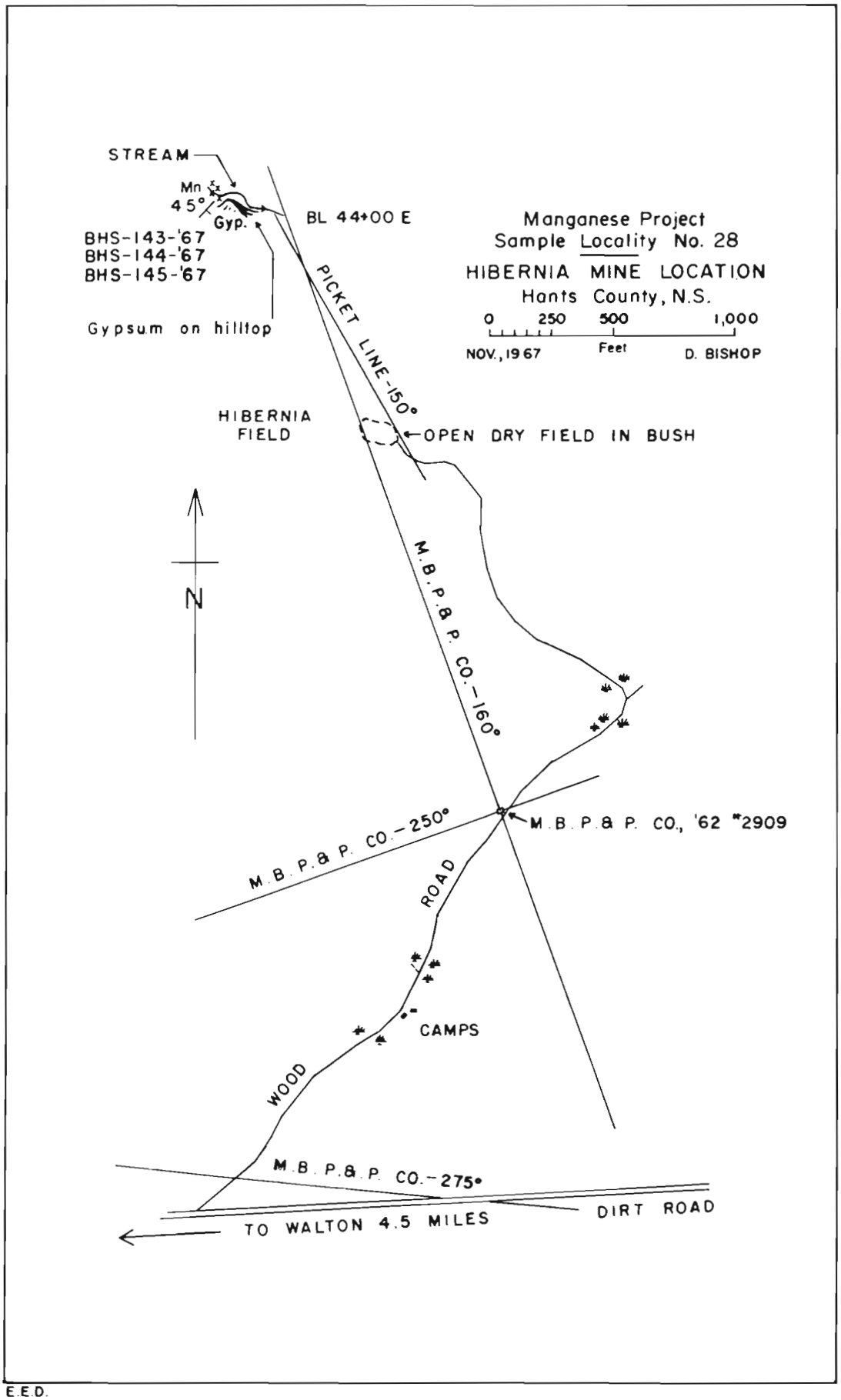

STREAM
Mn
45°
Gyp.
BL 44+00 E
BHS-143-'67
BHS-144-'67
BHS-145-'67
Gypsum on hilltop
PICKET LINE-150°
Manganese Project
Sample Locality No. 28
HIBERNIA MINE LOCATION
Hants County, N.S.
0 250 500 1,000
Feet
NOV., 1967
D. BISHOP
HIBERNIA FIELD
OPEN DRY FIELD IN BUSH
N
M.B.P.& P. CO.-160°
M.B.P.& P. CO.-250°
M.B.P.& P. CO., '62 #2909
ROAD
CAMPS
WOOD
M.B.P.& P. CO.-275°
DIRT ROAD
TO WALTON 4.5 MILES
E.E.D.

FIGURE 13

SEMIQUANTITATIVE SPECTROGRAPHIC ANALYSES OF MANGANESE ORES OF HANTS COUNTY

1967

Conducted by Nova Scotia Research Foundation, Truro, N. S.

See results in appendix

SAMPLE	LOCATION
BAC-1-67	Shaw & Churchill
BAC-2-67	Dresser Minerals Limited
BAC-3-67	Stephens
BAC-6-67	Stephens
BAC-7-67	Goshen
BAC-8-67	Lake Mine, Cheverie
BAC-9-67	Tennycape Mine
BAC-10-67	Sturgis
BAC-11-67	Dresser Minerals Limited
BAC-12-67	Scott Property
BAC-13-67	Goshen
BAC-14-67	Stephens
BAC-16-67	Dresser Minerals Limited
BAC-17-67	Stephens
BAC-18-67	Stephens
BAC-19-67	Hibernia

MANGANESE OCCURRENCES INVESTIGATED IN COLCHESTER COUNTY

(29) BLACK ROCK MANGANESE DEPOSIT

(30) EAST MOUNTAIN MANGANESE MINE

(31) MANGANESE MINES

(32) BORDEN PROPERTY

(33) FARNHAM BROOK MANGANESE OCCURRENCE

GENERAL

Manganese deposits were discovered in Colchester County prior to 1900. All of the manganese deposits with the exception of the deposit at Manganese Mines are of the replacement type and consist of the minerals pyrolusite, psilomelane and manganite. The deposits are at or near the contact of the Windsor Group with the underlying Horton sandstones and shales. At Manganese Mines the manganese occurs in sediments of Lower Carboniferous age (Horton Group).

The manganese deposits in Colchester County have been examined by several geologists. In 1925, Dr. W. L. Uglow examined many occurrences of manganese in the Maritime Provinces. In 1927, Dr. George Hanson published an account of the major manganese deposits in Canada.

During the field season of 1950 and 1951, I. M. Stevenson examined all the known manganese occurrences in the Truro map-area.

During the field season of 1967 and 1968, the area was investigated by the Geological Division of the Nova Scotia Department of Mines. This investigation included a field study of the geology and collecting samples of the mineralization for chemical and spectrographic analyses for both major and minor elements. In addition, two diamond drill holes were put down in 1968 to test the area in the vicinity of the shaft at East Mountain Manganese mine.

Five manganese occurrences were investigated in Colchester County . Four of the deposits are indicated on figures 14 and 15.

DESCRIPTION OF INDIVIDUAL DEPOSITS

(29) BLACK ROCK MANGANESE OCCURRENCE

Lat: 45° 19' 00"
Long: 63° 28' 42"
N. T. S. 11 E/6 W

The Block Rock manganese occurrence is on the east bank of Shubenacadie River, 300 feet west of the remains of the ferry wharf at Black Rock. The deposits lie between low and high tide levels, which are here 45 feet apart.

The rocks in the immediate vicinity of the manganese occurrence are thinly laminated, dark grey, fine grained Macumber limestone which is overlain by reddish Pembroke limestone conglomerate. These rocks are af Windsor age (lower Mississippian) and are overlain by Triassic sandstone and grit. The Macumber limestone is warped into small folds striking and plunging west. Joints and inconspicuous fractures are numerous in the laminated limestone and many are healed by calcite. The limestone holds many specks and irregular veinlets of a pink carbonate. Two veins, 9 and 12 inches in width,of white dogtooth spar with hematite fill a fracture in the Macumber limestone.

As the deposits have been idle for many years there is now very little evidence of former development work. Small pieces of manganese may be picked up in the drift along the shore. One small vein of pyrolusite, about three inches wide, was located by Stevenson (1958, p. 111).

LEGEND

POST-CARBONIFEROUS

8 — *Diabase dikes.*

TRIASSIC

7 — *ANNAPOLIS FORMATION: red sandstone, conglomerate, shale.*

CARBONIFEROUS

PENNSYLVANIAN

6 — RIVERSDALE GROUP
Grey shale, sandstone.

MISSISSIPPIAN

5 — CANSO GROUP
Red and grey sandstone, shale.

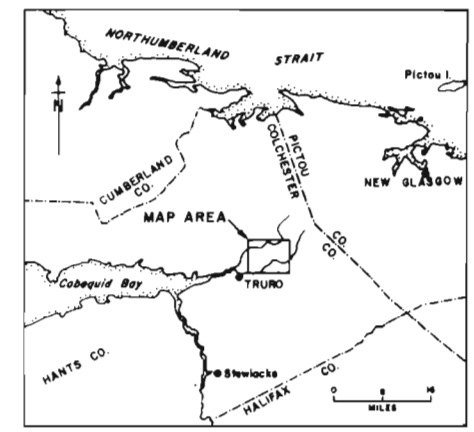
4 — WINDSOR GROUP (UPPER)
Grey limestone, shale, gypsum.

3 — WINDSOR GROUP (2-4)
Undifferentiated

2 — *PEMBROKE FORMATION: red limestone, conglomerate.*

1 — HORTON GROUP
Red sandstone, shale, conglomerate.

Outcrop location ... XXX
Faults (position assumed) ... ~~~~~
Geological boundary (approximate, assumed) ... — — ····
Sample number ... BSC-17-67
Prospect ... X
Abandoned workings ... ⚒



EAST MOUNTAIN

East Mountain Mine

BSC-17 to 19-67

BSC-1 to 6-67
BSC-14 to 16-67

Borden

BSC-7 to 13-67

MANGANESE MINES

red sandstone
Limestone — BSC-24 to 26-67
Dogtooth spar
Pyrolusite crystals — BSC-27-67

North Brook

McKenzie Brook

Clifford Brook

Moon Brook

Salmon River

Farnham Brook

Half Brook

Christie Bk

HALF MOON HILL

BROOKSIDE

VALLEY

TOPOGRAPHIC A.S.E. POST NO. 472

104

4

MANGANESE PROJECT
GEOLOGICAL MAP

SHOWING MANGANESE OCCURRENCES
AND SAMPLE LOCATIONS
TRURO AREA, COLCHESTER CO., N.S.

1/4 0 1/4 1/2 3/4 1
MILES

1973 D.G. BISHOP

J.D.D.

FIGURE 14

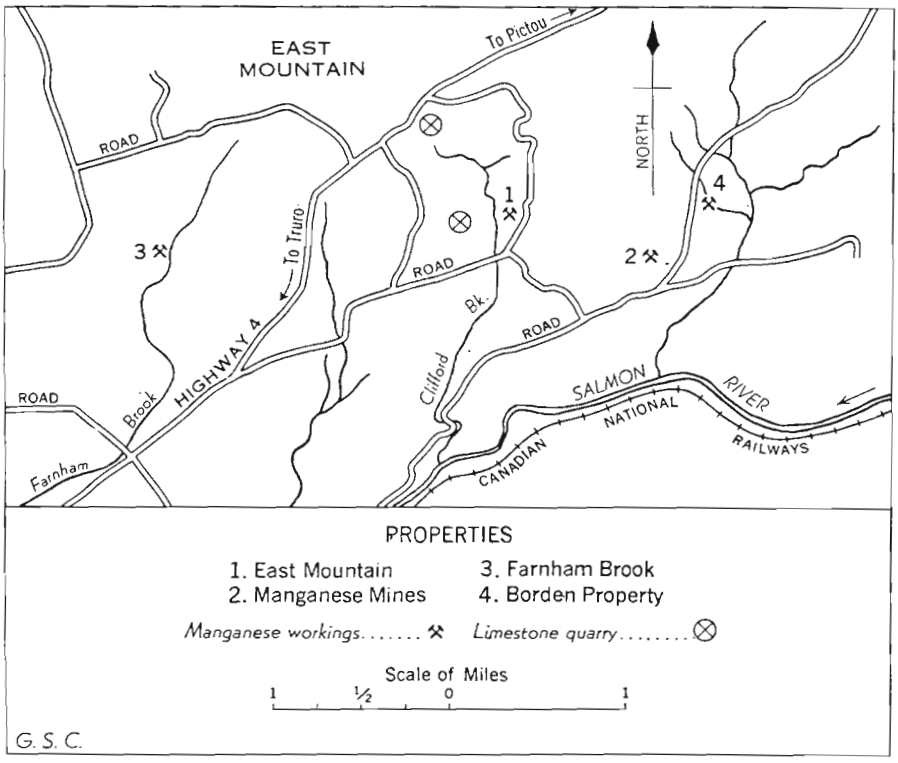


Figure 15. Plan showing locations of manganese properties in the vicinity of East Mountain, Colchester County, N.S.

The following information is quoted from Faribault's report: "The deposit occurs in the form of a fissure vein (which)....cuts the rocks vertically in a south-westerly direction towards the river, in the course of which it divides into two veins extending to low-water mark. The main vein is exposed for a length of 180 feet, from mud flats near the high tide to the low tide; and the branch or north vein for 143 feet from the point of divide to low-water mark, where the two veins are 30 feet apart. The two veins are lenticular, and vary in width from one to thirty inches, but for the greater part of their length they are from one to six inches. One lens of ore which occurs at a bend on the main vein, has a width of 12 to 30 inches for a length of 50 feet; and a smaller lens on a branch vein measures 15 to 24 inches for 14 feet. At their extremities the veins thin out to nothing. The ore consists of manganese oxides, with a few small pockets or streaks of crystallized pyrolusite, and includes calcite, iron oxides and fragments of wall rocks."

The following information is taken from Smitheringale's manuscript: "Besides the main veins, smaller replacement stringers containing manganese oxides occur in the lowest thinly laminated limestone member. These veinlets contain calcite, limonite, manganite, pyrolusite and hausmannite. Some of the calcite is dark brown and contains much manganese and iron. The limonite is botryoidal and has crystallized in radiating groups of crystals which extend across the original formational banding of the limonite. Polished sections of specimens from the veinlets show that the manganese is chiefly present as a manganite in crystalline form, but exhibiting as well, rough colloform banding. This suggests that the manganese oxides were originally deposited as a colloidal mass and later crystallized as manganite. Pyrolusite is rare and replaces

manganite. Hausmannite occurs as minute grains and clusters. It is suggested that meteoric waters percolating through the limestone deposited manganese and iron along the joints, bedding planes, and fractures forming the present veinlets. Evidence supporting this view is found some distance away where a small trickle of water emerges from the contact between laminated limestone and limestone conglomerate. The seepage has enlarged the contact plane and is depositing limonite on the walls and on the rock over which it flows. Possibly the larger fissures were filled in this way."

TABLE 28

Major and Minor Element Content of Manganese, Calcite, Hematite and Limestone from Black Rock Prospect

Elemental Content in Percentages except Silver

SAMPLE NO.	Mn	Fe	Cu	Pb	Zn	Ni	Mo	Ba	As	Ag (ppm)
BCS-8-68 (Manganese)	32.9	2.0	.03	.03	.04	.02	.01	-	-	1.5
BCS-9-68 (Hematite)	33.0	1.90	.055	.03	.08	.025	.01	-	-	1.5
BCS-10-68 (Calcite)	2.3	-	.004	.03	.004	.02	.01	-	-	.5
BCS-11-68 (Calcite)	.5	2.00	.002	.03	.004	.01	.01	-	-	.5
BCS-12-68 (Hematite)	22.5	12.5	.03	.05	.02	.02	.01	-	-	1.0
BCS-9-69	20.0	1.00	.04	.03	.04	-	-	7.0	.002	.20
BCS-10-69	38.0	0.60	.09	.03	.09	-	-	1.30	.008	.40
BCS-11-69	28.0	1.20	.03	.03	.04	-	-	-	-	.40

TABLE 28 - continued

SAMPLE NO.	Mn	Fe	Cu	Pb	Zn	Ni	Mo	Ba	As	Ag (ppm)
BCS-12-69	2.7	16.0	.02	.03	.01	-	-	27.0	-	.30
BCS-13-69	1.40	15.9	.04	.03	.03	-	-	30.0	-	.10
BCS-14-69	2.80	25.50	.01	.03	.008	-	-	18.0	-	.10
BCS-15-69	1.45	22.0	.01	.03	.003	-	-	30.0	0	.10
BCS-17-69	0.60	42.9	.03	.03	.005	-	-	7.6	-	.6
BCS-18-69	1.20	27.7	.005	.03	.005	-	-	21.0	-	1.0
BCS-19-69	.90	18.3	.01	.03	.004	-	-	32.0	0	.80
BCS-20-69	2.00	29.9	.015	.03	.005	-	-	-	10.0	.40
BCS-21-69	1.20	24.6	.01	.03	.003	-	-	-	32.0	.40
BCS-22-69	2.00	19.0	.01	.03	.003	-	-	-	27.0	.40
BCS-23-69	2.10	55.0	.02	.03	.005	-	-	-	37.0	.40

All semiquantative spectrographic analyses of the Black Rock mineralization are tabulated in the appendix to the report.

REFERENCES

Faribault, E. R.
1918: Investigations in Western Nova Scotia, Geol. Surv. Can. Sum. Rept., pt. F, pp. 1-2.

Hanson, G.
1932: Manganese deposits of Canada; Geol. Surv. Can., Econ. Geol. Ser. No. 12, pp. 38-39.

Stevenson, I. M.
1958: Truro map-area, Colchester and Hants County, Nova Scotia; Geol. Surv. Can., Mem. 297, pp. 110-111.

(30) EAST MOUNTAIN MANGANESE

Lat: 45° 25' 00"
Long: 63° 09' 54"
N. T. S. 11 E/6 E

LOCATION AND WORKINGS

The East Mountain mine, known locally also as the Fraser property, is six and one half miles northeast of Truro and half a mile northeast of Manganese Mines post office, Colchester County.

HISTORY

Manganese was discovered at East Mountain about 1897. A shaft was sunk vertical for five feet and then on an incline of 55 degrees for 20 feet. It is reported that 100 tons of ore was removed in 1897. The property then lay idle until 1918 when the shaft was deepened five feet and ten tons of ore recovered.

Work was renewed on the property in 1938. A slope 120 feet long was driven into the deposit and about 50 tons of ore extracted. This slope was opened near the base of a brecciated Pembroke limestone and the underlying red ferruginous sandstone of Horton age. The dip of the contact is 30 degrees. Figure 16 shows the total underground development work on the property.

During the period 1939 to 1941 development work was carried out on the deposit. The area was stripped for 200 feet for an average width of 40 feet and to a depth of 30 feet. A bed of limestone, red shale and conglomerate of Pembroke age was exposed in the excavation, and two and one half tons of manganese ore were obtained from the limestone near the contact with Horton sandstone (Fig. 16). In 1939, seven diamond drill holes were drilled vertically to define the boundaries of the limestone horizon (Fig. 17). The indications are that the block of ground containing the ore is about 100 feet by 300 feet in extent. The east side of the block is cut off by a fault with a vertical displacement of about 50 feet.

GEOLOGY

The rocks at the workings are sediments consisting of buff-coloured limestone which grades upward into calcareous shale, and is underlain by a thinly laminated sandstone. The sediments are probably of Lower Carboniferous age (Fig. 14). According to old reports, the ore is said to have occurred in three layers each about a foot thick and separated by three or four feet of limestone containing nodules of pyrolusite.

Specimens from the dump indicate that the manganese minerals are pyrolusite with a minor amount of manganite. Small vugs are common into which project minute acicular crystals of pyrolusite in some of which tiny plates of barite occur. Some of the calcite in the veinlets contains manganese as a veneer over crystal faces and along fractures. Previous workers believe that the deposit is a replacement resulting from a progressive concentration of manganese by meteoric waters. The origin of the manganese is not

known. It may have been an original constituent of the limestone, introduced as a carbonate. Later solution and oxidation resulted in the formation of vugs and the precipitation of manganese oxides.

RECENT INVESTIGATION

Field work by the Nova Scotia Department of Mines during 1967 and 1968 consisted of examining the rocks enclosing the deposits and the manganese mineralization in the pits and on the dumps. Samples of the manganese mineralization and soils were collected for chemical and spectrographic analyses for both major and minor elements.

Eleven samples were tested for metal content using atomic absorption techniques. The results are tabulated in the following table:

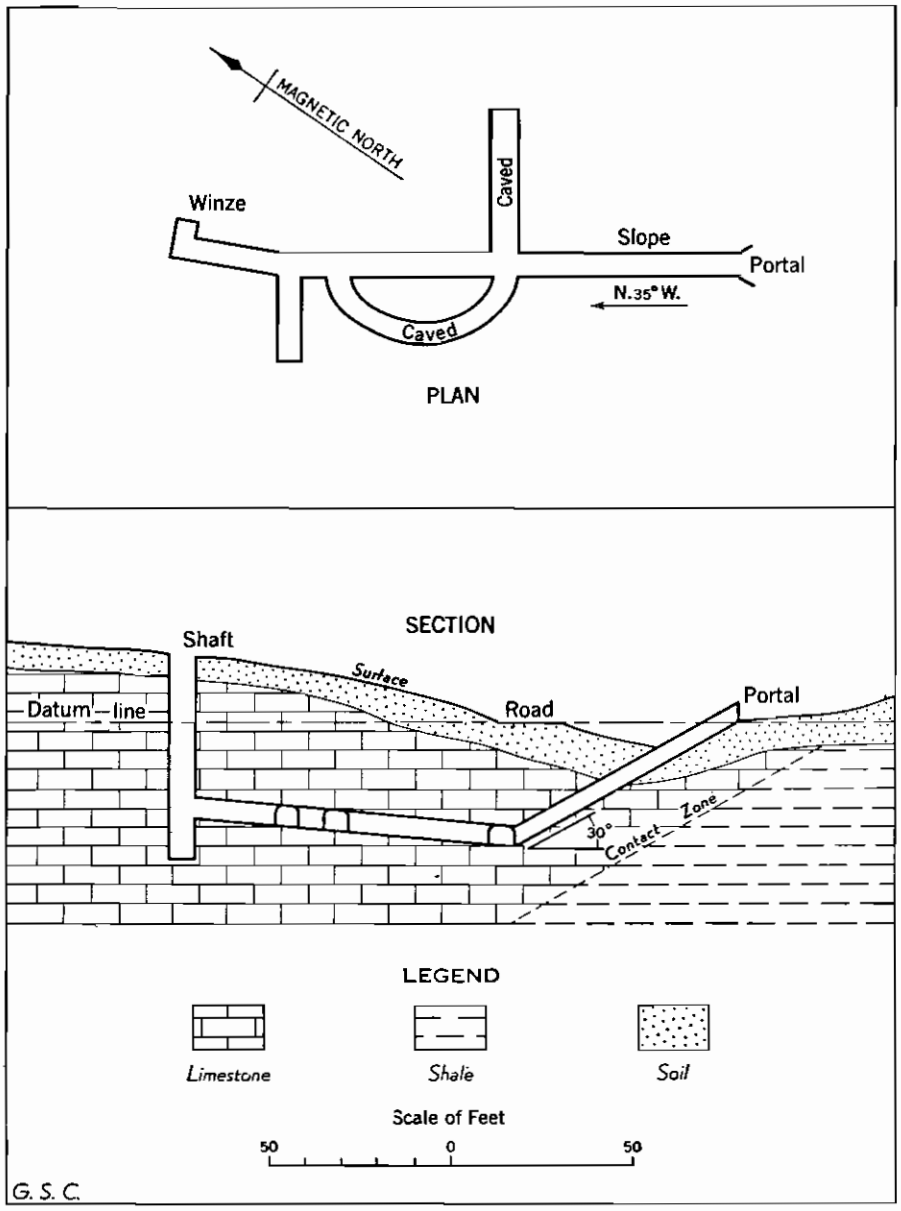


Figure 16. Plan and vertical section of underground workings at East Mountain manganese mine (from data provided by Nova Scotia Department of Mines, 1947).

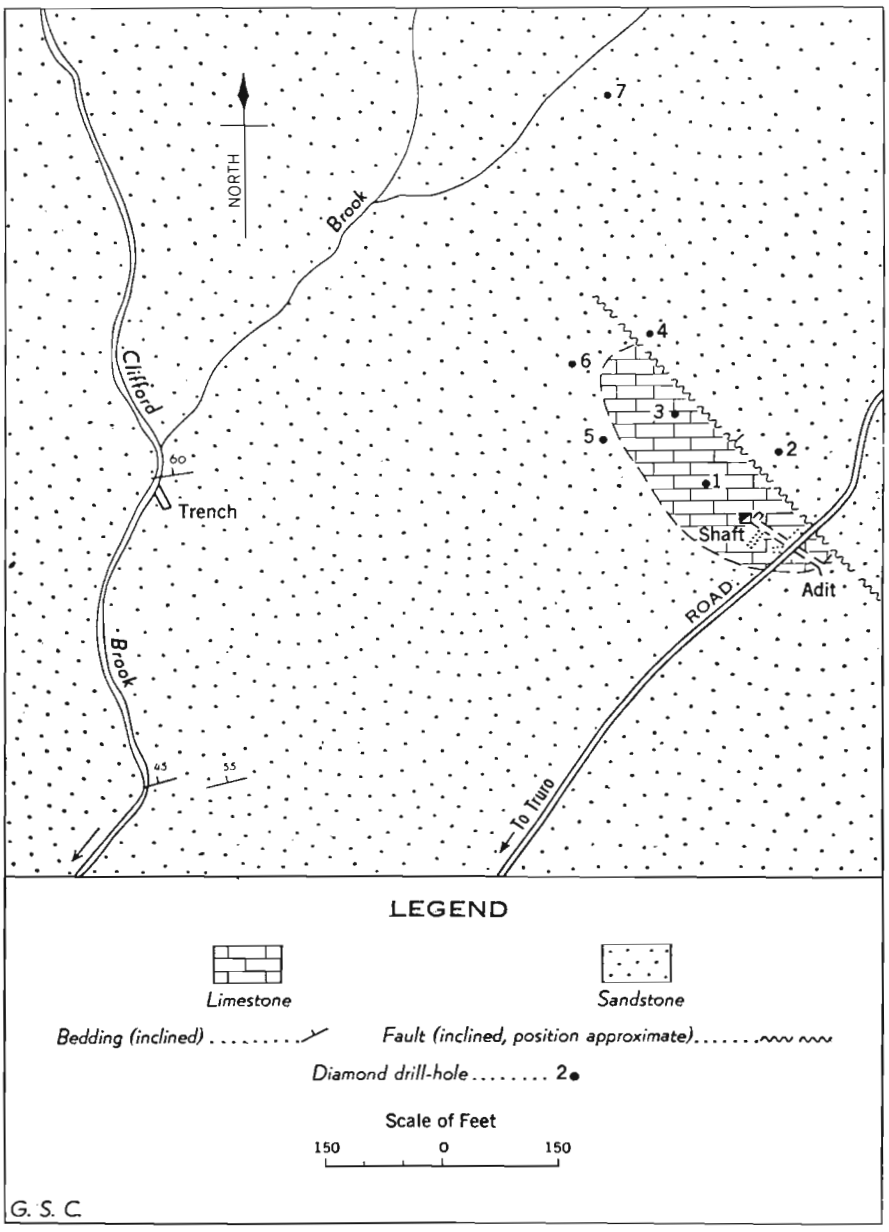


Figure 17. Plan of East Mountain manganese property, Colchester County, N. S., showing location of diamond drill-holes

TABLE 29

Metal Content of Samples of East Mountain Manganese

Elemental Concentration in Percentages except Silver

SAMPLE NO.	Mn	Pb	Zn	Cu	Fe	Ba	Ag(ppm)	Ni	Mo	As
BCS-17-67	0.02	.03	.002	.005	0.5	-	3.0	-	-	-
BCS-18-67	0.30	.03	.003	.006	0.5	-	1.5	-	-	-
BCS-19-67	56.40	.03	.020	.460	-	-	0.5	-	-	-
BCS-14-68	54.2	.03	.025	.12	-	.52	1	.01	.01	.06
BCS-15-68	49.5	.03	.03	.13	2.0	1.1	1	.01	.01	.01
BCS-16-68	56.0	.03	.03	.28	-	.9	1	.01	.01	.03
BCS-17-68	0.44	.02	.006	.01	-	-	.4	-	-	-
BCS-18-68	.06	.02	.05	.01	-	-	.15	-	-	-
BCS-19-68	.15	.02	.004	.005	-	-	.1	-	-	-

In 1968 two diamond drill holes were drilled to investigate the area in the vicinity of the old workings at East Mountain mine (Fig. 18).

Hole No. 1 (Fig. 18) was located east of the fault and directed S.70°W. at an angle of 45 degrees. The rock intersected consisted almost entirely of shale and sandstone of the Horton Group, with a narrow bed of limestone holding minor amounts of manganese mineralization (Fig. 19).

Hole No. 2 was collared near the east margin of the trench and directed S.70° W.to intersect the "shaft" area. This hole intersected a band of Windsor lime-

stone; the remainder of the core being shale (Fig. 19). A large cavity was encountered near the base of the limestone horizon. This cavity could represent the location of the underground workings.

It is evident that most of the manganese ore has been removed from the small flat-lying outlier of Windsor limestone and limestone conglomerate of the Macumber and Pembroke formations.

Spectrographic analyses (4) from the East Mountain are listed in the tables that form an appendix to this report.

REFERENCES

Flynn, A. E.
1939: Survey of Minas Basin Manganese deposits; N. S., Dept. of Mines Ann. Rept., Pt. 2, pp. 105-106.

Hanson, G.
1932: Manganese deposits of Canada; Geol. Surv. Can., Econ. Geol. Ser. No. 12, p. 33.

Stevenson, I. M.
1958: Truro map-area, Colchester and Hants County, Nova Scotia; Geol. Surv. Can., Mem. 297, pp. 104-108.

Uglow, W. L.
1920: Manganese Mines, Colchester County, Nova Scotia; Munitions Resources Commission, Final Report, p. 88.

N. S. Dept. of Mines Ann. Repts: 1884, p. 33; 1938, pp. 162-166; 1940, p. 58; 1941, p. 50.

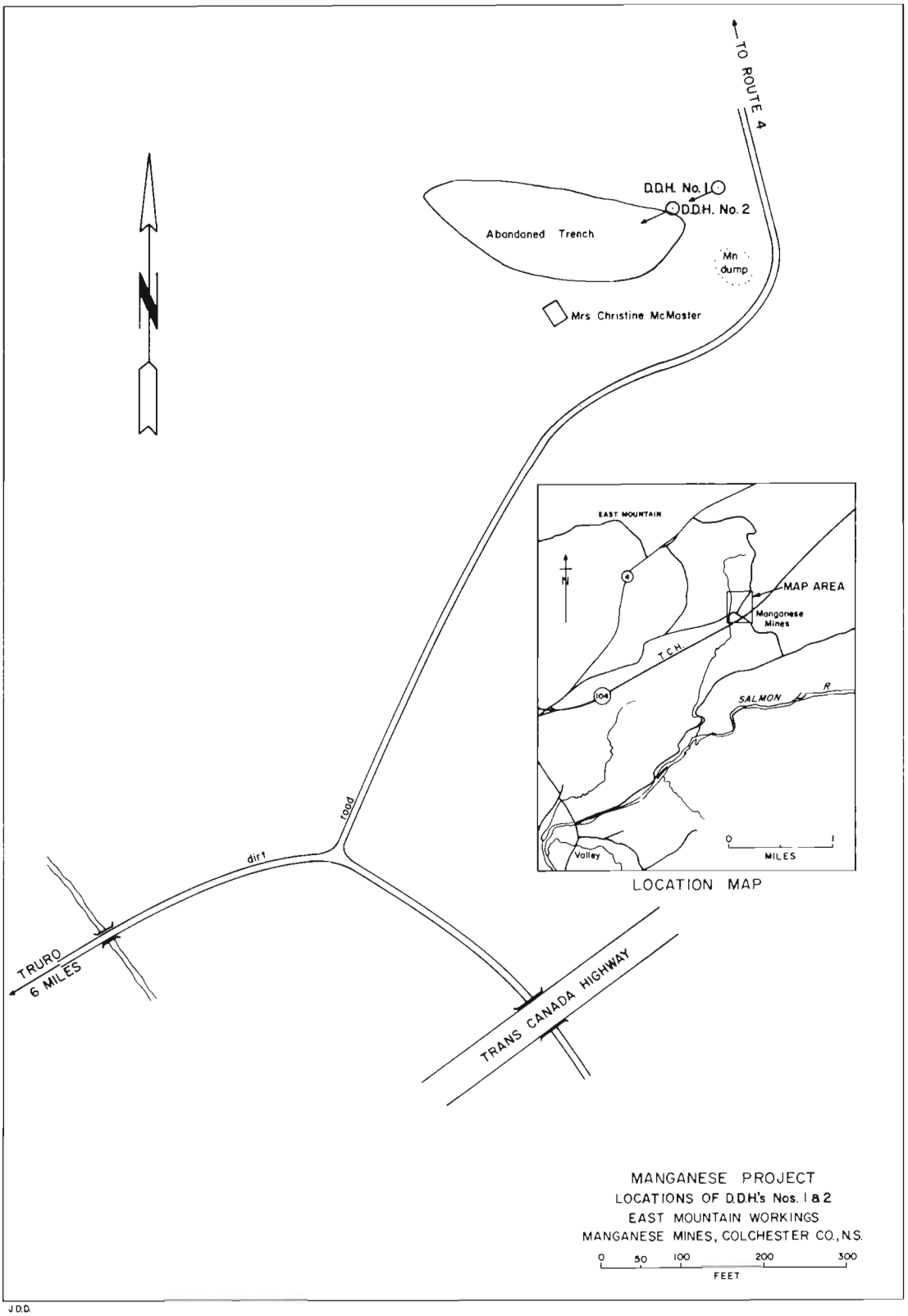

TO ROUTE 4
D.D.H. No. 1
D.D.H. No. 2
Abandoned Trench
Mn dump
Mrs Christine McMaster
EAST MOUNTAIN
MAP AREA
Manganese Mines
T.C.H.
104
SALMON R
Valley
0 1
MILES
LOCATION MAP
road
dirt
TRURO
6 MILES
TRANS CANADA HIGHWAY
MANGANESE PROJECT
LOCATIONS OF D.D.H's Nos. 1 & 2
EAST MOUNTAIN WORKINGS
MANGANESE MINES, COLCHESTER CO., N.S.
0 50 100 200 300
FEET
J.D.D.

FIGURE 18.

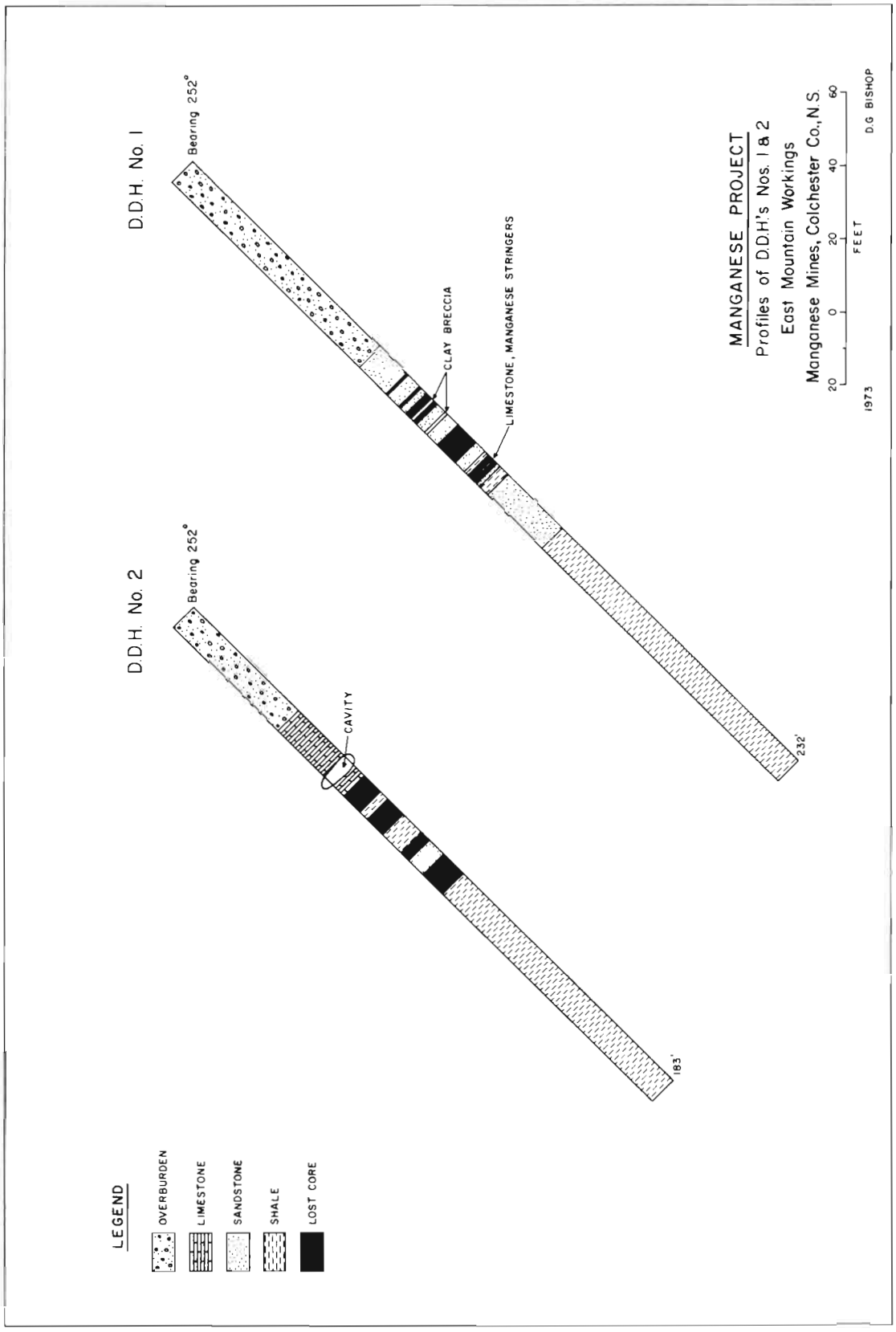

D.D.H. No. 1
Bearing 252°
CLAY BRECCIA
LIMESTONE, MANGANESE STRINGERS
232'
D.D.H. No. 2
Bearing 252°
CAVITY
183'
LEGEND
OVERBURDEN
LIMESTONE
SANDSTONE
SHALE
LOST CORE
MANGANESE PROJECT
Profiles of D.D.H's Nos. 1 & 2
East Mountain Workings
Manganese Mines, Colchester Co., N.S.
20 0 20 40 60
FEET
1973
D.G BISHOP
J.D.D.

FIGURE 19.

(31) MANGANESE MINES OCCURRENCE

Lat: 45° 24' 40"
Long: 63° 08' 50"
N. T. S. 11 E/6 E

The property known as Manganese Mines is situated about six miles east of Truro, in Colchester County. The property is three quarters of a mile north of the Canadian National Railway(Fig. 14).

According to the literature the property was worked continually for 15 years from 1880 to 1896. During that period about 2,000 tons of ore were mined and shipped. The ore was crushed and concentrated prior to shipment. From 1896 to 1905 work was done at irregular intervals and from 1905 to 1938 the mine was idle. In 1938 the main pit was pumped out and the old workings inspected, but no new development work was initiated.

The principal workings were carried out in red sandstones and quartzites that dipped steeply southward and are of Horton age. The manganese ore was found along joints and bedding planes of these rocks. Westerly dipping joints were the richest and in places up to a foot of pure pyrolusite was obtained.

The main pit is 100 feet long and 70 feet wide, and at the bottom of it a shaft has been sunk to a depth of 100 feet. No body of ore was found in the bottom of the pit.

The rock exposed on the south side of the pit is red, ferruginous sandstone which dips vertically. Small stringers of manganese occur along the bedding planes. At the west end of the north side of the pit similar rocks strike northeast and dip 30 degrees northwest. It is probable that the contact of these beds with the vertical ones on the south side is a fault which served as a host for the main ore body.

According to Smitheringale (1928) the ore was chiefly pyrolusite occurring as compact masses of small, interlocking prisms or as veinlets of fine, acicular crystals up to an inch in length. Small grains of manganite also occur. Calcite is associated with the manganese minerals and commonly lines the walls of manganese veins, but is also found within the ore minerals and in some places forms thin partings along the centres of veins. In places an ore breccia may be observed that consists of fragments of sandstone cemented by pyrolusite. The occurrence of the breccia suggests that following the consolidation of the sandstone the region was subjected to faulting. The resulting brecciated fragments of sandstone were then recemented by finer material. The finer matrix was then injected by ore bearing solutions that deposited their mineral content in the form of pyrolusite. Manganese oxide is also disseminated to some extent through the coarser material of the fragments.

TABLE 30

Major and Minor Trace Elements

Determined by Atomic Absorption

Elemental Content in Percentages except Silver

SAMPLE NO.	Mn	Pb	Zn	Cu	Mo	Ni	As	Ba	Fe	Ag(ppm)
BCS-7-67	.50	<.03	.002	.01	-	-	-	-	-	.5
BCS-8-67	6.65	<.03	.004	.031	-	-	-	-	-	.5
BCS-9-67	.20	<.03	.001	.005	-	-	-	-	-	.5
BCS-10-67	41.9	<.03	.020	.073	-	-	-	-	-	.5
BCS-11-67	.10	<.03	.001	.006	-	-	-	-	-	.5
BCS-12-67	13.6	<.03	.005	.031	-	-	-	-	-	.5
BCS-13-67	.05	<.03	.002	.003	-	-	-	-	-	.5
BCS-8-68	32.9	.03	.04	.03	.01	.02	-	-	2.0	1.5
BCS-13-68	53.5	.03	.014	.11	.01	.01	.002	.38	2.10	1

Three spectrographic analyses are available for samples from Manganese Mines property.

REFERENCES

Hanson, G.
1932: Manganese deposits of Canada; Geol. Surv. Can., Econ. Geol. Ser. No. 12, pp. 35-36.

Stevenson, I. M.
1958: Truro map-area, Colchester and Hants Counties, Nova Scotia; Geol. Surv. Can., Mem. 297, pp. 108-109.

(32) BORDEN MANGANESE OCCURRENCE

Lat: 45° 25' 00"
Long: 63° 08' 27"
N. T. S. 11 E/6 E

LOCATION

The Borden manganese occurrence is seven miles east of Truro and about three miles north of Valley Station on the Truro-New Glasgow division of the Canadian National Railway in Colchester County. It is 1,000 feet northeast of the property known as Manganese Mines (Figs. 14 and 15).

HISTORY

The Borden manganese occurrence is said to have been the original discovery of manganese in the district. The workings consist of a number of pits which are now caved so that no bedrock is exposed.

The area was quite thoroughly investigated by gravity, magnetic and geochemical surveys in 1968 by Chibtown Copper Corporation. The results of these surveys were not encouraging enough to justify more development work.

GEOLOGY

There is no bedrock exposed in any of the old trenches. In a stream gully north of the main opening, grey schistose Horton sandstone striking north 30 degrees

west and dipping steeply northeast is exposed. The rocks in the vicinity are extensively faulted.

A few pieces of manganese ore lie in the vicinity of the main cut. The rock observed on the dump contains pyrite, siderite, magnetite, hematite and limonite in a light to dark green schist.

TRACE ELEMENT DATA

Several samples were collected for chemical and spectrographic study. The results indicate a very low content of manganese and high iron. It is evident that the prospect is of no economic importance as a source of manganese.

TABLE 31

Major and Minor Element Content of Samples of Borden Manganese

Elemental Concentration in Percentages except Silver

SAMPLE NO.	Mn	Pb	Zn	Cu	Fe	S	Ag(ppm)	Ni	Mo	As
BCS-1-67	.061	<.03	.006	.003	52.9	2.48	1	-	-	-
BCS-2-67	.058	<.03	.004	.002	58.0	3.39	1	-	-	-
BCS-3-67	.041	<.03	.005	.003	64.1	2.48	1	-	-	-
BCS-4-67	.020	<.03	.044	.004	34.4	3.13	1.5	-	-	-
BCS-5-67	.045	<.03	.040	.003	45.1	2.78	1	-	-	-
BCS-6-67	.096	<.03	.025	.007	1.5	2.55	1	-	-	-
BCS-14-67	.07	<.03	.003	.003	51.5	-	0.5	-	-	-
BCS-15-67	.02	<.03	.003	.003	4.5	-	0.5	-	-	-
BCS-16-67	.1	<.03	.002	.004	6.35	-	0.5	-	-	-
BCS-1-68	.007	.03	.03	.007	60.50	.33	1	.03	-	-
BCS-2-68	.005	.03	.03	.006	61.50	.77	1.5	.03	-	-
BCS-3-68	.007	.03	.025	.007	63.20	-	1	.025	-	-
BCS-4-68	.012	.03	.006	.005	53.0	-	1	.05	-	-
BCS-5-68	.20	.03	.004	.002	57.5	-	1	.05	.01	.002
BCS-6-68	.20	.03	.003	.002	57.0	-	1	.05	-	.002

REFERENCES

Hanson, G.
1932: Manganese deposits of Canada; Geol. Surv. Can., Econ. Geol. Ser. No. 12, p. 33.

Kumarapeli, S.
1968: Exploration Work in Tracts 31 and 32, Sheet No. 11 E 6 D, Chibtown Copper Corporation. Report on file at Department of Mines, Halifax and Stellarton.

Stevenson, I. M.
1968: Truro map-area, Colchester and Hants Counties, Nova Scotia, Geol. Surv. Can., Mem. 297, pp. 111-112.

(33) FARNHAM BROOK MANGANESE OCCURRENCE

Lat: 45° 24' 42"
Long: 63° 12' 18"
N. T. S. 11 E/6 E

LOCATION

The Farnham Brook manganese deposit is located in the upper reaches of Farnham Brook and about two miles west of the East Mountain manganese mine (Fig. 14).

GEOLOGY

In the vicinity of the deposit, Farnham Brook runs through a narrow valley, the sides of which are quite steep. On the west side of the brook and also on the east side of the brook several hundred feet lower down there is an extensive limestone talus. The limestone has a peculiar mottled effect, due to the weathering of red hematite that occurs as disseminations throughout the rock.

At the upper location on the west side of the brook, there is evidence of an old dump and a few pieces of manganese ore were found both in the brook and on the dump. Information available indicates that some manganese ore was won from this area about 1880.

Two old pits were found on the east side of the brook but there was no evidence of manganese on the bank surrounding the pits. The color and characteristics of the limestone are similar to the occurrence at the East Mountain operation, and the manganese is probably of the same type.

The result of the chemical tests made on four samples from the dump indicate clearly that the deposit is of no commercial importance.

TABLE 32

Element Content of Samples - Farnham Brook

Elemental Content in Percentages except Silver

SAMPLE NO.	Mn	Pb	Zn	Cu	Fe	Ag (ppm)
BCS-24-67	0.20	<.03	.005	.005	-	3.0
BCS-25-67	0.10	<.03	.006	.006	-	2.0
BCS-26-67	0.40	<.03	.006	.005	.15	2.0
BCS-27-67	0.10	<.03	.004	.002	.15	3.0

REFERENCES

Stevenson, I. M.
1958: Truro map-area, Colchester and Hants Counties, Nova Scotia; Geol. Surv. Can., Mem. 297, p. 112.

Nova Scotia Department of Mines, Ann. Rept., 1938, p. 167.

OTHER AREAS INVESTIGATED IN COLCHESTER COUNTY

During the investigation of the manganese occurrences in Colchester County, a brief visit was made to areas of known sulphide, carbonate and sulphate mineralization. The object being to collect samples for chemical analyses to determine the manganese content present in these ores. Manganese oxides occur associated with the lead-zinc-copper-silver deposit at Walton, Hants County. Brief mention will be made of the geology and mineralization of the areas investigated.

(34) SMITHFIELD LEAD DEPOSIT

Lat: 45° 16' 09"
Long: 63° 04' 32"
N. T. S. 11 E/6 E

This deposit is located 12 miles southeast of Truro and 13 miles east of Brookfield Station on the Truro-Halifax branch of the Canadian National Railways.

The lead-zinc mineral deposit occurs in a limestone bed that lies at the base of the Lower Windsor Group. The limestone lies disconformably upon beds of red sandstones and shales of Horton age. The ore is probably of hydrothermal origin. The ore formed both by replacement and cavity filling.

TABLE 33

Trace Element Content of Smithfield Sulphide Ore

Elemental Content in Percentages except Silver

SAMPLE NO.	Mn	Pb	Zn	Cu	Fe	As	Ni	Ba	Ag (ppm)
BCS-40-68	.34	10.2	1.1	.008	-	.002	.03	2.0	1.25
BCS-41-68	.15	.025	.01	.008	29.0	.01	-	-	.6
BCS-42-68	.15	11.2	16.9	.008	.9	.011	.04	-	1.5

Spectrographic analyses for both major and minor elements of the Smithfield sulphide ore oppear in the appendix (Samples BCS-40 and BCS-42).

REFERENCE

Stevenson, I. M.
1958: Truro map-area, Colchester and Hants Counties, Nova Scotia; Geol. Surv. Can., Mem. 297, pp. 93-98.

(35) BROOKFIELD BARITE DEPOSIT

Lat: 45° 16' 06"
Long: 63° 10' 35"
N. T. S. 11 E/6 W

The barite deposit is located 2 1/2 miles northeast of Brookfield and approximately 12 miles south of Truro, Colchester County.

The barite is found principally in fine grained, grey and red Horton shales, many of which are extensively brecciated. The interstices between the brecciated particles have been filled with coarsely crystalline barite and siderite. The orebody dips northwest at about 60 degrees and plunges east at approximately 45 degrees. The ore appears to occupy part of the crest of a sharp fold.

TABLE 34

Elemental Content Brookfield Barite

Elemental Content in Percentages except Silver

SAMPLE NO.	Cu	Pb	Zn	Mn	Ba	Ag (ppm)
BCS-51-68	.007	.02	.006	.05	2.62	.1
BCS-52-68	.007	.02	.002	.06	55.8	.2
BCS-53-68	.007	.02	.004	.05	54.9	.3
BCS-54-68	.004	.02	.002	.2	56.6	.4

Spectrographic analyses of three samples (BCS-52; 53 and 54) indicate the major and minor elements contained in the barite mineralization at Brookfield.

REFERENCE

Stevenson, I. M.
1958: Truro map-area, Colchester and Hants Counties, Nova Scotia; Geol. Surv. Can., Mem. 297, pp. 70-76.

(36) EAST BRANCH BEAVER BROOK

Lat: 45° 18' 30"
Long: 63° 24' 26"
N. T. S. 11 E/6 W

Two samples of Macumber limestone with manganese staining were collected for laboratory investigation along Beaver Brook, Colchester County. This occurrence is small and is of academic interest only.

TABLE 35

Element Content of Limestone, Beaver Brook

Elemental Content in Percentages except Silver

SAMPLE NO.	Cu	Pb	Zn	Mn	Fe	Ni	Ag (ppm)
BCS-20-68	.008	.025	.004	.88	1.60	.01	.6
BCS-21-68	.009	.025	.02	.20	-	-	.7

MANGANESE OCCURRENCES INVESTIGATED IN CUMBERLAND COUNTY

(37) BROOKDALE MANGANESE

(38) PAINT MINE BROOK

DESCRIPTION OF INDIVIDUAL DEPOSITS

(37) BROOKDALE MANGANESE (KINNEAR QUARRY)

Lat: 45° 47' 17"
Long: 64° 08' 45"
N. T. S. 21 H/16 E

LOCATION

The deposits are situated on Fred S. Shipley's farm, Brookdale, on the west side of the road leading from Amherst to Salem, Cumberland County.

GENERAL GEOLOGY

The following remarks are taken from a report by E. R. Faribault. "The manganese occurs in limestone which is light reddish and grey in colour, concretionary, yielding no fossils...(This limestone is now mapped as Windsor in age.) From several of the openings manganese ore has been extracted which is said to have nearly paid for the cost of working. The ore has been found in pockets, irregular cavities and along fractures and joints in the rock. About 20 years ago 60 tons of good ore was extracted from one opening 13 feet in diameter and 30 feet in depth, close to Mr. Shipley's house. The deposits are no doubt the result of local deformation and fracturing of the rocks, followed by the filling of the cracks with manganese oxide. Three sets of fractures or joints have been observed, two of which are vertical and at right angles to the northeast and to the southeast, and a third one horizontal, dividing the rock in rectangular blocks. It is impossible to come to any practical conclusion, however, regarding the possible distribution of the ore bodies. Though exploratory work for ore bodies may not give promise of successful results, the working of the quarries for the limestone and its excellent

lime product might lead to important discoveries of manganese ore."

TABLE 36

Major and Minor Elements of the Brookdale Manganese

Elemental Content in Percentages except Silver

SAMPLE NO.	Cu	Pb	Zn	Mn	Fe	Ba	As	Ag (ppm)
BCuS-67-68	.008	.02	.03	8.0	-	-	-	.3
BCuS-68-68	.027	.02	.06	40.3	-	-	-	.2
BCuS-69-68	.008	.02	.012	.22	-	-	-	.7
BCuS-70-68	.005	.02	.05	.01	-	-	-	.2
BCuS-71-68	.008	.05	.025	1.0	-	-	-	.3
BCuS-72-68	.013	.02	.025	9.20	-	-	-	1.25
BCuS-119-69	.03	.03	.08	51.0	-	-	-	.4
BCuS-120-69	.05	.03	.04	14.0	1.10	-	.005	5
BCuS-121-69	.008	.03	.02	9.5	-	-	-	6
BCuS-122-69	.004	.03	.025	7.3	-	-	-	8
BCuS-123-69	.004	.03	.03	8.5	1.3	0.4	.005	7
BCuS-124-69	.002	.03	.008	0.55	-	7.35	-	7

Elements determined by atomic absorption methods. Two spectrographic analyses of the Brookdale manganese (BCuS-68-68 and BCuS-72-68) are given in the appendix.

REFERENCE

Faribault, E. R.
1918: Investigations in western Nova Scotia, Geol. Surv. Can., Sum. Rept. pt. F, p. 3.

(38) PAINT MINE BROOK

Lat: 45° 29' 30"
Long: 64° 43' 30"
N. T. S. 21 H/7 E

LOCATION

Bog manganese occurs in the vicinity of Paint Mine Brook in tracts 107 and 108, Cumberland County. The area can be reached by driving west from Joggins on the Sand River road for a distance of approximately 21 miles and then by dirt road for a distance of 1.6 miles. The deposit lies 2,800 feet to the west of the road in the vicinity of Paint Mine Brook.

GEOLOGY

Bog manganese overlies bedrock of light buff coloured sandstone, a member of the Cumberland Group of Pennsylvanian age. Three small trenches expose the manganese-iron mineralization. Twenty-nine samples were collected from the bog material and manganese-iron nodules for analyses. The results are tabulated in figure 20.

TABLE OF ANALYSES

Spring Seep

Sample No.	P. P. M. Cu	Pb	Zn	% Mn	Fe
1	8	25	55	13.6	19.2
2	15	25	55	2.5	50.0
3	5	25	40	18.5	18.2
4	5	25	40	12.2	27
5	8	25	35	13.9	23.5
6	8	25	65	10.1	25
7	5	45	30	17.5	23.5
Average	7.7	28	46	12.6	26.6

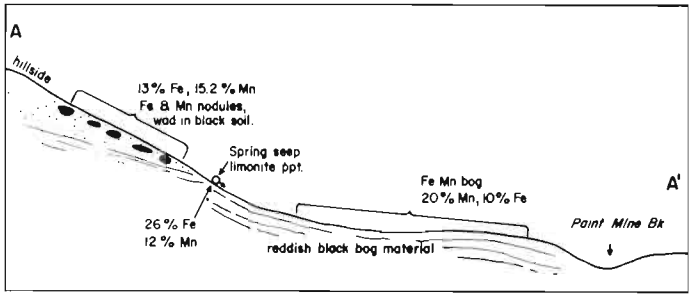
Bog Material

8	8	50	100	24	9
9	9	35	65	9	28
10	8	25	65	18.5	10
11	5	25	75	4.5	6
12	8	25	60	21	9.6
13	5	25	13	29	11.8
14	5	45	55	29.5	6.8
15	5	45	25	33	6.8
16	8	25	55	25.5	13.3
17	8	25	40	1.0	2.0
18	7	25	60	12.3	5.0
19	6	25	48	37.0	6.6
20	7	25	48	21.5	17.8
21	7	25	55	18.8	17.0
Average	6.8	30.3	54.5	20.3	10.6

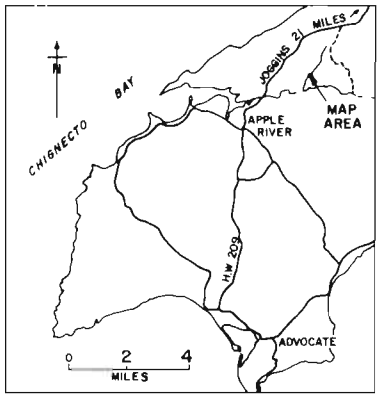
Fe Mn Nodules

22	39	25	100	7.5	8
23	22	25	70	0.2	2
24	15	25	55	10.2	12
25	10	25	50	6.7	17
Average	21.5	25	68.7	6.1	9.7

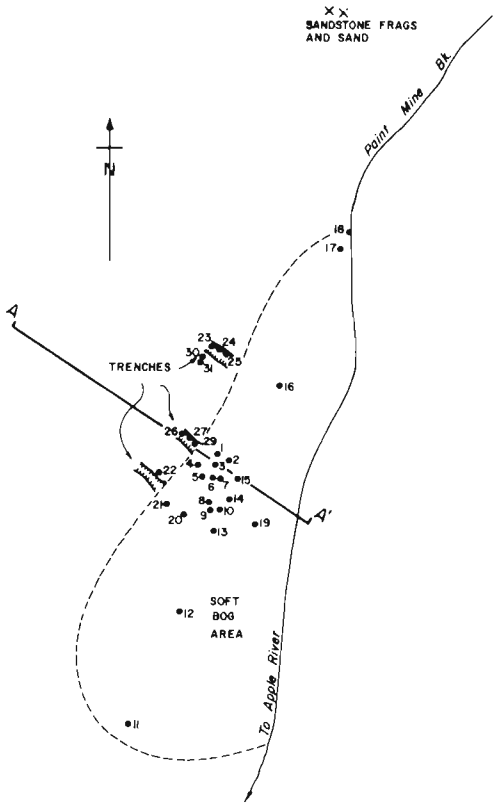
Fe Mn Nodules	%				
26	.010	.03	.008	29	14
27	.004	.03	.008	29	15
28	.004	.03	.005	20	18
29	.004	.03	.005	19	18
Average	.005	.03	.006	24.2	16



GENERALIZED CROSS-SECTION (NOT TO SCALE)



LOCATION MAP



MANGANESE PROJECT

PLAN AND ANALYSES OF SAMPLES

Paint Mine Brook, Cumberland Co., N.S.

50 0 50 100
FEET

1973 D.G BISHOP

J.D.D

FIGURE 20

MANGANESE INVESTIGATION IN CAPE BRETON COUNTY

(39) McNEILL PROPERTY

(40) McCUISH PROSPECT

(41) MORRISON MINE

DESCRIPTION OF INDIVIDUAL DEPOSITS

(39) McNEILL PROPERTY

Lat: 46° 10' 40"
Long: 60° 27' 51"
N. T. S. 11 K/1 W

LOCATION AND WORKINGS

The bog manganese deposit is exposed along the bank skirting the shoreline and a substantial depth was found for a distance of at least 600 feet along the shore west of McNeill Brook, Boularderie Island, Cape Breton County. The bog manganese was located for 150 feet up the slope from the shoreline along the south coast of Boularderie Island.

J. A. Gillis, of Sydney, Nova Scotia did some work on the property in 1912 and in 1917. The British Empire Steel Company examined the McNeill property in 1915, but did nothing more.

In 1940 six trenches were dug at right angles to the shoreline. These trenches vary in length from 60 feet to 150 feet and in depth from 12 to 15 feet at the shore to about four feet at their termination on the hillside. The manganese lies under one to three feet of overburden. The thickness of the ore varies from eight feet at the shore to about two feet at a point 150 feet inland. Within the manganese horizon are several parallel seams of limonite which are generally about one inch in thickness, but widen out to lenses up to six inches. The limonite is confined to the lower three feet of the bed. Many small springs trickle out of the cliff at the base of the manganese horizon.

It is thought that the iron amd manganese were dissolved out of the sedimentary rocks of the area and deposited by springs as bog ore. The source of the manganese is no doubt from manganese silicate or carbonate which is present in the Carboniferous sediments upon which the deposit rests.

GEOLOGY

The rocks exposed in the vicinity of the bog manganese deposit include limestone and gypsum of the marine Windsor Group and shale, sandstone and conglomerate of the Pennsylvanian Group of Upper Carboniferous age. The strata dip west at low angles and lie along the south limb of the Boularderie syncline.

CHEMICAL DATA ON THE BOG MANGANESE

In 1938 three samples were collected from the trenches and the results of the analyses given in percent are as follows:

SAMPLE	Mn	Fe	Insolubles
1	18.2	18.7	5.7
2	30.1	17.1	6.7
3	19.8	4.3	1.7

In 1970 the McNeill property was examined and 17 samples collected from the various trenches and rock exposures along the shore for analyses. The results of the analyses are tabulated below, and shown in figure 21.

TABLE 37

Major and Minor Elements Determined

Elemental Content in Percentages except Silver

SAMPLE NO.	Cu	Pb	Zn	Mn	Fe	Ag (ppm)
BC-1 -70	.002	.03	.01	0.30	4.1	>0.4
BC-11-70	.04	.03	.01	.21	5.71	>0.4
BC-12-70	.01	.03	.01	.11	4.50	>0.4
BC-13-70	.002	.03	.25	23.5	12	>0.4
BC-14-70	.005	.03	.25	15.7	7.1	>0.4
BCS-15-70	.01	.03	.04	36.5	21.5	>0.4
BCS-16-70	.002	.03	.05	21.4	23.7	>0.4
BCS-17-70	.005	.03	.03	2.05	10.7	>0.4
BCS-18-70	.01	.03	.01	1.90	12.5	>0.4
BCS-19-70	.005	.03	.06	8.10	33.7	>0.4
BCS-20-70	.002	.03	.18	32.5	13.5	>0.4
BCS-21-70	.002	.03	.03	4.0	11.0	>0.4
BCS-22-70	.002	.03	.12	20.5	4.0	>0.4
BCS-23-70	.005	.03	.05	13.8	18.2	>0.4
BCS-24-70	.005	.03	.01	2.35	20.8	>0.4
BCS-25-70	.002	.03	.04	14.4	30.5	>0.4
BCS-26-70	.002	.03	.05	11.1	8.8	>0.4

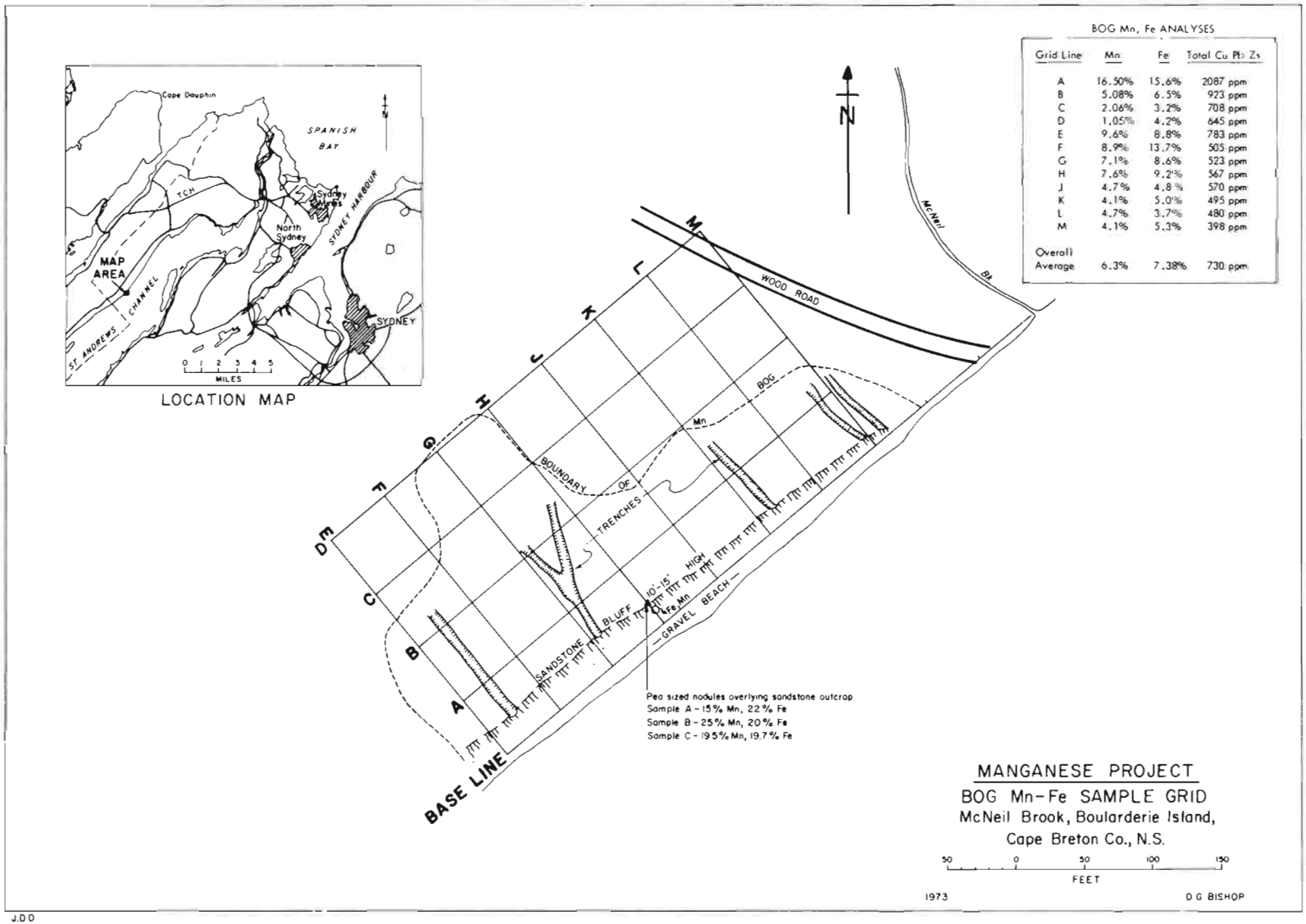

BOG Mn, Fe ANALYSES
Grid Line | Mn | Fe | Total Cu Pb Zn
A 16.50% 15.6% 2087 ppm
B 5.08% 6.5% 923 ppm
C 2.06% 3.2% 708 ppm
D 1.05% 4.2% 645 ppm
E 9.6% 8.8% 783 ppm
F 8.9% 13.7% 505 ppm
G 7.1% 8.6% 523 ppm
H 7.6% 9.2% 567 ppm
J 4.7% 4.8% 570 ppm
K 4.1% 5.0% 495 ppm
L 4.7% 3.7% 480 ppm
M 4.1% 5.3% 398 ppm
Overall Average 6.3% 7.38% 730 ppm
Cape Dauphin
SPANISH BAY
TCH
Sydney Mines
North Sydney
SYDNEY HARBOUR
MAP AREA
CHANNEL
ST ANDREWS
SYDNEY
0 1 2 3 4 5
MILES
LOCATION MAP
N
M
L
K
J
H
G
F
E
D
C
B
A
BASE LINE
WOOD ROAD
McNeil BR
BOG
Mn
BOUNDARY OF TRENCHES
BLUFF
10'-15' HIGH
Fe, Mn
GRAVEL BEACH
SANDSTONE
Pea sized nodules overlying sandstone outcrop
Sample A - 15% Mn, 22% Fe
Sample B - 25% Mn, 20% Fe
Sample C - 19.5% Mn, 19.7% Fe
MANGANESE PROJECT
BOG Mn-Fe SAMPLE GRID
McNeil Brook, Boularderie Island,
Cape Breton Co., N.S.
50 0 50 100 150
FEET
1973
D G BISHOP
J.D.D

FIGURE 21

REFERENCES

Hanson, G.
1932: Manganese deposits of Canada, Geol. Surv. Can., Econ. Geol. Ser. No. 12, pp. 28-29.

Hentachel, H. W.
1940: Investigation of Manganese Properties, Boularderie Island, Cape Breton County. Copy on file at Nova Scotia Department of Mines.

Messervey, J. P.
1938: Manganese, Boularderie Island. Copy on file at Nova Scotia Department of Mines.

(40) McCUISH PROPERTY

Lat: 45° 48' 44"
Long: 60° 30' 45"
N. T. S. 11 F/15 E

GENERAL

The discovery of manganese at Loch Lomond was made by Hugh Fletcher during geological mapping in 1879. About 130 tons of manganese ore was produced in the years 1881 and 1882. In 1889, 243 tons were produced. In 1915 the Dominion Steel Corporation sank a shaft at the Morrison Mine. Production of 12 tons of ore was obtained from the McCuish Mine in 1916.

Records indicate that much of the ore mined was obtained from the soil as loose masses that had weathered out of the shales and limestones, and some ore occurred as nodules in the stream beds. The ore was shipped to Boston, where it was used for the

manufacture of chlorine, bleaching powder and for decolorizing glass.

LOCATION

The McCuish mine also referred to as the Moseley mine is situated in the southern part of Cape Breton County on McCuish Brook. McCuish Brook is located on the Salmon River road 1.6 miles east from the junction with the L'Ardoise Road at Enon.

GEOLOGY

The rocks at the McCuish prospect are of Windsor and Horton age and consist of grey to buff crystalline limestone, conglomerate, red shale and brown limestone. The manganese deposits occur at the contact of the limestone with the sandstone. Replacement of limestone by manganese is evident.

Most of the ore in the solid rock occurred in the red shale, but considerable amounts occurred in loose nodules in the soil. In the red shale, which is from one to ten feet thick, the manganese ore occurs as layers and lenses lying parallel to the bedding planes. The shales on weathering released manganese nodules in the soil and creek beds. Manganese occurs also as irregular replacements in the limestone underlying the red shale and to a minor extent in the cement and coating on the pebbles of the overlying conglomerate.

The manganese minerals are pyrolusite, manganite and hausmannite. The porous ore is mostly pyrolusite with scattered masses of the other manganese minerals. Vugs in the porous ore contain barite. Some of the massive ore occurs as a replacement of limestone. In this section this replacement is seen to begin as a yellowish smudge on calcite; the smudge gradually becomes intensified and manganite blebs appear within

and replace the calcite. Finally the replacement of the calcite is completed and manganite and hausmannite appear in crystalline form. Oxidation resulted in porous ore consisting mostly of pyrolusite.

The manganese probably represents the products from leaching of manganese bearing silicates that found their way into the Carboniferous sediments and replaced certain horizons in these sediments, as manganese salts are readily transported in waters containing carbon dioxide and also readily replace either siliceous or carbonate rocks.

The minerals occur in masses, evidently replacing the limestone, the original structure of which is destroyed, although there is a tendency on the part of the manganese oxide to replace along bedding planes and some pseudomorphic retention of the laminated limestone form occurs. The shape of the masses is irregular and they vary in size. There is a tendency for the ore to follow along the bedding planes in masses, a few inches in thickness.

In 1969 the area in the vicinity of the McCuish manganese occurrence was examined in detail. A pace and compass traverse was made along McCuish Brook and in the vicinity of the old workings (Fig. 22). A total of 40 samples were collected for determination of major and minor elements by atomic absorption techniques at the Nova Scotia Technical College, Halifax. The analytical data are presented in the following table:

TABLE 38

Major and Minor Elements Determined from Samples

of Manganese Ore and Rocks from McCuish Mine

Elements in Percentages except Silver

SAMPLE NO.	Cu	Pb	Zn	Fe	Mn	As	Ba	W	Sr	Ag (ppm)
BBS-126-69	.04	.06	.025	.4	51	-	-	-	-	.5
BBS-127-69	.02	.06	.025	.5	49.5	<.002	.45	<.03	.012	.5
BBS-128-69	.04	.06	.18	.3	49	-	-	-	-	.6
BBS-129-69	.03	.03	.04	.7	52.5	<.003	.42	-	-	.5
BBS-130-69	.13	.08	.04	.2	57	-	-	-	-	.5
BBS-131-69	.06	.06	.01	.15	56.5	-	-	-	-	.5
BBS-132-69	.06	.06	.025	.00	55	-	-	-	-	.5
BBS-134-69	.05	.06	.03	.2	55.5	-	-	-	-	.3
BBS-135-69	.06	.08	.03	.2	58	-	-	-	-	.3
BBS-136-69	.03	.05	.045	.2	58.5	-	-	-	-	.3
BBS-137-69	.018	.05	.01	.5	55.5	.0028	1.10	<.03	-	.4
BBS-138-69	.05	.08	.05	.45	51.5	-	-	-	-	.4
BBS-139-69	.02	.05	.03	.15	58.5	<.002	.45	<.03	.01	.4
BBS-140-69	.04	.05	.02	-	58.0	-	-	-	-	.5
BBS-141-69	.07	.05	.05	-	45.0	-	-	-	-	.5
BBS-142-69	.06	.08	.02	-	50.0	-	-	-	-	.6
BBS-143-69	.05	.07	.02	-	49.0	-	-	-	-	.6
BBS-144-69	.05	.08	.05	-	49.5	-	-	-	-	.5
BBS-145-69	.02	.05	.005	0.5	55.0	<.002	.65	<.03	.01	.4
BBS-146-69	.03	.05	.018	-	55.0	-	-	-	-	.7
BBS-147-69	.07	.08	.01	.5	56.0	-	-	-	-	.7
BBS-149-69	.008	.04	.018	1.0	12.5	-	-	-	-	2.0
BBS-150-69	.009	.05	.019	.6	13.5	-	-	-	-	2.0
BBS-151-69	.028	.04	.17	.3	53.5	-	-	-	-	.5
BBS-152-69	.024	.03	.06	-	50.5	-	-	-	-	.5
BBS-153-69	.028	.03	.09	-	51.5	-	-	-	-	.5
BBS-154-69	.05	.04	.08	-	52.0	-	-	-	-	.5
BBS-155-69	.02	.08	.015	-	52.7	-	-	-	-	.8
BBS-156-69	.03	.08	.01	-	49.5	<.001	.26	.03	-	.8
BBS-157-69	.01	.08	.08	-	42.5	-	-	-	-	.8

TABLE 38 - continued

SAMPLE NO.	Cu	Pb	Zn	Fe	Mn	As	Ba	W	Sr	Ag (ppm)
BBS-158-69	.018	.03	.04	-	47.2	-	-	-	-	.5
BBS-159-69	.02	.03	.035	-	42.5	-	-	-	-	.5
BBS-160-69	.016	.03	.02	-	45.5	-	-	-	-	.5
BBS-162-69	.015	.03	.05	-	58.5	-	-	-	-	.8
BBS-163-69	.06	.03	.04	-	59.0	-	-	-	-	.8
BBS-164-69	.01	.03	.06	-	32.0	-	-	-	-	.5
BBS-165-69	.04	.03	.01	-	34.2	-	-	-	-	.5
BBS-166-69	.065	.03	.075	-	57.5	-	-	-	-	.5
BBS-167-69	.01	.03	.05	-	43.5	-	-	-	-	.5

Spectrographic analyses are available for 15 samples collected at the McCuish property. They are tabulated in the appendix.

REFERENCES

Hayes, A. O.
1917: Investigations in Nova Scotia; Geol. Surv. Can., Sum. Rept. p. 27

Hanson, G.
1932: Manganese deposits of Canada, Geol. Surv. Can., Econ. Geol. Ser. No. 12, p. 29.

Messervey, J. P.
1938: Loch Lomond District-Manganese;Report on file with Nova Scotia Department of Mines.

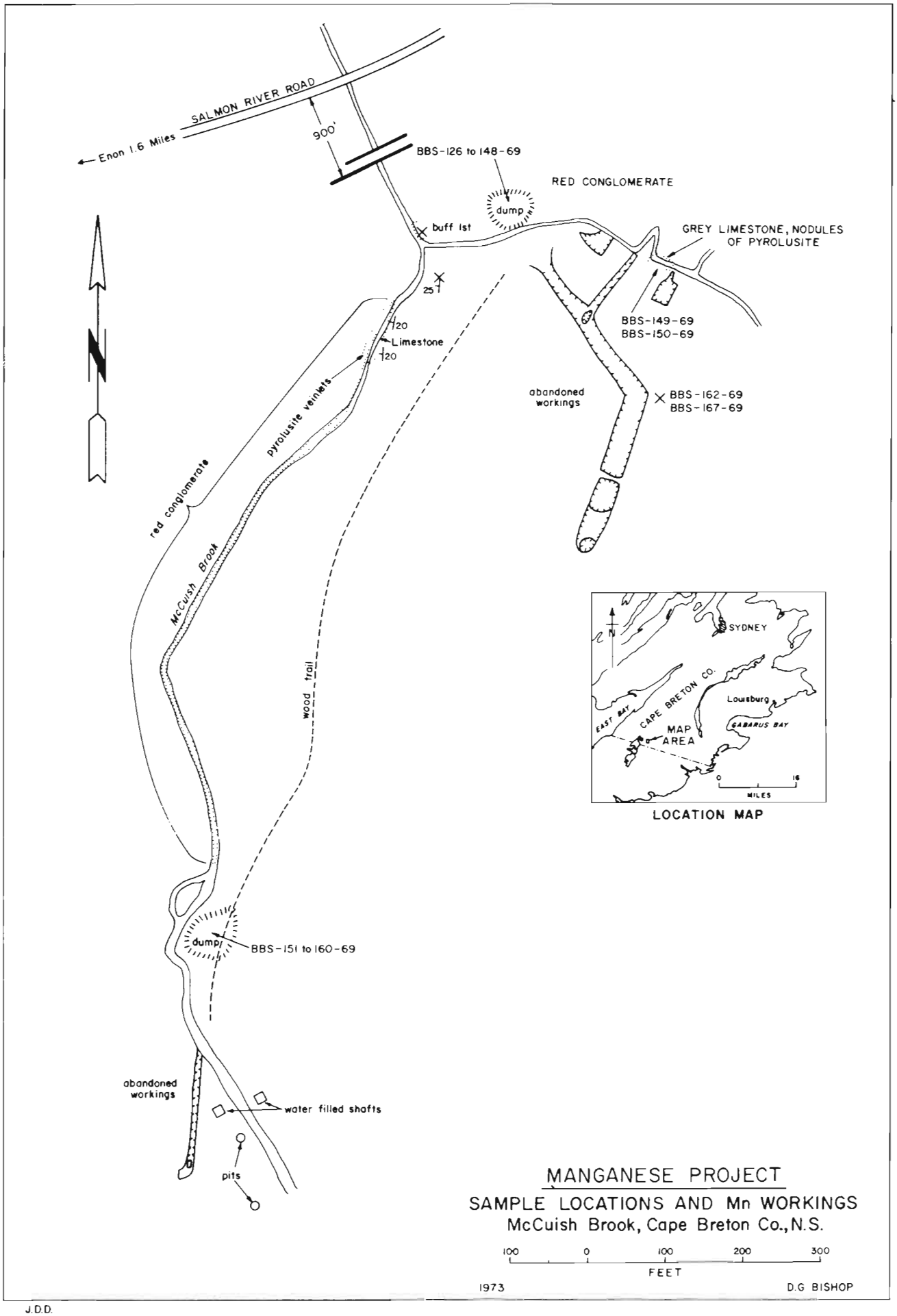

SALMON RIVER ROAD
Enon 1.6 Miles
900'
BBS-126 to 148-69
RED CONGLOMERATE
dump
buff lst
GREY LIMESTONE, NODULES OF PYROLUSITE
25
20
Limestone
20
pyrolusite veinlets
BBS-149-69
BBS-150-69
abandoned workings
BBS-162-69
BBS-167-69
red conglomerate
McCuish Brook
wood trail
dump
BBS-151 to 160-69
abandoned workings
water filled shafts
pits
N
SYDNEY
CAPE BRETON CO.
EAST BAY
Louisburg
GABARUS BAY
MAP AREA
0
15
MILES
LOCATION MAP
MANGANESE PROJECT
SAMPLE LOCATIONS AND Mn WORKINGS
McCuish Brook, Cape Breton Co., N.S.
100 0 100 200 300
FEET
1973
D.G BISHOP
J.D.D.

FIGURE 22.

(41) MORRISON MINE

Lat: 45° 48' 57"
Long: 60° 29' 46"
N. T. S. 11 F/15 W

LOCATION

The Morrison Mine is located three quarters of a mile east of the McCuish Mine. The workings on Morrison's farm are about a quarter of a mile south of the road, on the west side of a small stream flowing north.

The manganese deposits at the Morrison Mine were developed by shallow trenches and pits, a shaft 20 feet deep and a tunnel.

GEOLOGY

The manganese ore occurs in interbedded limestone, shale and conglomerate of the Horton and Windsor Groups, overlying a pink granite of pre-Carboniferous age. According to reports, at the bottom of the shaft, 20 feet, a bedded deposit of manganese about three inches in thickness was intersected. Some lateral work was done from the bottom of the shaft, but the manganese ore was not removed.

The overburden varies in thickness from about three to ten feet, with occasional outcrop of bedrock. The limestone, a laminated nodular variety apparently of algal origin in part at least, is interbedded with a conglomerate holding very angular fragments largely of quartz porphyry. No evidence of igneous activity in the form of dikes cutting the Carboniferous limestone measures was found. The mineralization appears to be fairly widespread. Specimens of dark manganiferous limestone analyzed returned 14.58 percent manganese.

The manganese mineralization occurs as irregular bodies in red shale, as veinlets, nodular masses, and irregular replacements in limestone, as a cement and as a coating of pebbles in the conglomerate, and as small, irregular replacements in the underlying granite. In the limestone, the manganese replacements tend to follow the bedding planes. Most of the ore found in the rocks lies in red shale, but a large part of the ore obtained was found as loose nodules in the creek bed. The manganese in the conglomerate and underlying granite occurs only in minor quantity and has not been mined. From reports available, the thickness of the manganese-bearing ore and even of the manganiferous limestone was measurable in inches rather than in feet. Gilpin states that the combined thickness of the ore and manganiferous limestone varied from two to eight inches. Fletcher stated that a tunnel 30 feet long had been driven in a vein seven inches thick. Hayes was informed that at the bottom of the shaft there was a three inch layer of manganese oxides.

The ore consists of pyrolusite. Associated minerals are calcite, barite and selenite. The pyrolusite is very free from iron and remarkably pure, and is well adapted to chemical manufacture.

Eight samples were collected from the old dumps for chemical analyses employing atomic absorption techniques.

TABLE 39

Major and Minor Elements Detected

Elemental Content Given in Percentages except Silver

SAMPLE NO.	Cu	Pb	Zn	Mn	Ba	As	W	Ag (ppm)
BBS-170-69	.03	.03	.006	0.3	-	-	-	.7
BBS-171-69	.05	.03	.06	56	-	-	-	.8
BBS-172-69	.04	.05	.075	52	.24	.002	.03	.8
BBS-173-69	.05	.03	.02	10.5	-	-	-	1.5
BBS-174-69	.11	.05	.08	48.5	-	-	-	.8
BBS-175-69	.03	.04	.035	20.5	-	-	-	.5
BBS-176-69	.02	.28	.37	58	-	-	-	.5
BBS-177-69	.02	.03	.45	1.5	.22	.002	.03	.5

REFERENCE

Hanson, G.
1932: Manganese deposits of Canada, Geol. Surv. Can., Econ. Geol. Ser. 12, pp. 30-31.

OTHER AREAS EXAMINED IN CAPE BRETON COUNTY

SALMON RIVER ROAD

Lat: 45° 49' 33"
Long: 60° 28' 02"
N. T. S. 11 F/16 W

Several samples of Windsor limestone were collected for determination of manganese and other trace elements along the Salmon River Road. It is interesting to note that the lead content of the ten samples averages 2.38 percent, with very low content of copper and zinc; 1.3 percent manganese and 2.26 ppm silver.

TABLE 40

Major and Minor Element Analyses of Manganiferous Limestone from Salmon River Road

Elemental Content in Percentages except Silver

SAMPLE NO.	Mn	Cu	Pb	Zn	Ag (ppm)
BBS-178-69	1.3	.005	2.9	.01	2
BBS-179-69	1.0	.002	1.8	.005	2
BBS-180-69	1.0	.005	4.2	.01	2
BBS-181-69	1.5	.005	1.75	.003	.6
BBS-182-69	1.0	.008	1.5	.008	2
BBS-183-69	1.5	.005	3.7	.01	2
BBS-184-69	1.3	.004	.95	.008	2
BBS-185-69	1.6	.005	2.9	.004	2
BBS-186-69	1.55	.008	2.6	.008	4
BBS-187-69	1.3	.005	1.5	.003	4

BIG GLEN AREA

Lat: 45° 49' 00"
Long: 60° 28' 21"
N. T. S. 11 F/16 W

A traverse was made to study the limestone horizon exposed on Big Glen Brook, south of the Salmon River Road. As elsewhere in the area, the limestone holds considerable lead, manganese and silver. It is interesting to note from the analyses that where lead is in small amounts, the amount of manganese is also low. Silver is fairly consistent in all samples tested.

TABLE 41

Minor and Major Elements Determined for Limestone,

Big Glen area

Elemental Content in Percentages except Silver

SAMPLE NO.	Cu	Pb	Zn	Mn	Ag (ppm)
BBS-188-69	.005	5.5	.65	2.9	4
BBS-189-69	.005	3.9	.13	1.8	4
BBS-190-69	.005	3.0	.02	2.1	4
BBS-191-69	.01	3.1	.06	2.0	5
BBS-192-69	.005	2.7	.07	2.0	2
BBS-193-69	.005	0.45	.35	0.25	2
BBS-194-69	.005	0.03	.02	0.55	1

MANGANESE INVESTIGATION IN VICTORIA COUNTY

(42) O'HANDLY'S PROPERTY

(42) O'HANDLY'S PROPERTY

Lat: 46° 08' 58"
Long: 60° 32' 11"
N. T. S. 11 K/2 E

LOCATION

This bog manganese deposit is located northeast of the Catholic Church between South Side Boularderie and Island Point, Boularderie Island, Victoria County.

GEOLOGY

The rock exposed along the shore in the vicinity of the manganese deposit consists of limestone, sandstone and shale of the Windsor Group, overlain by sandstone, and arkosic grit of the Morien Series of Pennsylvanian age. The formations dip 23 degrees westward.

The bog manganese deposit is on the gently sloping, eastern bank of a small stream about half a mile west of the lake shore. The manganese lies at the surface above a fine white sand. It ranges in thickness from one to seven feet and extends over an area of 27 acres. This deposit is only a surface one and probably its depth will be quite variable and conform to the contour of the surface of bedrock. The outline of the ore occurrences are irregular. There will also be a great variation in the composition of the ore in the different parts of the bed.

Smitheringale suggests that the manganese and iron of the deposit were dissolved out of the sedimentary rocks of the area and deposited by springs as bog ore.

In September 1940, the O'Handly property was visited by Mr. Hentachel and two samples obtained from borings were submitted for analyses. The results are given below: Values in Percentages

LOCATION	Mn	Fe	SiO_2	P	Co_2	Moisture
5-foot section on manganese horizon	20.15	29.48	6.06	.51	2.60	1.60
Boring on manganese zone- at old trench	44.00	10.38	1.44	.38	9.35	1.95

The O'Handly prospect was examined by the writer in 1970 and several auger borings made along picket lines. The results (Fig. 23), clearly indicate that the deposit is uneconomical as a source of manganese.

REFERENCE

Hanson, G.
1932: Manganese deposits of Canada; Geol. Surv. Can., Econ. Geol. Ser. No. 12, pp. 28-29.

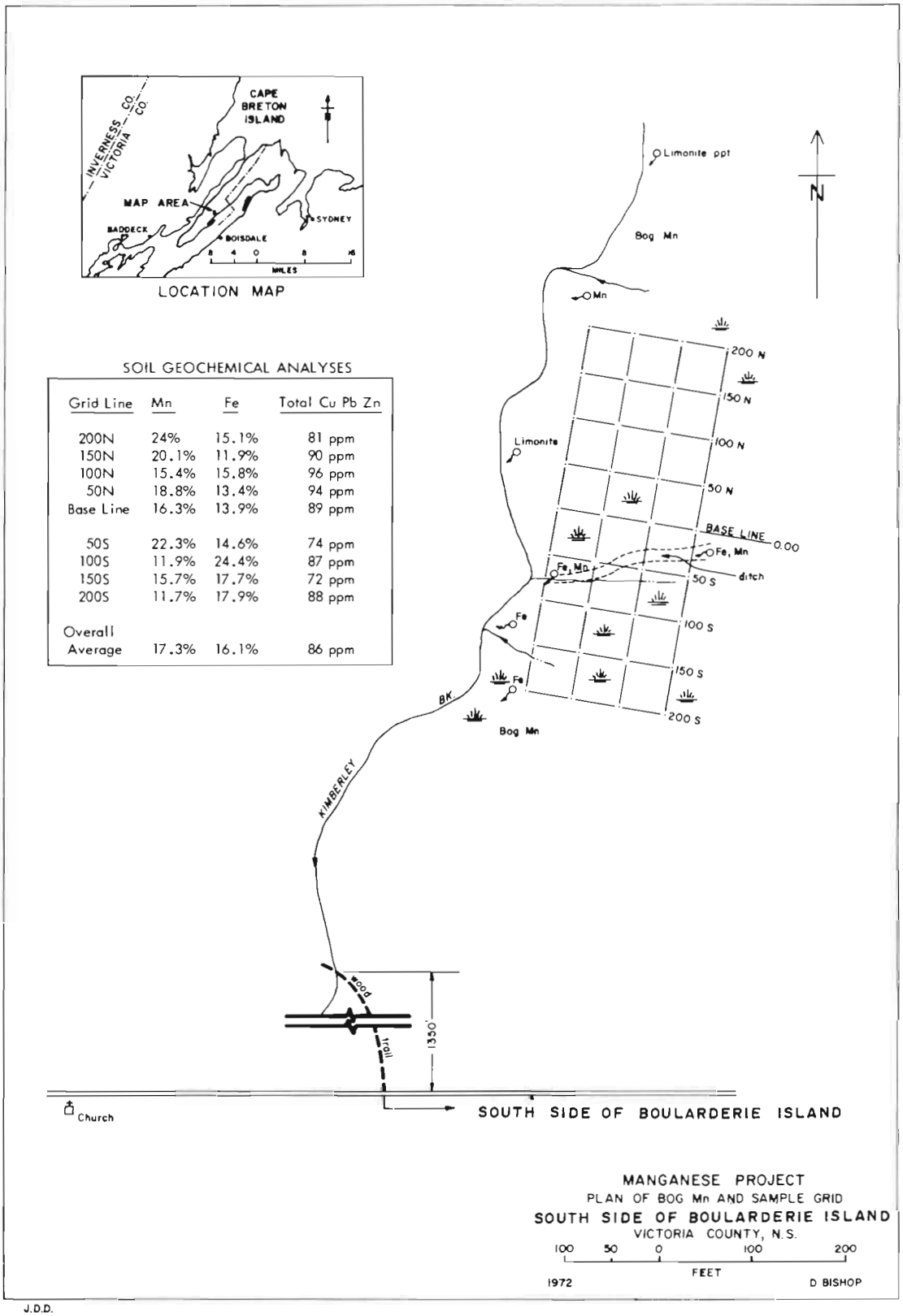

CAPE BRETON ISLAND
INVERNESS CO.
VICTORIA CO.
MAP AREA
SYDNEY
BADDECK
BOISDALE
MILES
LOCATION MAP
SOIL GEOCHEMICAL ANALYSES
Grid Line | Mn | Fe | Total Cu Pb Zn
200N | 24% | 15.1% | 81 ppm
150N | 20.1% | 11.9% | 90 ppm
100N | 15.4% | 15.8% | 96 ppm
50N | 18.8% | 13.4% | 94 ppm
Base Line | 16.3% | 13.9% | 89 ppm
50S | 22.3% | 14.6% | 74 ppm
100S | 11.9% | 24.4% | 87 ppm
150S | 15.7% | 17.7% | 72 ppm
200S | 11.7% | 17.9% | 88 ppm
Overall Average | 17.3% | 16.1% | 86 ppm
Limonite ppt
Bog Mn
Mn
N
200 N
150 N
100 N
50 N
Limonite
BASE LINE
0.00
Fe, Mn
Fe, Mn
ditch
50 S
100 S
150 S
200 S
Fe
Fe
BK.
Bog Mn
KIMBERLEY
road
trail
1350'
Church
SOUTH SIDE OF BOULARDERIE ISLAND
MANGANESE PROJECT
PLAN OF BOG Mn AND SAMPLE GRID
SOUTH SIDE OF BOULARDERIE ISLAND
VICTORIA COUNTY, N.S.
100 50 0 100 200
FEET
1972
D BISHOP
J.D.D.

FIGURE 23

MANGANESE INVESTIGATION

IN

INVERNESS COUNTY

(43) SCOTSVILLE AREA

GENERAL

The barite deposits near the east shore of Lake Ainslie were discovered in 1890 and have been worked intermittently by several companies since that date. Production up to 1932 has been about 22,000 tons.

The barite at Lake Ainslie is accompanied by a small amount of fluorite and calcite; it occurs in well-defined veins that have a general northeasterly trend across the ridges in which they occur. The veins vary in thickness along the strike, from a few feet to as much as 18 feet locally, but the thicker parts of the veins form lenticular bodies. Analyses of the barite furnished by Spence show that the veins grade from about 62 percent to 96 percent barium sulphate with calcium fluoride (fluorite) and carbonate (calcite) and small amounts of oxides of iron, aluminum, and silicon as impurities.

The deposits so far discovered and worked occur at three separate localities between Scotsville at the outlet of Lake Ainslie and Trout River post office, six miles south of the outlet.

The barite occurrence examined and sampled for analyses is locally known as the Scotsville deposit. Samples were collected from three localities along the Scotsville deposit.

(43) SCOTSVILLE DEPOSITS

Lat: 46° 11' 08"
Long: 61° 08' 41"
N. T. S. 11 K/3 E

The Scotsville deposits are on the summit of the ridge one mile from the lake and approximately one half mile north of Cobb Brook.

GEOLOGY

The barite veins occur in mica schist at or near its contact with basalt and rhyolite flows of pre-Carboniferous age. The flows lie on the western side of the mica schist.

One vein strikes N 5° E, and dips 40 degrees east. Three incline adits were driven down the vein. It was worked by an incline to 110 feet in depth with short levels. The barite vein is reported to be lenticular and to be from 11 to 18 feet in thickness. According to Spence, practically all the ore above the 110-foot level, the entire length of the drift has been stoped out, so that any reserves lie below the 110-foot level.

Two or three other veins, ranging from two to six feet thick are reported to occur to the south.

It is suggested that the barite is younger than the neighbouring Carboniferous rocks and that the barite may fill not only fractures in the rhyolite and schist but also fractures between the rhyolite and Carboniferous rocks. It is possible that the veins of barite lie in subsidiary fractures of major north-south faults.

Fourteen samples of barite and associated wallrock were collected from the various dumps along the trend of the Scotsville deposits for chemical study. The results tabulated below indicate up to one percent manganese associated with the barite. Thin section studies indicate minor to trace amounts of manganiferous limonite, pyrite and chalcopyrite occur in the vein material too. Analyses of the barite by atomic absorption techniques showed strontium in concentrations as high as one percent and three ppm in silver.

TABLE 42

Major and Minor Elements of the Barite and Fluorite Mineralization in Lake Ainslie area

Elemental Content in Percentages except Silver

SAMPLE NO.	Cu	Pb	Zn	Ba	Sr	F	Mn	Fe	Ag (ppm)
BIS-195-69	.005	.03	.002	55	1.02	.36	.05	-	.3
BIS-196-69	.005	.03	.01	-	-	-	.2	1.1	.3
BIS-197-69	.005	.03	.002	56	.95	.35	.05	.3	.3
BIS-198-69	.005	.03	.002	54.5	1.1	1.5	.05	.25	.3
BIS-199-69	.005	.03	.002	4.5	.08	34.0	.15	-	.3
BIS-200-69	.008	.03	.015	28.0	.58	23.0	.1	.15	.3
BIS-201-69	.008	.03	.002	19.5	.46	21.6	.1	-	.3
BIS-202-69	.005	.03	.003	3.4	.07	23.8	.3	-	.3
BIS-203-69	.005	.03	.008	42.0	.9	8.6	.08	.15	.3
BIS-204-69	.04	.03	.009	3.9	.05	14.7	.1	-	.3
BIS-205-69	.005	.03	.003	54.5	.9	2.7	.05	-	.3
BIS-206-69	.02	.03	.003	56.5	1.3	.25	.05	.1	.3
BIS-207-69	.03	.03	.003	55.0	1.3	.25	.05	.25	.3
BIS-208-69	.08	.03	.09	37.0	.58	.8	1.0	1.0	.3

REFERENCE

Norman, G. W. H.
1935: Lake Ainslie map-area, Nova Scotia, Geol. Surv. Can., Mem. 177, pp. 64-65.

MANGANESE INVESTIGATION IN LUNENBURG COUNTY

(44) DEAN AND CHAPTER

(45) CAIN AND MARPIC

DESCRIPTION OF THE MANGANESE AREA

The mineralized area is located approximately 21 miles southeast of Windsor and nine miles north of New Ross. The district consists of four abandoned mine workings: the Dean and Chapter or "Upper Mine", the Dr. Cain or "Lower Mine", the Riddle Mine, and the Marpic shaft, located east of the Cain shaft (Figs. 24 and 25). The properties are accessible by a very rough dirt road, a distance of four and one-half miles from Mill Road.

The country is rough and poorly drained, characterized by swampy areas, granite outcrops and boulders and spruce swamp.

The manganese deposits occur in a shear zone in a porphyritic biotite granite. The granite consists of unoriented crystals of microline in a granitoid texture composed of orthoclase, biotite, muscovite and quartz. Fine grained phases are seen on the road between the Upper and Lower Mines. An aplite dyke occurs 70 feet northwest of No. 3 shaft at the Upper Mine.

The manganese was originally found by Ernest Turner of Mill Road in 1907. Details and past history of the exploration activities may be found in the literature and files of the Nova Scotia Department of Mines and will not be repeated in this report.

The mineralization occupies a narrow sinuous fracture zone or zones within the granite. The veins vary greatly in width, the maximum being 70 inches. Minor alteration extends south into the footwall. The dip of the fracture zone is 85 degrees to the northwest and the Marpic report (1959) states that crushed rock and mineralization is encountered as deep as 340 feet as proved by drilling. The feldspars have been altered to kaolin and the granite disintegrates on exposure to the air in a few hours. This fact makes mining difficult for every foot of exposed granite must be timbered or it will "run".

The mineralized zones lying in depressions or swamps are flanked on either side by outcrops of hard unaltered granite. The zones themselves consist of highly fractured and crushed rock. The presence of fractures would serve as channel ways for mineralizing solutions.

In 1958, Marpic Explorations put down a three compartment shaft east of the Lower or Cain shaft. Levels were established at 100 feet and at 162 feet (200 foot level). Three cross-cuts intersected the ore zone and two diamond drill holes put down from the deeper level found ore at a depth of 340 feet (Fig. 24).

Due to the weathering of the upper part of the vein, it is extremely difficult to determine the exact nature of the mineralization. One must rely on written reports for information on the workings and the mineralization encountered at depth. The dumps were examined in the vicinity of the shafts, and a total of 64 samples were collected for analyses, a number of samples were submitted to L. M. Costelliz at Nova Scotia Technical College for X-ray analyses. Samples were sent to D. F. Hewett for his examination and interpretatian. Numerous specimens were sawed and polished for examination. The following descriptions were taken from the Marpic Explorations Report of 1959. It refers to the 200 foot level.

"The fracture zone has a width of 34 feet from footwall to hanging wall. The hanging wall section contains a lead of approximately 42 inches of pyrolusite, and the footwall contained a lead 20 inches wide of the same type of material. The crushed granitic rock between these leads had several small stringers of high grade manganese mineralization running parallel and across the zone". It is noted that over eight feet of

manganese ore was intersected in the cross cut. Diamond drill hole No. C-16 (Fig. 24) intersected the area in the vicinity of the crosscut.

Weeks examined the area in 1942 and carried out 6,700 feet of drilling to determine the extent of the mineralized zone (Figs. 24 and 25). It is essential to note that no manganese was cored in hole No. C-16. A section of three feet of lost core was reported and sludge samples were obtained. Weeks then estimated a width of two feet for the manganese zone. It would seem that the nature of the mineralization is such that it is not conducive to core recovery. Eighteen holes were drilled across the Cain zone for a total footage of 2,600 feet (Fig. 24). The ore intersections in all holes were similar. It must therefore be considered in the light of the above information, that a much wider zone of mineralization may exist than previously indicated. It has also been shown that mineralization exists to a depth of 340 feet as determined by the underground drilling. The drill logs by Weeks refer to the presence of manganite and other manganese minerals in the sludge. The underground drilling from the Marpic shaft proved the presence of a zone fifty feet wide at 260 feet and a 34-foot wide zone at 360 feet. It is interesting to note that a three inch seam of psilomelane was obtained at three depths to 245 feet in hole M-1 (Fig. 24).

A total of 64 samples were collected from the dumps in New Ross district for trace element analyses. Seven samples were carefully selected and submitted to Nova Scotia Technical College for X-ray analyses. With the work of D. F. Hewett in mind, it was expected that hypogene minerals would be found which would help resolve the dispute concerning the origin of the deposits.

The following minerals were identified from the New Ross manganese mineralization by X-ray analyses:

BLS-103-68	Pyrolusite	5% - 7%	MnO_2
	Hematite	95% - 93%	Fe_2O_3
BLS-104-68	Pyrolusite		MnO_2
BLS-105-68	Manganite	45%	Mn_2O_3 H_2O
	Pyrolusite	30%	MnO_2
	Calcite	25%	$CaCO_3$
BLS-106-68	Ramsdellite	55% - 65%	MnO_2
	Pyrolusite	35% - 45%	MnO_2
BLS-107-68	Knebelite	UNABLE	$(FeMn)_2$ SiO_4
	Hematite	TO	Fe_2O_3
	Rhodochrosite		$MnCO_3$
	Pinakiolite	DETERMINE	$Mg_3Mn^{2+}Mn_2^{3+}B_2O_{10}$
BLS-109-68	Manganite	80% - 70%	$Mn_2O_3H_2O$
	Rhodochrosite	20% - 30%	$MnCO_3$
BLS-110-68	Manganite	80% - 70%	$Mn_2O_3H_2O$
	Rhodochrosite	20% - 30%	$MnCO_3$

In addition to the above work, specimens were sent to D. F. Hewett in 1968 for his studies. He reported the presence of manganite with minor pyrolusite. The manganite formed a definite vein in the granite and Hewett stated that the mineralization was definitely of hypogene origin (personal communication). Barite was also present. In his past published papers entitled: "Manganite, Hausmannite, Braunite: Features, Modes of Origin", Hewett states that the New Ross manganite is hypogene and that rhodochrosite is present. It is significant to note that the X-ray work found rhodochrosite, knebelite (an iron manganese silicate) and pinakiolite - a complex oxide of manganese containing boron. These are in addition to the common oxides pyrolusite, psilomelane and manganite. This mineral assemblage points to a hydrothermal source.

Directly to the southeast of the manganese mineralization lies a lenticular band of Goldenville quartzite that extends easterly from near Harris Lake to Leminister. It was in this area and farther south in the granite that work was carried out on tin, fluorite and molybdenite prospects. Cassiterite was first discovered in 1907 in pegmatite dikes in granite south of the belt of sedimentary rocks of the Meguma Group. The granite has been invaded by hydrothermal pneumatolytic emanations and this entire district is similar to the tin-copper district of Cornwall, England. The English deposits represent a classic example of zoning; ore disposition away from an igneous center, largely caused by decreases in temperature and pressure. The metals produced by the mines are largely tin and copper with lesser amounts of arsenic, tungsten, lead, zinc, silver, uranium, radium, iron, manganese, bismuth, nickel and cobalt. The ores are in fissures that cut both granite and the slates.

Figure 26 depicts the four distinct zones of mineralization at Cornwall.

1. Tin zone
2. Tungsten, copper and arsenic zone
3. Silver, lead and zinc zone
4. Iron, manganese zone

The iron-manganese oxides are oxidation products of the hypogene carbonates-siderite and rhodochrosite. The manganese silicate, rhodonite was also identified in the outer zones. This outer zone is beyond the limits of recognized metamorphism caused by igneous activity. Tin belongs to the deepest of the recognized zones and is found within the granite and above the granite in metamorphosed sediments. Cassiterite is the principal ore mineral with minor amounts of copper, arsenic and tungsten. The deposition of copper-arsenic and tungsten ores took place during and after the formation of the tin minerals.

Lead-silver ores originated later than the tin and copper and just preceded the iron-manganese mineralization. The minerals found are galena, sphalerite, stibnite, pyrite, fluorite, barite with minor amounts of uranium, nickel, bismuth and cobalt.

The intriguing aspect of the New Ross district is that it is similar in many ways to the Cornwall deposits. The close proximity of the tin deposits to the manganese invites comparisons. The manganese mineralization is found within the porphyritic biotite granite typical to the Southern Upland. However, the tin deposits are located directly south in a lighter muscovite granite intruded by pegmatites. A lenticular outcrop of Goldenville quartzite separates the biotite and muscovite granite.

At Turner tin on Mill Road the cassiterite is found in veins of greisen. Assays run as high as 20 percent in tin per ton. Associated minerals are fluorite, bornite and

pyrite. Other tin prospects in the area are found at Wallaback Lake and Loke Ramsey, along with the molybdenite prospects at Lander River, Leminister and New Russell. Associated minerals are fluorite, pyrite, bornite, tourmaline, silver and tungsten. The tin bearing pegmatites occur in the lighter muscavite granite and directly north of the manganese deposits in the dark biotite granite. This latter granite has been intruded by pegmatites and hydrothermal pneumatolytic emanations.

It would appear that the New Ross manganese deposits were formed by deposition of hydrothermal solutions in a fault zone in association with the tin-bearing deposits and represents a zoning effect similar to that of Cornwall. Examination of the samples from the dump show veined manganite cutting feldspars in a crushed granitic matrix. Hewett has stated that the samples he examined were hypogene in origin. Black manganoan calcite can be seen in intimate association with hematite stained granitic veinlets. X-ray analyses have proved the presence of rhodochrosite, manganese-iron silicates, and a complex manganese boron mineral. All of the above minerals prove the existence of a stage or stages of mineralization.

Trace element analyses of the New Ross manganese reveal the presence of those elements which Hewett lists as indicative of a hypogene origin. Tin and beryllium values are well above the norm.

Following are tables of elemental content of the manganese ores from the New Ross area as determined by atomic absorption work:

TABLE 43

DEAN AND CHAPTER (UPPER MINE)

SAMPLE NO.	Mn%	Fe%	Cu%	Pb%	Zn%	Ba%	As	Ag (ppm)
BLS-25-68	44.95	1.0	.015	.05	.01	2.08	.01	.5
BLS-64-69	59	.3	.06	.08	.02	-	.015	.5
BLS-65-69	54	-	.03	.06	.02	-	-	.5
BLS-66-69	58	-	.02	.04	.02	-	-	.7
BLS-67-69	56	-	.02	.15	.01	-	-	.5
BLS-68-69	59	-	.01	.06	.01	-	-	.5
BLS-69-69	58	-	.02	.2	.02	-	-	.7
BLS-70-69	50	-	.03	.09	.02	-	-	.7
BLS-71-69	56.5	-	.03	.10	.01	-	-	.8
BLS-72-69	59	-	.04	.05	.01	-	-	.7
BLS-73-69	59	-	.05	.03	.03	-	-	.5
BLS-74-69	54	-	.02	.27	.01	5.5	-	.9
BLS-75-69	45	-	.03	.06	.02	-	-	1.5
BLS-76-69	58	-	.05	.06	.02	-	-	.5
BLS-77-69	58.5	-	.03	.04	.02	-	-	.5
BLS-78-69	57.3	-	.05	.04	.04	-	-	4
BLS-79-69	61	.5	.03	.03	.02	-	.014	2
BLS-80-69	50	-	.02	.07	.01	-	-	1
BLS-81-69	59.5	-	.04	.08	.02	-	-	.5
BLS-82-69	59	-	.04	.10	.02	-	-	.6
BLS-83-69	59	-	.03	.15	.02	-	-	.7
Av. 21 Samples	55.94	.4	.03	.09	.02			.895

TABLE 44

CAIN ZONE - MARPIC 1958 SHAFT

SAMPLE NO.	Mn%	Fe%	Cu%	Pb%	Zn%	Ba%	As%	Ag(ppm)	Ni
BLS-31-68	48.1	1.5	.03	.03	.01	.74	.005	.1	.01
BLS-84-69	57	-	.02	.05	.05	.25	.03	.5	-
BLS-85-69	59	-	.03	.04	.02	-	-	.5	-
BLS-86-69	51	1.1	.02	.05	.01	-	.035	.2	-
BLS-87-69	55	-	.03	.07	.01	-	-	.2	-
BLS-88-69	58	.2	.03	.06	.03	.7	.002	.5	-
BLS-89-69	46	-	.02	.08	.02	-	-	.5	-
BLS-90-69	56	.4	.05	.08	.03	1.2	.002	.5	-
BLS-91-69	59	.8	.03	.02	.02	-	-	.5	-
BLS-92-69	58	.6	.03	.03	.02	-	-	.8	-
BLS-93-69	57	-	.02	.03	.08	-	-	.9	-
BLS-94-69	48	-	.03	.08	.02	-	.03	1.0	-
BLS-95-69	57	-	.03	.03	.01	-	-	.5	-
BLS-96-69	55	1.0	.05	.08	.02	-	.001	-	-
BLS-97-69	58	-	.06	.03	.02	-	-	-	-
BLS-98-69	57	-	.02	.03	.02	.3	.005	.5	-
BLS-100-69	59	.3	.01	.01	.001	.8	.005	.6	-
BLS-101-69	56	-	.03	.03	.02	1.1	-	.5	-
BLS-102-69	58	-	.02	.02	.008	1.1	.02	.5	-
BLS-103-69	54	.6	.04	.15	.02	-	-	.3	-
BLS-104-69	55	.7	.06	.03	.02	1.2	-	.3	-
BLS-105-69	57	-	.05	.05	.02	-	-	.3	-
BLS-106-69	45	-	.04	.08	.02	-	-	.4	-
BLS-107-69	54	.6	.04	.10	.02	-	.05	.6	-
Average 26 Samples Dump-1958 Marpic Shaft	54	2.57	.032	.051	.021	.79	.013	.45	-

TABLE 45

CAIN SHAFT

SAMPLE NO.	Mn%	Fe%	Cu%	Pb%	Zn%	Ba%	As%	Ag(ppm)	Ni
BLS-26-68	46.9	5.4	.02	.03	.008	-	-	.1	.02
BLS-28-68	40.2	20.2	.02	.03	.01	.55	.01	.1	.02
BLS-109-69	57	.9	.03	.08	.02	-	-	.3	-
BLS-110-69	57.5	.8	.06	.04	.02	.2	.08	.3	-
BLS-111-69	46	-	.03	.06	.017	-	-	.4	-
BLS-112-69	58	-	.013	.03	.008	-	-	.4	-
BLS-113-69	57.5	.5	.05	.08	.015	.37	.045	.4	-
BLS-114-69	57	1.0	.02	.10	.02	-	-	.3	-
BLS-115-69	60	-	.04	.03	.01	.25	.014	.8	-
BLS-116-69	58	-	.04	.06	.01	-	-	.6	-
BLS-117-69	54	-	.04	.05	.02	-	-	1.0	-
BLS-118-69	58	-	.04	.08	.01	-	-	.3	-
Average 12 Samples	54.2	4.8	.033	.06	.014	.34	.04	.42	

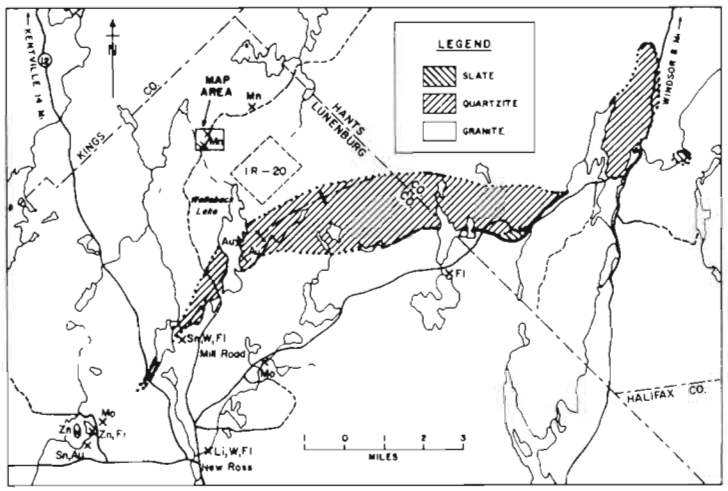
A total of 59 samples were taken from the New Ross district for Atomic Absorption work. The overall average of the samples is as follows:

TABLE 46

	Mn	Fe	Cu	Pb	Zn	Ag (ppm)
Average 59 Samples	54.7	2.6	.03	.07	.018	.59 ppm
Dean & Chapter	55.9	.4	.03	.09	.02	.90 ppm
Cain Zone Marpic	54	2.6	.03	.05	.02	.45 ppm
Cain Shaft	54.2	4.8	.03	.06	.01	.42 ppm

It is evident from the above tables that there is an enrichment of lead and silver in the manganese oxides from the Dean and Chapter Mine.

Spectrographic analyses of the manganese mineralization from the New Ross area are included in the tables that form an appendix to this report.



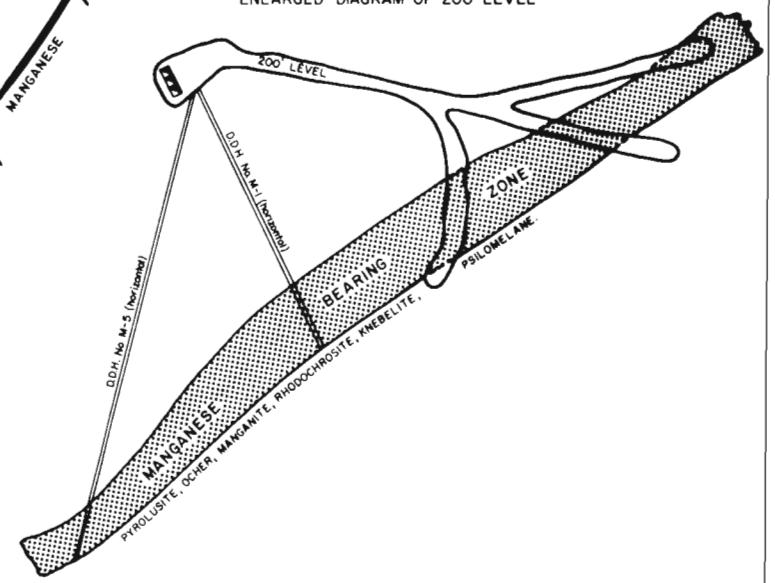
Geology of New Rass Manganese District showing proximity to Tin - Flourite bearing pegmatites. Location map reference 21-A-16-W

C-1 22°
C-2 40°
C-3 45°
C-4 45°
C-5 45°
C-6 45°
C-8 45°
C-10 45°
C-12 25°
C-14 55°
C-16 45°
C-18 45°
C-20 45°
C-21 45°
C-23 45°
C-22 45°
C-19 45°
C-7 45°
C-9 55°
C-11 55°
C-13 50°
C-15 45°
C-17 45°

BLS-30-68 to BLS-34-68
BLS-84-69 to BLS-108-69
BLS-26-68 to BLS-29-66
BLS-109-69 to BLS-118-69

MARPIC SHAFT
200' LEVEL
dump
CAIN SHAFT
RIDDLE SHAFT
MANGANESE BEARING ZONE
ROAD
DIRT

ENLARGED DIAGRAM OF 200' LEVEL



MANGANESE PROJECT
PLAN OF CAIN MANGANESE WORKINGS
WITH DIAMOND DRILLING AND SAMPLE LOCATIONS
New Ross, Lunenburg Co., N.S.
100 0 100 200 300 400
FEET
1973 D.G. BISHOP

Note. D.D.H.'s by L. J. Weeks - 1942.

J.D.D.

FIGURE 24

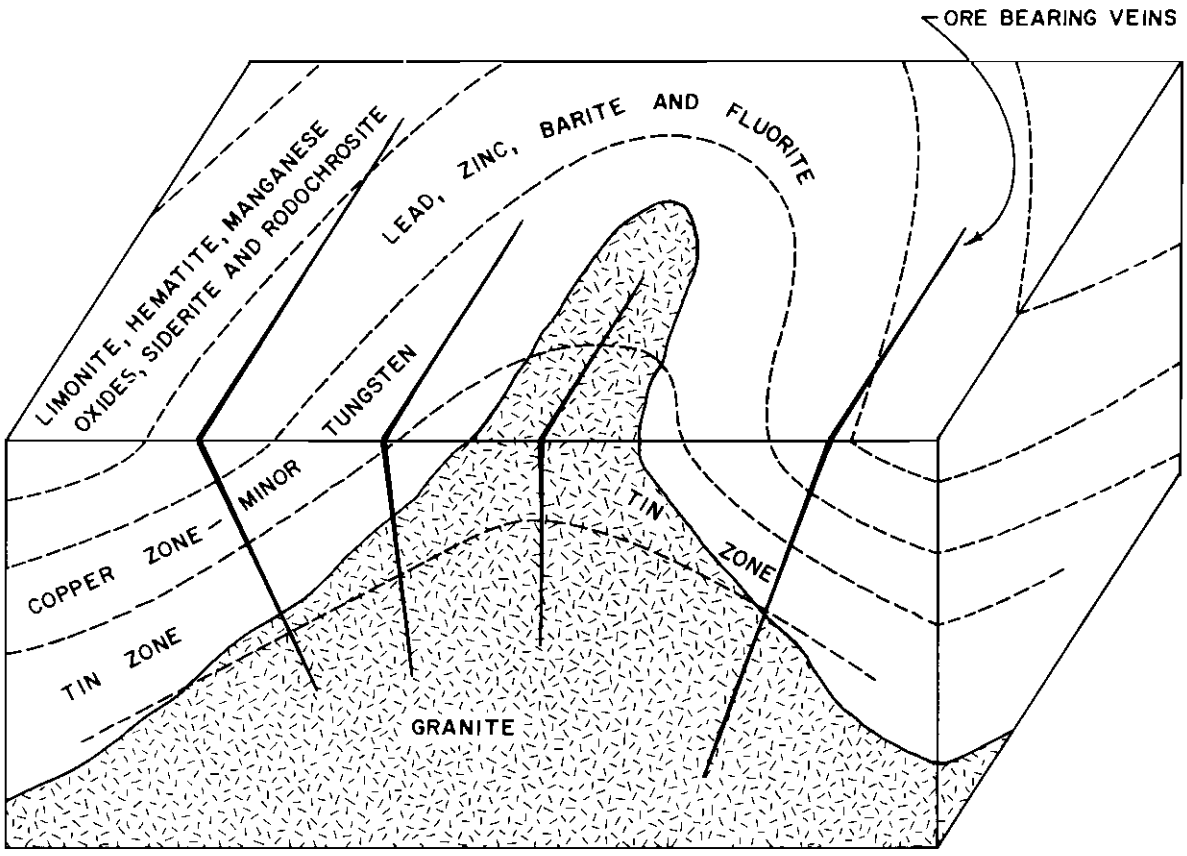


Figure 26. Block diagram showing the arrangement of ore zones relative to granite-slate contact, Cornwall, England

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1968: Silver in veins of hypogene manganese oxides; U. S. Geol. Surv., Circ. 553.

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1912: Geology of the New Ross Map-area, Nova Scotia; Geol. Surv. Can., Sum. Rept., Pt. F, pp. 23-28.

MANGANESE INVESTIGATION IN HALIFAX COUNTY

(46) LAKE CHARLOTTE AREA

(47) CARIBOU LAKE

(48) GAYS RIVER

DESCRIPTION OF DEPOSITS

(46) LAKE CHARLOTTE MANGANESE

Lat: 44° 46' 04"
Long: 62° 56' 10"
N. T. S. 11 D/15 W

LOCATION

The Lake Charlotte manganese deposit is located near the village of Lake Charlotte, roughly midway between Jeddore Inlet and Ship Harbour Inlet, and approximately 38 miles east of the city of Dartmouth, Halifax County.

HISTORY

There is no record of manganese having been found in place prior to 1931. Several attempts have been made to outline a zone of the manganiferous slate horizon of possible economic importance. In 1955 the area was examined by Stratmat Limited. Several chip samples were taken at various points along a distance of 7,300 feet. In 1956 Barymin Company Limited carried out a magnetometer survey and a detailed sampling program. Three drill holes were completed in 1957.

GEOLOGY

The manganese occurs in a host of dark, contorted slates along the north limb of a tightly folded synclinal structure. There is considerable evidence that a duplication of the manganiferous horizon found along the north limb of the fold may occur along the

The slate belt averages 2,500 feet in width. The north limb manganiferous zone lies approximately 600 feet south of the north quartzite contact. As may be expected the slates are not manganiferous over their entire width. It appears that only the very dark variety carries manganese mineralization. This phase grades into a barren grey type, thence into a reddish-yellow phase (siliceous) as the quartzite contact is reached.

The strike of the manganiferous bed is N.65° E. Dips apart from local bedding flexures, vary from 80 degrees south to vertical. The occurrence of the manganese is in the form of manganese dioxide (pyrolusite) and rhodochrosite. There is evidence that spessartite, a manganiferous garnet, also occurs in the mineralized horizon.

According to data available the higher analyses ranging from 15 percent to 33 percent manganese were obtained from the black nodules which are oval shaped and up to four inches in longest dimension. Massive interbedded slates, phyllites and fine grained quartzites, seemingly less disturbed, reportedly contain from five percent to 15 percent manganese. The black nodules have a core of quartzitic rock with an outside shell or covering of manganese oxide.

There is no authentic information available on the manganese content of the rock obtained from the three diamond drill holes. The most reliable analysis available indicated an average of slightly over six percent manganese in a chip sample across 20 feet of the manganiferous slate. It is apparent that the manganese tenor of the slate horizon is not sufficient to make a profitable operation.

In recent years electrolytic manganese production has been fully developed using as low as 19 percent manganese ore suitable for mining by low-cost, open-pit methods.

Two samples were collected from the dump material and tested for manganese and other elements.

TABLE 47

Major and Minor Elements of Lake Charlotte Manganese

Elemental Content in Percentages except Silver

SAMPLE NO.	Mn	Cu	Pb	Zn	Fe	Ag (ppm)
BHS-36-68	4.0	.01	.02	.016	-	.2
BHS-37-68	5.6	.008	.02	.012	9.0	0.2

An X-ray analysis was made of the Lake Charlotte manganese. The only manganese mineral identified was less than four percent spessartite. Three spectrographic analyses are recorded in the appendix.

REFERENCES

Logan, R. A.
1956: Lake Charlotte manganese deposit, Halifax, Nova Scotia.

Mowat, J. R.
1955: The Lake Charlotte manganese deposit, Halifax, Nova Scotia; Report on file, Nova Scotia Department of Mines.

Shea, F. S.
1956: Lake Charlotte manganese project. Progress report to the Barymin Company Limited.

(47) CARIBOU LAKE LEAD MINERALIZATION (DUNBRACK MINE)

Lat: 44° 49' 08"
Long: 63° 11' 31"
N. T. S. 11 D/14 E

LOCATION

The Dunbrack lead-silver prospect is situated three and one half miles northwest of the village of Musquodoboit Harbour, Halifax County, Nova Scotia.

GEOLOGY

The lead mineralization occurs in a quartz vein cutting granite. This granite is intrusive into a series of altered sedimentary rocks, chiefly quartzite and impure slates of the Meguma Group.

At the prospect the granite is cut by a narrow dike of fine grained red to grey porphyritic rock of intermediate composition.

The mineralization consisting chiefly of galena with minor amounts of copper occurs along the dike. Mineralization and silicification are usually confined to the contact between the hanging wall of the dike and the enclosing granite. This contact is characterized by a zone of quartz which is from four to eight feet in width. The ore minerals, the

only one of importance being galena, appear to be richest next to the dike rock and become poorer across the quartz zone towards the granite hanging wall.

The vein and dike are known to be exposed for a length of about 500 feet. Not all of the vein was mineralized. The only occurrence of galena rich enough to warrant consideration was found in the No. 2 shaft, where a small mineralized shoot, part of which is low grade was outlined for around 50 feet in length and to a vertical depth of 90 feet. About 2,000 tons of ore containing roughly nine percent lead and two ounces of silver is indicated.

Several samples were collected from the dump to determine the major and trace elements as a possible guide to the geologic environment in which the deposit was formed. The presence of nickel, arsenic, cobalt and molybdenum suggest a hypogene origin for the ore. See data on spectrographic analysis in the appendix.

TABLE 48

Major and Minor Elements of the Dunbrack Lead Zone

Elemental Content in Percentages except Silver

SAMPLE NO.	Cu	Pb	Zn	Mn	Mo	Co	Ni	As	Ag (ppm)
BHS-44-68	.51	9.8	1.1	.1	.01	.008	.02	.002	1.3
BHS-45-68	.08	14.1	.3	.1	.01	.008	.01	.002	3.5
BHS-46-68	.04	.025	.02	.1	.01	.008	.01	.002	.5
BHS-47-68	.07	1.90	.09	.1	.01	.008	.01	.002	.1
BHS-48-68	.70	8.6	1.2	.1	.01	.008	.04	.002	3.0
BHS-49-68	.08	6.8	.78	.1	.01	.008	.01	.002	2.0

REFERENCE

Hayes, A. O.
1917: Summary Rept., Geol. Surv. Can., Pt. F, pp. 30-31.

(48) GAYS RIVER LEAD-ZINC DEPOSIT

Lat: 45° 01' 26"
Long: 63° 21' 48"
N. T. S. 11 E/3 W

LOCATION

The deposit is located in Halifax County one half mile southwest of the village of Gays River, and five miles southeast of Shubenacadie, Hants County.

HISTORY

Lead has been known to occur in this area since 1868. The most important exploratory work was done in 1951. At that time over 9,000 feet of diamond drilling was completed. This work defined four lead-zinc horizons with a total of over 900,000 tons ranging from 1.1 percent to 3.0 percent combined lead-zinc.

GEOLOGY

The lead-zinc mineralization occurs in a dolomitized fossiliferous limestone of Lower Windsor age (Mississippian) resting with a marked angular unconformity upon metamorphosed and folded quartzites and slates of the Meguma Group of possible Ordovician age. The Windsor limestone is conformably overlain by beds of anhydrite,

gypsum, and red shales of the Windsor Group. The limestone beds are generally quite massive and are relatively undisturbed as compared with the underlying closely folded rocks of the Meguma Group. The thickness of the limestone in the vicinity of the deposits is more than 25 feet.

Much of the Windsor sediments have been removed by erosion and outliers of the Meguma quartzites protrude through the covering of Windsor rocks. The best exposures of the mineralized limestone occur on the west side of Gays River, along the Windsor-Meguma contact.

MINERALIZATION

Lead and zinc mineralization occurs in flat-lying Carboniferous dolomitic limestone at the contact with quartzites and slates of the Meguma Group. The lead is in the form of galena, the zinc being present as a very light coloured sphalerite. Manganese, possibly occurring as pyrolusite, is present in small but quite constant amounts. Three samples from a drill hole gave .35, .36 and .34 percent manganese.

Pyrite is rare. A few crystals of fluorite occur in the basal limestone. Tiny veinlets of a hydrocarbon mineral identified as ozokerite are fairly numerous in some sections.

Lead and zinc mineralization is present in all outcrops along a strike length of some 2,800 feet west of and along the river by 1200 feet; this widespread nature of the mineralization has been confirmed by diamond drilling.

The mineralization at Gays River is on the north flank of and near the anticlinal axis of an easterly plunging anticline in the Meguma Group of sedimentary rocks. This fold, pre-Carboniferous in age, was undoubtedly accentuated by post-Carboniferous tectonic forces. The existence of the anticline is regarded as important in mineralization control. The area is presently being tested by diamond drilling.

A number of samples were taken from the outcrops and trenches in the area east of the contact of the limestone with the underlying Meguma sediments.

TABLE 49

Elements Determined in the Gays River Limestone

Elemental Content in Percentages, except Silver

SAMPLE NO.	Mn	Pb	Zn	Cu	Ag (ppm)
BHS-43-68	.54	.85	1.3	.005	.4
BHS-56-68	.40	.03	.42	.009	.5
BHS-57-68	.44	.02	.003	.005	.4
BHS-58-68	.52	.02	.01	.01	.3
BHS-59-68	.08	7.0	3.0	.01	.6
BHS-60-68	.68	5.25	1.45	.026	.7
BHS-61-68	.44	1.0	2.40	.007	.7
BHS-62-68	.44	.85	2.40	.005	.7

REFERENCES

Dawson, Sir W.
1868: Acadian Geology, first ed., p. 275.

Campbell, C. O.
1952: Report Submitted to Gays River Lead Mines, Limited; copy on file, Nova Scotia Dept. Mines, Halifax, N. S.

N. S. Dept. Mines Ann. Repts.: 1928, pp. 402-403, 427-430; 1951, p. 56, 1952, p. 44.

Wilson, M. E.
1926: Geol. Surv. Can., Sum. Rept., pt. C, p. 83.

MANGANESE INVESTIGATION IN GUYSBOROUGH COUNTY

(49) ROCKY LAKE MANGANESE DEPOSIT

(50) SONORA MANGANESE DEPOSIT

(49) ROCKY LAKE MANGANESE DEPOSIT

Lat: 45° 12' 15"
Long: 62° 19' 40"
N. T. S. 11 E/1 W

LOCATION

The manganese deposit is situated six miles southeast of Liscomb Lake in the northwestern part of Guysborough County, Nova Scotia. The showings are located on claim O of tract 69, between Rocky Lake and Little Rocky Lake.

GEOLOGY

The bedrock consists of quartzite, phyllite and slate of the Meguma Group of possible Ordovician age. The rock in the vicinity of Rocky Lake is predominantly quartzite; but bands of it are sufficiently foliated to classify as a schist or a slaty schist. The foliated zones contain numerous small flakes of biotite and these are usually aligned parallel to the schistosity.

Wide zones of darker rock, characterized by very narrow bands that are brown , black, grey and white in colour, occur within the above mentioned country rock. Interspersed at random throughout this banded material are nodular blebs, less than an inch or two inches across,of manganese.

Microscopic examination made at the Mineral Dressing Laboratory of the Department of Mines and Technical Surveys, Ottawa, in 1958 confirms that spessartite and pyrophanite are the most abundant manganese-bearing minerals. At the surface there is considerable manganese oxide visible, but the rock is very dense and only slightly fractured, and evidence of oxidation ceases within a foot or two of surface.

The nature of the manganese mineral below the zone of oxidation is unknown, it may be a silicate, such as manganiferous garnet spessarite or it may be very finely divided oxide. The average manganese content varies from 4.8 percent to 15 percent, averaging about seven percent.

The material of this deposit is not a manganese ore under present conditions. Any ore under 40 percent manganese which is being mined at present must be of such a nature as to permit up-grading by very simple methods, such as hand sorting, or at most, by using such elementary ore dressing equipment as log washers or jig. No very low grade highly siliceous, fine grained ores such as this deposit contains are being exploited anywhere in the world today.

TABLE 50

Major and Minor Elements of the Rocky Lake Manganese

Elemental Content in Percentages except Silver

SAMPLE NO.	Mn	Fe	Cu	Pb	Zn	Ni	Ag (ppm)
BG-61-70	.3	6.8	.02	.03	.02	.03	.5
BG-62-70	.35	7.0	.01	.02	.03	.04	.5
BG-63-70	.2	13.5	.01	.04	.03	.03	.5
BG-64-70	7.8	3.0	.03	.02	.01	.02	.5
BG-65-70	15.6	3.0	.02	.06	.02	.02	.5
BG-66-70	4.7	2.5	.02	.03	.01	.02	.5
BG-69-70	5.7	6.0	.04	.03	.02	.02	.5

This material is not a manganese ore under present conditions, because there is no known method of concentrating such material to a marketable product at a cost which will compete with imported ores.

Major and minor elements were determined by spectrographic analyses of three samples of the manganese-bearing rocks from Rocky Lake (Samples BG-61-70; BG-62-70 and BG-69-70).

REFERENCES

Halet, R. A.
1954: Rocky Lake manganese prospect, Guysborough County, Nova Scotia.

MacNeil, D. J.
1959: A Reconnaissance Study of some manganese-bearing rock in Guysborough County, Nova Scotia.

(50) SONORA MANGANESE DEPOSIT

Lat: 45° 03' 45"
Long: 61° 53' 00"
N. T. S. 11 F/4 W

LOCATION

The showing examined and sampled is located 5,400 feet east of the village of Sonora, Guysborough County.

GEOLOGY

A small portion of the manganiferous slate formation was investigated in some detail by Penelope Explorations Limited in 1959. Trenches were dug at eight places along the strike of the slate horizon for over 2,000 feet on the south limb of the Sonora syncline. The strike of the slate horizon varies between 90 degrees and 101 degrees. The general dip varies between 52 degrees north to vertical. At one place the bedding is overturned 85 degrees to the south.

A total of 54 samples were taken from the pits and trenches by Penelope Explorations. The following is a summary of the sample widths and manganese content from several of the trenches:

Trench No.	Mn Content in Percent	Width
26	4.27	20'6"
27	3.91	36'6"
28	5.49	50'0"
30	1.98	22'0"
31	2.46	15'6"
32	5.85	23'0"
33	6.07	18'0"

It was observed that the first inch or two of the bedrock surface was sometimes badly decomposed. A more accurate method of sampling would be that of blasting the bedrock to a depth of two to three feet and then channel sampling the fresh exposure. None of the samples taken for assaying contained any pieces of high grade pyrolusite which frequently were found scattered throughout the trenches.

An average grade of 4.5 percent manganese must be considered as very low. Considering the cost of equipment required to upgrade the product to 55 percent manganese by the manganese dithionate process, it is imperative that the deposit is not of commercial importance at the present.

The area was visited and several samples collected for major and trace element studies by atomic absorption and spectrographic techniques. The manganese content varies from three percent to 5.8 percent.

TABLE 51

Major and Minor Trade Elements Determined by Atomic Absorption Techniques

Elemental Content in Percentages except Silver

SAMPLE NO.	Mn	Fe	Cu	Pb	Zn	Ni	Ag(ppm)
BG-75-70	3.0	6.5	.03	.02	.02	-	.5
BG-76-70	4.0	8.5	.03	.02	.02	.05	1.0
BG-77-70	5.5	8.8	.02	.02	.02	-	.8
BG-78-70	.6	6.9	.01	.02	.01	-	.5
BG-79-70	5.8	6.5	.01	.02	.02	.03	.5
BG-80-70	4.5	10.0	.01	.03	.02	.08	.5

Semiquantitative spectrographic analyses were made of samples 76, 79 and 80. The results are listed in the table of spectrographic analyses that form an appendix to this report.

REFERENCE

Moffat, W. W.
1959: The Manganese Property of Penelope Explorations Limited; Report on file in the library at the Nova Scotia Dept. Mines, Halifax, N. S.

MANGANESE INVESTIGATION IN PICTOU COUNTY

(51) BRIDGEVILLE IRON AND MANGANESE

(52) GAIRLOCH LAKE

(53) IRON ROCK QUARRY

DESCRIPTION OF INDIVIDUAL DEPOSITS

(51) BRIDGEVILLE IRON AND MANGANESE DEPOSITS

Lat: 62° 36' 30"
Long: 45° 26' 13"
N. T. S. 11 E/7 E

LOCATION

Numerous small deposits of iron and manganese occur along the East River of Pictou County extending from Springville southerly to Sunny Brae. The principal area of mineralization is in the vicinity of Bridgeville (Figs. 27 and 28).

HISTORY

The deposits near East River have been known since 1828 when some mining was done by the General Mining Association of London, England. The Pictou Coal and Iron Company and its successor, the Nova Scotia Steel and Coal Company, developed them later, and all the known deposits are now regarded as exhausted.

GEOLOGY

The area along the East River of Pictou County is underlain by Ordovician and Silurian strata with a large amount of intrusive rocks of various types. Overlying these rocks unconformably and occupying the low valley of East River are limestones of the marine Windsor Group. The contact of the limestone with the older rock is irregular and it is exposed in a quarry near Springville (Fig. 27)

Small deposits of hematite, limonite and goethite, with the manganese minerals manganite and psilomelane are found at the contact of the Lower Carboniferous limestone with Silurian and Devonian rocks. Some limonite and manganese minerals occur in the slates and shales of pre-Carboniferous age. It is possible that the small orebodies will be pockety, and consequently, that no continuity from one iron-manganese body to another can be expected.

Five areas in the vicinity of Bridgeville, (See Fig. 28), were visited and samples collected from the dumps. All underground workings are inaccessible at present. Barite up to over 54 percent occurs associated with the iron-manganese mineralization. Trace amounts of copper, lead, zinc and silver occur associated with the mineralization. Spectrographic analyses of samples with greater than 25 percent manganese indicate traces of tungsten and strontium.

TABLE 52

Major and Trace Elements of the Bridgeville Manganese and Iron

Elemental Content in Percentages except Silver

SAMPLE NO.	Mn	Fe	Cu	Pb	Zn	Ba	Ag (ppm)
BPS-76-68	31.10	5.75	.04	.03	.022	-	.3
BPS-77-68	11.3	54.3	.055	.02	.022	-	.3
BPS-78-68	2.48	50.2	.05	.02	.04	-	.2
BPS-85-68	2.82	2.32	.02	.04	.03	-	.3
BPS-86-68	12.3	19.7	.045	.08	.05	-	.3
BPS-24-69	26.5	28.0	.10	.03	.06	.15	.5

TABLE 52 - continued

SAMPLE NO.	Mn	Fe	Cu	Pb	Zn	Ba	Ag (ppm)
BPS-25-69	28.0	26.5	.09	.05	.05	-	.50
BPS-26-69	10.4	42.5	.03	.03	.02	2.50	.40
BPS-27-69	13.3	18.8	.05	.03	.02	17.40	.70
BPS-28-69	19.5	32.5	.07	.03	.03	2.90	.50
BPS-29-69	.5	35.0	.04	.05	.01	17.70	.60
BPS-30-69	19.5	26.0	.08	.03	.04	6.95	.30
BPS-31-69	.4	26.5	.005	.03	.05	30.50	.30
BPS-32-69	.4	12.8	.005	.03	.07	46.0	.30
BPS-33-69	10.2	45.0	.06	.03	.04	-	.70
BPS-34-69	37.5	12.5	.09	.03	.06	5.10	.5
BPS-35-69	20.7	35.5	.02	.03	.03	-	.4
BPS-36-69	.20	27.0	.002	.03	.01	30.80	.5
BPS-37-69	2.0	10.5	.002	.03	.01	46.0	.9
BPS-38-69	1.30	34.0	.008	.03	.01	24.0	.6
BPS-39-69	.20	23.5	.002	.03	.001	32.0	.2
BPS-40-69	.20	37.0	.01	.03	.02	19.0	.2
BPS-41-69	42.0	8.4	.08	.03	.06	1.9	.2
BPS-42-69	43.0	9.0	.09	.03	.06	.5	.3
BPS-43-69	.3	1.2	.02	.03	.04	54.0	.2
BPS-44-69	5.1	25.0	.03	.03	.03	-	.3

TABLE 52 - continued

SAMPLE NO.	Mn	Fe	Cu	Pb	Zn	Ba	Ag (ppm)
BPS-46-69	55.0	.70	.08	.03	.005	.85	.2
BPS-47-69	45.0	7.10	.07	.03	.04	1.2	.2
BPS-48-69	51.0	1.3	.02	.03	.04	-	.2
BPS-49-69	54.0	1.0	.01	.03	.01	1.5	.2
BPS-50-69	5.1	25.0	.03	.03	.03	-	.3
BPS-51-69	17.0	32.0	.02	.03	.04	-	.3
BPS-52-69	1.0	16.0	.002	.03	.002	25.0	.4
BPS-53-69	.5	6.5	.001	.001	.04	.95	.5
BPS-54-69	31.5	25.0	.06	.03	.06	-	.4
BPS-55-69	34.0	24.0	.06	.03	.06	-	.4
BPS-56-69	1.10	49.5	.10	.03	.04	-	.5
BPS-57-69	35.0	21.0	.12	.03	.04	-	.4
BPS-58-69	1.2	54.0	.02	.04	.01	-	.8
BPS-59-69	13.5	39.0	.07	.05	.04	-	.5
BPS-60-69	38.0	15.0	.06	.03	.04	-	.5
BPS-61-69	.7	54.0	.08	.03	.03	-	.5
BPS-62-69	9.4	42.0	.08	.05	.04	-	.7
BPS-63-69	32.0	49.5	.04	.03	.03	-	.5

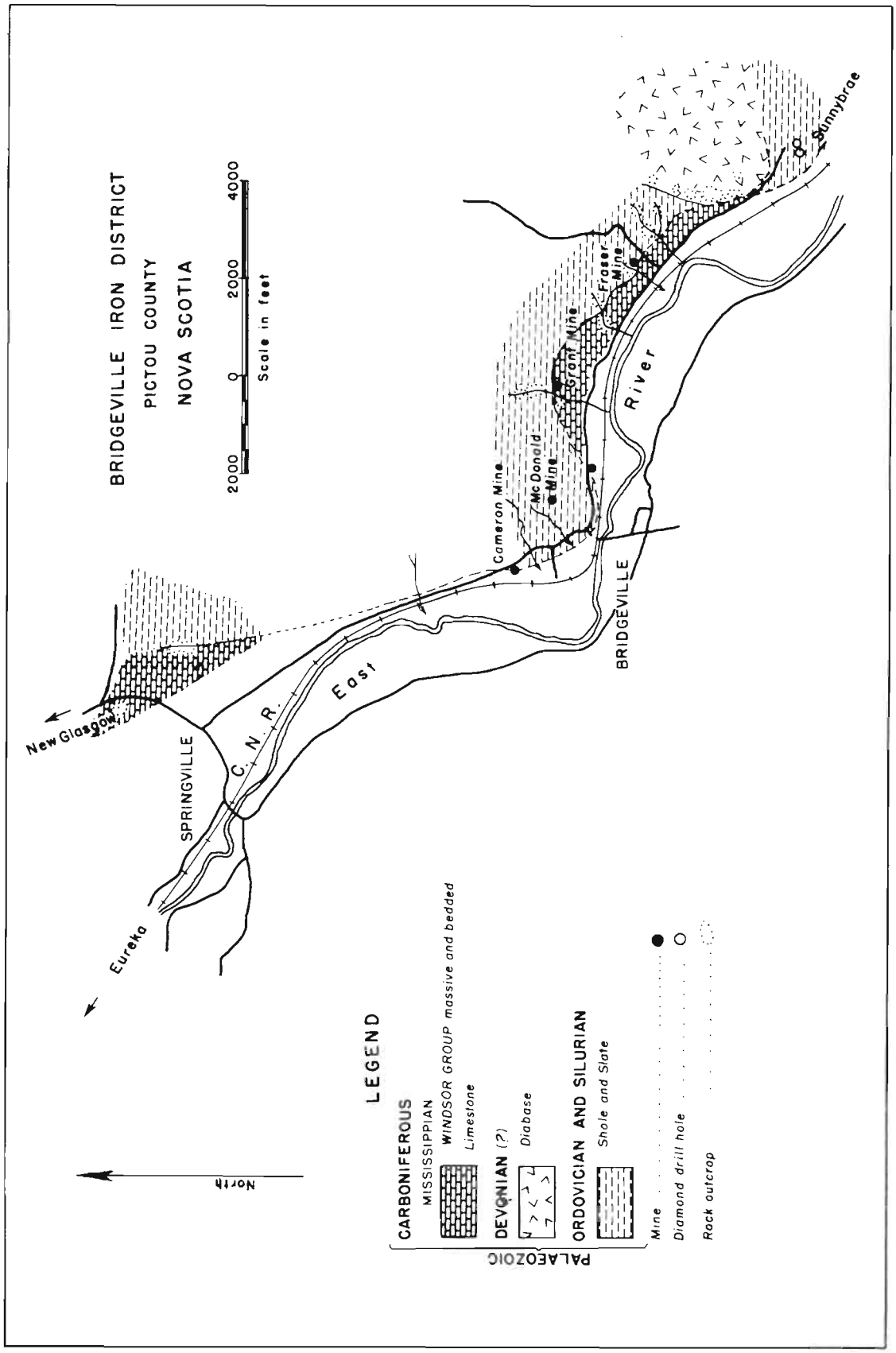
BRIDGEVILLE IRON DISTRICT
PICTOU COUNTY
NOVA SCOTIA
Scale in feet
2000
0
2000
4000
LEGEND
PALAEOZOIC
CARBONIFEROUS
MISSISSIPPIAN
WINDSOR GROUP massive and bedded
Limestone
DEVONIAN (?)
Diabase
ORDOVICIAN AND SILURIAN
Shale and Slate
Mine
Diamond drill hole
Rock outcrop
North
New Glasgow
Eureka
SPRINGVILLE
C. N. R.
East
River
BRIDGEVILLE
Cameron Mine
McDonald Mine
Foord Mine
Fraser Mine
Sunnybrae

FIGURE 27

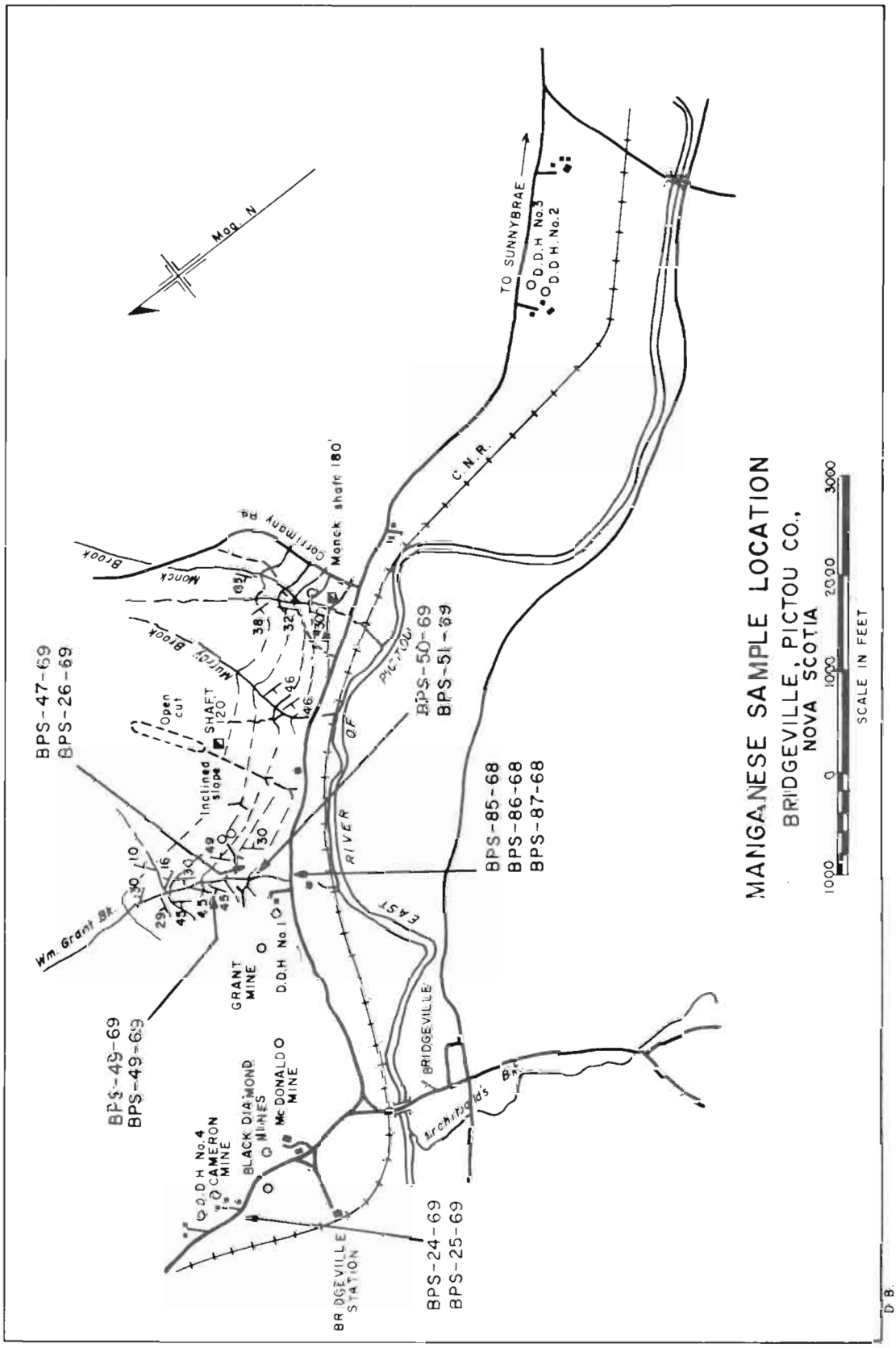
MANGANESE SAMPLE LOCATION
BRIDGEVILLE, PICTOU CO.,
NOVA SCOTIA
SCALE IN FEET
1000
0
1000
2000
3000
Mag. N
TO SUNNYBRAE
D.D.H No.3
D.D.H. No.2
C.N.R.
Monck shaft 180'
Open cut
Inclined slope
SHAFT 120'
Wm. Grant Br.
GRANT MINE
D.D.H No.1
BRIDGEVILLE
BRIDGEVILLE STATION
D.D.H No.4
CAMERON MINE
BLACK DIAMOND MINES
McDONALD MINE
Archibald's Br.
PICTOU RIVER
EAST
BPS-47-69
BPS-26-69
BPS-48-69
BPS-49-69
BPS-24-69
BPS-25-69
BPS-50-69
BPS-51-69
BPS-85-68
BPS-86-68
BPS-87-68

FIGURE 28

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Weeks, L. J.
1944: Bridgeville iron deposits, Geol. Surv. Can.; reprint in Ann. Rept. N. S. Dept. Mines.

(52) GAIRLOCH LAKE

Lat: 45° 28' 52"
Long: 62° 50' 03"
N. T. S. 11 E/7 W

A visit was made to examine reported occurrences of iron ore in the vicinity of Gairloch Lake, Pictou County.

The rock in the area consists of interbedded red and grey mudstone, shale, siltstone and minor fine grained sandstone.

No evidence was found of the old workings indicated in the reports of the Geological Survey of Canada for the year 1889. A suite of samples were collected alang the highway near Gairloch Lake that contained some red hematite. The results certainly do not justify more consideration be given to this area.

TABLE 53

Major and Minor Element Content of

Manganese-iron Mineralization, Gairloch Lake

Elemental Content in Percentages except Silver

SAMPLE NO.	Mn	Fe	Cu	Pb	Zn	Ni	Ag (ppm)
BPS-73-68	.01	4.2	.005	.05	.003	-	.2
BPS-74-68	.05	4.4	.005	.02	.005	-	.2
BPS-83-68	.1	6.80	.002	.04	.008	.01	.3
BPS-84-68	.1	4.43	.008	.04	.004	-	.3
BPS-87-68	.27	3.1	.004	.08	.003	-	.3
BPS-88-68	.2	2.70	.49	.04	.015	-	.2

(53) IRON ROCK QUARRY

Lat: 45° 26' 44"
Long: 62° 31' 48"
N. T. S. 11 E/7 E

HISTORY

A plant for the production of agricultural limestone was started at Iron Rock in 1924 by the Nova Scotia Department of Agriculture, and was in operation until 1930.

GEOLOGY

The limestone deposit occurs along the base of the steep hillside of igneous rock on the north side of East River. The beds,all much fractured, rest on the igneous rock and dip steeply downhill at about the same angle as does the surface of the igneous

rock. Though the limestone extends for several hundred feet along the base of the hill in both directions from the quarry it does not extend up the hillside for more than sixty feet above the level of the highway. There is a maximum thickness of about forty feet of soft, fine grained, impure, calcium carbonate in broken beds.

Three samples were collected from the quarry to determine the major and minor trace elements. A semiquantative spectrographic analysis was made of sample BPS-79-69. The result is indicated in the tables that form an appendix to this report.

TABLE 54

Major and Minor Elements Identified in the Limestone

SAMPLE NO.	Mn%	Fe%	Cu%	Pb%	Zn%	Ni%	Ag (ppm)
BPS-79-68	4.05	17.32	.005	.02	.012	-	.2
BPS-80-68	.18	5.38	.38	.02	.012	.003	.2
BPS-81-68	.10	4.16	.42	.02	.010	.002	.5

REFERENCE

Goudge, M. F.
1934: Limestones of Canada, Maritime Provinces; Dept. Mines, Mines Branch Can. , Pt. 11, p. 98.

MANGANESE OCCURRENCES

INVESTIGATED IN KINGS COUNTY

(54) NICHOLSVILLE MANGANESE

(55) BISHOP BROOK MANGANESE

(54) NICHOLSVILLE MANGANESE,

Lat: 45° 58' 30"
Long: 64° 50' 00"
N. T. S. 21 A/15 W

INTRODUCTION

This manganese prospect is found on the farm of Roy Ward, Nicholsville. It is reached from the Palmer Road which runs south from route 1, directly west of the town of Aylesford. The property lies just below the summit of South Mountain and directly east of the Ward orchard road on Zebe Brook (Fig. 29, in pocket).

A 12' x 5' vertical, timbered shaft was sunk in the mineralized zone at the contact of the gabbro with the argillites of the White Rock Formation. The pit is water filled and was determined to be 20 feet deep. The brook flows over the argillites about 80 feet downstream and exposes the manganese mineralization.

Manganese minerals occur in association with minor barite and iron oxides in Silurian argillites at their contact with a gabbro intrusive. Diamond drilling by the Department of Mines intersected massive pyrite mineralization in the sediments below the dike. In addition, numerous intersections of mafic composition were found with associated siderite veins, iron-manganese oxides and pyrite. Limited geophysical work carried out by the Nova Scotia Research Foundation indicated a shallow anomaly directly south of the gabbro contact.

PREVIOUS WORK

Manganese was first reported as being mined in 1885 by A. McPhail and three barrels of ore were won from the deposit. It was not until 1908 that an eight foot test pit was sunk by A. Banks. W. E. Bishop of Aylesford sank a 25-foot shaft in 1918 on the mineralized zone, and a second shaft 60 feet to the east. The second shaft seems to have missed the mineralized zone entirely. It was reported that the ore occurred as lenses and stringers, following generally the strike of the argillites at their contact with the southern margin of a gabbro dike. The largest vein was reported to be three and one half feet in width. The manganese minerals identified are manganite, pyrolusite, and psilomelane with iron oxides, calcite, white barite and siderite. The following excerpt is taken directly from the Geological Survey Summary Report of 1920, Part F, p. 12E; "ten feet west of the shaft the vein is said to be cut by a fault that appears to extend northwesterly along the eastern side of Palmer Road and to cut the belt of quartzites with a right-hand displacement of over 100 feet. The ore occurs in streaks and small lenses, and the largest body is said to have been found in the shaft and to be about three feet in width. The ore from the shaft consists of manganese oxide, mostly pyrolusite in massive and crystalline form, mixed with iron oxides, decomposed country rock, and calcite. At the shaft, the gabbro comes in contact with the vein of manganese mineralization. The main manganese mineralization apparently occurs in close association with the calcite and is genetically related to the gabbro intrusion. Specimens of the associated minerals collected at the mouth of the shaft are reported to consist of white calcite holding small irregular crystalline masses of siderite-."

Examination of the dump by the writer revealed the presence of hard manganese ore replacing a highly siliceous argillite of the White Rock Formation. Examination of a polished section shows a network of quartz veinlets cutting the manganese oxides but it also reveals a vein of manganese cutting across the quartz. This indicates the presence of two stages of mineralization. In the argillites at the contact with the sheared gabbro intrusive, occur pods and nodules of iron-manganese oxides which lie parallel to the cleavage. However, these are intersected by veins of pyrolusite and quartz which cut the cleavage planes and nodules at right angles. White barite crystals are found at the center of the pyrolusite veins and as irregular masses throughout the manganese mineralization. The sheared and altered gabbro is approximately 100 feet wide and can be traced by four discontinuous outcrops west from Factorydale to the brook immediately west of the Palmer Road, a distance of three and one-half miles. A second gabbro dike outcrops 900 feet downstream on Zebe Brook, the width is approximately 100 feet and it can be traced for a distance of 250 feet. Two distinct dikes are found outcropping on the unnamed brook directly west of Palmer Road. The southernmost intrusive is identical to that at the manganese workings while the northernmost one is a diabase.

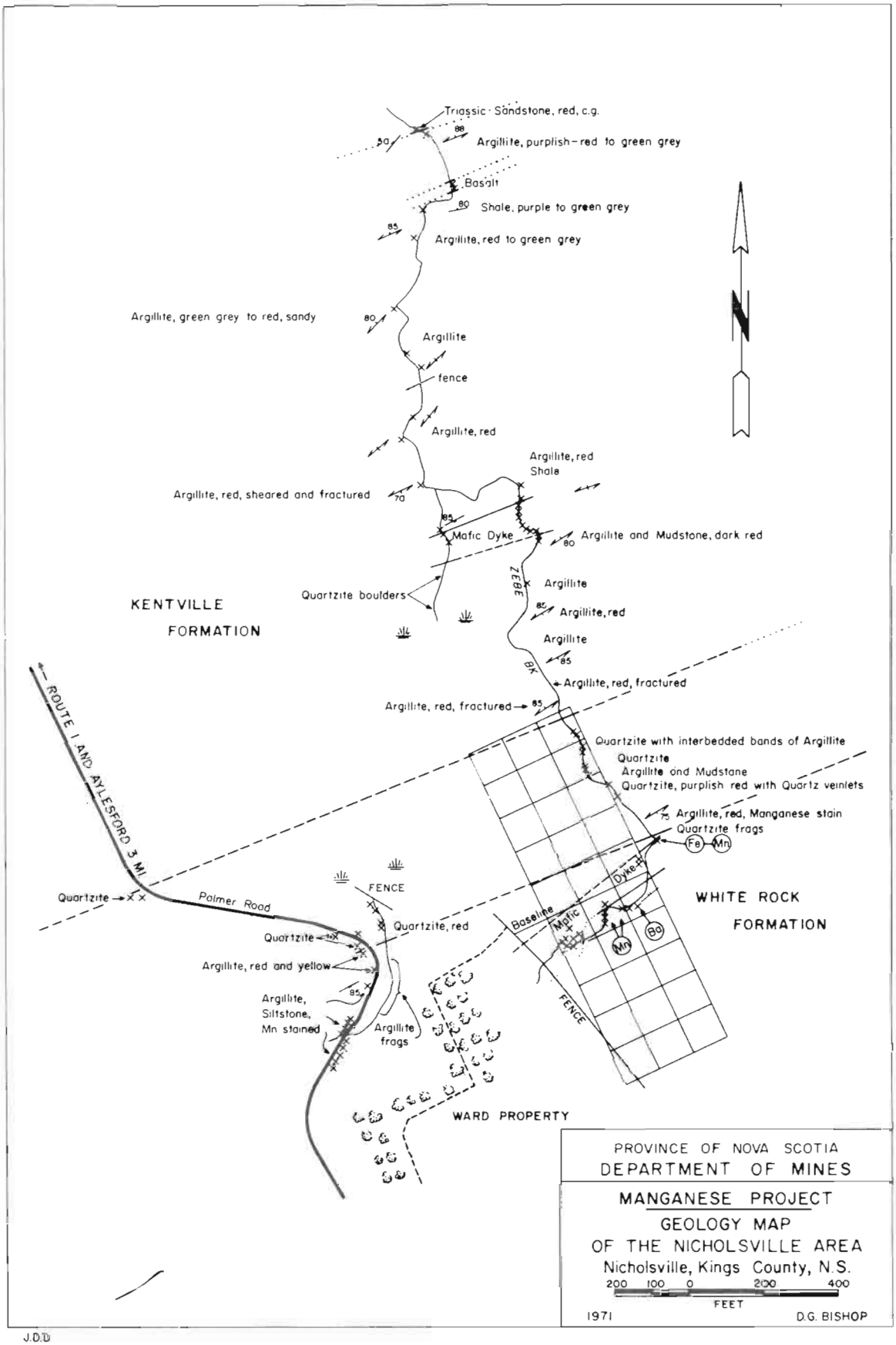

Triassic - Sandstone, red, c.g.
Argillite, purplish - red to green grey
Basalt
Shale, purple to green grey
Argillite, red to green grey
Argillite, green grey to red, sandy
Argillite
fence
Argillite, red
Argillite, red
Shale
Argillite, red, sheared and fractured
Mafic Dyke
Argillite and Mudstone, dark red
Quartzite boulders
Argillite
Argillite, red
Argillite
Argillite, red, fractured
Argillite, red, fractured
KENTVILLE
FORMATION
ROUTE 1 AND AYLESFORD 3 MI.
Quartzite with interbedded bands of Argillite
Quartzite
Argillite and Mudstone
Quartzite, purplish red with Quartz veinlets
Argillite, red, Manganese stain
Quartzite frags
Fe
Mn
Dyke
WHITE ROCK
FORMATION
Quartzite
Palmer Road
FENCE
Quartzite, red
Baseline
Mafic
Mn
Ba
Quartzite
Argillite, red and yellow
Argillite,
Siltstone,
Mn stained
Argillite
frags
FENCE
WARD PROPERTY
PROVINCE OF NOVA SCOTIA
DEPARTMENT OF MINES
MANGANESE PROJECT
GEOLOGY MAP
OF THE NICHOLSVILLE AREA
Nicholsville, Kings County, N.S.
200 100 0 200 400
FEET
1971
D.G. BISHOP
J.D.D

FIGURE 30

TABLE 55

Samples Collected from the Dump at the Shaft

Elemental Content in Percentages, except Silver

SAMPLE NO.	Mn	Fe	Cu	Zn	Pb	Ba	Ag (ppm)
BKS-89-68	17.5	18.9	.03	.07	.05	-	.3
BKS-90-68	19.75	13.62	.03	.02	.02	-	.2
BKS-91-68	10.5	12.6	.03	.007	.04	-	.3
BKS-92-68	16.4	18.0	.02	.005	.02	.18	.15
BKS-93-68	30.7	19.02	.06	.006	.02	-	.15
BKS-94-68	21.05	23.7	.04	.02	.04	2.18	.15
BKS-96-68	30.1	6.06	.03	.008	.02	1.88	.15
BKS-97-68	21.2	14.7	.035	.007	.02	-	.15
BKS-98-68	21.7	17.4	.051	.018	.02	-	.15
BKS-99-68	19.2	12.7	.055	.017	.02	.44	.15
BKS-100-68	17.7	11.5	.054	.004	.04	.15	3.76

Spectrographic analyses of samples are found in the appendix.

The following samples were taken from the southern margin of the intrusive and its contact with the argillites, 300 feet downstream from the shaft.

TABLE 56

Elemental Content in Percentages, except Silver

SAMPLE NO.	Mn	Fe	Cu	Zn	Pb	Ba	As	Ag (ppm)
BKS-102-68	26.52	10.6	.05	.031	.04	2.01	-	.15
BKS-104-69	44.75	8.75	.05	.008	.04	.4	.002	.2
BKS-105-69	43.25	1.85	.05	.007	.03	.8	.015	.4

The area extending from Factorydale west to Inglisville contains numerous intrusions of mafic sills and dikes (Fig. 29, in pocket). Most are of gabbroic composition and range in thickness from a few feet up to 250 feet. These bodies intrude all formations from the Halifax to the Torbrook inclusive. It is known that they are pre-granite since small sills and dikes are intruded by granite within this area.

In 1972, the Department of Mines completed 2,935 feet of diamond drilling on the Nicholsville manganese property. A total of eight holes were drilled at or near the southern contact of the gabbro dike with the Silurian sediments (See Figs. 31, 32, 33 and 34). The drilling encountered massive pyrite mineralization in the sediments underlying the dike (Fig. 32). In addition, minor copper and lead values were obtained in the assays (.2% and 5% respectively). Siderite veins were encountered along with associated manganese oxides and barite near the contact with the sheared gabbro.

The Nova Scotia Research Foundation carried out an EM-16 VLF, magnetometer and induced polarization surveys across the strike of the dike and the sediments. The induced polarization survey was conducted only on the 2+00 line. A metal factor of 19 was obtained 200 feet south of the base line. The three surveys produced results that

outlined an anomaly lying at the southwestern margin of the intrusive. It is believed that a north-west trending fault displaces the dike at this point (See Figs. 35, 36 and 37).

Diamond drill holes 2 (Fig. 32) and 5 (Fig. 34) contained considerable pyrite that replaced grey and red mottled argillites of the White Rock Formation. Assay results are tabulated in the enclosed tables. Diamond drill hole 8 (Fig. 34) intersected a sheared and calcareous gabbro which was cut by numerous calcite and siderite veinlets. At 183 feet, the drill intersected a vein of iron and manganese oxides with associated white calcite and pyrite within the gabbro rock (Plate 6). Holes 8, 2, 5 and 4 (Figs. 34, 32) are vertical holes drilled from west to east along the strike for a distance of 250 feet. All four holes revealed unlike sections. Number 6 (Fig. 34) is a 45 degree hole drilled north-west from the point 2+300 feet south. The section revealed a sequence of red shale, altered dike with siderite veins, fault zone, a sixty foot section of red and green mottled shales (the shales contained veins of siderite with minor barite and manganese oxides), and the gabbro dike. The intrusive is sheared and highly calcareous with calcite veins throughout. Holes 8, 2, 5 and 4 intersect the mineralized zone at different levels and at different relationships to the intrusive. Hole 5 (Fig. 34) bottomed in quartzite, while hole 4 (Fig. 32) struck a rhyolite breccia. Certainly, there is a genetic relationship between the intrusive and the mineralization containing the siderite, manganese and barite veins. The massive pyrite is for the most part in the slates of a deeper depth adjacent to the intrusion.

Due to the fact that the dike can be traced for some distance and in light of the information obtained to date, it is recommended that detailed geochemical and geophysical work be carried out from Factorydale west to Inglisville, a distance of

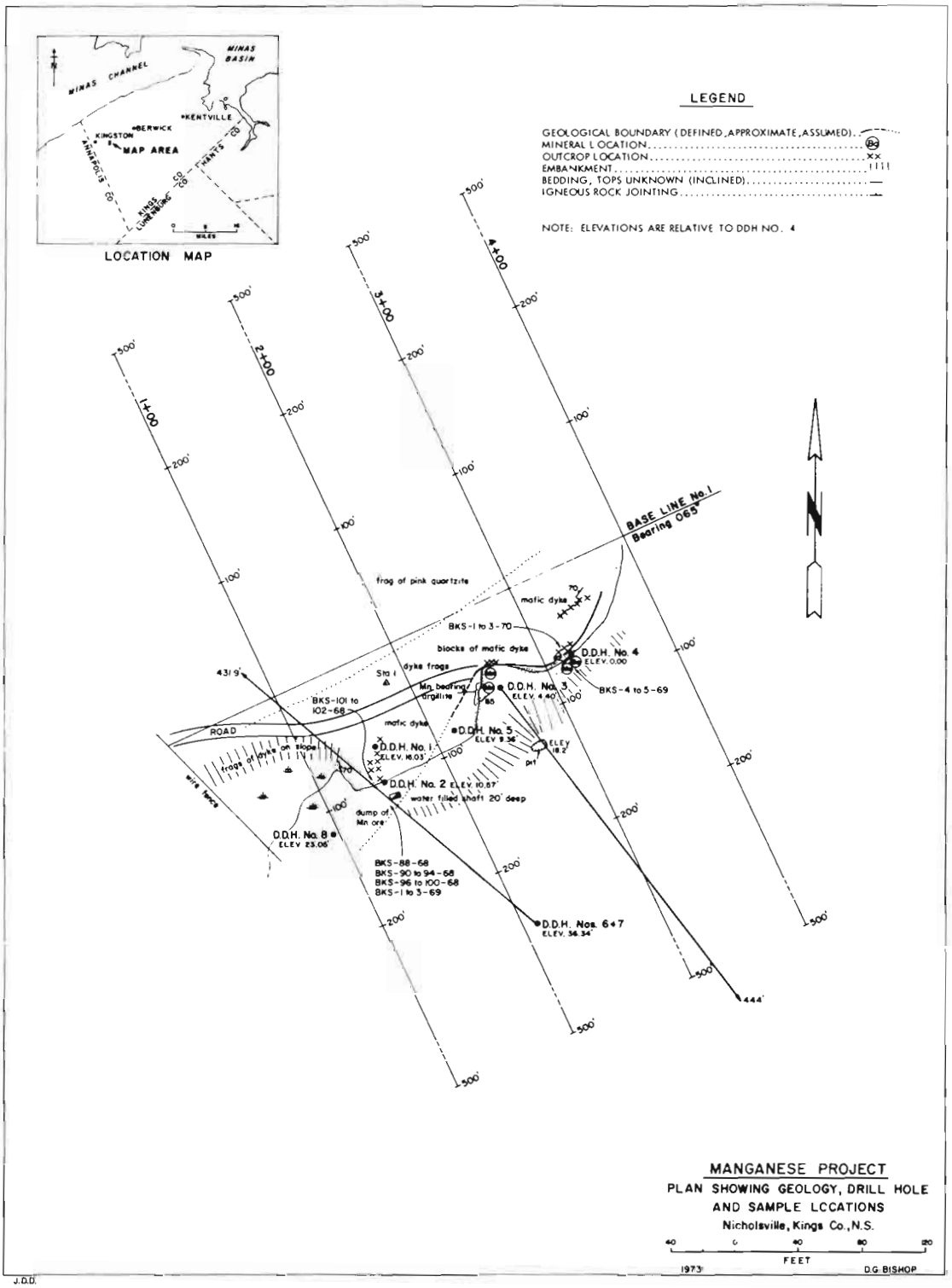

LOCATION MAP
MINAS BASIN
MINAS CHANNEL
KENTVILLE
BERWICK
KINGSTON
MAP AREA
ANNAPOLIS CO
KINGS CO
HANTS CO
LEGEND
GEOLOGICAL BOUNDARY (DEFINED, APPROXIMATE, ASSUMED)
MINERAL LOCATION
OUTCROP LOCATION
EMBANKMENT
BEDDING, TOPS UNKNOWN (INCLINED)
IGNEOUS ROCK JOINTING
NOTE: ELEVATIONS ARE RELATIVE TO DDH NO. 4
BASE LINE No. 1
Bearing 063°
frag of pink quartzite
mafic dyke
BKS-1 to 3-70
blocks of mafic dyke
dyke frags
Sta 1
Mn bearing argillite
D.D.H. No. 4
ELEV. 0.00
D.D.H. No. 3
ELEV. 4.40'
BKS-4 to 5-69
BKS-101 to 102-68
ROAD
D.D.H. No. 5
ELEV. 9.36
ELEV 19.2'
D.D.H. No. 1
ELEV. 16.03'
D.D.H. No. 2 ELEV. 10.87'
water filled shaft 20' deep
frags of dyke on slope
wire fence
dump of Mn ore
D.D.H. No. 8
ELEV 23.06'
BKS-88-68
BKS-90 to 94-68
BKS-96 to 100-68
BKS-1 to 3-69
D.D.H. Nos. 6+7
ELEV. 36.34'
444'
1+00
2+00
3+00
4+00
MANGANESE PROJECT
PLAN SHOWING GEOLOGY, DRILL HOLE AND SAMPLE LOCATIONS
Nicholsville, Kings Co., N.S.
FEET
1973
D.G. BISHOP
J.D.D.

FIGURE 31

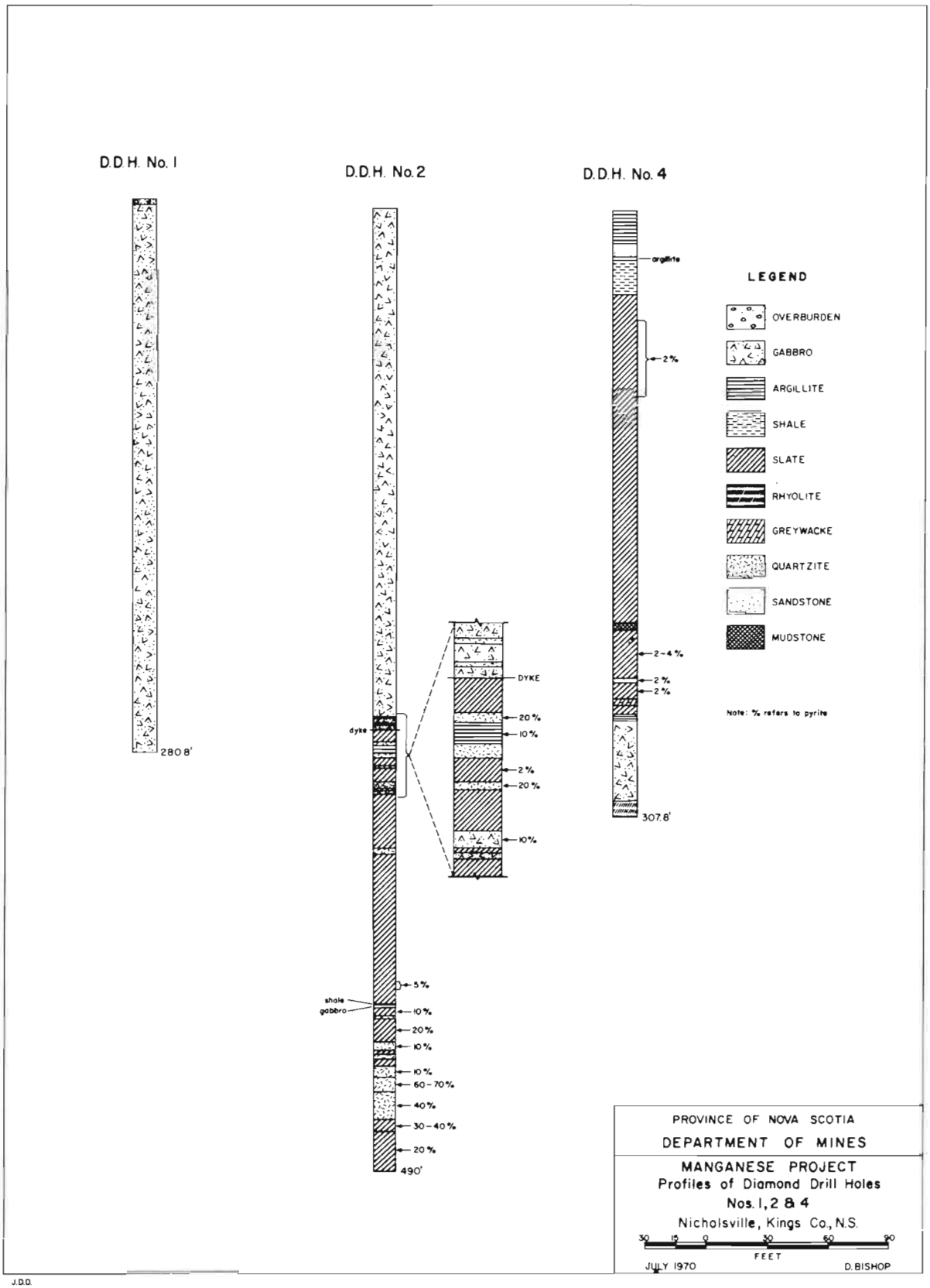

D.D.H. No. 1
280.8'
D.D.H. No.2
dyke
DYKE
20 %
10 %
2 %
20 %
10%
shale
gabbro
5%
10 %
20 %
10 %
10 %
60 - 70%
40%
30 - 40%
20 %
490'
D.D.H. No. 4
argillite
2%
2 - 4 %
2 %
2 %
307.6'
LEGEND
OVERBURDEN
GABBRO
ARGILLITE
SHALE
SLATE
RHYOLITE
GREYWACKE
QUARTZITE
SANDSTONE
MUDSTONE
Note: % refers to pyrite
PROVINCE OF NOVA SCOTIA
DEPARTMENT OF MINES
MANGANESE PROJECT
Profiles of Diamond Drill Holes
Nos. 1, 2 & 4
Nicholsville, Kings Co., N.S.
30 15 0 30 60 90
FEET
JULY 1970
D. BISHOP
J.D.D.

FIGURE. 32

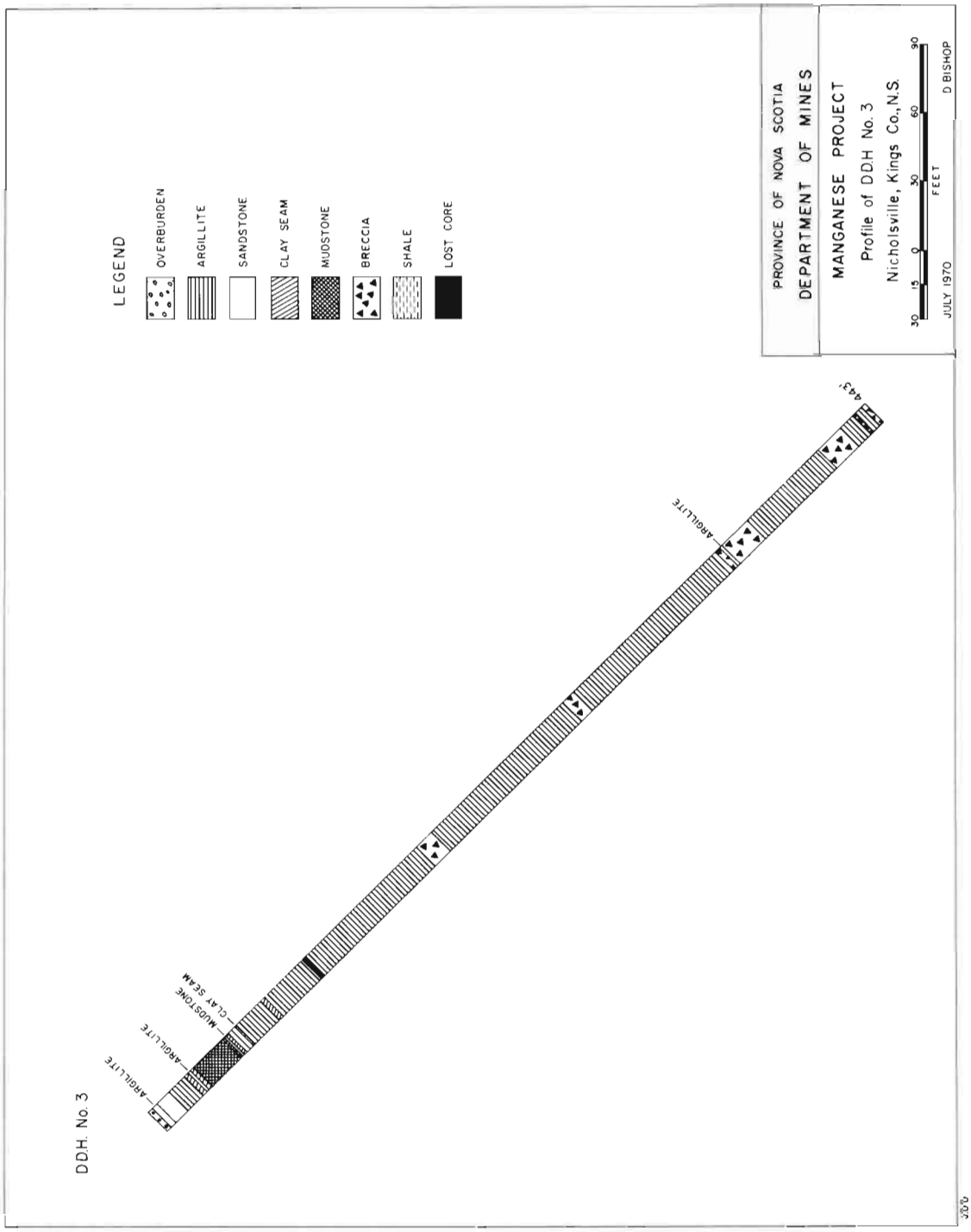

LEGEND
OVERBURDEN
ARGILLITE
SANDSTONE
CLAY SEAM
MUDSTONE
BRECCIA
SHALE
LOST CORE
PROVINCE OF NOVA SCOTIA
DEPARTMENT OF MINES
MANGANESE PROJECT
Profile of D.D.H. No. 3
Nicholsville, Kings Co., N.S.
30 15 0 30 60 90
FEET
JULY 1970
D. BISHOP
D.D.H. No. 3
ARGILLITE
ARGILLITE
MUDSTONE
CLAY SEAM
ARGILLITE
443'

FIGURE. 33

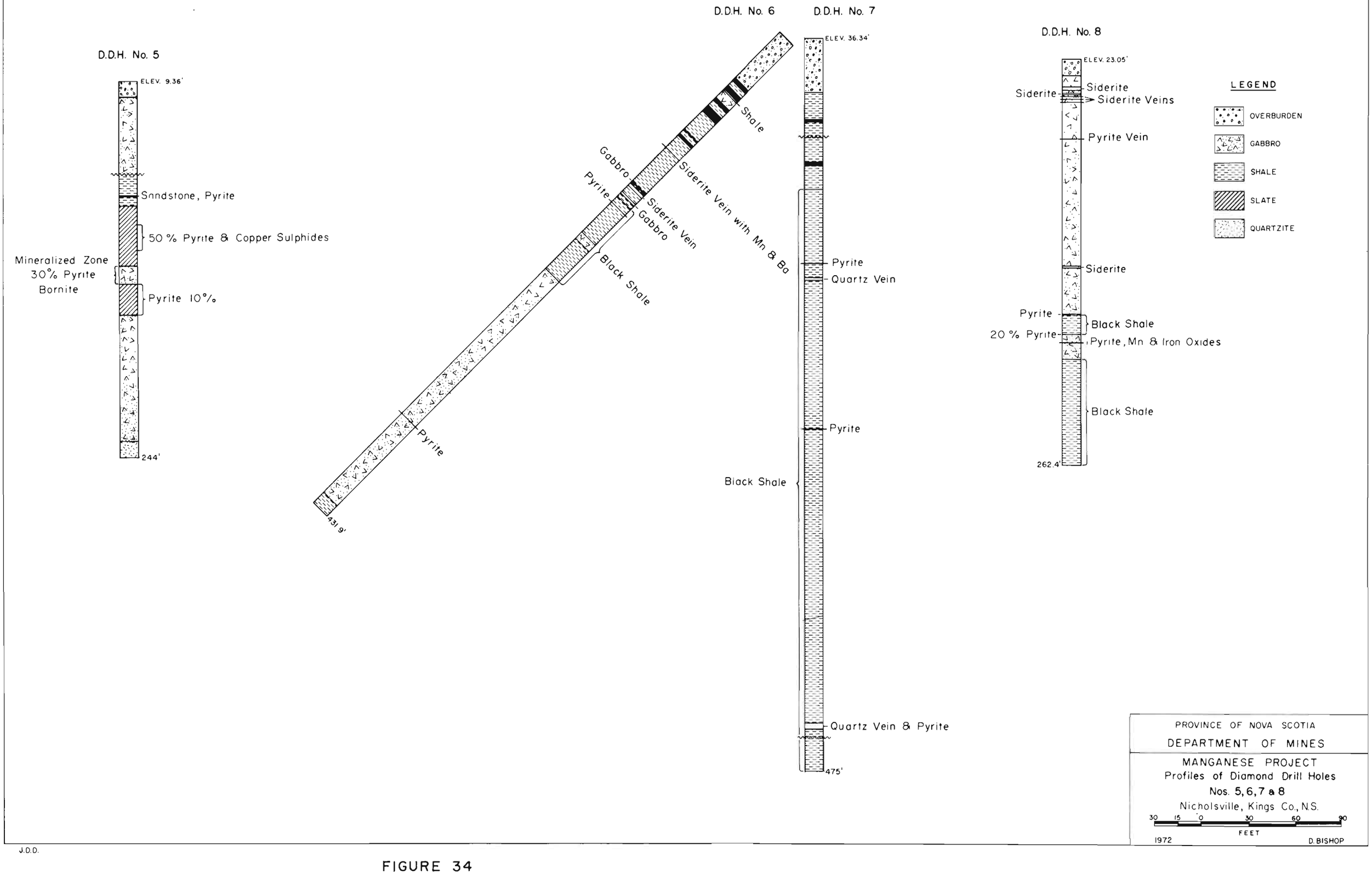

D.D.H. No. 5
ELEV. 9.36'
Sandstone, Pyrite
50 % Pyrite & Copper Sulphides
Mineralized Zone
30% Pyrite
Bornite
Pyrite 10%
244'
D.D.H. No. 6
Shale
Gabbro
Siderite Vein with Mn & Ba
Pyrite
Siderite Vein
Gabbro
Black Shale
Pyrite
431.9'
D.D.H. No. 7
ELEV. 36.34'
Pyrite
Quartz Vein
Pyrite
Black Shale
Quartz Vein & Pyrite
475'
D.D.H. No. 8
ELEV. 23.05'
Siderite
Siderite
Siderite Veins
Pyrite Vein
Siderite
Pyrite
Black Shale
20 % Pyrite
Pyrite, Mn & Iron Oxides
Black Shale
262.4'
LEGEND
OVERBURDEN
GABBRO
SHALE
SLATE
QUARTZITE
PROVINCE OF NOVA SCOTIA
DEPARTMENT OF MINES
MANGANESE PROJECT
Profiles of Diamond Drill Holes
Nos. 5, 6, 7 & 8
Nicholsville, Kings Co., N.S.
30 15 0 30 60 90
FEET
1972
D. BISHOP
J.D.D.

FIGURE 34

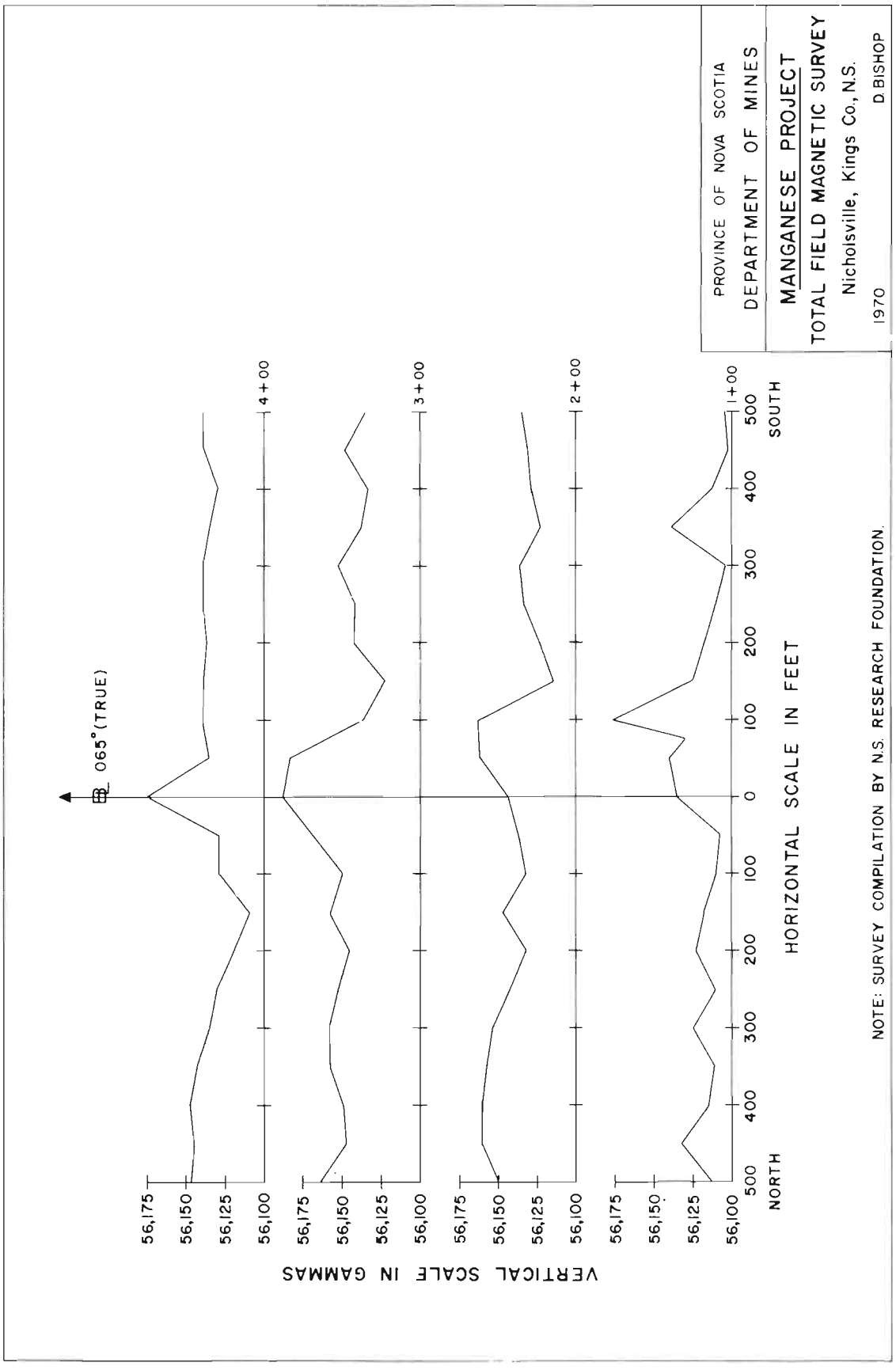

PROVINCE OF NOVA SCOTIA
DEPARTMENT OF MINES
MANGANESE PROJECT
TOTAL FIELD MAGNETIC SURVEY
Nicholsville, Kings Co., N.S.
1970
D.BISHOP
065° (TRUE)
4+00
3+00
2+00
1+00
56,175
56,150
56,125
56,100
500
400
300
200
100
0
100
200
300
400
500
NORTH
SOUTH
HORIZONTAL SCALE IN FEET
VERTICAL SCALE IN GAMMAS
NOTE: SURVEY COMPILATION BY N.S. RESEARCH FOUNDATION.
J.D.D.

FIGURE. 35

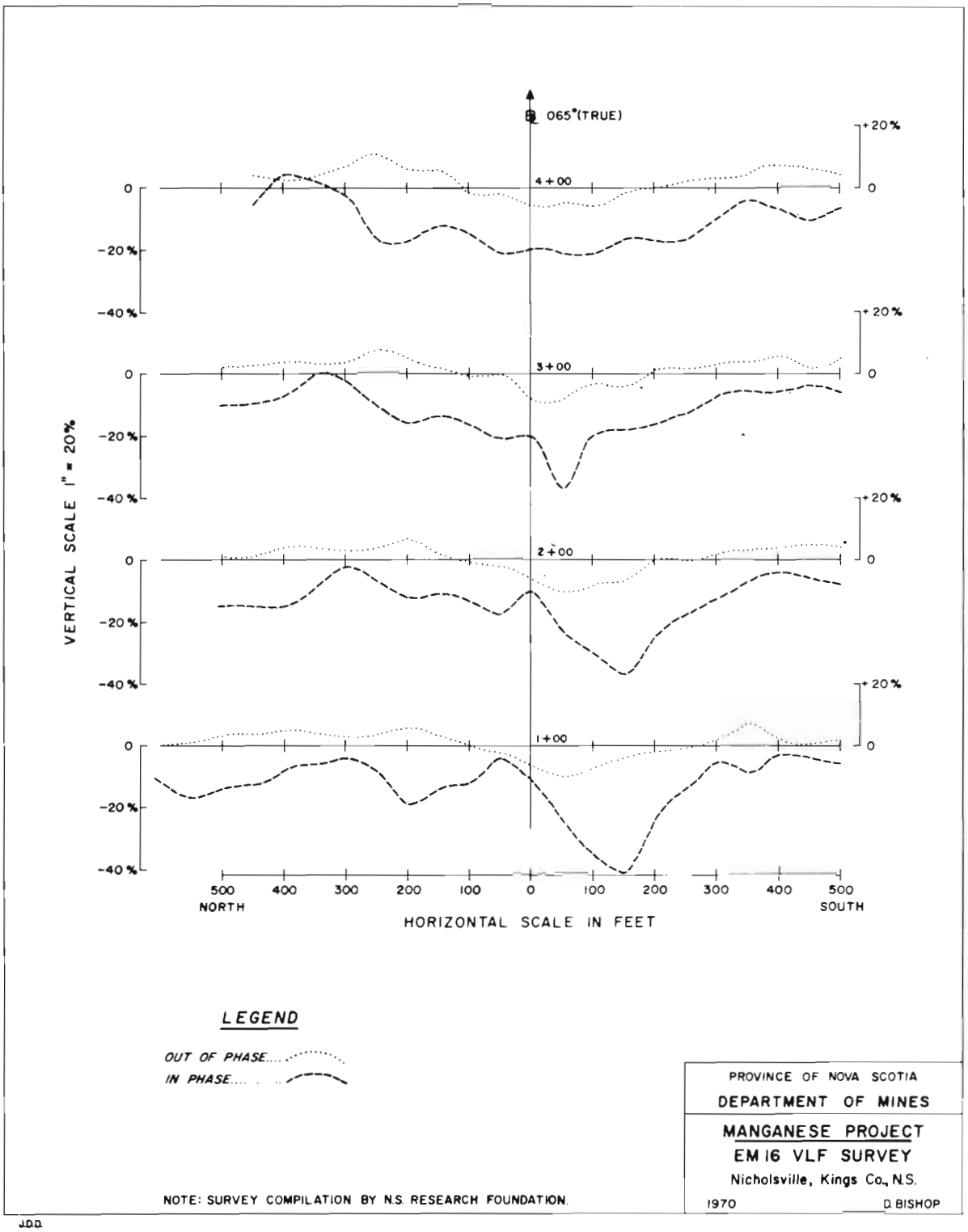
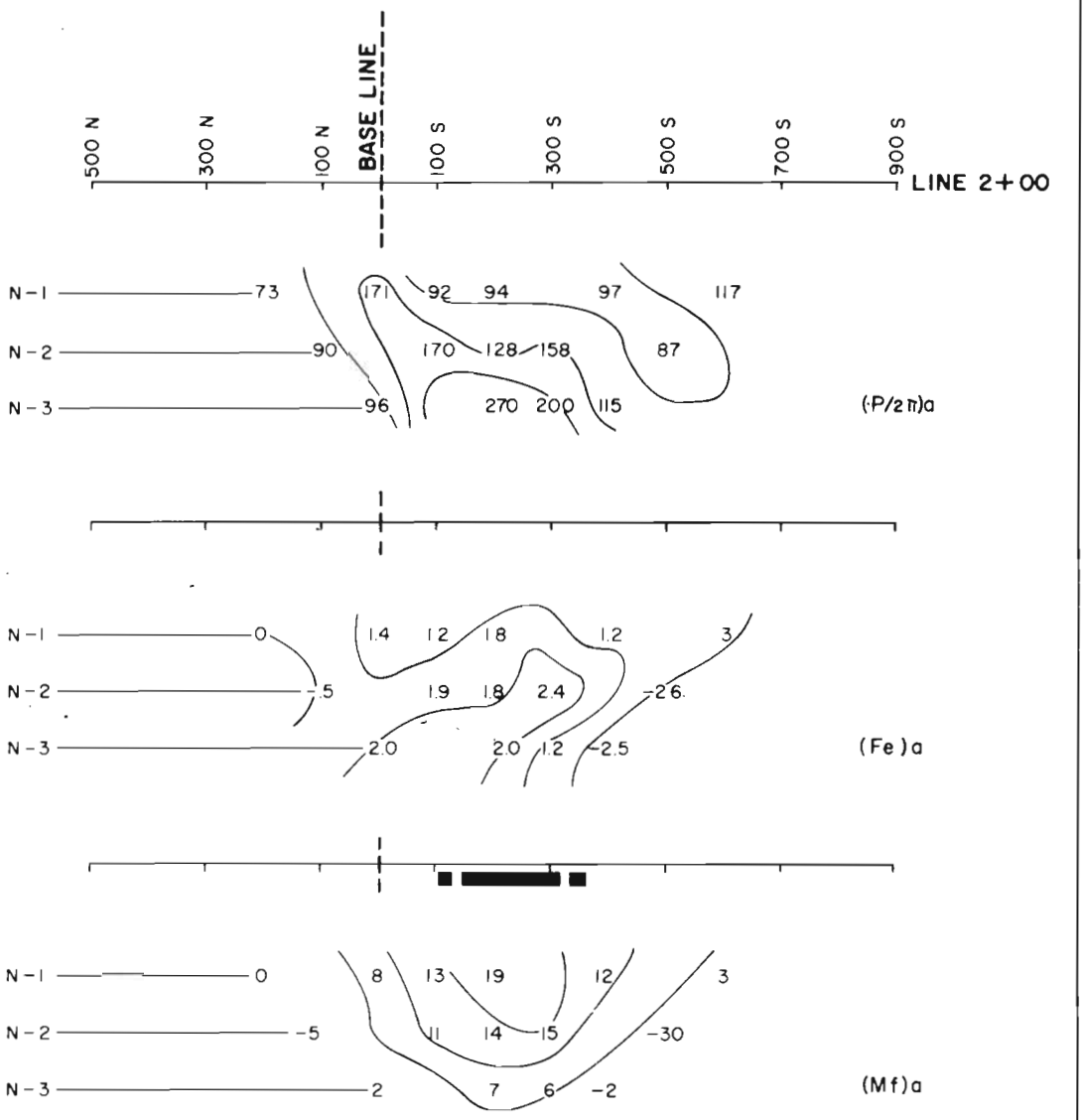

065°(TRUE)
4+00
3+00
2+00
1+00
+20%
0
-20%
-40%
VERTICAL SCALE 1" = 20%
500 400 300 200 100 0 100 200 300 400 500
NORTH
SOUTH
HORIZONTAL SCALE IN FEET
LEGEND
OUT OF PHASE
IN PHASE
NOTE: SURVEY COMPILATION BY N.S. RESEARCH FOUNDATION.
PROVINCE OF NOVA SCOTIA
DEPARTMENT OF MINES
MANGANESE PROJECT
EM 16 VLF SURVEY
Nicholsville, Kings Co., N.S.
1970
D. BISHOP
JDD

FIGURE. 36



NOTE: SURVEY COMPILATION BY N.S. RESEARCH FOUNDATION.

PROVINCE OF NOVA SCOTIA

DEPARTMENT OF MINES

MANGANESE PROJECT

I.P. SURVEY

Nicholsville, Kings Co., N.S.

1971 D.G. BISHOP

J.D.D.

FIGURE. 37

twenty miles. There is a small outcrop of this altered gabbro about 120 yards northeast from the manganese workings. The rock is deeply weathered and has a pronounced hematite stain. The following samples were taken of the gabbro dike.

In tables 57, 58, 59, 60, 61, 62, 63, 64 and 65 all elements were determined by atomic absorption.

TABLE 57

SAMPLE NO.	Mn%	Fe%	Zn%	Cu%	Pb%	Ag (ppm)
BK-30-70	.10	14.7	.02	.01	.012	.4
BK-31-70	.10	14.2	.02	.01	.01	.4
BK-32-70	.10	15.4	.012	.01	.01	.4

Samples 33 to 37 inclusive were taken south to north across the mafic dike 400 feet downstream on Zebe Brook.

TABLE 58

SAMPLE NO.	Mn%	Fe%	Zn%	Cu%	Pb%	Ag (ppm)
BK-33-70	.10	7.2	.008	.01	.01	.4
BK-34-70	.10	8.0	.008	.01	.01	.4
BK-35-70	.10	9.1	.008	.01	.01	.4
BK-36-70	.10	6.8	.008	.01	.01	.4
BK-37-70	.14	6.7	.05	.01	.01	.4

The following rock samples were collected from mafic intrusives found west of the Nicholsville manganese property.

TABLE 59

Brook, Directly West of Palmer Road

SAMPLE NO.	Mn%	Cu%	Zn%	Pb%	Ag (ppm)
BK-38-70 Diabase dike with disseminated pyrite	.25	.03	.02	.02	.4
BK-39-70 Diabase dike	.2	.005	.01	.01	.5
BK-40-70 Mafic dike	.2	.01	.02	.01	.5

TABLE 60

Samples from Reported Manganese Workings in Basalt Member of White Rock Formation

SAMPLE NO.	Mn%	Fe%	Cu%	Zn%	Pb%	Ag (ppm)
BK-41-70 From trench in basalt	.5	-	.01	.01	.01	.5
BK-42-70 Iron weathered frags	.4	6.8	.01	.02	.01	.8%

The following sample was taken of the mafic dike which crosses the road eight-tenths of a mile west of Inglisville on the West Inglisville road.

TABLE 61

SAMPLE NO.	Mn%	Fe%	Cu%	Zn%	Pb%	Ag (ppm)
BK-44-70 Medium grained gabbro	.3	4.5	.02	.008	.04	.5

The East Inglisville road crosses a large ultra-basic dike 1.6 miles from paved route 10. This dike is 220 feet wide.

TABLE 62

SAMPLE NO.	Mn%	Fe%	Cu%	Zn%	Pb%	Ag (ppm)	Ni%
BK-45-70	.5	-	.05	.03	.01	.5	.02
BK-46-70	.2	4	.02	.01	.03	.5	.04
BK-47-70	.2	4.5	.008	.01	.03	.8	-
BK-48-70	.8	3.5	.02	.02	.04	.5	.02
BK-49-70	.2	5.1	.1	.04	.06	.5	.06

Rusty weathered phase of intrusive, 1000 feet west from road.

TABLE 63

SAMPLE NO.	Mn%	Fe%	Cu%	Zn%	Pb%	Ag (ppm)	Ni%
BK-51-70	.2	-	.04	.008	.01	.5	-
BK-52-70	.2	4.5	.03	.01	.01	.5	-
BK-53-70	.2	-	.002	.008	.01	.5	-
BK-54-70	.2	4.7	.01	.01	.01	.5	.02
BK-55-70	.5	4.5	.02	.02	.01	.8	-
BK-56-70	.2	4.5	.008	.015	.01	.5	-
BK-57-70	.6	5	.01	.015	.02	.8	-
BK-58-70	.3	6.8	.02	.02	.03	.5	-
BK-59-70	.4	7	.01	.03	.02	.5	-

TABLE 64

DIAMOND DRILL HOLE NO.	Cu%	Pb%	Zn%	Ni%	Ag (ppm)	
N1	.01	.04	.01	.10	2	gabbro dike above contact zone
N2	.2	.5	.1	-	1	pyrite bands in black slate
N3	.2	.06	.02	.08	1.5	disseminated pyrite in quartzite
N4	.01	.03	.02	.06	1.5	pyrite in black slate

TABLE 65

Diamond Drill Hole #5

Contact Zone of Gabbro Dike with Argillites

FOOTAGE	Mn%	Ba%	Cu(ppm)	Pb(ppm)	Zn(ppm)	Ni(ppm)	Ag(ppm)
61'-64'3"	.48	.95	35	80	145	240	-
64'3"-66'10"	.35	-	35	40	40	80	-
66'10"-70'	.43	.07	35	20	95	225	-
71'2"-74'	.84	-	40	40	115	275	39.5
74'-76'6"	.92	-	50	20	50	150	30.5
76'6"-80'7"	.63	.04	50	40	40	150	2.0
80'7"-83'8"	.10	-	140	20	50	175	2.0
94'-95'	1.06	.03	30	40	60	175	-
95'-96'11"	2.60	.22	50	40	80	225	-
96'11"-100'	0.69	.04	180	20	70	200	-
100'-102'1"	0.05	.05	70	40	60	200	-
102'3"-105'	0.20	.04	25	40	60	180	-
105'-107'9"	0.52	.06	55	20	80	175	-
107'9"-109'1"	0.35	.06	40	20	60	175	-
109'1"-110'	0.06	.08	195	40	40	85	-
120'9"-122'8"	3.39	.05	820	40	185	525	-
122'8"-125'	6.30	.01	310	40	145	500	-
125'-127'7"	7.15	.02	240	40	130	510	-
127'7"-130'	1.65	.02	40	20	95	200	-
130'-131'5"	0.17	.08	50	40	60	200	-

REFERENCES

Bancroft, M. F.
1937: Annual Report on Mines, Province of Nova Scotia, Pt. 2, p. 32.

Faribault, E. R.
1920: Geological Mapping of Berwick and Lakeview map areas, Kings and Annapolis Counties, Nova Scotia; Geol. Surv. Can., Sum. Rept. Pt. E, pp. 12-13.

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1928: The Manganese Occurrences of the Maritime Provinces, Canada· unpub. M.Sc. Thesis, Geol. Surv. Can. Files.

Smitheringale, W. G.
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(55) BISHOP BROOK MANGANESE

Lat: 45° 03' 00"
Long: 64° 29' 55"
N. T. S. 21 H 1 W

The Bishop Brook manganese occurrence is located approximately one mile west of the New Minas interchange on Highway 101. At the point where the highway crosses the brook, mineralization can be observed in the road cut on the southeast side of the road. It would appear from the sketch maps of the early workings (Mines Report, 1942, p. 101) that the new highway crosses the brook directly north of the ore zone.

The deposit was discovered in the late 1800's when pyrolusite was dug out of the soils. The last reported work was performed in 1917 by a Mr. A. R. Eisenhauer who dug pits exposing manganese oxides in beds up to one inch in thickness in the Meguma slates, which strike northeast and dip southeast at 60 to 65 degrees. The mineralized zone has a width of 600 feet and it is reported that the zone has been traced along strike for 1500 feet.

The Eisenhauer rock cut is found on the west bank of the westernmost branch of Bishop Brook. The cut was reported to be 20 feet long and five feet deep in slates and phyllites, containing discontinuous bands of manganese oxides up to one inch thick.

There appears to be three belts of mineralization. Belts 1 and 2 are found in the Eisenhauer cut and belt number 3 was found on the middle branch and the east branch of Bishop Brook for a distance of 550 feet. The bulk of the mineralization is a compact ferruginous-manganese ore formed as a replacement in the bands of grey

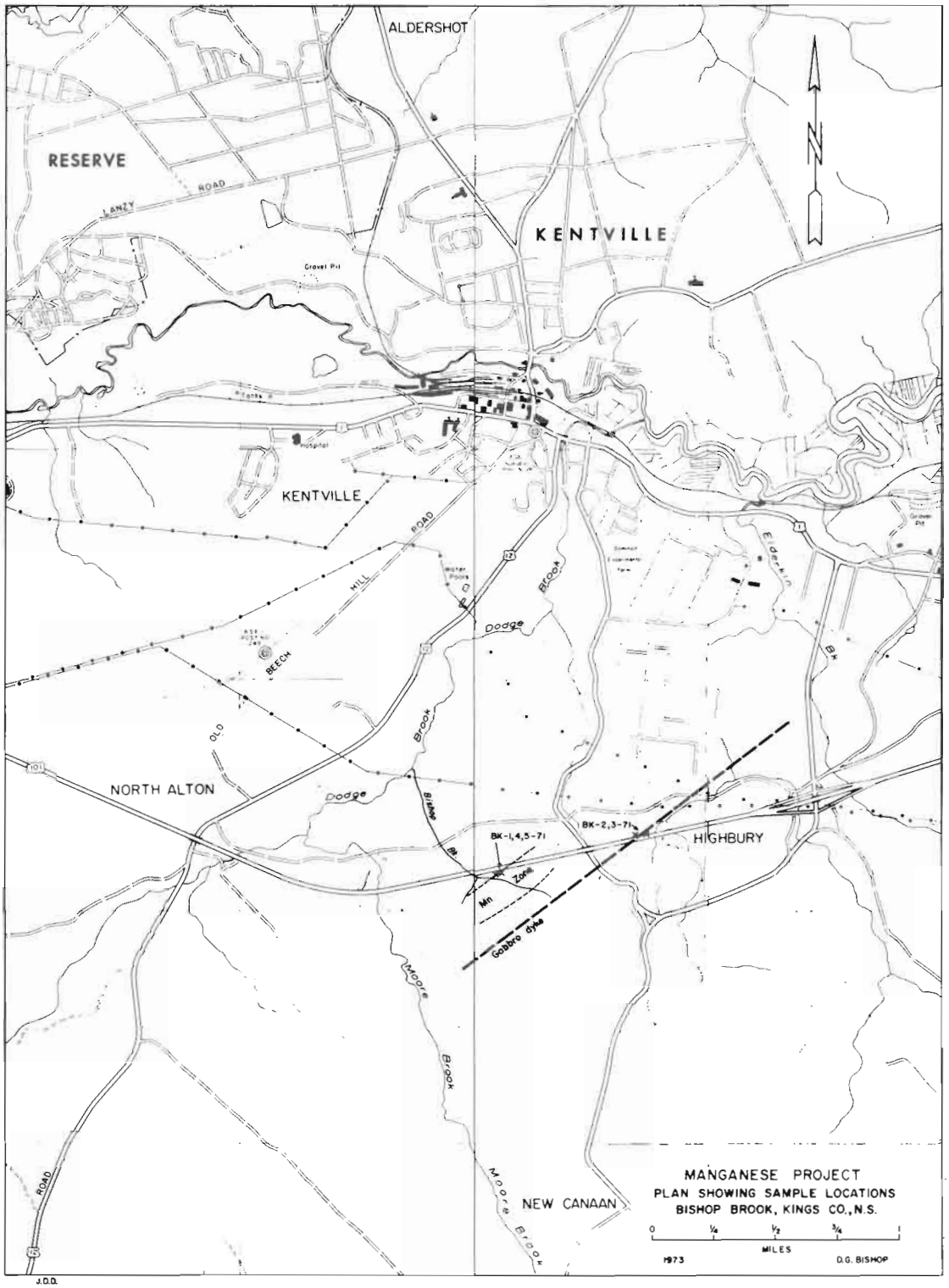
ALDERSHOT
RESERVE
LANEY ROAD
KENTVILLE
Gravel Pit
KENTVILLE
HILL ROAD
Dodge Brook
BEECH
OLD
NORTH ALTON
Dodge Brook
Bishop Br.
BK-1,4,5-71
BK-2,3-71
HIGHBURY
Zone
Mn
Gabbro dyke
Moore Brook
NEW CANAAN
Moore Brook
ROAD
MANGANESE PROJECT
PLAN SHOWING SAMPLE LOCATIONS
BISHOP BROOK, KINGS CO., N.S.
0 1/4 1/2 3/4 1
MILES
1973
D.G. BISHOP
J.D.D.

FIGURE 38

phyllite. It is interesting to note that a large mafic dike 75 feet thick occurs directly south of the manganese belt. The intrusive is cut by numerous quartz veins carrying up to five percent pyrite. The new Highway 101 cuts the dike and it can be examined directly west of the New Minas interchange. In view of the mineralization found in the Nicholsville area in which we have the same environment it is recommended that this occurrence be more closely scrutinized.

The following samples were taken from the mineralized belts within the slates.

TABLE 66

Major and Minor Element Content of Manganese

Elemental Content in Percentages except Silver

SAMPLE NO.	Mn	Fe	Cu	Zn	Pb	Ag (ppm)
BK-1-71	21	10.5	.03	.02	.02	.8
BK-4-71	31	11	.08	.02	.02	1
BK-5-71	24	13	.02	.02	.02	.8

The following are samples from the gabbro dike.

TABLE 67

Major and Trace Element Content of Gabbro

SAMPLE NO.	Mn%	Fe%	Cu%	Zn%	Pb%	Ni%	Ag (ppm)
BK-2-71	-	7.8	.01	.02	.02	.08	1
BK-3-71	.8	7	.01	.01	.02	-	1

REFERENCE

Bancroft, M. F.
1942: Manganese occurrences in Kings County; Ann. Rept. on Mines, N. S. Dept. of Mines, p. 97-111.

MANGANESE OCCURRENCE INVESTIGATED IN ANTIGONISH COUNTY

(56) REAR GEORGEVILLE MANGANESE

(56) REAR GEORGEVILLE BOG MANGANESE

Lat: 45° 47' 30"
Long: 61° 59' 00"
N. T. S. 11 F/13 W

LOCATION

This bog manganese deposit is located on the late John Hefferman property, twelve miles northeast of Antigonish and four miles south of the village of Georgeville.

GEOLOGY

Bedrock is not exposed on the farm property and auger holes to depths of eighteen feet did not encounter rock. The soil bought up by these borings contained a considerable amount of wad nodules ranging in size from minute pellets to that of a walnut. This occurred at various places on the farm, on the crest of hills as well as in the swales. No definite bed of ore was encountered in any of the borings reported to have been made on the property. A sample of the soil collected in 1940 by the Nova Scotia Department of Mines gave a manganese content of 7.3 percent.

FIELD WORK

A soil sample grid was laid out over the field directly east of the Hefferman home. Bedrock is not exposed in the survey area but boulders of Horton conglomerate are plentiful.

The soil is dry, dark brown and contains tiny pellets of dark grey pyrolusite. The pyrolusite seems to be restricted to a very small area as indicated on the sample grid (Fig. 39). Black manganese staining was found in the moist, dark brown clayey

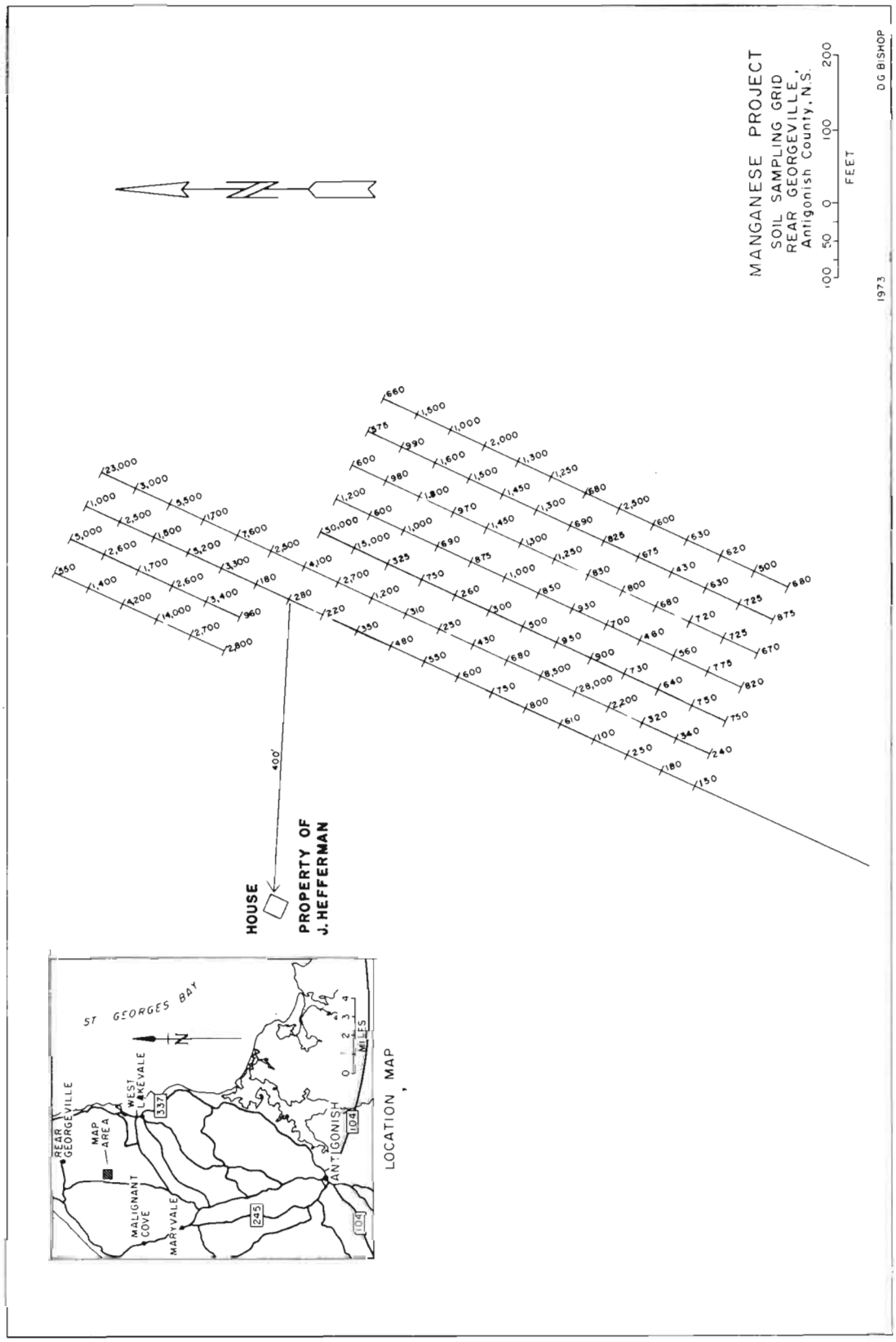
MANGANESE PROJECT
SOIL SAMPLING GRID
REAR GEORGEVILLE,
Antigonish County, N.S.
100 50 0 100 200
FEET
1973
D G BISHOP
BMN
HOUSE
PROPERTY OF
J. HEFFERMAN
400'
660 1,500 1,000 2,000 1,300 1,250 680 2,500 600 630 620 500 680
576 990 1,600 1,500 1,450 1,300 690 825 675 430 630 725 875
600 980 1,300 970 1,450 1,300 1,250 830 800 680 720 725 670
1,200 600 1,000 690 875 1,000 850 930 700 480 560 775 820
50,000 15,000 325 750 260 300 500 950 900 730 640 750 750
4,100 2,700 1,200 310 250 430 680 8,500 28,000 2,200 320 340 240
23,000 3,000 5,500 700 7,600 2,500 280 220 350 480 550 600 750 800 610 100 250 180 150
1,000 2,500 800 3,200 3,300 180 960 2,700 2,800
5,000 2,600 1,700 2,600 3,400 960
550 1,400 4,200 14,000 2,700 2,800
ST GEORGES BAY
N
REAR GEORGEVILLE
MAP AREA
WEST LAKEVALE
337
MALIGNANT COVE
MARYVALE
245
ANTIGONISH
104
104
0 1 2 3 4
MILES
LOCATION MAP

FIGURE 39

soil. In one small circular depression the clay contained concretions of manganese about the size of a pea.

The results of the survey (Fig. 39) indicate the manganese occurs in small local pockets and lenses and for this reason the deposit cannot be considered a source of manganese ore.

REFERENCE

Goudge, M. G.
1940: Manganese at Georgeville, Antigonish County. Report to the Nova Scotia Department of Mines.

PLATE I.

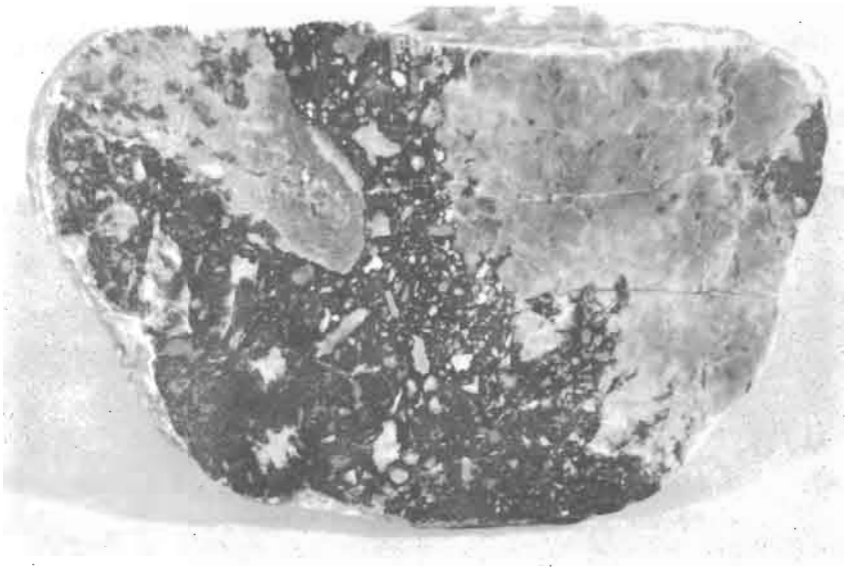

Figure I Massive black manganite replacing Pembroke limestone, Lake property, Cheverie, Hants County. Locality No. 1.

Figure II Diabase sills at headland and in foreground intrude low dipping Horton Bluff shales, Johnson Cove, Hants County.

PLATE II.

Figure III Angular unconformity, steeply dipping shales of Horton Bluff formation and overlying Triassic sandstones, Rainy Cove, Hants County

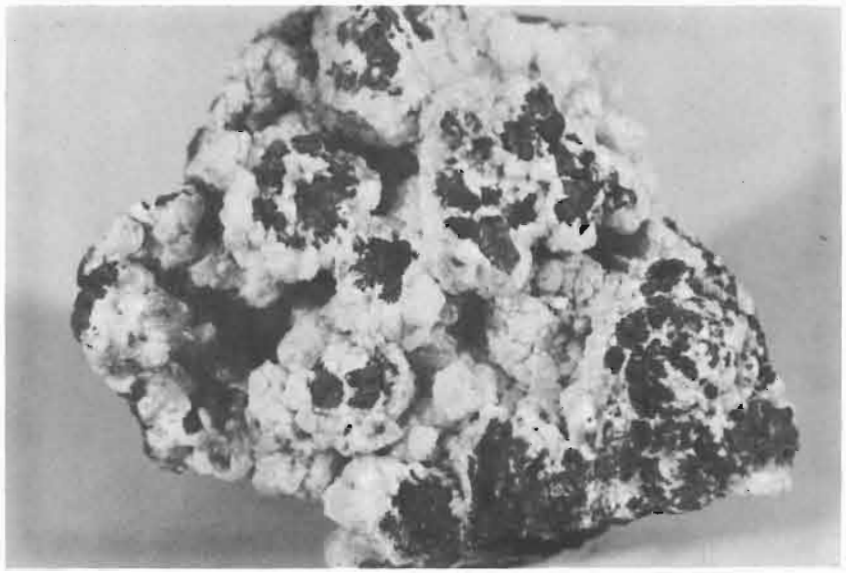

Figure IV Nodules of pyrolusite enclosed by calcite. Dresser Minerals Mine dump, Walton, Hants County. Locality No. 8

PLATE III.

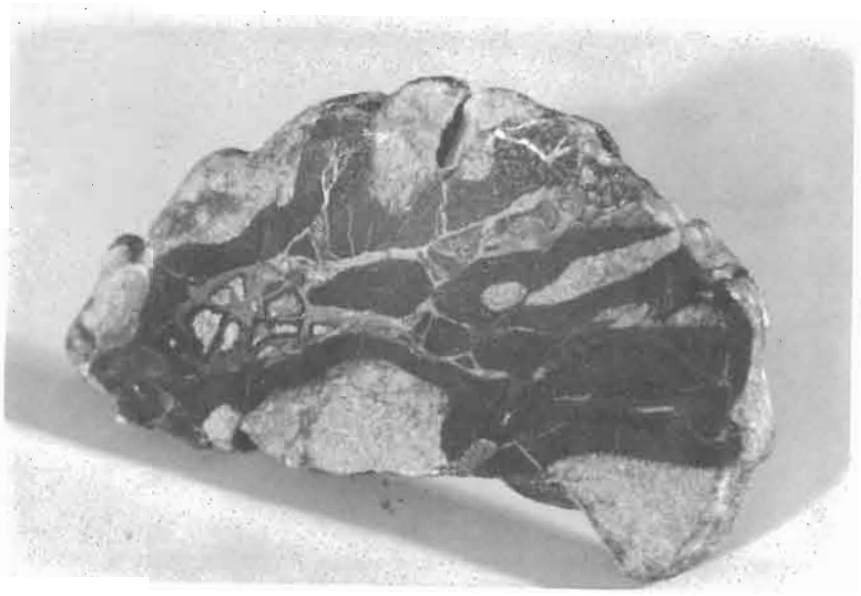

Figure V Network of manganite veinlets (light grey) surrounded by area of partial replacement by pyrolusite of Cheverie quartzose sandstone. Sturgis Mine, Walton, Hants County. Locality No. 6

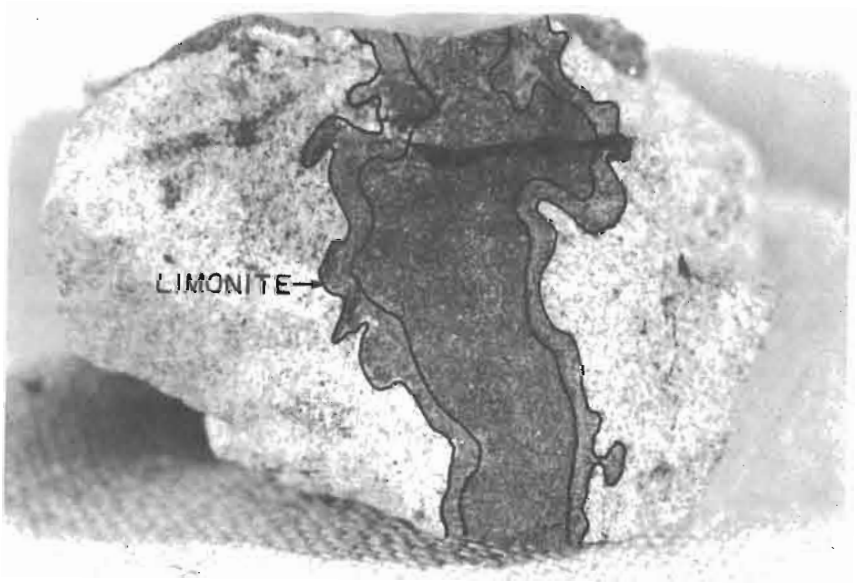

Figure VI Hand specimen showing band of pyrolusite and outer layer of yellow brown limonite in Cheverie quartzose sandstone, Sturgis Mine, Walton, Hants County. Locality No. 6

PLATE IV.

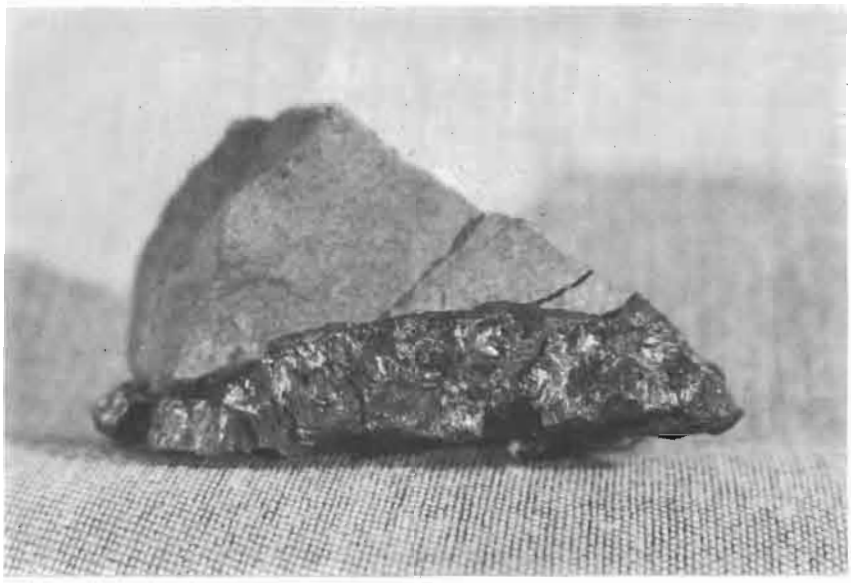

Figure VII S-section of pyrolusite vein filling joint in Macumber limestone, Tennycape Mine, Tennycape, Hants County. Locality No. 19

Figure VIII Basal Triassic conglomerate cemented by pyrolusite and calcite, Cape Tenny, Tennycape, Hants County. Locality No. 20

PLATE V.

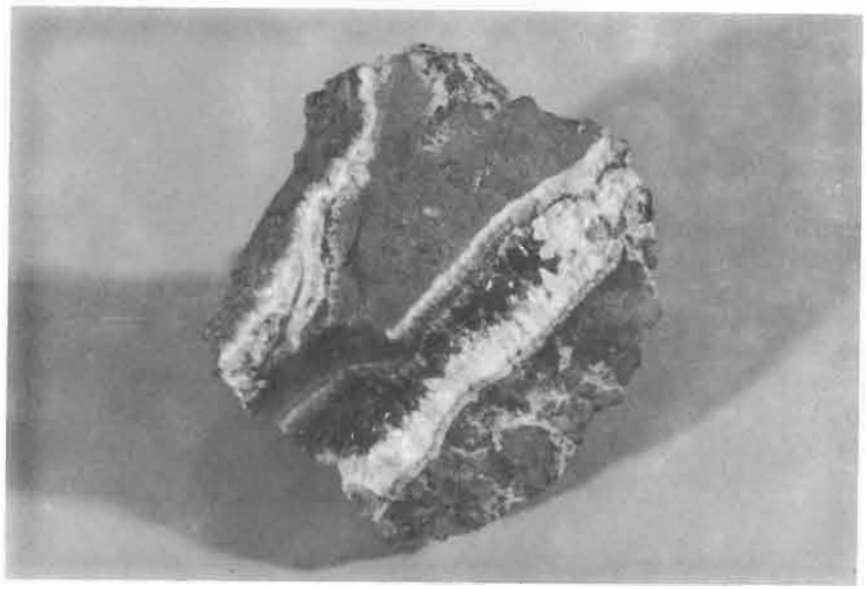

Figure IX Vein of white dog tooth spar with interior lined with fibrous pyrolusite crystals in Pembroke limestone conglomerate, Faulkner property, Hants County. Locality No. 21

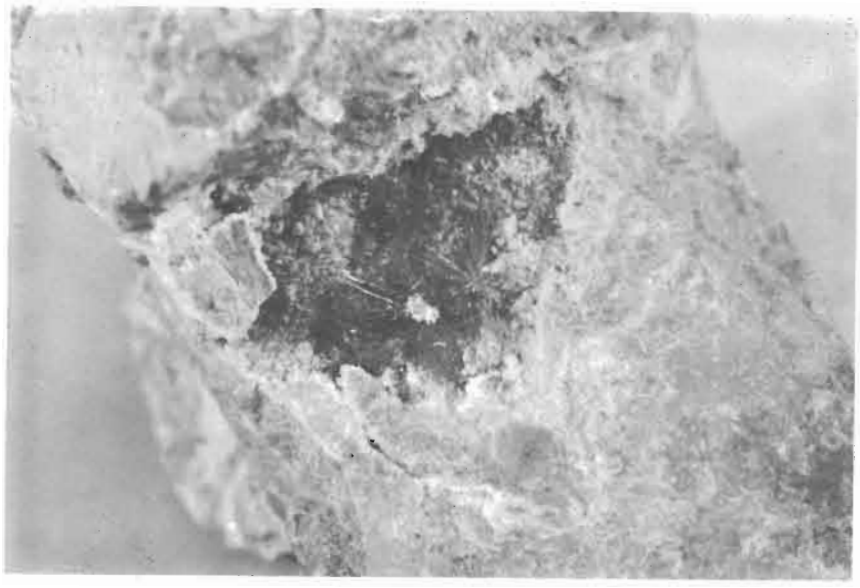

Figure X Needle-like radiating pyrolusite crystals in Pembroke limestone conglomerate, Faulkner property, Hants County. Locality No. 21

PLATE VI.

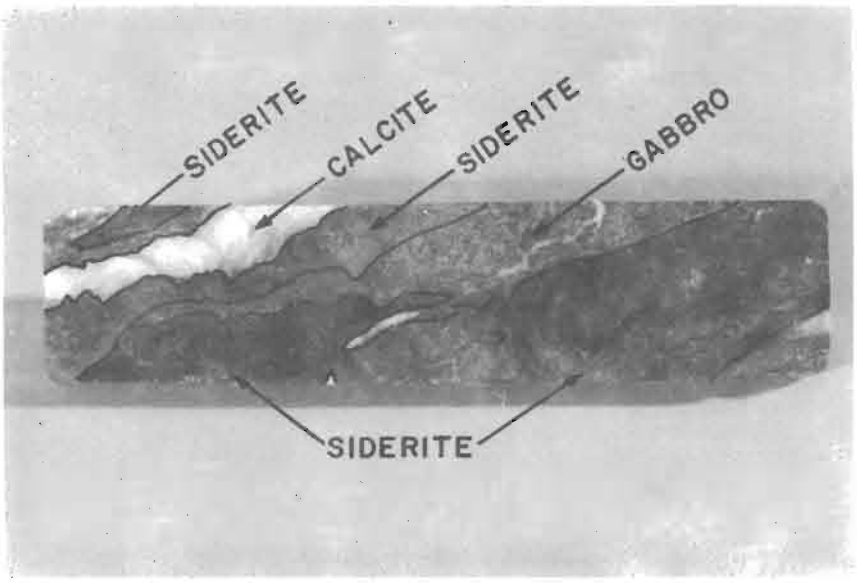

Figure XI. Polished core from DDH #8. Yellowish-brown siderite veins with white calcite in gabbro intrusive. Nicholsville, Kings County, N. S.

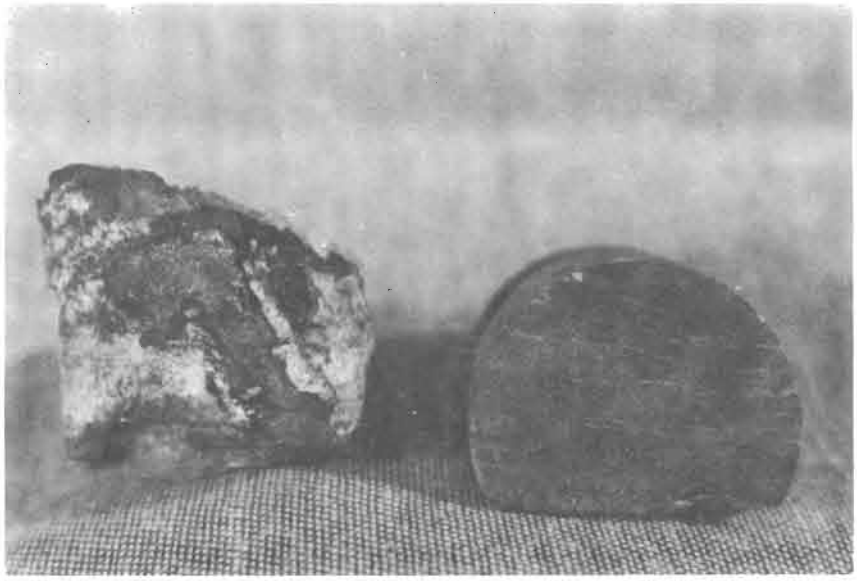

Figure XII. Core on left from DDH #8. Note the elongated bleb of pyrite in association with manganese oxides and dogtooth spar within fine grained phase of gabbro dike. Core on right from DDH #2 shows the replacement of red-grey argillite with pyrite. Both cores from Nicholsville, Kings County, N. S.