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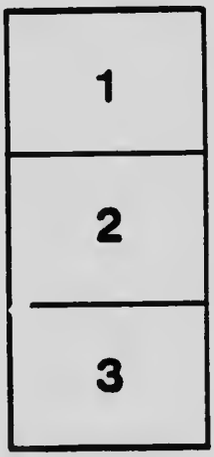

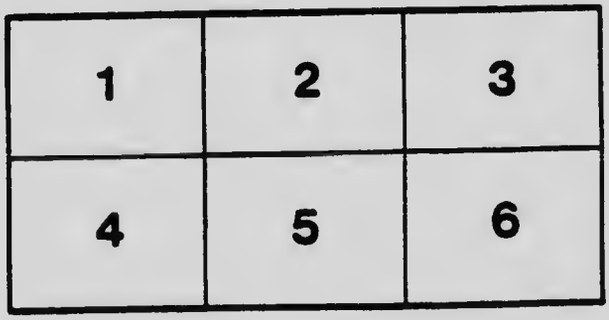

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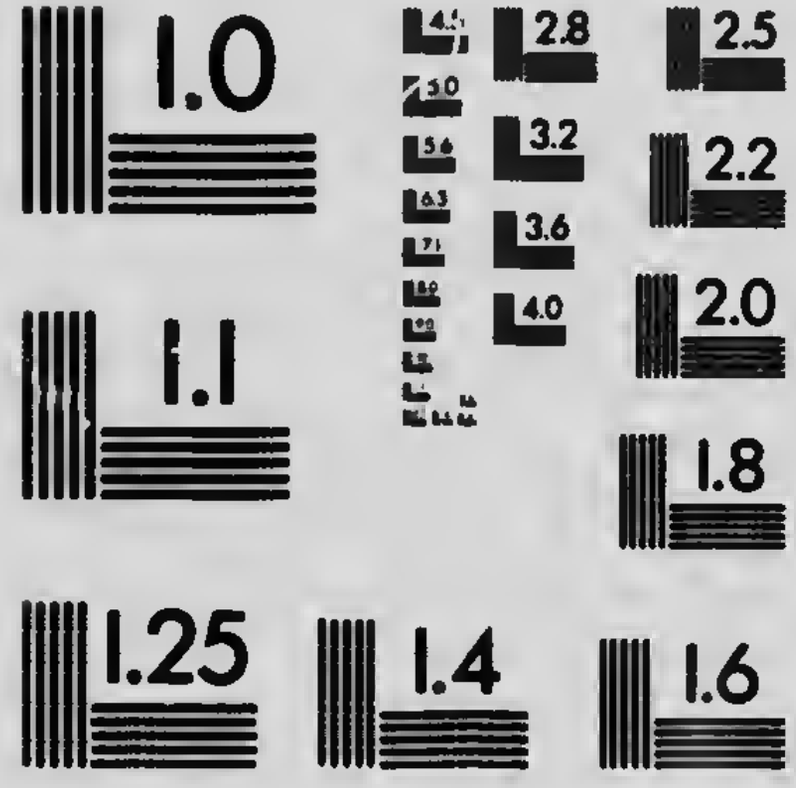

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2

IRON ORE MINES of the

NOVA SCOTIA STEEL & COAL COMPANY LIMITED.

IRON ORE MINES

AT

WABANA

NEWFOUNDLAND

OF THE

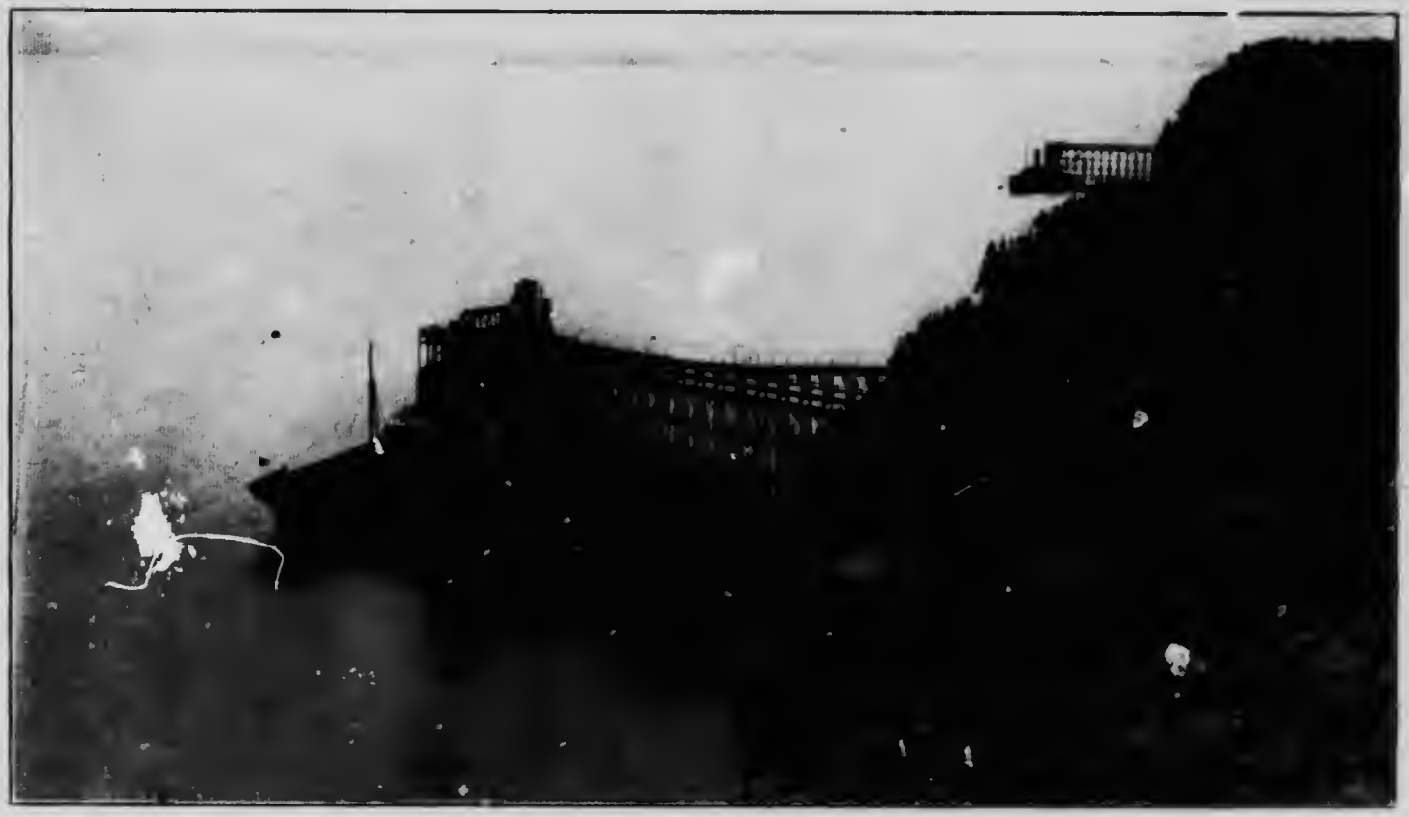
Nova Scotia Steel and Coal Co.

LIMITED.

COAL MINES AND FURNACES:
SYDNEY MINES NOVA SCOTIA.

IRON ORE MINES:
WABANA, NEWFOUNDLAND.

HEAD OFFICE AND ROLLING MILLS:
NEW GLASGOW, N. S.



WABANA ORE SHIPPING PIERS—SCOTIA PIER IN THE BACKGROUND.

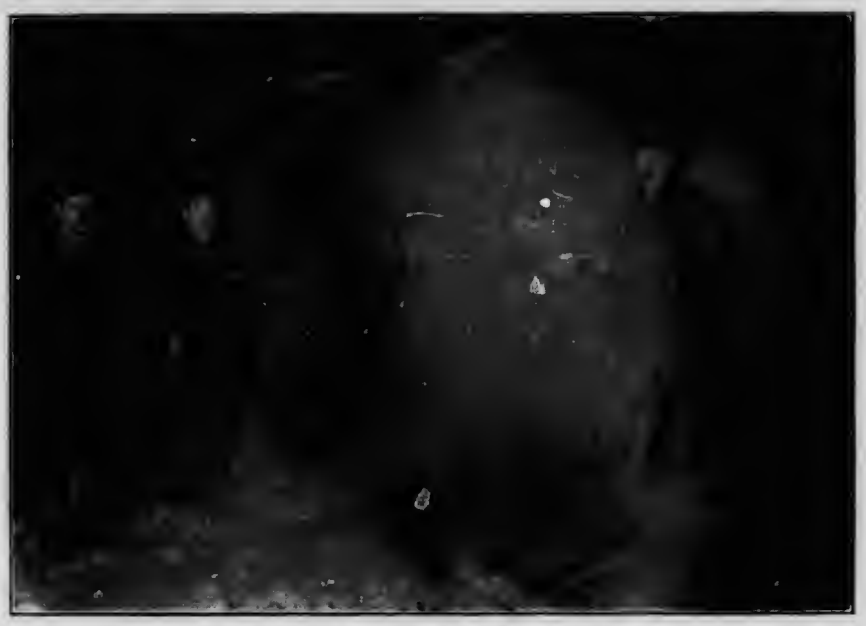
Wabana: The Island of Iron.

Set like a jewel amid the heaving waters of Conception Bay, on the extreme eastern coast of Newfoundland, lies rugged and picturesque Bell Island. On this lonely little island is situated the Wabana iron mines, the chief mining industry of the "Ancient Colony" and among the most important iron mines in the Empire. With a deposit of ore the limits of which are as little known now as when work began on it fifteen years ago, a geographical position that commands the markets of the world and the cheapest possible water transportation, the Wabana ore properties are in an unique position. There are larger deposits worked. There are deposits in operation that have a higher percentage of iron in the ore. It is doubtful, however, if there exists in the world any deposit that so combines the advantages of good ore, easy mining, excellent location, and cheap transportation.

Forty years ago attention was attracted to this ore by outcroppings at two different spots on the island. Not until twenty-five years had elapsed, however, was the ore worked. The development carried on since has shown that the deposits on the land are merely the fringes of great beds of ore that extend far out under Conception Bay. The main seam has been followed for more than three miles until it dipped into the sea again at each shore of the island; and the workings have shown that this ore extends for at least two miles to the dip of the seam.

While these explorations have proven that an immense body of ore exists there, no one has attempted to define exactly its limits. Experts have estimated that these beds contain from ten to twenty times as much mineral as has been absolutely proved to exist; but the accuracy of these assertions can be determined only by future work. Enough has been shown, however, to prove that there is ore enough in this deposit to last for at least another century at the present rate of working.

Two companies operate these deposits, the Nova Scotia Steel & Coal Company, which was the pioneer company in this field, and the Dominion Iron & Steel Company. The latter company utilizes the ore only for the operation of its blast furnaces at Sydney, in Cape Breton, about four hundred miles away. The Scotia Company, as the Nova Scotia Steel & Coal Company is generally known, in addition to supply-



UNDERGROUND IN THE SCOTIA MINE.

ing its own iron and steel works at Sydney Mines, a few miles away from the Dominion Steel plant, also exports large quantities to Great Britain, the United States, and Germany.

Fifteen years ago, Bell Island was inhabited by a few hundred farmers and fishermen. On the south side of the island there were some scattered farms, while the northern side was nothing but a dense forest. Tremendous changes have been wrought in the island since then. The population has increased very rapidly. On the southern side are two big loading piers at which ore steamers are nearly always lying during the shipping season, while on the northern side are to be seen the half dozen mines operated by the two companies.

"Wabana" is an Indian name, meaning "the place where the light first shines." This is literally true, for these mines are situated on almost the most easterly land in America. Conception Bay, so-called by Cartereal, the Portugese explorer who followed Sebastian and John Cabot in exploring Newfoundland, is an inlet in the Avalon peninsula on the northeast coast of the Colony, a few miles from St. John's, its capital. This arm of the sea runs inland for about thirty miles, and in places is thirteen miles wide. Near the southeastern side of the bay

STRIPPING AND MINING OPERATIONS ON THE SCOTIA BED.

there are three little islands, the largest of which, about twelve miles in extent, is Bell Island.

Bell Island's cliffs rise perpendicularly for several hundred feet and in many cases they overhang, the incessant ravages of the sea having worn away the base. Geologists assert that the island is a remnant of an immense syncline or trough of sediments deposited in Cambrian times. The general outline of Conception Bay was then the same as now but larger. It is supposed that it was the estuary of a large river that flowed down from the higher land to the west, and a series of ripple marks found on the island strengthens this belief. Enormous quantities of sediment were evidently carried into the estuary, and the bay began to fill up. There was a continual re-adjustment of pressure and eventually this whole portion of Newfoundland was gradually lifted above sea level.

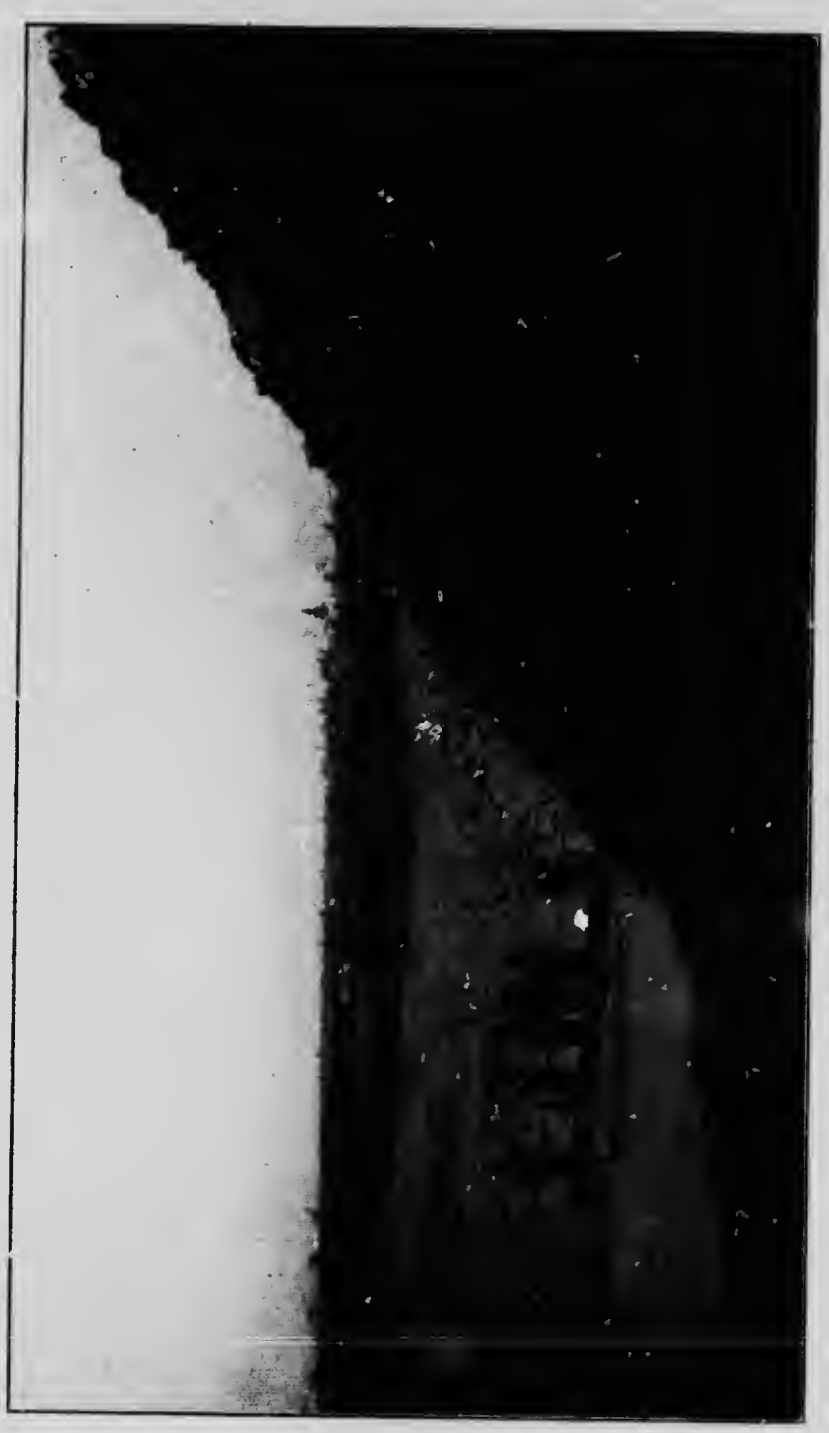
As a result of this re-adjustment, the bay exists to-day where the estuary was situated formerly, and there is now visible only the uppermost beds on Bell Island which contain the ore seams. Weathering and ice action have removed a great portion of the ore beds that formerly extended farther south than the present outcrops. The north side of Bell Island contains a number of seams of red hematite iron ore,

OPEN CUT MINING ON THE SCOTIA BED.

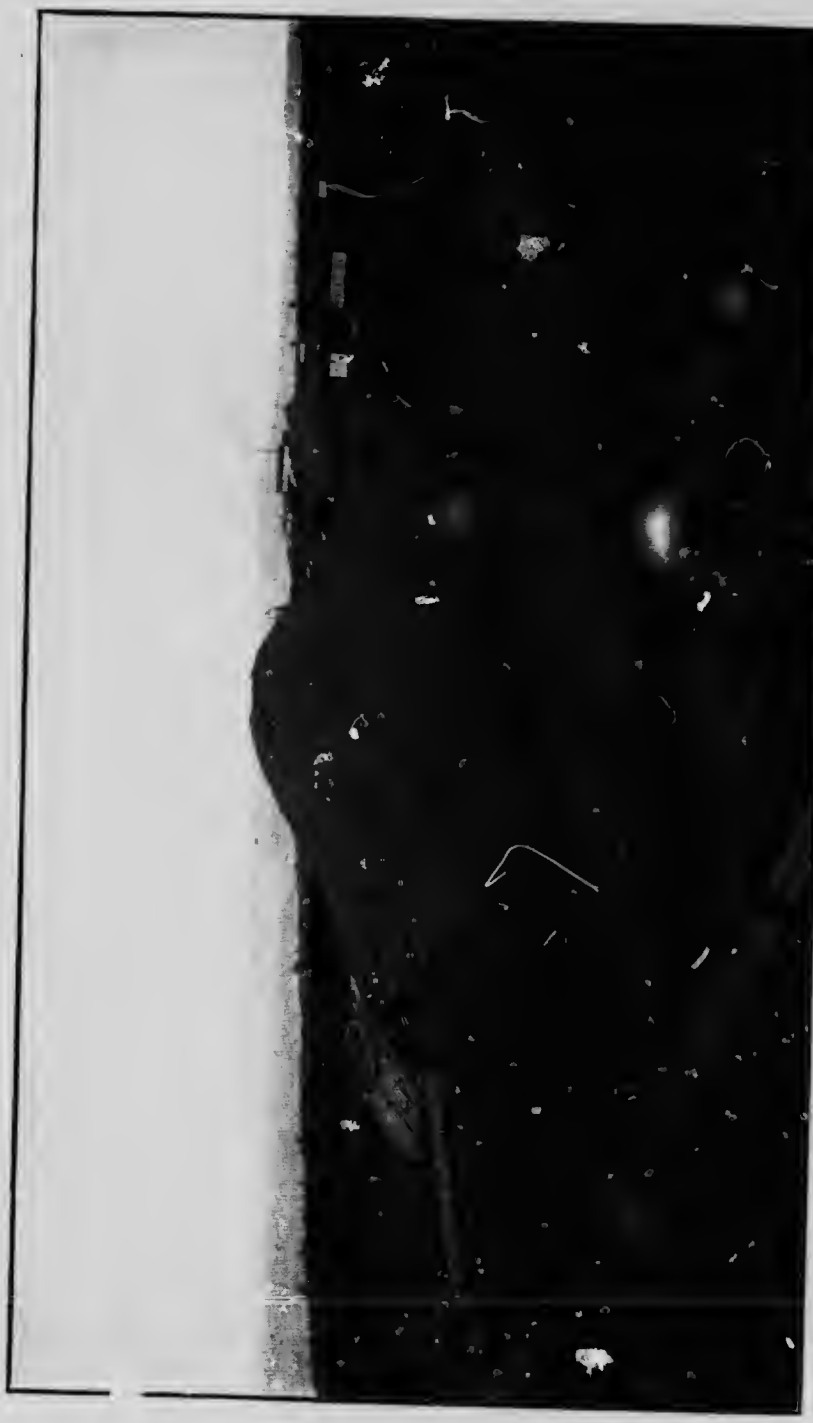
WABANA OPEN CUT MINING.

three only of which are economically important at present. These seams or beds are interstratified with the sandstone and shales of the formation with a common dip and strike, the former being about eight degrees.

Just how attention was first attracted to these deposits is not known. There is a legend that a Bell Island fisherman came into St. John's harbour one day with a killock, or anchor, in his boat made from a large piece of iron ore which he had found on the beach, and that the peculiar colour and great weight of it attracted the attention of some men who knew a little about minerals. At any rate, the property eventually came into the hands of Messrs. Butler, of Topsail, who, after vainly endeavouring to interest other capital in the venture, finally leased the deposit to the Nova Scotia Steel Company in 1893. Two years afterwards, that company commenced to mine the ore in a small way. The work, at first, consisted entirely of open-cut mining, the earth covering being simply stripped off the deposit as it lay in the ground and the ore then carried by an endless rope tramway to a pier on the south side of the island. This pier was simply a block set out some distance from the shore and connected with it by a suspension bridge. Later, however, a trestle work was built out from the shore.

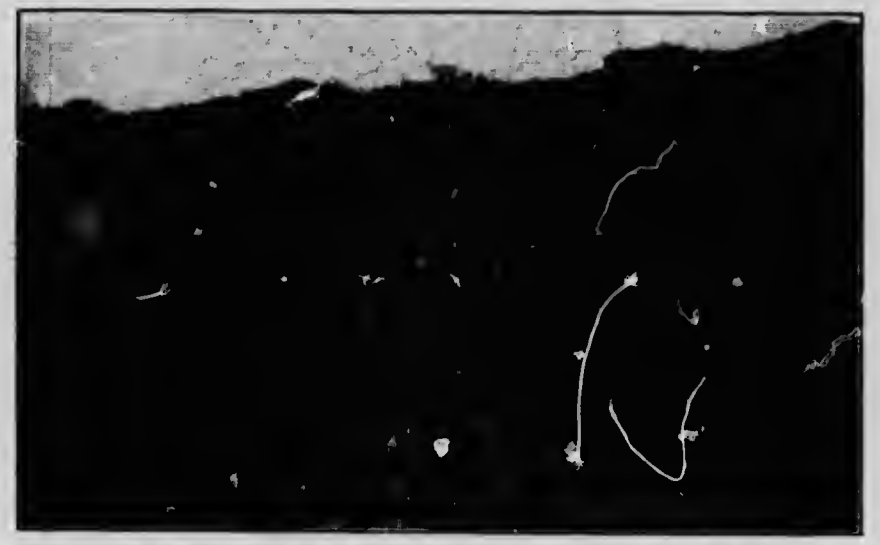


OPEN CUT MINING AT WABANA IN THE LOWER BED.



SCOTIA PROPERTY, LOOKING EAST FROM NO. 1 MINE, SHOWING STOCK PILES AND NO. 2 MINE, WITH CAPE ST. FRANCIS IN THE BACKGROUND.

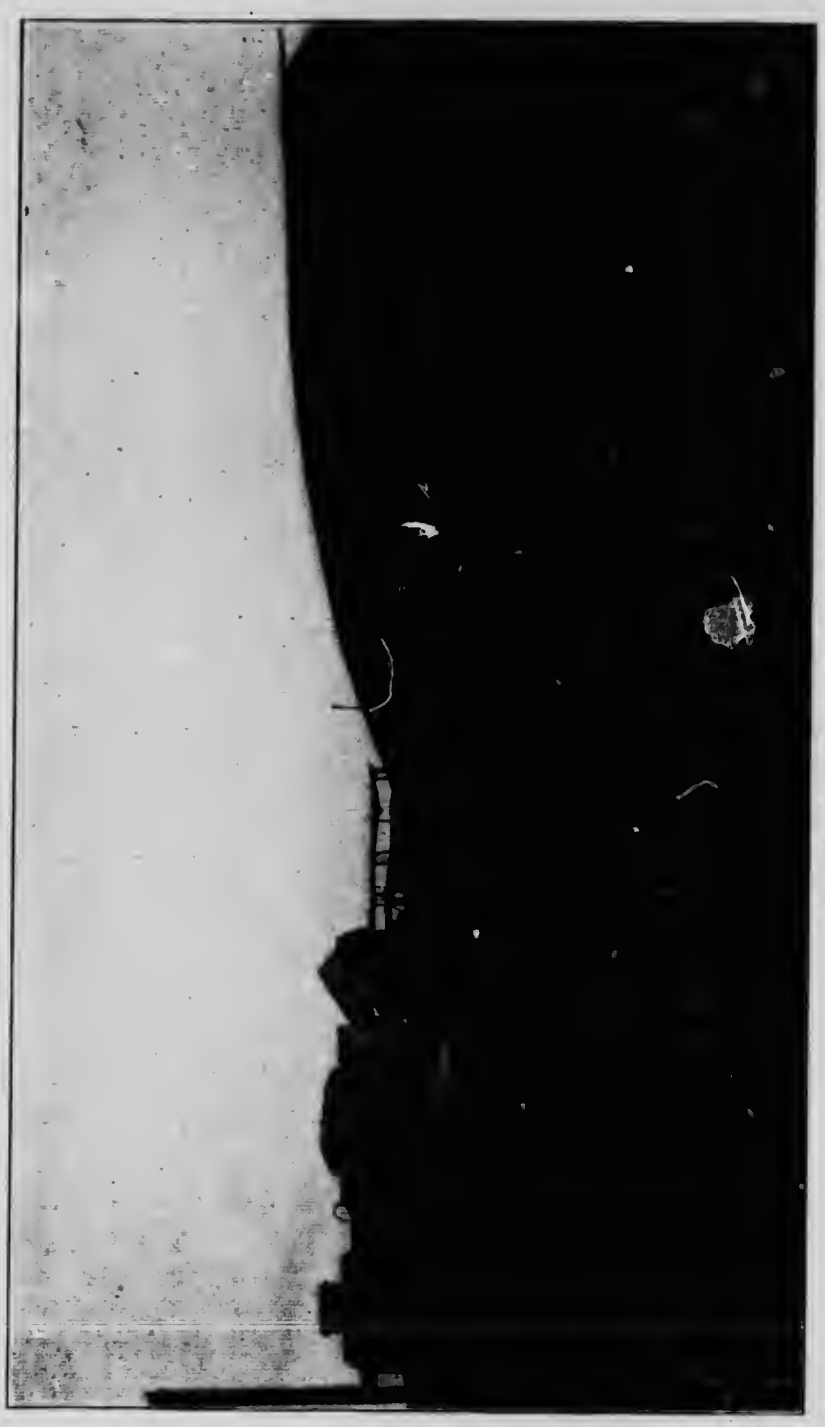
OPEN CUT ORE IN DOMINION BED.



OPEN CUT ORE FACE, SHOWING CHARACTERISTIC RHOMBOHEDRAL CLEAVAGE.

At first the ore was used solely to supply the blast furnace of the Nova Scotia Steel Company at Ferrona. The Wabana plant consisted merely of a hopper pier of two thousand tons capacity and the tramway. The mining was simply quarry work, and, therefore, did not require an elaborate outfit. Three years later the possibility of shipping ore to European markets called for an increase in the plant. Storage pockets were built, giving an increase of from twelve to fifteen thousand tons storage capacity. At the same time a horizontal ore conveyor was installed. To increase the facilities for producing ore, tramways were built along the crop of the lowest bed of ore and quarries were opened at different points along the line.

In the year 1899 the Dominion Iron & Steel Company commenced operations at Wabana. This company purchased from the Scotia people the lowest of the three parallel beds of ore which had been operated by the latter concern, together with all their equipment. The Scotia Company at once commenced to open up the middle, or Scotia, bed of ore in order to secure an uninterrupted supply. Twelve hundred men were kept at work that season, mining from the old property and developing the new. When the time came for them to turn over to the Dominion Company the property they had purchased, the Scotia bed was in condition to produce all the ore required. Tramways had been constructed,



NO. 1 MINE AND STOCK PILE.

NO. 2 MINE, WITH SUBMARINE DOCK-HEAD IN COURSE OF ERECTION.

75,000-TONS OF ORE, STOCK PILE AT NO. 2 MINE.

a new pier had been built, and the Scotia Company went ahead producing ore without a single break in deliveries.

By the terms of the sale to the Dominion Company, that concern secured the upper and lower of the three beds of ore and also got a block of submarine areas lying next to the shore and containing about three square miles. The land ore beds of the two companies overlap, one company working in some cases directly underneath the other, but in the submarine areas each company owns all the ore there is in its holdings.

When building their new pier, the Scotia Company took advantage of a great gulch near it to construct an immense storage pocket of ore. By very little work, this break was converted into a storage receptacle of much greater capacity than the one formerly used.

For two years after opening the Scotia bed the ore was secured simply by stripping and quarrying the ore lying near the surface. In 1902, however, work was commenced sinking two slopes on the land areas. Work was carried on rapidly, and within a year the two mines had been opened up and were being worked in a manner similar to the bord-and-pillar method followed in coal mining. Both these slopes were sunk at a considerable height above tide-water, and one of them

BOILER ROOM AND ENGINE HOUSE OF SUBMARINE HOISTING PLANT.

was driven so as to come out on the shore above high water mark, thus forming an adit. The other slope, Scotia No. 2, was destined eventually to be driven under the sea.

About the year 1905 the possibilities of development of the submarine areas began to attract the attention of the Scotia Company. Further additions to its under water holdings were secured, until it owned thirty-five square miles of submarine areas. At the same time the Dominion Company increased its submarine holdings until it held five square miles. The Scotia Company decided to drive a pair of slopes to the submarine areas and, an arrangement having been entered into with the Dominion Company by which the slopes were to be driven through the areas belonging to the latter corporation, work on them was commenced in May, 1906. After two and one-half years' work, during which many engineering difficulties were successfully overcome, the Scotia Company entered its own property. Bore-holes were sunk and proved that the same beds that outcropped on the surface extended under the sea with an appreciable increase in the thickness of the mineral.

During the progress of sinking the slopes, several serious faults in the strata were met with. Where work is now being done, however, no

SCOTIA COMPRESSOR HOUSE AND BOILER ROOM.

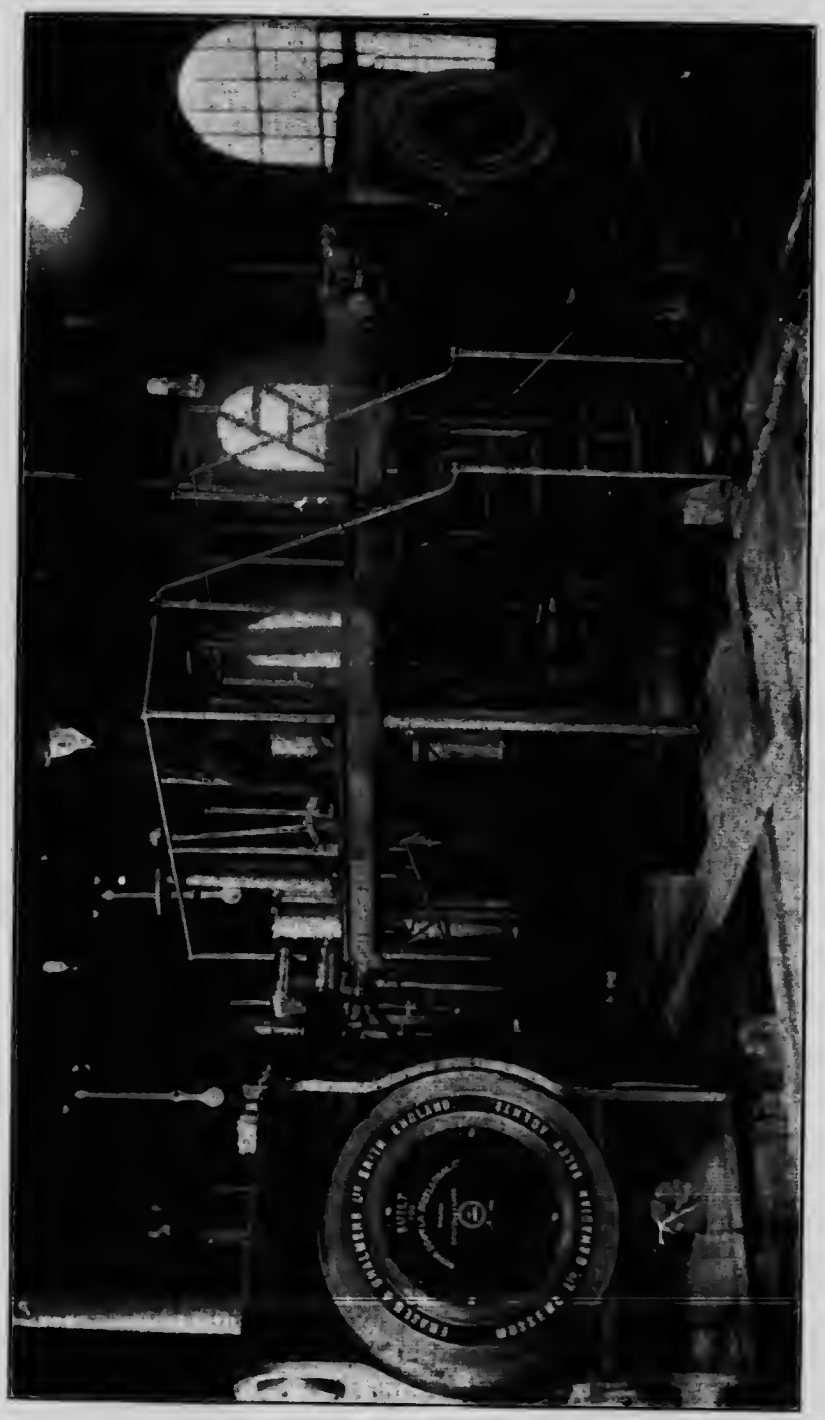
CABLE OPERATED TRAMWAY FROM PIER TO MINE.

TRESTLE AND TIPPLE OVER STORAGE BIN.

faults are encountered. The Scotia areas were entered at a distance of about 4,000 feet from the shore, and conditions were found to be more favourable than had even been hoped for.

Since that time the slopes have been driven two thousand feet farther, and preparations are now nearly completed to mine on a large scale. Levels will be broken off from the slope and systematic mining commenced.

The equipment of the land mines consists of deckheads at each slope, where the ore is picked and screened. In the summer season the ore is shipped direct to the pier. During the winter it is stock-piled by means of a system originated and patented by the engineers of the company. The system is unique, inasmuch as no trestlework is required, although at times the pile reaches a height of seventy-five feet. It has proved very efficient. The equipment comprises a power plant of large capacity, hoisting engines, air compressors, and ventilating fans, with all the necessary pumps, etc. The method of mining is by pillaring and subsequent caving. The development of the submarine areas has necessitated large additions and improvements to the equipment. A deckhead of an absolutely new type, in which the cars are handled without any horizontal landing, has been completed. The cars, each containing


BRAKE & ENGINEERS LTD BRIDGE ENGLAND
BRAKE & ENGINEERS LTD BRIDGE ENGLAND

REVOLVING TIPPLE (CROSS OVER TYPE), TIPPING 2-TON CARS AT PIER STORAGE POCKET—CAPACITY, 12 TONS PER MINUTE.

twenty tons of ore, are hauled up out of the mine by a rope one and one-eighth inches in diameter and eight thousand feet long. They dump their contents automatically, thus reducing the number of men required to attend them to the minimum. The hoisting is done by a Fraser and Chalmers first motion, duplex steam hoisting engine, which is said to be the most powerful of the kind in British North America. This engine is equipped with the most modern overwind and automatic braking devices. The cars are to be filled in the mine from bins, which in turn are supplied by small 2-ton mine cars.

SCOTIA PIER, SHOWING LOADING CHUTE AND AUTOMATIC TRIMMER—TAKEN FROM THE WATER.

Drilling, hoisting, and pumping are all carried on by compressed air. When the company commenced to mine on its land areas two compressors were installed, a 1,200 cubic feet capacity Norwalk machine and a 2,500 cubic feet Norberg machine. Since then a Walker compressor with a capacity of 3,500 cubic feet has been added to this equipment, and the piping of the three machines is connected together so that they may be operated as one plant or separately as required.

A special feature of the plant is the loading pier. It is located at a distance of about five hundred feet from the storage bin and at a lower level. The ore is conveyed from the workings to the storage bin in cable cars and is discharged from the bin on to an endless bucket conveyor. As the buckets pass under the bin they are loaded and pass out to the head of the pier, where they turn over a sprocket wheel and deposit their load into a chute, conveying it into the steamer's hold. There is a continual stream of loaded buckets passing along the top of the pier and a corresponding stream of empties returning to the bin to be loaded. Vessels of seven thousand tons capacity have been loaded in three hours. The normal capacity is 2,500 tons per hour.

A scheme for the ultimate electrification of the whole property is now being installed. This will consist of modern water tube boilers and stokers, built on piles at the shipping pier and adjacent to coal dis-

PIER HEAD AND END OF CALLEWAY, SHOWING STAIRWAY FROM SHIPPING PIER.

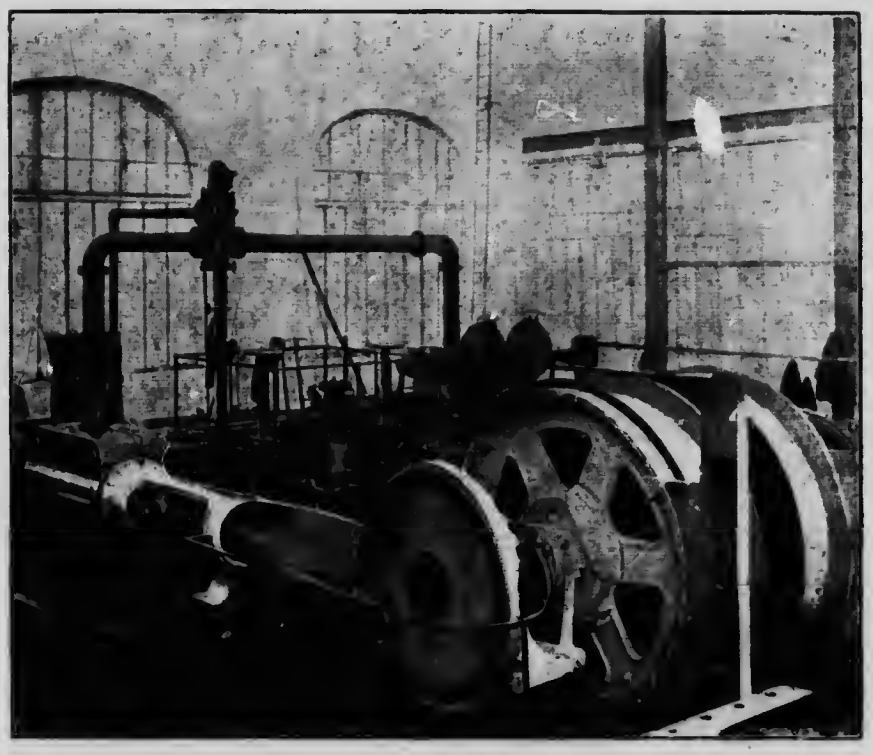
charging plant. These will supply steam to Belliss & Morcom marine type engines, operating Brown, Boveri generators, generating 60 cycle, 3 phase current at 6,600 volts, at which voltage it will be transmitted direct to the various points of consumption in the mines, both land and submarine.

ELECTRICAL POWER PLANT AT PIER DURING COURSE OF ERECTION.

SCOTIA PIER AND POCKET, 25000 TONS CAPACITY—VIEW TAKEN FROM THE WATER.

RUDDER STOCK FOR S. S. KONIGAN HOUSE, BEING CONSTRUCTED AT THE SCOTIA COMPANY'S WORKS FROM STEEL MADE FROM WABANA ORE.

STEEL FROM WABANA ORE BEING MANUFACTURED INTO A CRANK SHAFT FOR TORONTO CITY 15,000,000 GAL. PUMP.



FRASER AND CHALMERS HOIST FOR SCOTIA SUBMARINE MINE.

The ore is well liked wherever used. The average metallic iron percentage is about 53. There have been many tributes paid to it, but one received from a German engineer, whose command of the English language is not perfect, is probably unique. He said that it was "peaceable and well-beloved." What this gentleman was endeavouring to convey was that the ore came in conveniently sized pieces and that the furnacemen had a high opinion of it. During the fifteen years that operations have been in progress about 8,000,000 tons of ore have been taken out.

Following is a list of steamers loaded in 1909, giving destination, tonnage, and time of loading.

NOVA SCOTIA STEEL AND COAL CO.'S S. S. WOBUN LOADING AT SCOTIA PIER.

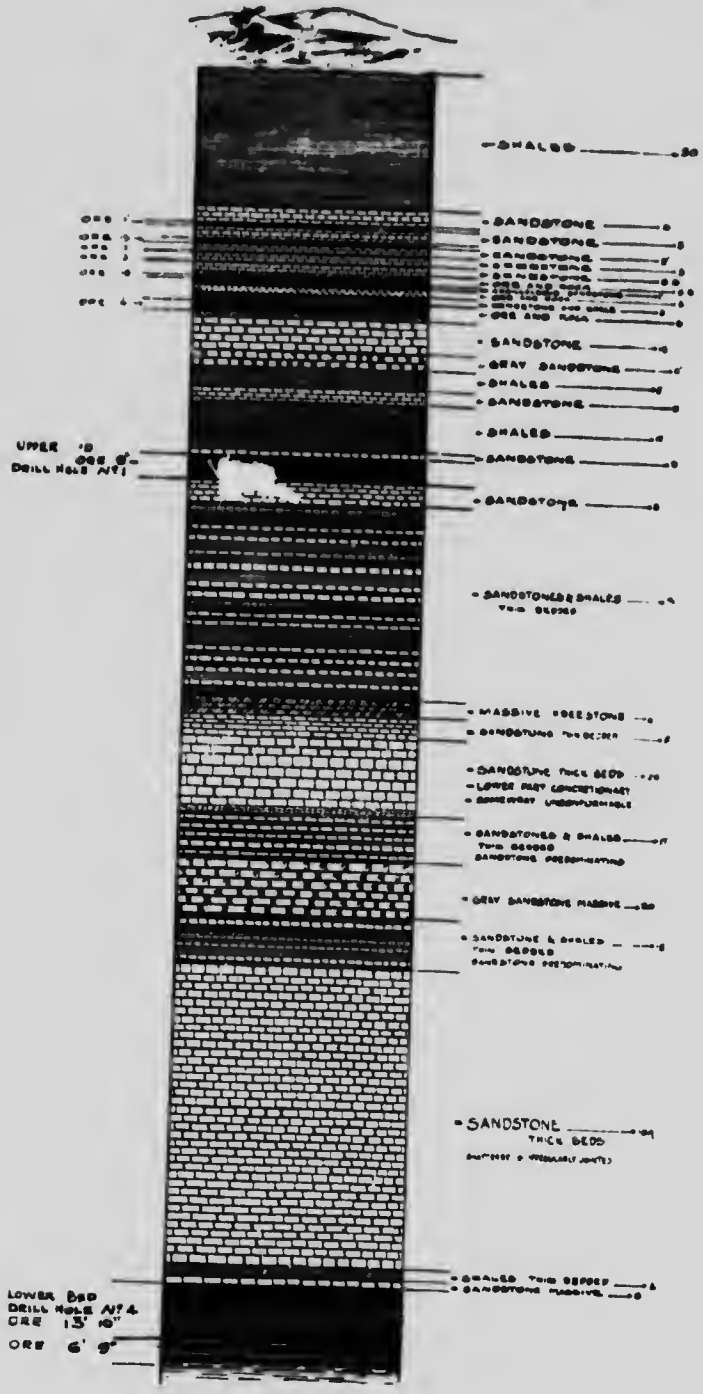
SHIPPING REPORT. SEASON 1909.

STEAMERS.	DESTINATION.	OUT-TURN.	LOADING.
Wegadesk	Rotterdam	6676	3 hours
Wacousta	Philadelphia	5326	3 "
Kamfjord	North Sydney	920	¾ "
Fimreite	Philadelphia	6291	4 "
Urania	Middlesboro	3321	3½ "
Wegadesk	North Sydney	7360	4 "
Fimreite	Philadelphia	6370	4 "
Bratsberg	North Sydney	6455	4½ "
Hermes	Philadelphia	6362	3½ "
Fimreite	Middlesboro	6225	4 "
Olaf Kyrre	Ardrossan	4609	3 "
Othello	Rotterdam	6037	3¼ "
Admiral Borresen.....	"	6220	4 "
Kamfjord	North Sydney	940	¾ "
Bratsberg	Philadelphia	6383	4½ "
Urania	North Sydney	3750	3 "

Hermes	Philadelphia	6532	3¾	"
Horda	New York	4164	3¼	"
Regulus	Philadelphia	1763	1¼	"
Benedick	Middlesboro	4030	3	"
Kamfjord	North Sydney	950	½	"
Fimreite	Rotterdam	6283	4½	"
Bratsberg	Philadelphia	6465	4	"
Othello	North Sydney	6100	3½	"
Admiral Borresen	Rotterdam	6192	4	"
Sjostad	North Sydney	1625	1½	"
Horda	Middlesboro	4159	2½	"
Othello	Philadelphia	6129	3½	"
Finn	Rotterdam	6200	4½	"
Bratsberg	Philadelphia	6432	4½	"
Hermes	Rotterdam	6411	3	"
Olaf Kyrre	Philadelphia	4780	3	"
Eva	New York	4600	3	"
Benedick	Middlesboro	4066	2½	"
Fimreite	Rotterdam	6158	3½	"
Othello	Philadelphia	6129	4½	"
Kamfjord	North Sydney	800	½	"
Admiral Borresen	Rotterdam	6425	4	"
Bratsberg	Philadelphia	6580	4	"
Olaf Kyrre	Middlesboro	4670	3	"
Finn	North Sydney	6600	4½	"
Hermes	Rotterdam	6300	4	"
Othello	Philadelphia	6170	4	"
Finn	North Sydney	6600	4	"
Fimreite	Philadelphia	6500	4	"
Benedick	Ardrossen	4030	3	"
Bratsberg	Philadelphia	6540	4	"
Othello	"	6110	4	"
Admiral Borresen	Rotterdam	6398	4	"
Horda	"	6350	4	"
Hermes	"	4225	4	"
Kamfjord	North Sydney	930	¾	"
Fimreite	Middlesboro	6300	4	"
Olaf Kyrre	Philadelphia	4820	3	"
Bratsberg	"	6520	4	"
Felix	North Sydney	3450	1¾	"
Benedick	Philadelphia	4100	3½	"

Othello	"	6190	4	"
Bratsberg	Rotterdam	6350	4	"
Admiral Borresen	Philadelphia	6400	3	"
Felix	North Sydney	3540	2	"
Hermes	"	6500	4	"
Horda	Middlesboro	4225	3½	"
Benedick	Ardrossen	4075	3	"
Felix	North Sydney	3400	2¼	"
Hermes	Philadelphia	6480	4	"
Olaf Kyrre	Middlesboro	4660	5	"
Othello	Philadelphia	5980	3¼	"
Regulus	"	1750	1¼	"
Kamfjord	North Sydney	800	½	"
Admiral Borresen	Rotterdam	6030	4	"
Felix	North Sydney	3430	2½	"
Kamfjord	"	800	½	"
Othello	Philadelphia	5970	4	"
Hermes	North Sydney	6375	3½	"
Bratsberg	Philadelphia	6480	4¼	"
Horda	Middlesboro	4175	3¾	"
Felix	North Sydney	3420	1 1-3	"
Kamfjord	"	800	¾	"
Hermes	Philadelphia	6450	3½	"
Olaf Kyrre	North Sydney	4720	3½	"
Bratsberg	Philadelphia	6470	4½	"
Kamfjord	North Sydney	750	1¾	"
Regulus	Philadelphia	1727	2	"
Wasis	North Sydney	75	¼	"
Taurus	Philadelphia	7300	5	"
Hermes	"	6350	5	"
Felix	North Sydney	3400	2	"
Wacousta	"	5150	4	"
Ellen	Philadelphia	6700	4½	"
Bratsberg	"	6330	4	"
Wegadesk	"	7000	3½	"
Olaf Kyrre	Middlesboro	4480	3	"
Kamfjord	North Sydney	750	3¼	"
Wobun	"	2300	2	"
Wacousta	Philadelphia	5300	4	"
Wegadesk	"	6000	8	"

While the deposit is now a very valuable one, its value is increasing on account of the gradual depletion of other deposits. In recent years there has been a growing feeling of unrest as to the future supply of ore, accentuated by the fact that the principal deposits, particularly in the United States, have fallen into the hands of big corporations. The amount of ore imported into the United States is increasing every year, and this circumstance adds to the value of the Wabana deposit. With the extent of the Wabana areas being proved larger every year, the progress of time must inevitably make these deposits of very great importance.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MASSIVE FREESTONE
SANDSTONE
SANDSTONE THICK BEDS
SANDSTONE & SHALES
THIN BEDDED
GRAY SANDSTONE MASSIVE
SANDSTONE & SHALES
THIN BEDDED
SANDSTONE
THICK BEDS
SHALES THIN BEDDED
SANDSTONE MASSIVE
UPPER BED
DRILL HOLE No 1
LOWER BED
DRILL HOLE No 4.
ORE 13' 10"
ORE 6' 9"


I leaf
OF
VABANA
SHOWING
& SUBMA
NING AR
cotia Steel &
cale :- 20 ch
Vertical Sc

SUBMARINE AREAS OF THE NOVA SCOTIA

TITLE FROM

21 SQ

D I. &

2½ SQ MILE

SUBMARINE AREAS OF THE NOVA SCOTI

HELD UNDER GRANTS IN

12½ SQ

SUBMARINE AREAS OF THE DOMINION

3 SQ MILES

COTIA STEEL AND COAL COMPANY LIMITED

FROM CROWN

21 SQ MILES

S. Co LTD.

MILES

SCOTIA STEEL AND COAL COMPANY LIMITED

IN FEE SIMPLE FROM THE CROWN

MILES

MINION IRON AND STEEL Co. L'T'D.

Vertical Section through Bell Island & Belowwater Areas

Plan of WABANA

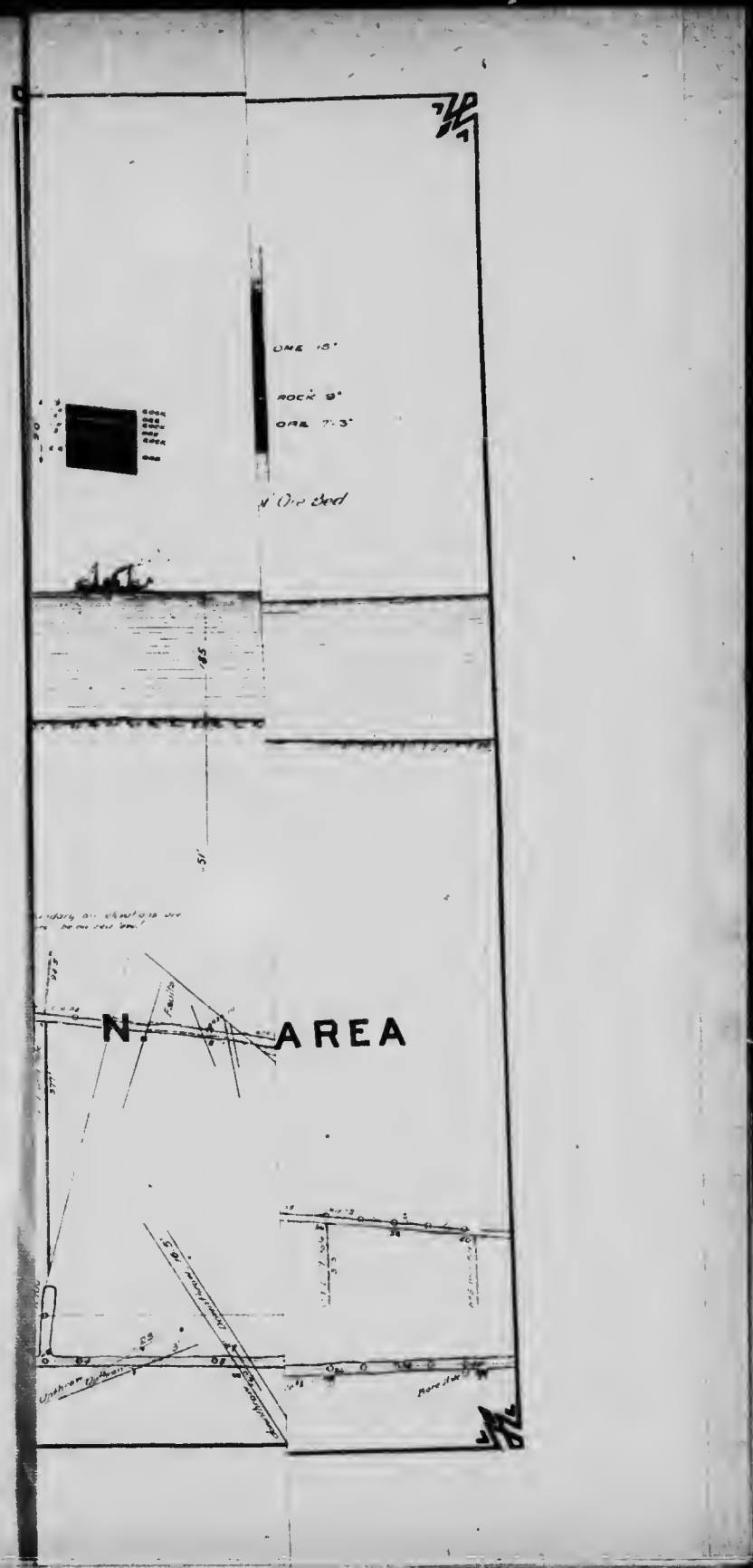
SHOWING

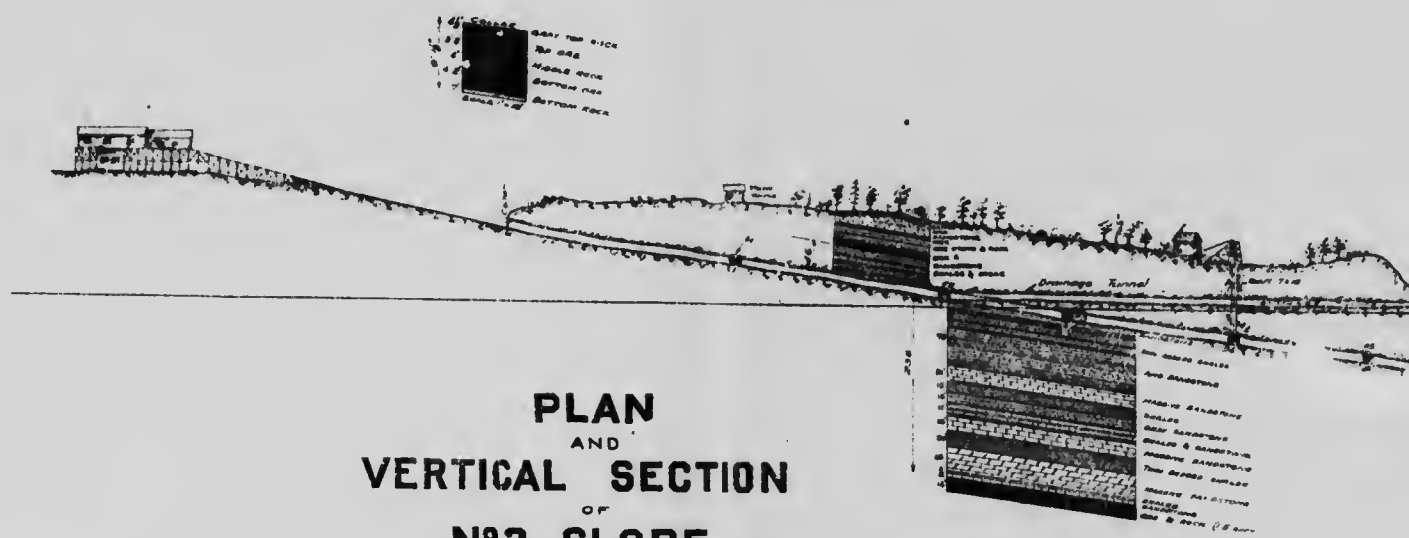
LAND & SUBMARINE

MINING AREAS

Nova Scotia Steel & Coal Co Ltd.

Scale — 20 chains - 1 inch

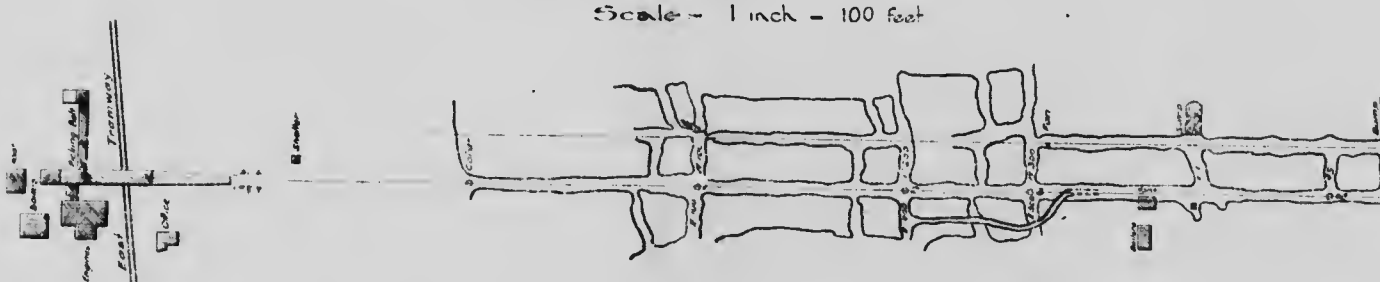

ORE 15'
ROCK 9'
ORE 7.3'
N Dip East
N AREA



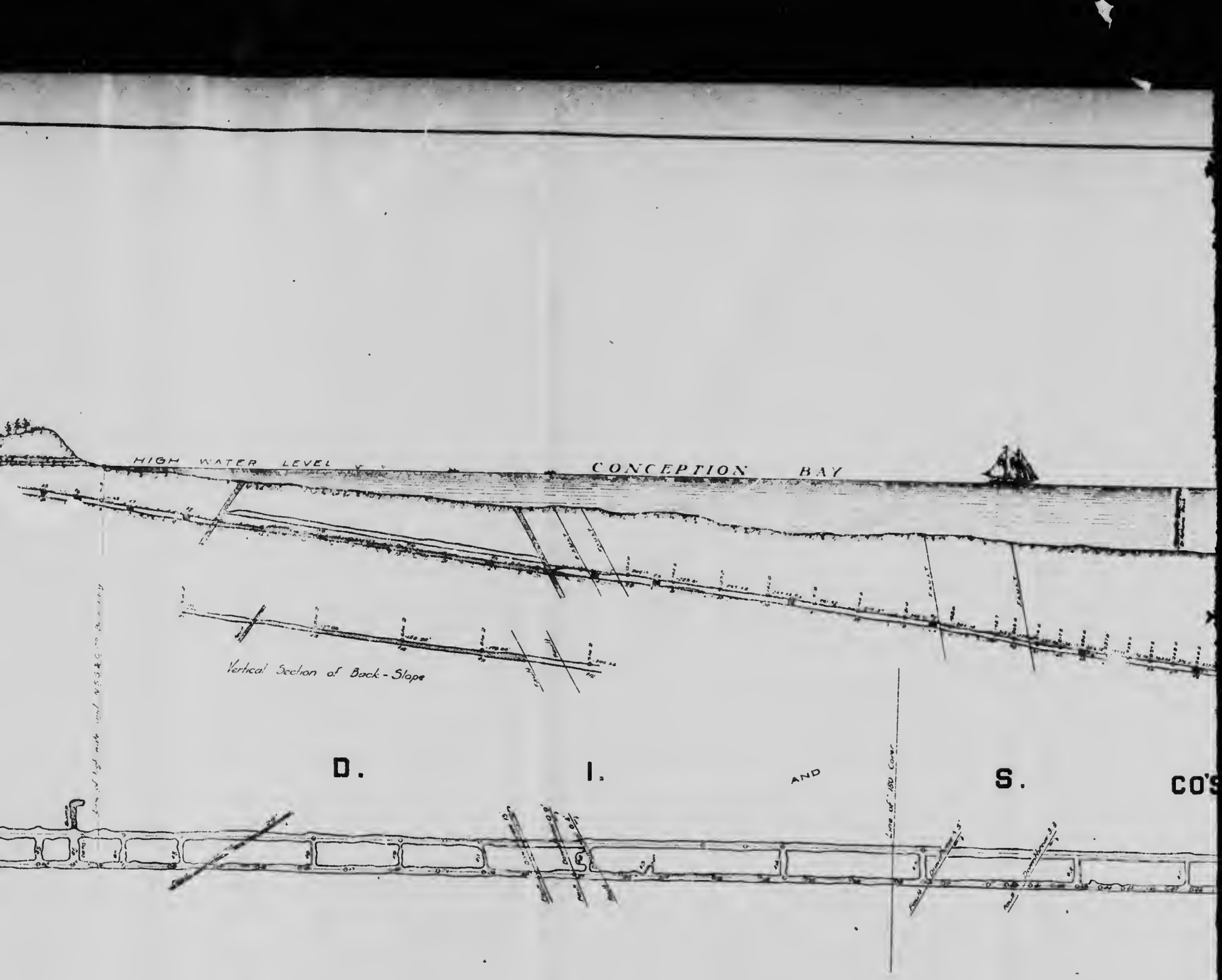
PLAN
AND
VERTICAL SECTION
OF
Nº2 SLOPE
AND
SUBMARINE WORKINGS
N. S. S. AND C. Co, LT'D.

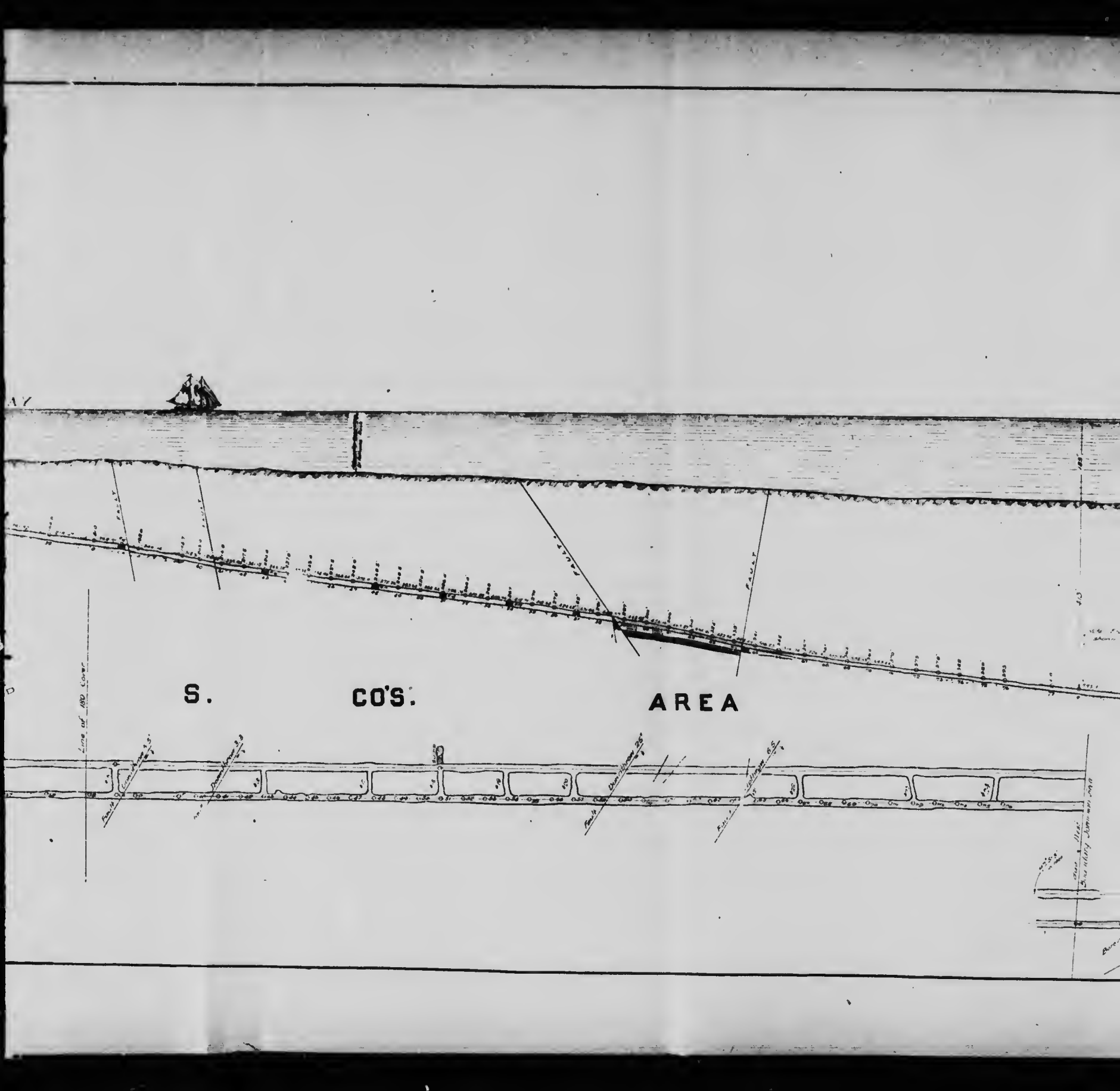
WABANA, N.F.D.

Scale – 1 inch – 100 feet

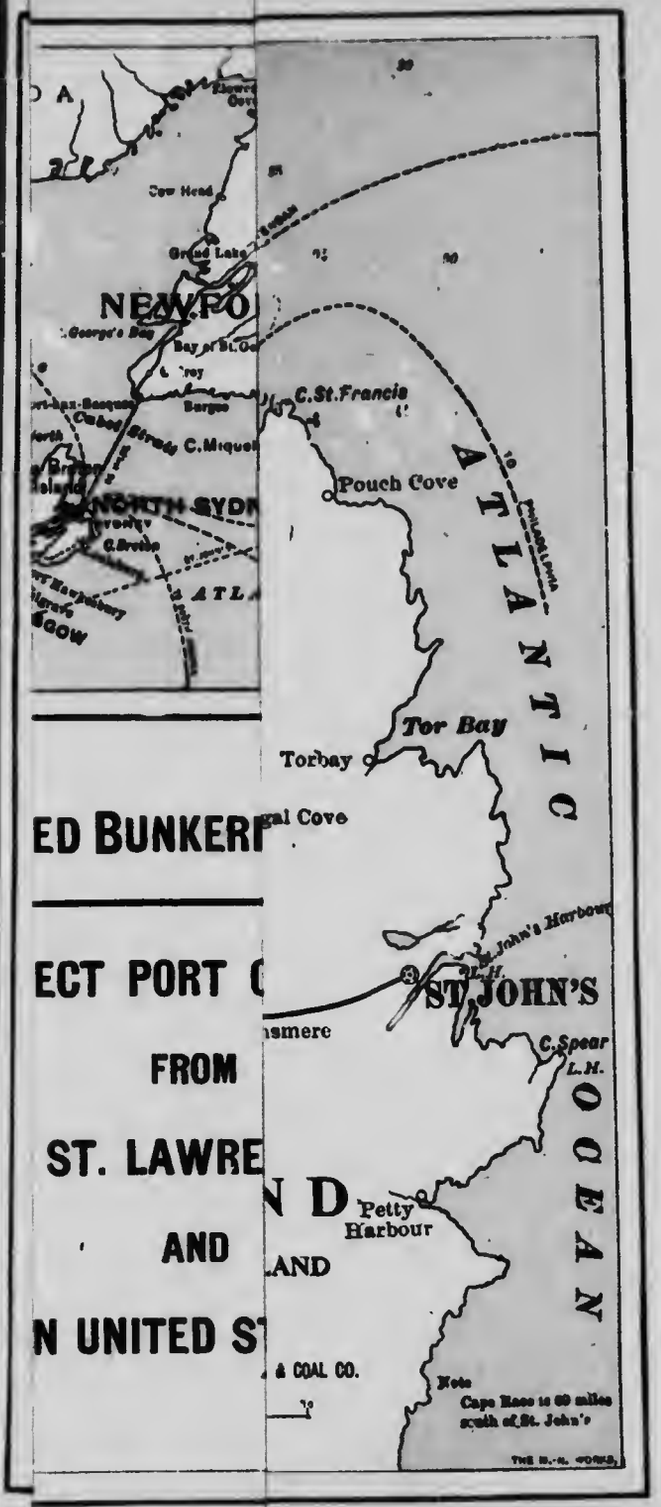


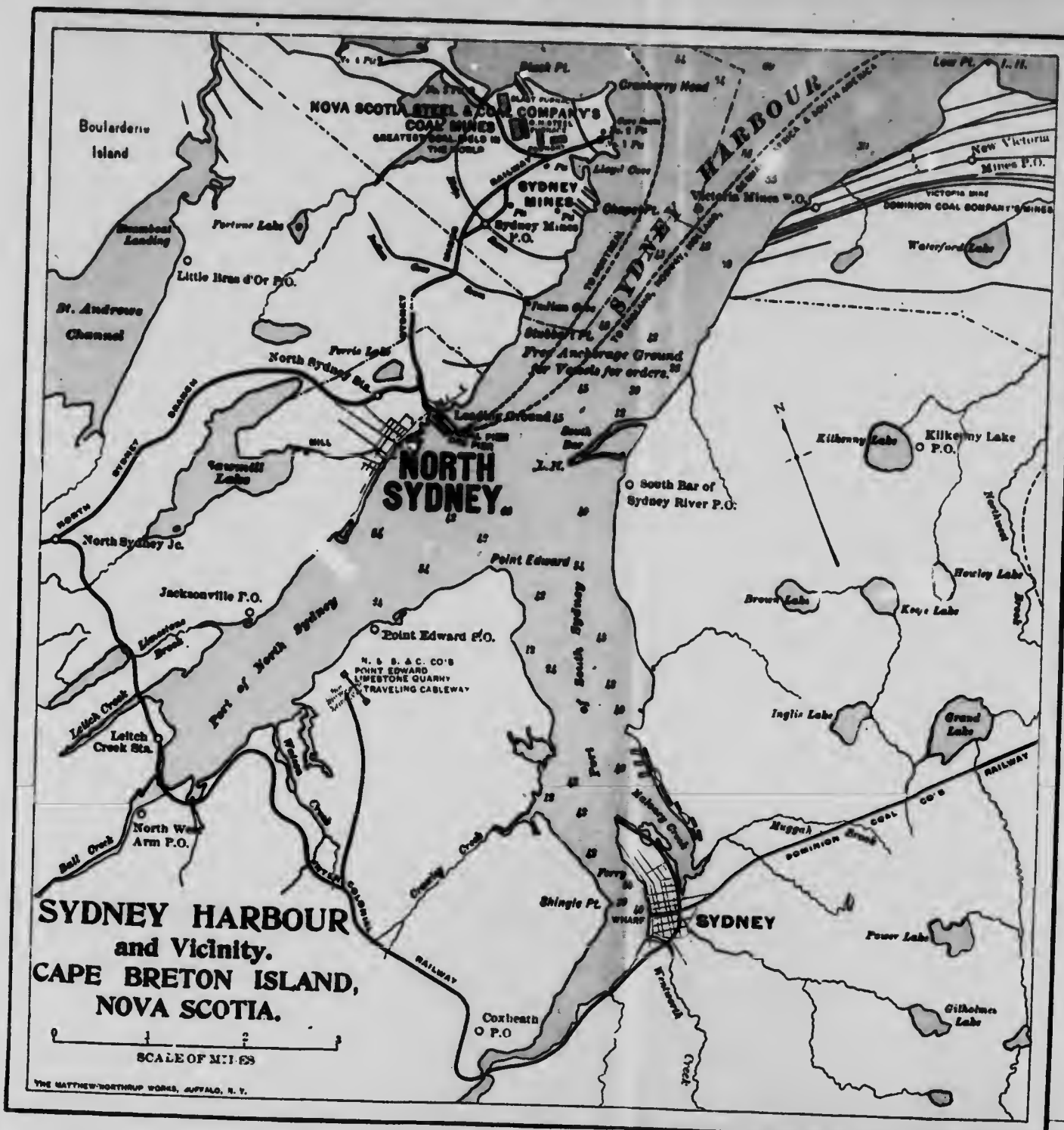
B.71


HIGH WATER LEVEL
CONCEPTION BAY
Vertical Section of Back-Slope
D.
I.
AND
S.
CO'S

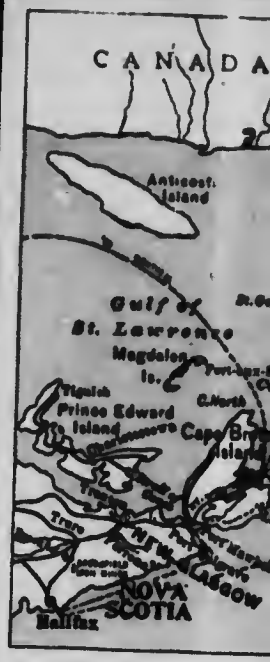

S.
CO'S.
AREA


ORE 15'
ROCK 8'
ORE 7.3'
Section of Ore Bed
N. S. S. AND C. CO'S. AREA


Cow Head
Grand Lake
NEWFO
George's Bay
Bay of St. Ge
Bay
C.St.Francis
Cabot Strait
C.Miquel
Pouch Cove
NORTH SYDN
C.Breton
ATL
GOW
ATLANTIC
Tor Bay
Torbay
al Cove
ED BUNKERI
ECT PORT C
FROM
ST. LAWRE
AND
N UNITED ST
& COAL CO.
St. John's Harbour
ST. JOHN'S
smere
C.Spear
L.H.
N D
Petty Harbour
LAND
OCEAN
Note
Cape Race is 60 miles south of St. John's



SYDNEY HARBOUR and Vicinity. CAPE BRETON ISLAND, NOVA SCOTIA.



UNRIVALLED

DIRECT

ST.

SOUTHERN UN

LLED BUNKERING FACILITIES.

IRECT PORT OF CALL

FROM

ST. LAWRENCE

AND

RN UNITED STATES PORTS.