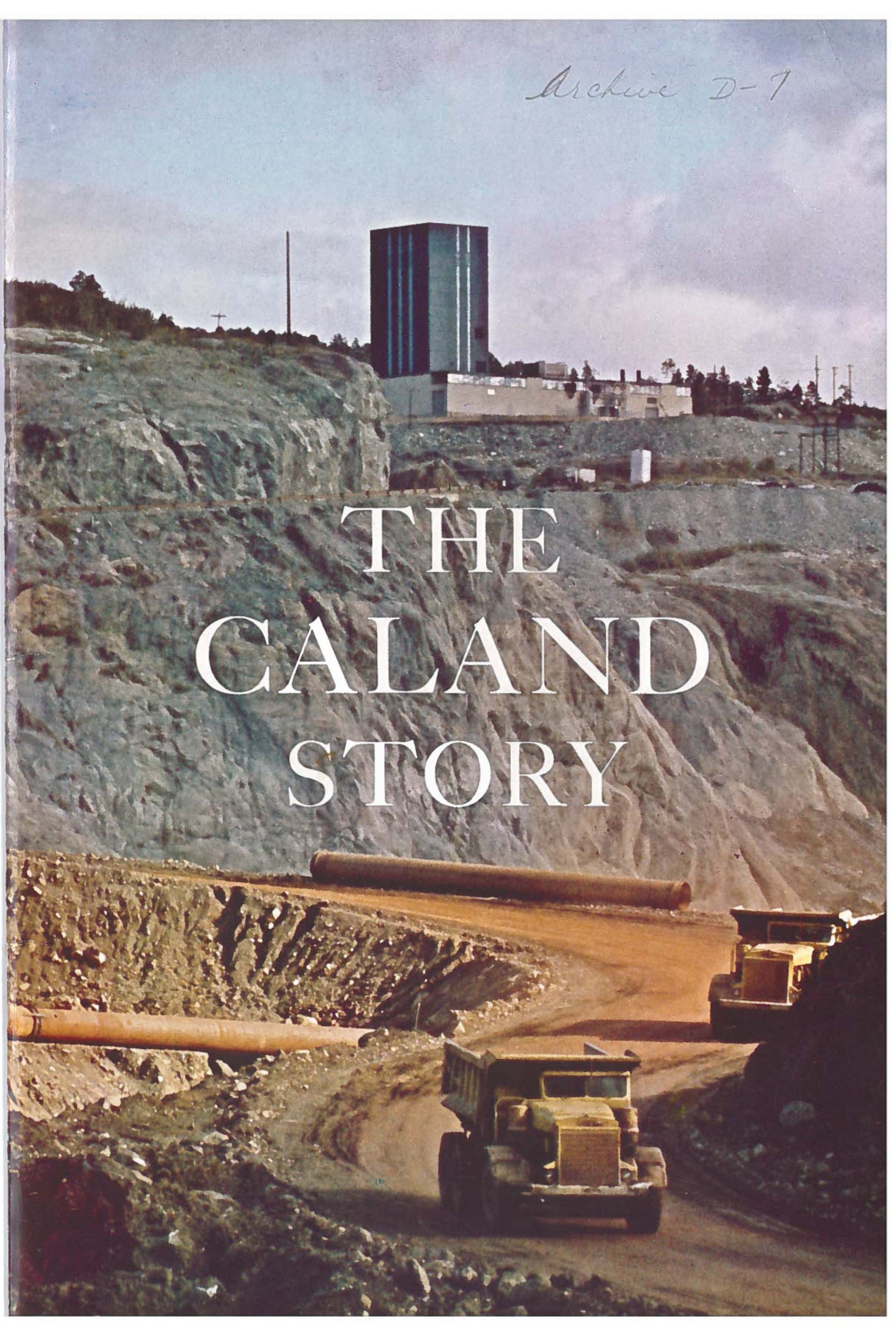
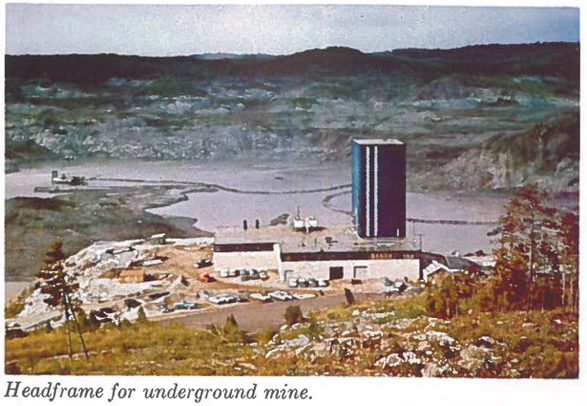
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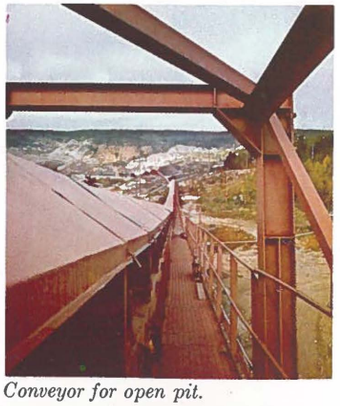


THE CALAND STORY

CALAND UNDER DEVELOPMENT



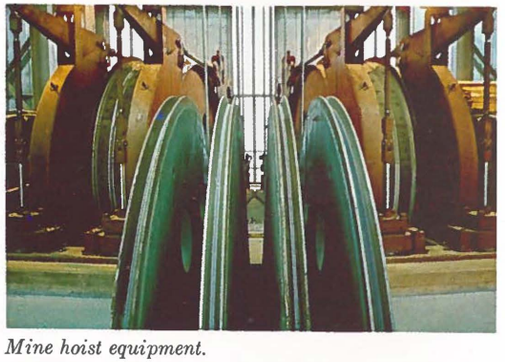
Headframe for underground mine.



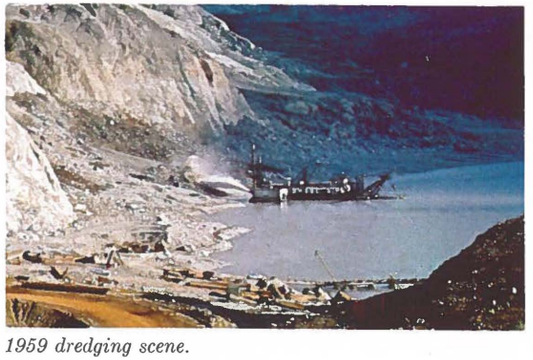
Conveyor for open pit.



Close-up of dredge Joseph L. Block.



Mine hoist equipment.



1959 dredging scene.



Forty-ton euclid ore truck.

MINING DIAGRAM

Caland

CANADIAN IRON ORE PRODUCER FOR INLAND STEEL

The Caland Ore Company, Ltd., Canadian subsidiary of Chicago-based Inland Steel Company, began mining operations this spring of a property that will eventually become Inland's largest source of iron ore.

From a modest annual shipment to the steel plant of 750,000 tons, Caland will eventually produce 3 million tons of iron ore every year. All of it is destined for the furnaces of Inland's giant steel plant at Indiana Harbor, Ind., near Chicago, the third largest steel plant in North America.

Inland can now produce 6,500,000 tons of steel a year at full operations, a rate that requires a comparable amount of iron ore.

Initially the ore will be dug from the lake bottom and, after crushing, conveyed to a railhead. By 1963 underground mining will start.

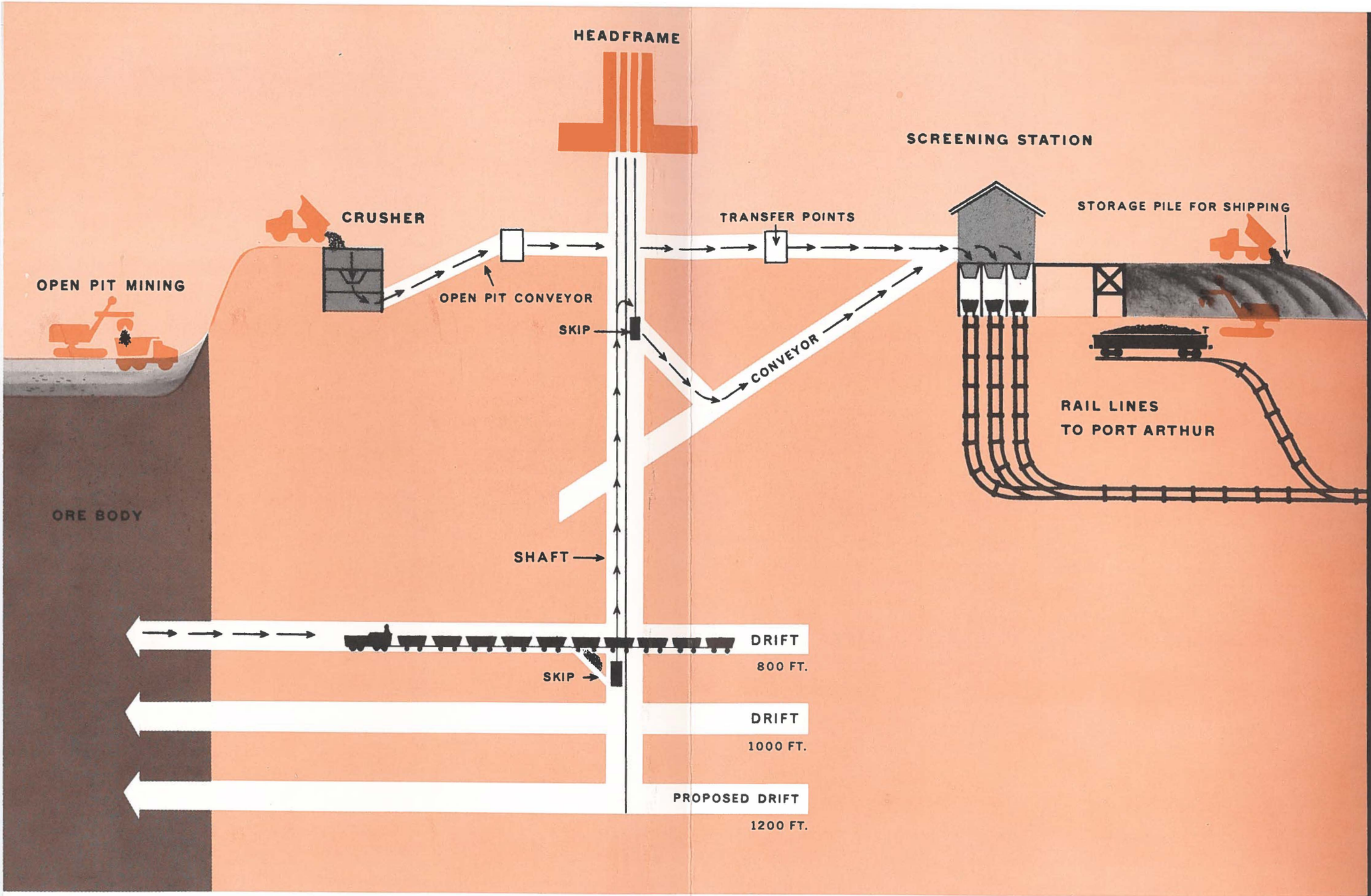
While far apart in distance, (Caland is almost 1,000 miles from Inland's steel plant) the two companies are efficiently linked by the waters of the Great Lakes.

Caland ore is shipped by Canadian National Railway 140 miles from Atikokan to Port Arthur on Lake Superior. There it is dumped into the railroad's ore docks for trans-shipment by lake freighter to Indiana Harbor—a trip that takes a day less than the runs from Duluth-Superior.

Caland has invested $50 million over a 10 year period to develop an ore body which test drillings indicated would yield at least 30 million tons of iron ore for Inland Steel. The ore lay beneath the bed of the Falls Bay area of Steep Rock Lake.

The timetable for the Caland project called for the removal of 160 million cubic yards of lake bottom material in five years so that iron ore could be mined and shipped by the spring of 1960.

Caland has met this schedule in the face of some of the greatest natural obstacles ever encountered in such a project. This booklet describes them.



OPEN PIT AND UNDERGROUND MINING AT CALAND

MINING DIAGRAM

Discovery

BENEATH A LAKE, A MAJOR SOURCE OF IRON ORE

The Caland ore body lies beneath the eastern arm of M-shaped Steep Rock Lake whose total ore reserves are estimated at between one and two hundred million tons. Getting at this rich find took 15 years of war against the forces of nature and the expenditure of upwards of $100 million by both Steep Rock Iron Mines, Ltd., and Caland Ore Company.

The discovery of ore in this lake is attributed to a Canadian mineralogy professor named Julian Cross who first surveyed the area in 1930.

For several years Cross drilled through ice and lake bottom rock to take samples. He proved the existence of ore. But it seemed inaccessible, lying beneath the waters of a deep lake and 380 feet of glacial silt, slime, and gravel.

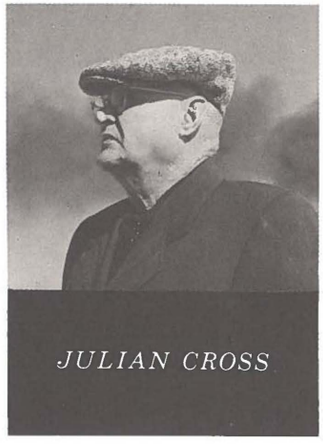
World War II created a need for this ore. Reports to Washington in 1942 indicated that the United States might not have enough high grade ore to last through a long war. Also, a high percentage of ore boats trafficking between the United States and South America were being sunk by Nazi submarines.

The post-war dwindling of high grade American ore reserves in the face of a possible doubling of America's steel capacity by 1975 added urgency to the Steep Rock project. More ore would be needed to feed American iron and steelmaking furnaces.

If ore could be mined and shipped from Steep Rock, mid-continental steel producers, dependent on Great Lakes shipments, would have additional reserves right in their backyard.

Cross, with three associates, began operations in 1938. Joe Errington, a mine developer was one; the other two were Major General D. M. Hogarth, and a young mining engineer, M. S. (Pop) Fotheringham.

It was Fotheringham who proposed one of the greatest engineering feats of all time: divert the Seine River whose waters flowed into Steep Rock Lake, drain two center arms of the 15 mile long lake and scoop out open pit ore from the dry lake bottom.



A mineralogy professor from the University of Toronto, he conducted exploratory drilling in Steep Rock Lake in 1930, discovered existence of ore.

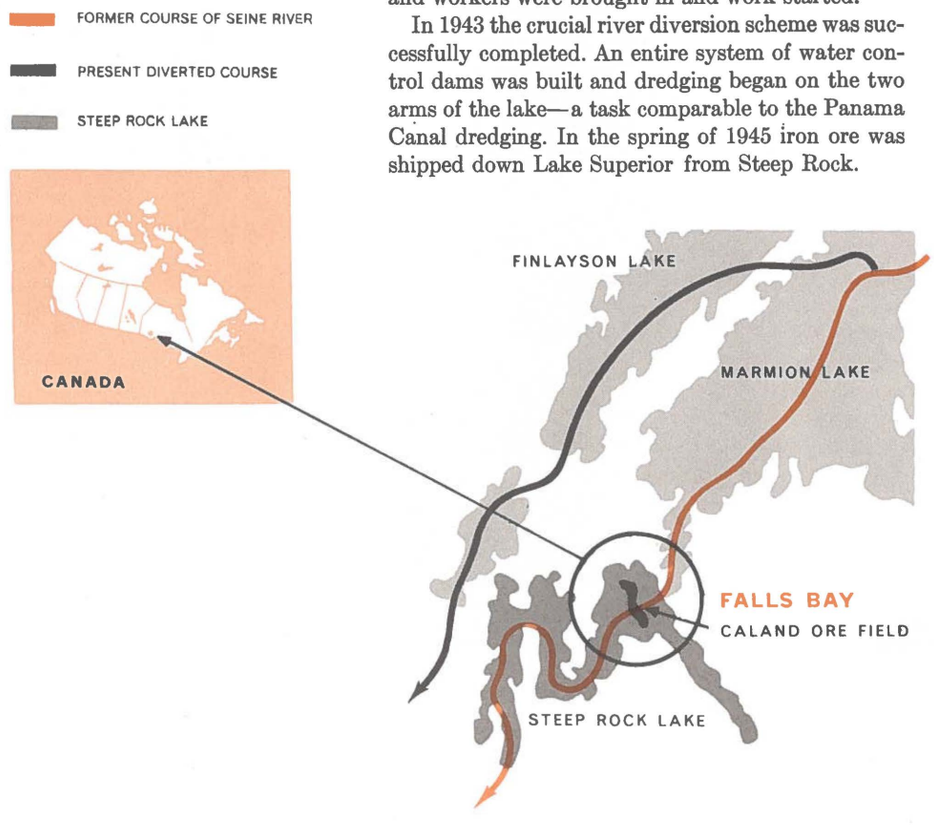
The Seine flowed first into Marmion Lake which emptied into Steep Rock Lake. Fotheringham proposed to dam up Marmion Lake at its lower end, reverse its flow and empty its waters through a man-made channel into nearby Finlayson Lake, which would be drained into the western arm of Steep Rock Lake and on to its natural course.

The difficulty was that Finlayson Lake was 33 feet higher than Marmion. Fotheringham proposed dropping the level of Finlayson 53 feet. He wanted to cut a channel through the hard rocks under Finlayson and through a series of artificial channels let the water out. Proposed cost? Ten million dollars.

Hogarth appealed to financier and steel-maker Cyrus Eaton who persuaded the United States government to lend him $10 million. Then he raised an additional $3,500,000, needed to start the mine.

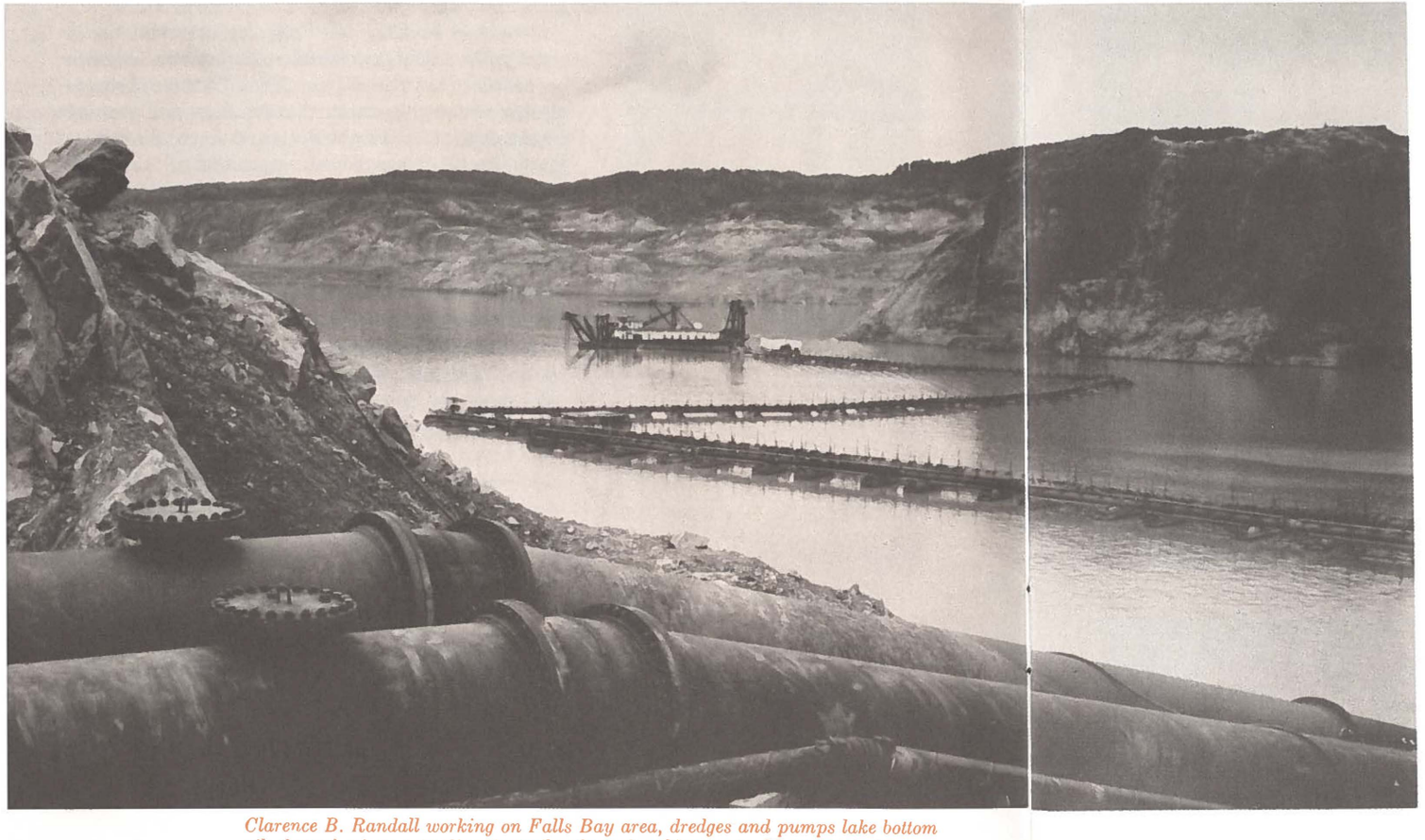
After this backing, the Canadian National Railways put in a spur, purchased rolling stock and built an ore dock at Port Arthur. The Ontario Hydro-electric commission built a power plant and strung a transmission line from Port Arthur to the Steep Rock site. Equipment including mammoth dredges and workers were brought in and work started.

In 1943 the crucial river diversion scheme was successfully completed. An entire system of water control dams was built and dredging began on the two arms of the lake—a task comparable to the Panama Canal dredging. In the spring of 1945 iron ore was shipped down Lake Superior from Steep Rock.



Development

FIVE YEARS OF DREDGING FOR AN IRON ORE CANYON



Clarence B. Randall working on Falls Bay area, dredges and pumps lake bottom silt through pipes extending five miles through wilderness to Marmion Lake.



Inland geologists inspect map of Falls Bay area.

A team of Inland geologists exploring for Canadian iron ore in 1948 was briefly excited by some reddish brown deposits on the shores of Straw Hat Lake, a few miles south of Steep Rock Lake in western Ontario.

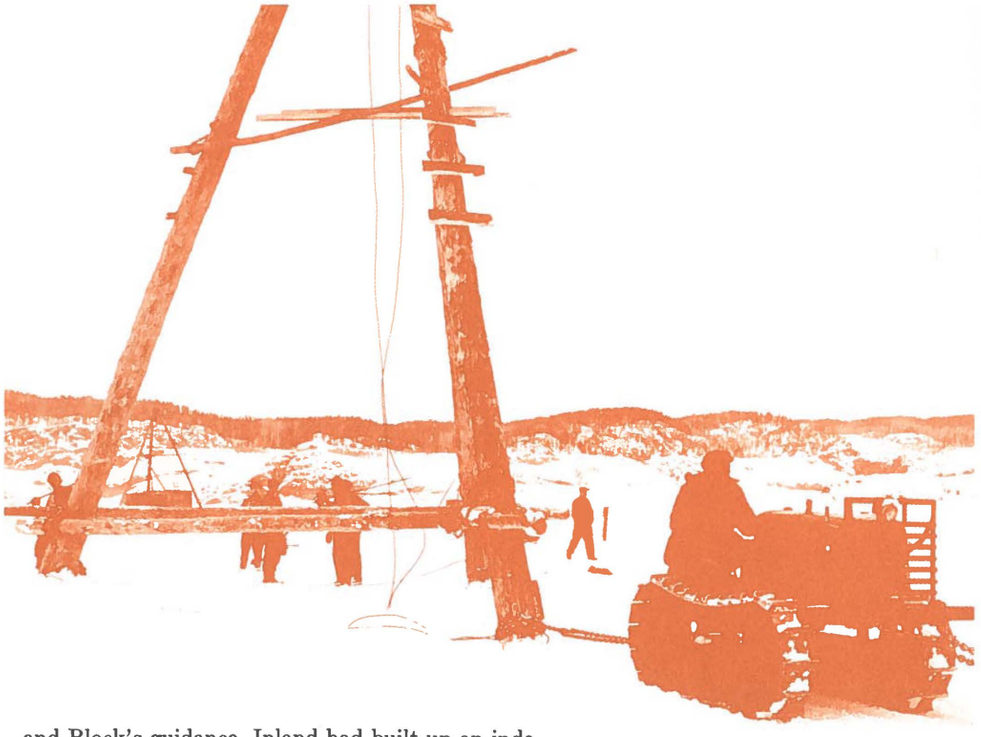
Ralph Archibald, leader of the team, considered the probabilities of finding ore in the Straw Hat and weighed them against investing in the development of a proven ore deposit at Steep Rock Lake. He knew that Steep Rock Iron Mines, Ltd., was already mining two ore bodies, but that its "C" body still lay beneath the waters of one arm of the lake.

It occured to him that perhaps Steep Rock would agree to an arrangement whereby Inland might develop and mine the "C" ore body on a royalty basis.

He outlined his recommendation to A. J. (Fred) Cayia, who was then heading Inland's ore mining and limestone quarrying operations.

Cayia went up to Steep Rock to see the operation for himself. He foresaw the potential value of Archibald's idea to Inland. The company was looking for a large source of rich ore that could be shipped directly over the Great Lakes to its steel mill on the southern shore of Lake Michigan. Such an ore find was what the company needed to pursue its ambitious expansion plans, encompassing doubling its steelmaking capacity within 12 years.

Cayia described the Steep Rock development to his boss, P. D. Block, Jr., then Inland's raw materials vice president, now vice chairman of Inland. Block liked the idea and took it up with Clarence B. Randall, then president of Inland. Under Randall



Drilling rig on ice-covered Falls Bay area in 1955.

and Block's guidance, Inland had built up an independent ownership of an interlocking system of coal, iron ore and limestone operations, as well as a fleet of five ore vessels. This system of mine to mill integration had enabled Inland, a once small steel operation, to become, in an industry known for its giants, the largest independent steel firm in the Midwest.

Randall gave the go-ahead and Inland acquired an option to lease the property in 1949.

The ore lay beneath the mile square eastern arm of M-shaped Steep Rock Lake, known as Falls Bay.

For three years a Canadian drilling team, Boyles Brothers, performed the laborious job of determining the direction, extent, and tonnage of the "C" ore body. In the 40-below Canadian winters they plunged their drills through the thick ice of the lake overlying the ore, and sent them hundreds of feet beneath the waters, glacial silt and into the ore to "prove up" the deposit.

Their drillings indicated an ore bed of approximately 30 million tons. For Inland this was the evidence it needed to invest in the ore body's development.

In 1953, P. D. Block, Jr., of Inland and M. S. Fotheringham, president of Steep Rock Iron Mines, Ltd., announced that the Caland Ore Company, a Canadian subsidiary of Inland, had leased the ore property for 99 years.

Before Caland could get at this ore 160 million

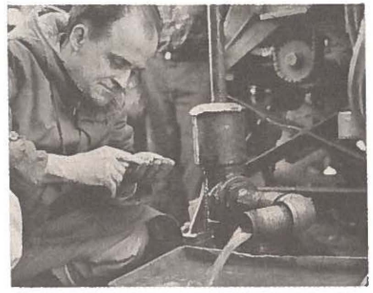


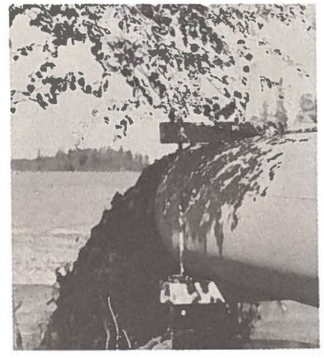
Specially designed tug boat kept ice broken in winter so drilling could continue.

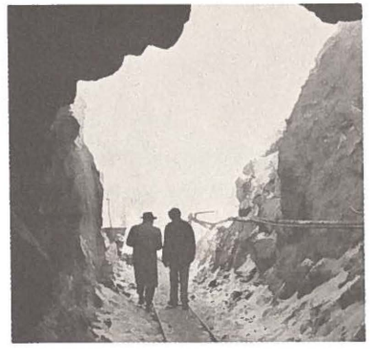
Inland geologist inspects lake bottom material for iron ore during scout drilling period.

Lake bottom silt cascades into Marmion Lake, five miles from dredges and pumps.

Margaret Lake tunnel was carved to divert drainage of one area into another river system.







cubic yards of clay, silt, and gravel had to be dredged out and deposited in adjoining Marmion Lake. This was the core problem, but it raised others that seemed just as insuperable. A road had to be slashed through seven miles of wilderness between Atikokan and the Falls Bay area, so that the heavy equipment and the workers could get to the site. The huge dredges and miles of mammoth steel pipe needed to carry away the silt had to be brought in. The pipes could be, but not the dredges so they were brought in piece by piece, assembled on the shores of the lake, and launched in 1954. They were christened Joseph L. Block, for Inland's present chairman, and Clarence B. Randall, the company's chairman at that time.

Marmion Lake was available for silt deposit, but it flowed into the Seine River, already diverted from Falls Bay by the Steep Rock Company. Something had to be done to prevent the silt from contaminating the river and destroying it as a scenic attraction and fishing source.

Caland solved the problem by building a series of dams between islands on the lake, sealing part of it off for a silt basin whose waters would not readily mix with the part of the lake that was on the Seine River course.

Another critical problem associated with dredging was that of obtaining recharge water. This is water that is reintroduced into the dredging area to provide the liquid for diluting the silt so it can be pumped away.

This water had to be relatively free of silt. (The ideal dredge burden is about 80 per cent water and 20 per cent solid material.) The recharge water was obtained through Twin Lakes adjoining Marmion Lake and was uncontaminated by dredged out silt.

Several other dams were built to prevent water flow from other lakes into the Falls Bay area. Some of this water was also diverted from its natural flow into Falls Bay to the Atikokan River system.

The dredging began in April of 1955. Day and night, seven days a week, the big dredges worked cutting into the lake bottom and pumping the silt through 3 foot diameter pipes, five miles through the wilderness into Marmion Lake.

In the winter when the Arctic cold built ice surfaces on the lake as thick as three feet, a specially designed tug boat brought in by railroad smashed and crushed the ice. This kept the floating pipelines from freezing into a rigid position locking in the dredges and preventing them from shifting their position. Sometimes ice was hauled away by the truckload to keep the water in the dredging area free of ice.

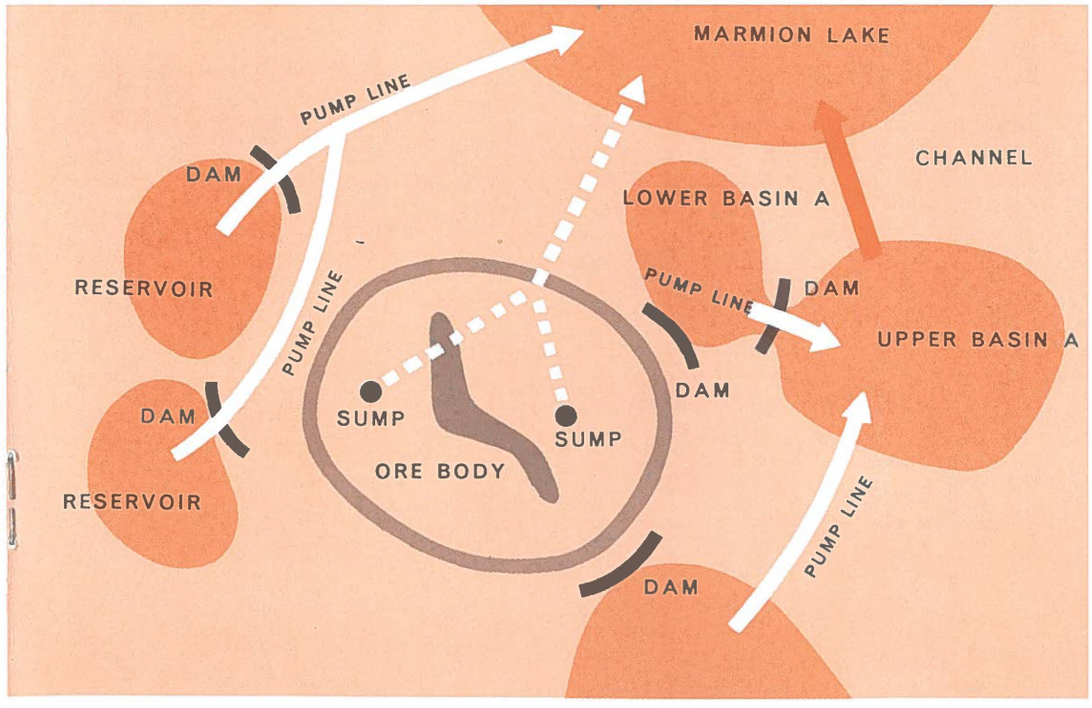
Under Caland's agreement with Steep Rock, ore was to be shipped from the "C" ore body in 1960. Caland planned to mine initially by the open pit method until the ore could no longer be removed economically this way and then change to underground mining.

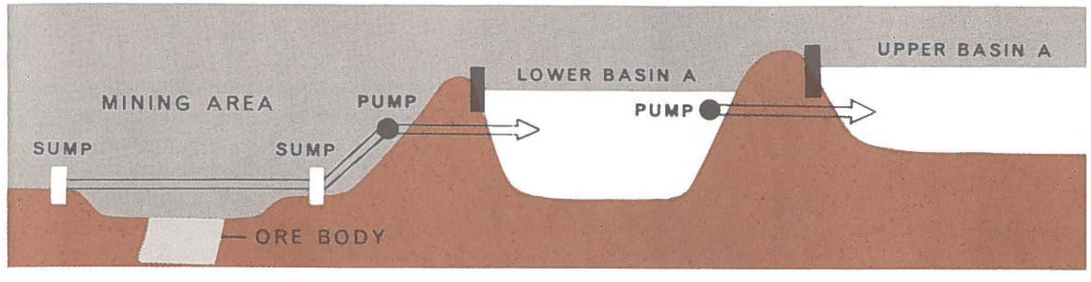
In 1956 the Patrick Harrison & Company, Ltd., a firm of mining contractors, was hired by Caland to sink the underground shaft. It was dug to a 1,300 feet depth with stations for "drifting" into the ore body cut at 400, 800, 1,000, and 1,200 feet. Construction of a headframe and service building was undertaken after the shaft was completed.

Meanwhile dredging continued and the lake was gradually lowered and the first ore was exposed at the foot of Lime Point on the northern end of the lake in 1957.

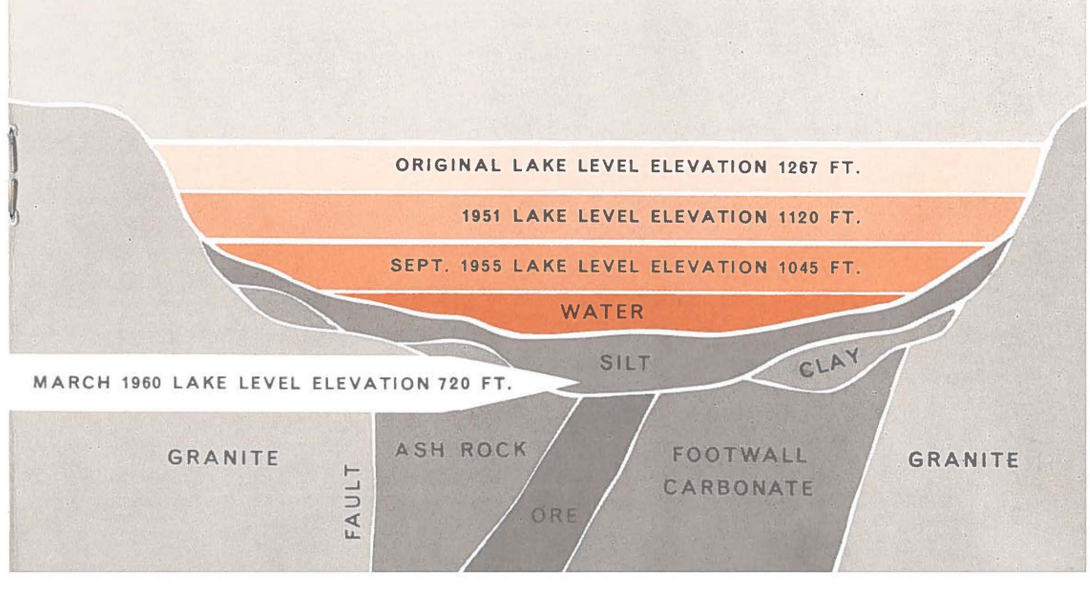
This ore was to be mined by the open pit method. Trucks would carry it to a crusher which would feed the ore on to a conveyor system running one mile to a railhead 450 feet above the mining area. By mid-1959 open pit equipment was on the site and stripping operations began. The first ore, shipped on May 3, 1960 to the loading dock at Port Arthur, fulfills the schedule set in 1949, when Caland first acquired its option.

The swing to undergound operations will start in 1963 and by 1969 Caland expects to ship 3 million tons a year to Inland Steel's Indiana Harbor works.





Elaborate water diversion system was built by Caland to protect dredging area in Falls Bay where "C" ore body lay. Diagramatic charts show revised water flow, dredging progress on lake.



Atikokan

TOP PRIORITIES: MORE CLASSROOMS, NEW HOMES

The name Atikokan, the booming mining town near Steep Rock Lake, has an aboriginal sound whose precise meaning seems in doubt. Most generally accepted is the derivation, Aticosepi, an Indian word, whose possible meaning ranges from moose bones to Caribou River.

In the late 1800's the town was a division point for the Canadian National Railway's branch line between Port Arthur and Fort Frances. In 1899, a gold prospector, Thomas Rawn, and his wife pitched their tent and became the town's first settlers. Rawn later built the first hotel, and after unsuccessfully trying his hand at sheep farming, resumed prospecting, only to disappear in the harsh muskeg country of western Ontario.

The community grew undramatically, reaching a population of only 300 by 1943. But from that year the population exploded in a decade to 7,000, as Steep Rock Iron Mines, Ltd., and Caland Ore Company began the development of the Steep Rock iron range. Within five years, when both mining companies reach full capacity the population is expected to double.

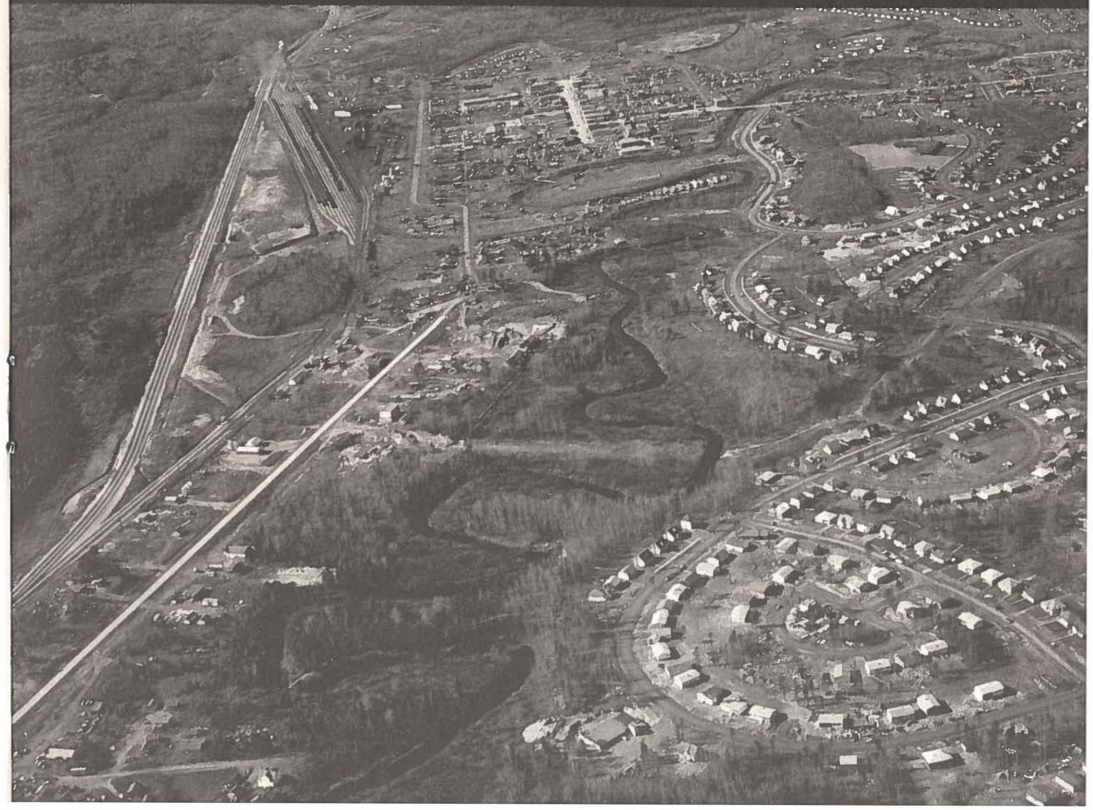
At present 25 per cent of Atikokan's residents work for Steep Rock Iron Mines or Caland. Caland, with 200 employees currently living in the town, expects to employ more than 1,000 when its mines reach capacity operations.

What kind of town is it?

A quick automobile tour around its streets provides a clue. There are three banks, several hotels, a pair of movie houses, and gently curving residential streets lined with brand-new homes. Yet only a few streets in the town are paved.

Once a year the town council considers paving plans drawn up many years ago by previous city planners, only to shelve them. Why? Atikokan's promising economic future has attracted scores of







young couples, expecting exciting opportunities in a modern, yet pioneer community. They have given the town Ontario's highest birth rate (45 per thousand compared with 25 for the rest of the province). With its inundation of new children Atikokan must earmark a high percentage of its tax money for schools instead of paved streets.

One member of the school board described the problem. "For the last four years, we have either built a new school or added to an old one each year, 30 new classrooms in all. Right now we have 1,500 pupils in Atikokan grade and high schools, but by 1968 we expect 2,300 in grade school alone."

Atikokan leadership has remained manfully on top of the pressures for new public facilities demanded by incoming Canadians. Housing, schools, sewers, water, sidewalks, and recreational equipment have all been added to accommodate public needs.

The pressure will increase as Caland adds 1,000 employees after 1960. Each represents a family totaling 3.5 more residents on the average or a total of 3,500. By 1968 Atikokan's population may approximate 20,000—a 300 per cent increase over 1960.

Caland people have assisted a core of dedicated Atikokan citizens in planning for the town's future. Former Caland Manager Philip D. Pearson who managed the five-year developmental work was a mem-



Street paving has been deferred until more class rooms are built for growing Atikokan children.



Atikokan citizens "liven up" neighborhoods with fence painting.



Favorite Atikokan winter sport is curling—game imported from Scotland.

Moose painted on wall of home is appropriate symbol of Atikokan.





ber of the Municipal Planning Board. E. W. Whitman, currently in charge of Caland's open pit operations, is now a member of the same board. A dozen other Calanders are active on the recreation council, chamber of commerce, and other community organizations dedicated to improving the town.

Peter P. Ribotto, a resident of Atikokan and vice president of Caland Ore Company, is a member of the board of Atikokan General Hospital and an honorary member of the Atikokan Chamber of Commerce.

A modern paved highway now links Atikokan with the provincial highway leading to Port Arthur and Fort William.

Seven years ago Atikokan was accessible only by railroad. Residents had cars which were bought in by train, but they were confined to roaming the few miles of city streets.

The restless drive of Canada swiftly moving toward greater industrialization and raw material development is typified by Atikokan. The people represent many national backgrounds—Canadian, Scandanavian, Baltic, Slavic, South European and American. Many share a common aim: The chance to improve themselves in the most basic of all industrial occupations—the mining of iron ore.



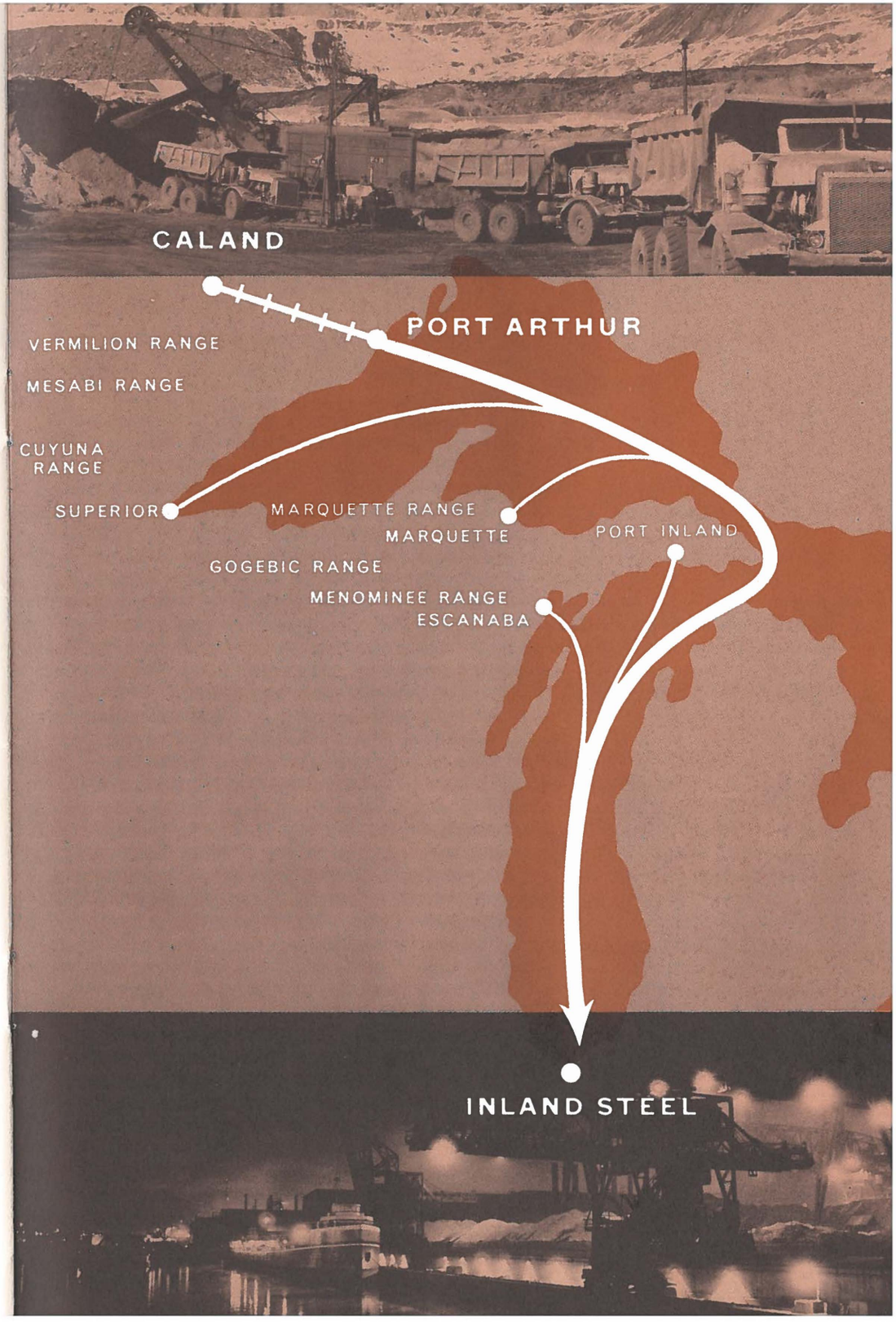
Great Lakes

LOW-COST, EFFICIENT SHIPPING OF STEEL'S RAW MATERIALS

The world's greatest deposits of high grade iron ore ring the rim of the northern Great Lakes. They lie in separate ranges: the Menominee, Marquette and Gogebic in Michigan, the Mesabi, Vermilion, Cuyuna in Minnesota, and now the biggest mid-continental ore find in 25 years, the Steep Rock district near Atikokan, Ontario.

The availability of these ores to Great Lakes shipping, along with limestone and coal, the other two basic steelmaking raw materials, enabled the American steel industry to achieve its highest regional growth in the Midwest. Three of the nation's largest steel plants, located in the Chicago area on the shores of Lake Michigan, receive their ore from these ranges.

Transporting the region's annual requirements for upwards of 30 million tons has given the giant ore freighter a crucial importance in the logistics of steel. Long, low, and fast, these vessels annually transport more tonnage through the Soo Locks between Lake Superior and Lake Huron than is carried yearly through the Suez Canal.



Inland Steel produces most of its iron ore. It operates five underground mines in northern Michigan and Minnesota: the Morris and Greenwood, near Ishpeming, the Sherwood at Iron River, the Bristol at Crystal Falls, all in Michigan; and the Armour No. 2 at Crosby, Minnesota. The Caland Falls Bay operation will be the largest of these with an ultimate annual production of 3 million tons.

Inland also owns with other steel companies operating mines on the Mesabi Range.

Inland Steel has grown rapidly—100 per cent in capacity since World War II. Last year it completed a $300 million modernization and growth program, encompassing the construction of new automated rolling mills, raw materials development, and expansion of its steel warehousing and fabricating subsidiaries. This year the company has earmarked $85 million for modernization and expansion.

The Caland development has been a vital part of Inland's growth plans, for assured sources of increased tonnages of iron ore are essential to ingot capacity expansion. Every new ton of capacity brings a need for an additional ton of iron ore.

The Inland fleet of ore carrying vessels now numbers six with the addition of the giant new *Edward L. Ryerson*, soon to be commissioned for service this year. This new vessel can carry more than a million tons of iron ore annually in the long runs between Lake Superior ports and its Indiana Harbor home port. This means an increase of 36 per cent in the per trip capacity of the fleet.

Inland's integration with its iron ore sources is greatly strengthened by Caland. The integration rests, not only on vast ore deposits, but also the fresh water routes for iron ore provided by the Great Lakes.



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