

THE HISTORICAL GEOGRAPHY OF TIN MINING
SEWARD PENINSULA, ALASKA

by

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THE HISTORICAL GEOGRAPHY OF TIN MINING SEWARD PENINSULA, ALASKA

CHAPTER I

THE OVERVIEW

Tin deposits on Seward Peninsula, Alaska, are among the few known sources of tin in North America. This thesis is a study of the lode tin mining operation at Lost River, Alaska. It describes the present development and mining activity; traces the sequence of ownership and development; and analyses the impact on settlement and the socio-economic life of the people. The political and economic problems of production are evaluated.

FIELD WORK

A grant received from the Arctic Institute of North America, through the Office of Naval Research, made possible four weeks of field work in Alaska during August and September 1955. The United States Tin Corporation provided the necessary accommodations and technical assistance at the mine. Specific field work included study and complete observation of underground development and operations, surface equipment for concentration of the ore and loading for shipment. Mining and milling

activities were in operation at the time of the visit. Details of the United States Bureau of Mines exploratory drilling program were observed under guidance of the government geologist.

Numerous short trips were made, such as along the exposed dike westward from Cassiterite Creek; field maps were drawn of the settlement and vicinity; homes of most Eskimo workers were visited for interviews and census enumeration; photographs of the region were taken and a survey of the upper adits and caved-in stope were made. During the evenings "social" calls were made on selected families, including the missionary, the school teacher, and the postmaster and his wife.

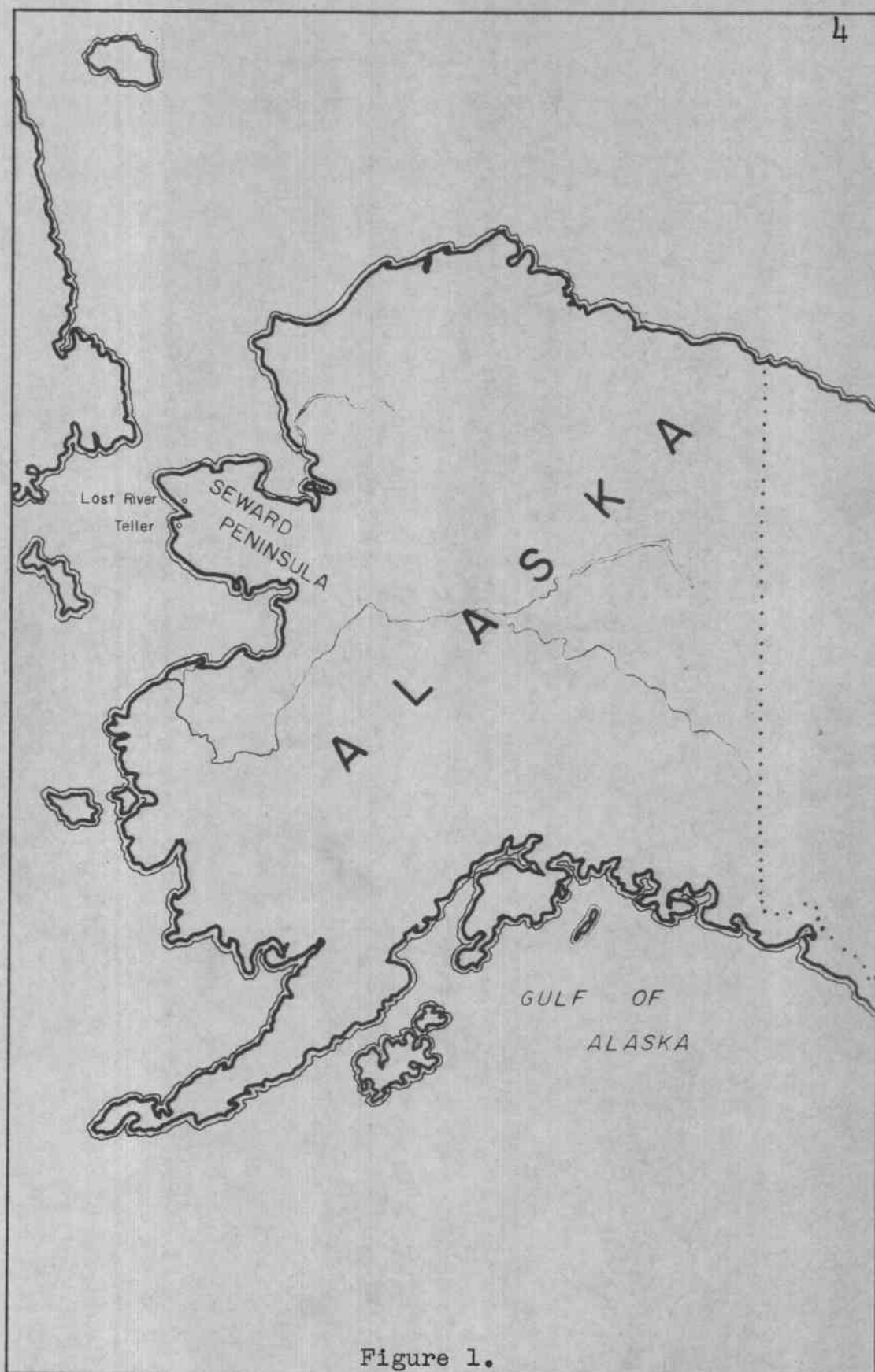
A trip was made with a load of tin concentrates to the loading area established on the narrow beach about seven miles from the mill. Other installations that were visited included the two constructed airports, one near the mine and the other near the beach; the powerhouse, which is used jointly as a passenger waiting room located at the airport near the mine; the warehouse and equipment storage facilities at the beach, and fuel storage capacity. A trip was made by boat from Lost River to Teller, a distance of thirty miles, with Mr. Osear Lee (Eskimo) and his three children.

In Alaska conferences were held and material was gathered in the School of Mines, and the Library of the University of Alaska, at College; from the United States Bureau of Mines and the United States Geological Survey officials at Juneau, Fairbanks and Nome; and from the agent of the United States Tin Corporation at Nome. In addition conferences were held in Seattle with officials of the United States Tin Corporation. Published material was perused in the Oregon State College Library and at the Bureau of Mines regional headquarters in Albany, Oregon.

THE LOST RIVER MINING AREA

The Lost River lode tin mine lies on the eastern side of Cassiterite Creek, the major tributary of a stream known as Lost River. The mine entrance and mill are seven miles inland from the Bering Sea and the principal adit is on the slope of the valley 200 feet above the settlement. The mine location is 65 degrees 28 minutes North Latitude and 167 degrees 8 minutes East Longitude on the Seward Peninsula and is included in the second Judicial Division of the Territory of Alaska. The settlement called Lost River is situated on a narrow terrace on the east side of Cassiterite Creek. (See Figure 1)

The mining camp is nestled between barren, steep, grey-toned rocky slopes of the Lost River hills in the



York Mountains. Brooks Mountain, over 3,000 feet in elevation, is visible to the north, and from certain vantage points at the mine the Bering Sea is visible.

There is an unusual poverty of vegetation and wildlife in the area. So much so that old Eskimo tales speak of Lost River as a haunted valley. It is said many refused to walk alone through the valley, however, this superstition has since disappeared. Only a few lichens, mosses and dwarfed willow trees sparsely vegetate the region.

The climate is severe. The July average maximum temperature is 57.6 degrees and the average minimum 44.9 degrees. In January the average maximum is 8.3 degrees and the average minimum minus 7.2 degrees. Freezing temperatures are recorded on 244 days of the year. Precipitation is relatively light, totalling 10.94 inches for the year. Nearly half of it comes as rain during the warm season, most of the rest as snow. Clear days are most common during the winter, but total only 103 for the entire year; proximity to the Bering Sea produces raw, chilly air during the entire year, especially in summer. It is not a pleasant climate nor attractive to white man. (See Table I)

Lost River is isolated, there are no roads, no railroads, and no harbor facility. Ships must anchor a

TABLE I
CLIMATE DATA
TELLER, ALASKA

Source: Climatic Atlas of Alaska

	Jan	Feb	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec	Year
Temperature													
Avg Max	8.3	10.0	13.8	29.8	39.3	56.0	57.6	51.6	48.4	36.5	24.3	13.9	33.0
Avg Min	-7.2	-5.2	-5.9	11.8	23.5	37.8	44.9	45.1	38.0	24.6	9.8	-0.3	18.1
Avg-days below 32°	-0.8 31	1.6 28	3.7 31	20.7 30	31.7 28	46.7 5	51.7 --	51.2 --	43.4 5	31.1 26	18.0 29	5.4 31	25.4 244
Precipitation													
Avg days with	1.1 5	0.5 3	0.3 4	0.7 4	0.5 4	0.6 4	0.9 11	1.5 11	1.7 11	0.7 6	0.8 6	0.5 5	10.9 74
Clear days	10	11	12	9	10	8	5	4	6	7	10	11	103

distance offshore and hire literage service from Nome. The only transportation facility is the "bush service" provided by a private airline company.



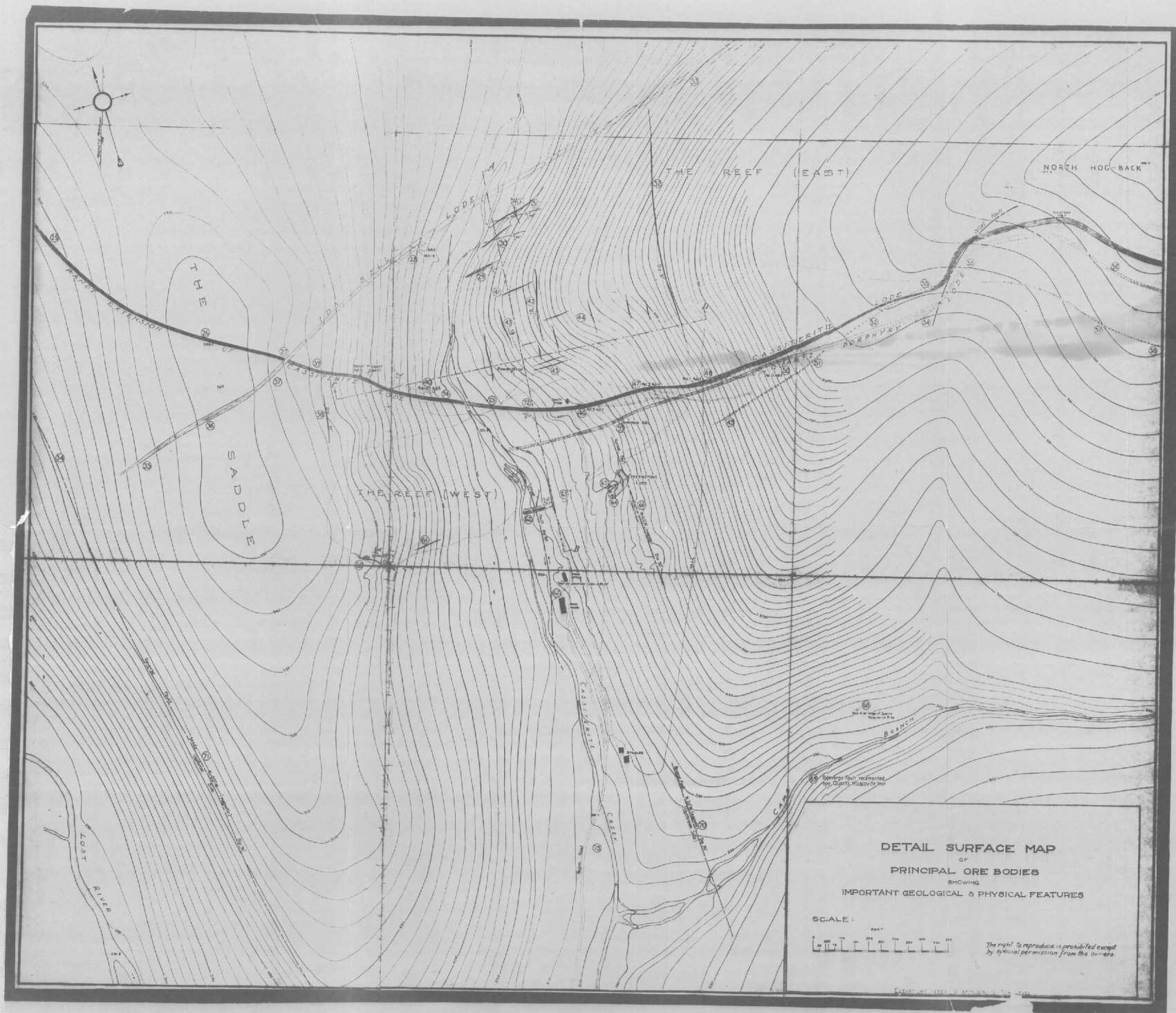
Figure 2. Lost River Valley. Confluence of Cassiterite Creek (lower foreground) and Lost River. Roadway leading south to the beach is left of Cassiterite Creek; heated water line to the right of creek.

CHAPTER II

SEQUENCE OF OWNERSHIP AND DEVELOPMENT

In 1903 three prospectors, Charles Randt, William O'Brien, and Leslie L. Grim discovered tin in float along Tin Creek, a tributary of Lost River. As a result of these finds the United States Geological Survey geologist, Arthur J. Collier, went to the area. He was able to trace the float to its source in a granitic dike which intruded into the Port Clarence limestone of the area. The mineralized dike came to be known as the Cassiterite lode. It is described in a number of bulletins of the United States Geological Survey. (14, p.70; 15, pp.154-167; 16, p.23)

Development work in the Lost River area has been intermittent since the discovery of tin on the Seward Peninsula around 1900. The three prospectors began the first development work at Lost River in 1903 shortly after the lode near Cassiterite Creek had been located. (14, p.145) Most of the early work was centered on this lode and in addition efforts were made to determine the western extent of the mineralized dike. This exploration work was done on the west side of the creek opposite the present mining area. Recent mining and development has all been in the Cassiterite lode. Activity at the Lost River mine is discussed in five periods.



THE FIRST PERIOD: 1903 THROUGH 1909

The first eight claims staked by the three prospectors (Randt, O'Brien and Crim) were bonded by an experienced mine operator, Lieutenant Governor Joseph H. Hutchinson, of Idaho, during September 1903. He hired a group of men to continue prospecting the claims and samples were sent to New York for assaying. In the summer of 1904 a field party was sent to Cassiterite Creek to carry out the first development work. A number of prospect holes were excavated, an adit was started, which is still the main entrance to the mine, and a second tunnel was driven west and above the main adit. Samples were taken at both levels. A crosscut was made from the main adit to show the trend of the ore and at this point the vein was shown to be about 60 feet long by 15 feet wide (3, p.120).

The western portion of the Cassiterite dike was examined and it was discovered that the vein was irregular and shattered and did not warrant the expense of further development. On the surface a talus covering prevented exact determination of the length of the dike.

The bond financed prospecting work over only a part of the area; but the original prospectors remained at Lost River late that fall (1904) and continued work. The following year the trio of prospectors worked on one of

the small veins which was estimated to carry from ten to twenty per cent of metallic tin and produced about twelve tons of ore. The three men were able to mine and haul to the beach about one ton of ore each day (3, p.123).

As early as 1905 it was evident to them that the lode deposit did not have sufficient ore value to pay the cost of the heavy outlay needed for development. The men were discouraged with their findings but still clung to a belief that their property would ultimately pay off. By 1907 five tunnels had been driven on the lode. In addition to the two entries a third tunnel 180 feet long entered 260 feet above the creek. A fourth tunnel 80 feet long started 1,710 feet above the creek, and a fifth located about 15 feet above the creek. A few permanent buildings were constructed during this period. The first log dwelling is still in use today (26, p.52). A crosscut nine feet long was made 50 feet from the mouth of the adit. The Ida Bell dike was explored by an adit 55 feet long and at one end a winze was sunk 69 feet deep. It flooded shortly after completion causing development work on the Ida Bell to be discontinued.

The shape of Cassiterite lode was now well delineated and the maximum width shown to be about 23 feet with a general average of 12 feet. These results were obtained from 1,110 feet of drifts. (6, p.86)

THE SECOND PERIOD

The Jamme Syndicate assumed control of the property in 1912 and actively developed the mine. The syndicate operated a small concentrating plant for about two months during the 1913 season to test the operating conditions. During the working season the plant produced 5,000 pounds of concentrates, containing over 60 per cent of metallic tin and 11 per cent tungsten. The total value \$1,323.00. Encouraged by these favorable results the organization made plans to install a larger plant on the property as well as a smelter in Seattle, Washington. (3, p.87)

Five men were employed during the 1912-1913 season and three were employed during the winter months. Developments on Cassiterite lode consisted of 1,094 feet of drifts on the five levels besides a number of feet between the first and second levels east. There were 157 tons of ore shipped from Lost River by horse and wagon to the beach, then by boat to Seattle, rail to New York, and boat to England for treatment. The Jamme Syndicate sold their option the following year. (6, p.373)

The option on Lost River property was assumed by W. W. Johnson and Associates during 1916. They carried on prospecting work that summer. A 50-ton ball mill, together with jigs and concentrators was shipped to Teller for use

in making tests on the ore to determine the average tin content. The amount of ore produced in 1917 was negligible; they were discouraged and sold their option the next year.

THE THIRD PERIOD 1918 THROUGH 1927

In 1918 a New York brokerage firm secured an option on the property and a company was formed called the Lost River Tin Mining Company. J. F. Halpin, was sent as mine manager from New York to take over operations for the season. He employed 22 men to clean out rock falls and ice from the mine timbering. Most of the work that summer was spent in rehabilitating the mine. Frederick Fearing, of Philadelphia, was hired to make a thorough geologic survey of the property in 1919. His report expresses the belief that there may be a large ore body at greater depth. He recommended sinking the shaft to as deep as 700 feet (21, pp.154-158).

FOURTH PERIOD 1928 THROUGH 1930

In 1928 Mr. A. MacIntosh purchased the option and renamed the tin interest as The National Tin Company. Considerable work was done that season; 12 men were employed in addition to a superintendent and a foreman. The following spring the company had financial difficulty and the mine was closed. The property remained idle until

1941 when the United States government took an interest in domestic tin and sent several United States Bureau of Mines experts to begin an exploratory drilling program. Restrictions on materials and supplies and closing of the area to civilians as a war time measure ended this program in 1944 and the mine was idle until 1948. (24, p.57)

FIFTH PERIOD 1948 THROUGH 1955

The United States Tin Corporation was organized in 1948 to operate the Lost River mining properties. Activities of development of this company are treated in the next chapter along with details of the mine and mining.

CHAPTER III

THE MINING AND MILLING

In the period from 1949 to 1951 placer mining was carried out on the gravels of Cassiterite Creek. Then in March 1951 the company entered into a contract with the United States of America through the General Services Administration and the Defense Minerals Exploration Administration. The loans from these government agencies enabled them to initiate underground operations and carry on full-scale milling of lode tin ore from 1952-1955. At the same time an exploratory drilling program was undertaken by teams from both the United States Bureau of Mines and the United States Geological Survey.

MINE DESCRIPTION

The mine at Lost River as studied in the summer of 1955 is a composite of the past development. There are three adits. The highest, number one, is at the elevation 262 feet above the creek and penetrates 370 feet; number two starts at elevation 162 feet above the creek and is 125 feet long; number three starts at 61 feet above the creek and penetrates the hill for 1,100 feet. It is the main portal and follows the vein to the shaft where it continues to the side of the vein. A number of crosscuts

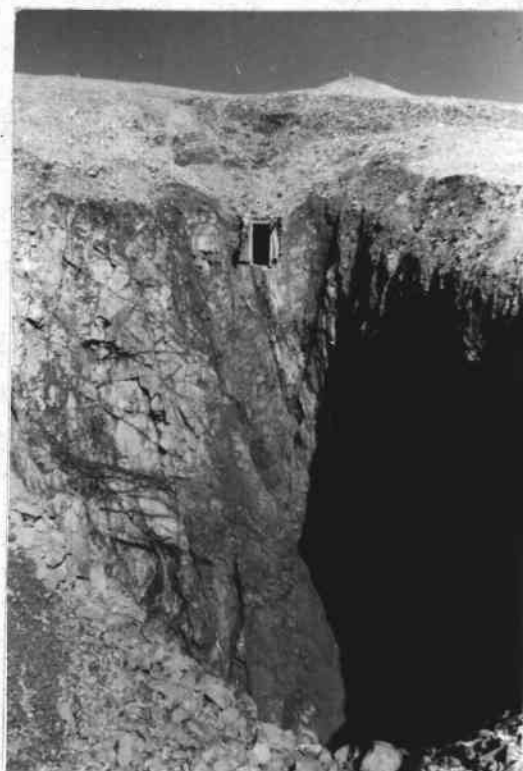


Figure 4. Caved-in slope.
No. 1 adit portal is
visible.

MAIN ADIT, CROSS SECTION

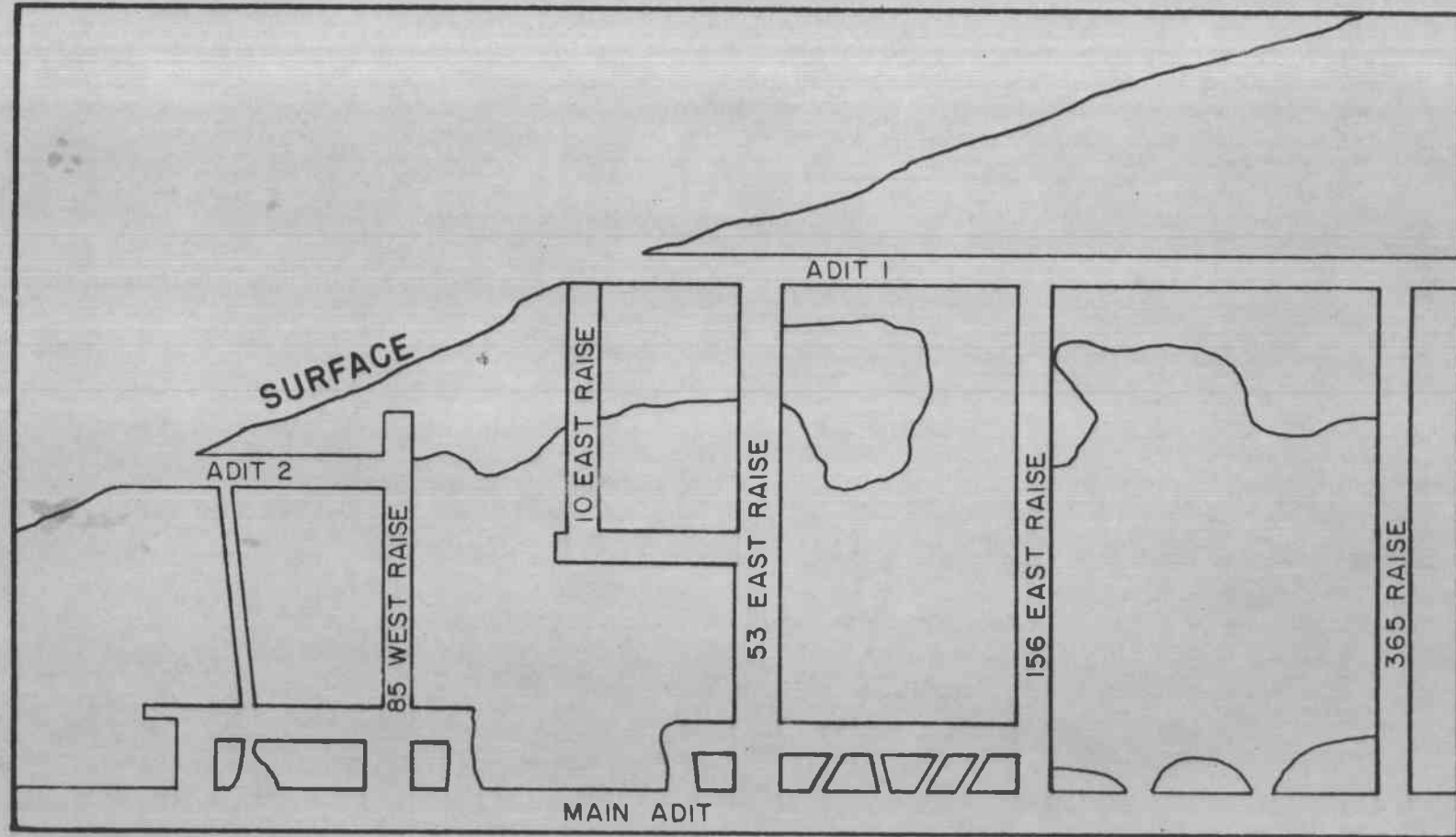


Figure 5.

Source, U.S. Tin Corporation

lead into the footwall of the ore vein. There are three raises now in use connecting the main, or 100-foot level, with the Number 2 and Number 1 adits. The raises connecting the main level are the 55 East raise, the 156 East raise, and the 365 East raise. The 85 West raise connects the main tunnel with the Number 2 adit. The 10 East raise, which has caved in, once connected the main level with the Number 1 adit. Mining has been carried on from and above the main level and only exploratory work at the lower levels. The main stopes are the A-1 West, A-1 East, A-2 East and A-3 East. During July 1955 the A-1 West stope caved in completely exposing the dike. A two-compartment shaft extends from the main tunnel downward to the 365-foot level. Development has been done on the 200 and 365-foot levels (See Figure 5)

MINING

The shrinkage stope method has been employed as the most practical method for mining the veins. The ore is drilled and blasted and sent by a system of ore chutes to the main level where one-ton ore cars move it directly to the mill. In the past the mine operators have tried the method of sub-level stoping, but the expense involved in mining the narrow veins made this impractical. In addition development work was required to mine the small



Figure 6. Mill and mine building at Lost River. Cassiterite Creek in the foreground.

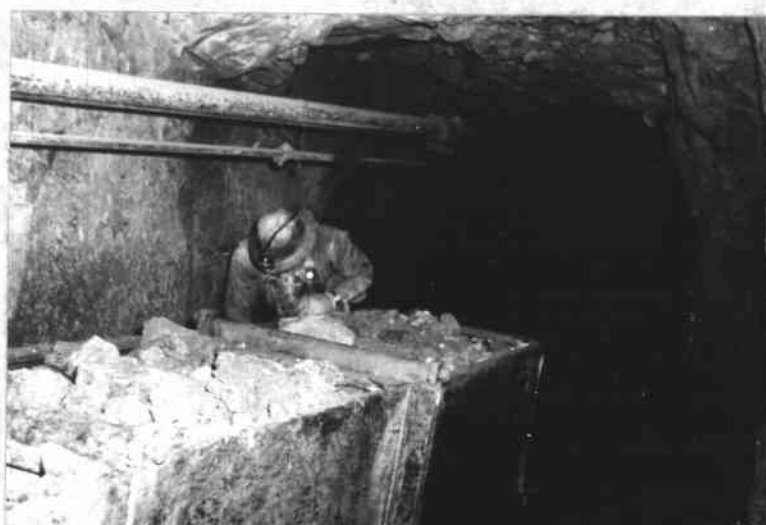


Figure 7. Eskimo worker hauling out ore from the main level.

off-shoots from the lode. Some of the mined-out stopes are used for waste rock. Officials at the mine stated that many other types of underground mining had been employed but none were successful. The walls and roof are generally strong enough to stand without timbering. Such timbering as is used is shipped in. (24, p.7)

THE MILL

The mill is located at the entrance of the main tunnel on the slope of the hill. A large shed-like building connected to the entrance of the tunnel contains the compressor shed, the welding and repair shop and equipment supply. A covered passageway connects these with the adjoining main bunkhouse, mess hall, and other facilities. The snow shed also covers the rail tracks from the mine to the mill. Ore is sent under cover to the mill.

ORE DRESSING

The ore is concentrated at Lost River by gravity separation and flotation. The mined ore first goes to a 25-ton coarse ore bin, is then crushed and screened. The ore which passes through these screens goes to a 22-inch cone crusher. The product is then fed to a fine ore bin of a 100-ton capacity. The oversized products from this are fed to a 4 x 10 rod mill. The undersized material is



Figure 8. Eskimo worker at 25-ton coarse-ore bin.



Figure 9. Tabling process.

fed by a pump to a duplex jig which produces a concentrate and tailings. The underflow from the jigs is taken by pump to a six-inch hydroclone separated and sent to a Fahrenward sizer for sizing preliminary to the tabling process. The tabling is done on 19 Diester tables. The fines go to one set of shaking tables for processing and middlings to another. The concentrate from the tables is accumulated in a concentrating settling box, the middlings are re-tabled, and the tailings discarded.

The concentrates are weighed and assayed and packed into barrels ready for shipment to the Longhorn tin smelter. The fines, or "slimes" are transported by pump to a conditioner, preparatory to a flotation process in order to recover the fine cassiterite. The final product is tin concentrate containing 60 to 62 per cent tin which is then placed in oil drums weighing 1600 to 1800 pounds. The tin concentrates are hauled by tractor from the mill to the beach where they are dumped. Twice a year the drums are lightered to a ship for transportation south by Alaska Steamship Company. Once they arrive at Seattle they are transshipped from the vessel by rail cars to the government Longhorn tin smelter, Texas City, Texas.



Figure 10. Screening crushed ore.



Figure 11. Shipment of tin concentrate in sealed oil drums. These are hauled to the beach by tractor.

CHAPTER IV

FACTORS OF PRODUCTION

The United States consumes nearly half of the world's supply of tin but is dependent upon foreign sources. A small domestic tin production chiefly from the Seward Peninsula of Alaska has been negligible, never amounting to more than a fraction of one per cent of the nation's requirement. The total all-time tin production from Alaska amounted to 2,152.1 short tons, having a value of \$2,710,582.00. Nearly all of this production has been from sporadic placer mine activity carried on in years of high price, except in 1953 and 1954. The graph (Figure 12) illustrates Alaska tin production and (Figure 13) shows price relationship.

GOVERNMENT INTEREST

The critical situation in tin supply which developed during World War II when Southeast Asia sources were cut off causing prices to rise sharply and stimulated interest in the Alaska deposits, especially the Lost River lode mine. The United States Government participated by financing prospecting activity and making loans available in order to stimulate the search for, and the production of tin. Hopes were high that important tin production

SEWARD PENINSULA TIN PRODUCTION

 Placer
 Lode

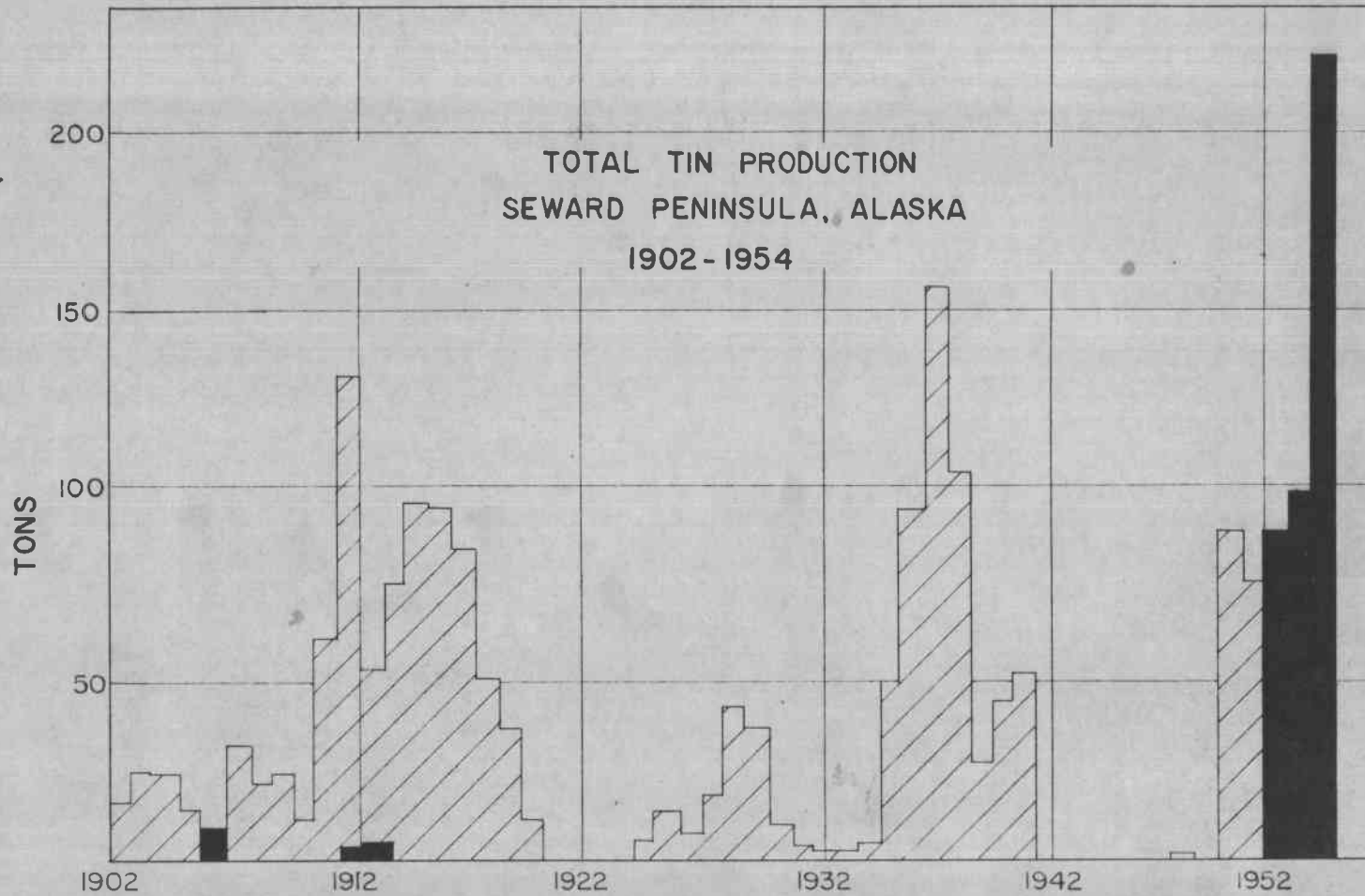
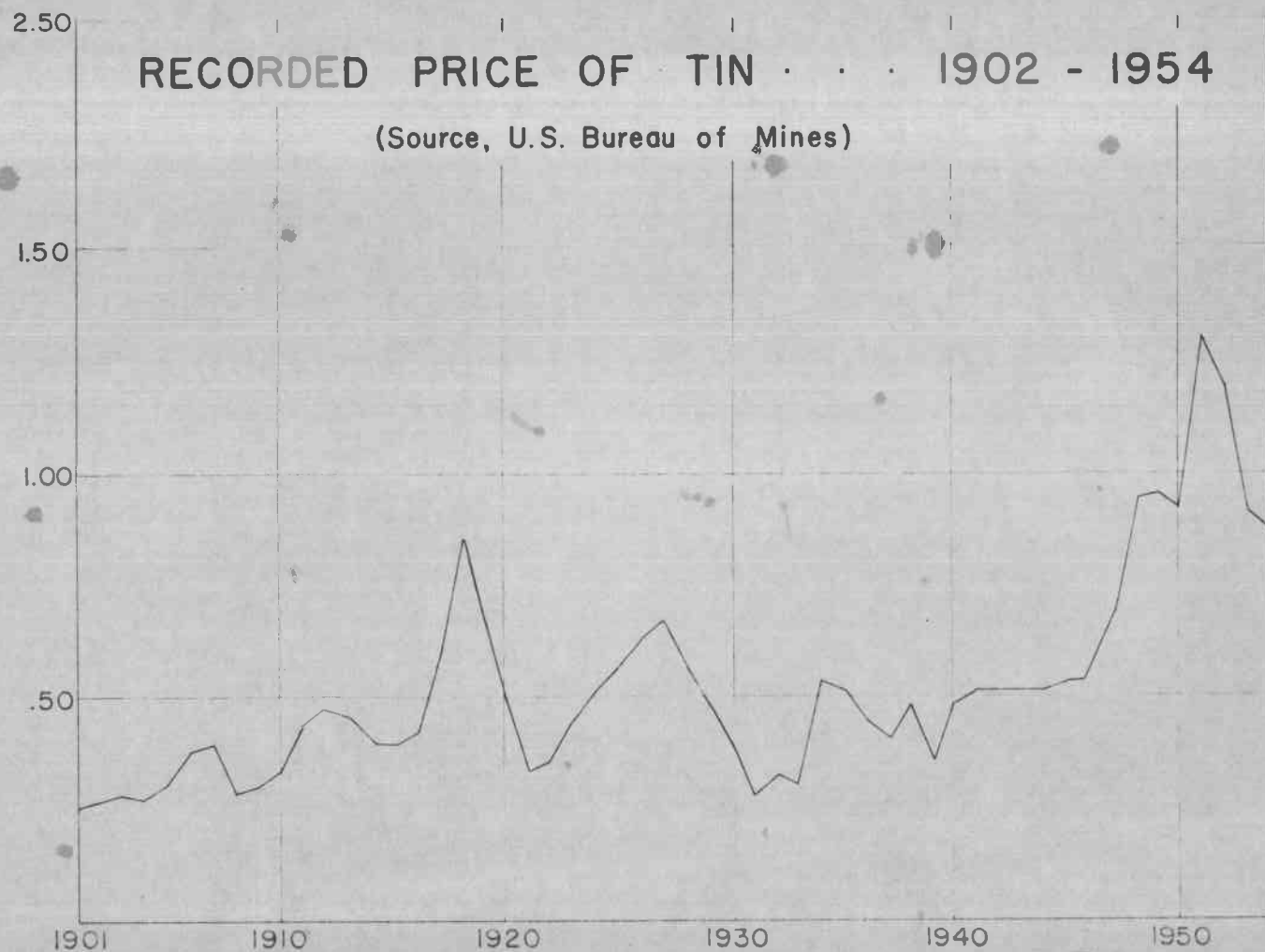


Figure 12.

Source, U. S. Tin Corporation

AVERAGE U.S. PRICE PER POUND · DOLLARS



might come from Lost River. The lode mine with its potential of year-round operation appeared to be the chief source of hope for major production. Placer mining labors under the limitation of a very short season due to the long winter period of frozen ground.

On March 23, 1951, the General Services Administration of the United States entered into a contract with the United States Tin Corporation. The contract provided that the Government would advance a sum of \$2,366,900.72 for the purpose of assisting the United States Tin Corporation to develop and expand its facilities and production at Lost River. The contract which expired December 31, 1955, provided that all production would be sold to the United States Government and that all proceeds be applied to payment of the funds advanced by the Federal Government plus interest at four per cent. In addition to the funds provided for actual mining the United States Tin Corporation secured aid for exploration purposes from the Defense Minerals Exploration Administration; this second contract dated August 25, 1952, provided \$226,000.00 for the purpose of underground exploration and for acquisition of equipment and supplies. The company provided ten per cent of the cost from its own funds. Repayment to the Government was provided for under the contract by royalties on all minerals to be produced from the exploration area. Under this

exploration contract a considerable program of core drilling was undertaken. The United States Bureau of Mines sent a drilling team under the leadership of an experienced diamond driller to the mine. Drilling was carried out from the lower levels of the mine in an endeavor to gather more complete information on possible ore bodies at greater depth. A second team from the United States Geological Survey also carried on drilling in the mine, but they were not active at the time of this study. The drilling programs were carried on during the summers of 1954 and 1955 and ended August 1955. At the time the drilling program was brought to a halt nothing of significance had been found at the lower depths. The opinion was expressed by a number of the mining people that it was unfortunate to call off the drilling program at this time when a continuation for another 100 or 200 feet might have proven conclusively the existence of an ore body, or the lack of it.

ECONOMIC FACTORS INHIBITING TIN PRODUCTION

Conditions for mining tin at Lost River are rigorous and highly unfavorable to economical production. The climate is severe and generally unpleasant; the mine is isolated; transportation facilities poor; labor is expensive; and the tin deposit so far proven is small.



Figure 14. Chris Sundet and Eskimo helper operating diamond drill under the United States Bureau of Mines exploratory drilling program at Lost River, 1955.

The rigorous climate adds to the cost of operation as during most of the year surface mining operations and milling must combat freezing conditions. Water essential to the mining and milling is provided at considerable cost. In general, the wet arctic conditions encountered make upkeep of vehicle, building and equipment difficult. Finally it bears emphasizing that the Lost River climate is not attractive to white people from outside the area although the Eskimo is well adjusted to it.

Isolation and distance from the smelter in Texas City, Texas, constitute a serious handicap. At the present time the tin ore is being concentrated to at least 60 per cent in order to partially offset the high cost of shipment. Although the rail charges from Seattle to Texas are high it saves about two months over-all by boat through the Panama Canal, moreover, there is no through water service from the Seward Peninsula to Texas. The small size of tin shipments, fluctuating tin price, and the distance to the smelter combine to make this a serious disadvantage to Alaska tin mining, especially the lode mine at Lost River. Shipments are too small to support shipload movement--shipments being made from Lost River only two times a year. Then it takes two weeks to two months to reach the smelter. With fluctuating tin prices it is difficult to foresee the actual purchase price of the tin when it reaches Texas City.

High cost of labor is a distinct disadvantage of the Alaska production when compared to other world areas. Nearly all of the mine workers are Eskimos who have proven to be good workers but requiring constant supervision to maintain steady production. Most of them have had no experience with modern machinery but they learn readily. Eskimo laborers are paid \$1.50 to \$2.00 an hour plus a mining bonus based on footage, and time and a half over the 40-hour week. Thus the laborer in the tin mine earns \$500.00 or more a month and in addition, his housing, lights, and water are all supplied free. A major difficulty is the continual turnover of mine employees. The Eskimo has little sense of responsibility for regular work and saving for the future. Company records show that in June of 1954 out of a working crew of 60 men there were 17 severances and 17 new workers added--a turnover of 28 per cent. Other months show a similar pattern. Non-Eskimo workers easily become dissatisfied with the living conditions, especially the climate, and after a year of contract leave the company.

The known deposit is small and so far there has been no proof of a major ore body sufficient to insure production over a long period. Placer mining production is far too small to support regular shipment to the smelter, consequently it is carried on only when prices

are high and at considerable uncertainty in the face of unstable tin prices.

COST OF OPERATION

The records of production cost at the Lost River lode tin mine reflect the unfavorable production complex. Table II shows actual cost per ton of concentrate production for the second half of 1954. Each pound of tin in concentrate is here shown to have cost \$1.99. To this there would be added cost of shipment to Texas City. In the same period tin was quoted in New York at prices ranging from 85 to 97 cents per pound. Perhaps production costs could be reduced significantly with longer experience, improved technology, or new management practices, but the fact is that production costs have exceeded market value.

TABLE II
COST PER TON OF ORE MILLED BASED ON COMPANY RECORDS
JULY TO DECEMBER 1954

Division	Wages and Salaries	Supplies	Total	Cost per lb Fine tin
Mine	\$3.016	\$0.714	\$3.730	\$0.290
Mill	1.489	0.678	2.167	0.169
Shop	0.679	0.061	0.740	0.058
Mobile equipment	0.289	0.159	0.448	0.035
Power and Air	0.388	1.816	2.204	0.171
Camp	0.261	1.218	0.479	0.037
Supervision - Mine	0.387	---	0.387	0.030
Supervision - Mill	0.754	---	0.754	0.059
Clerical	0.360	---	0.360	0.028
Technical	0.450	0.041	0.491	0.038
General Superintendent	0.366	---	0.366	0.028
Boarding house	0.150	---	0.150	0.012
Payroll, Taxes and Insurance	1.472	---	1.472	0.114
Miscellaneous (Travel etc)			0.354	0.031
Seattle Office			1.278	0.099
Total	\$10.061	\$3.687	\$15.380	\$1.199

CHAPTER V

THE LOST RIVER SETTLEMENT

Although there has been sporadic tin mining since 1903, no permanent settlement was ever established until the United States Tin Corporation began operating the mine in 1952. The scale of operation visualized by the company required a permanent settlement in order to house and supply year-round workers and supervisory personnel. In addition to those connected with the mine operation, a number of service workers such as a storekeeper, school teacher, postmaster and missionary, became essential to the community.

THE SITE AND BUILDINGS

The site selected by the United States Tin Corporation for the settlement was located one-half mile from the entrance of the mine on the lower end of the terrace flanking the east bank of Cassiterite Creek. The main roadway from the airport passing through the site to the mine was improved by the Alaska Territorial Road Commission as part of cooperation with the mining company.

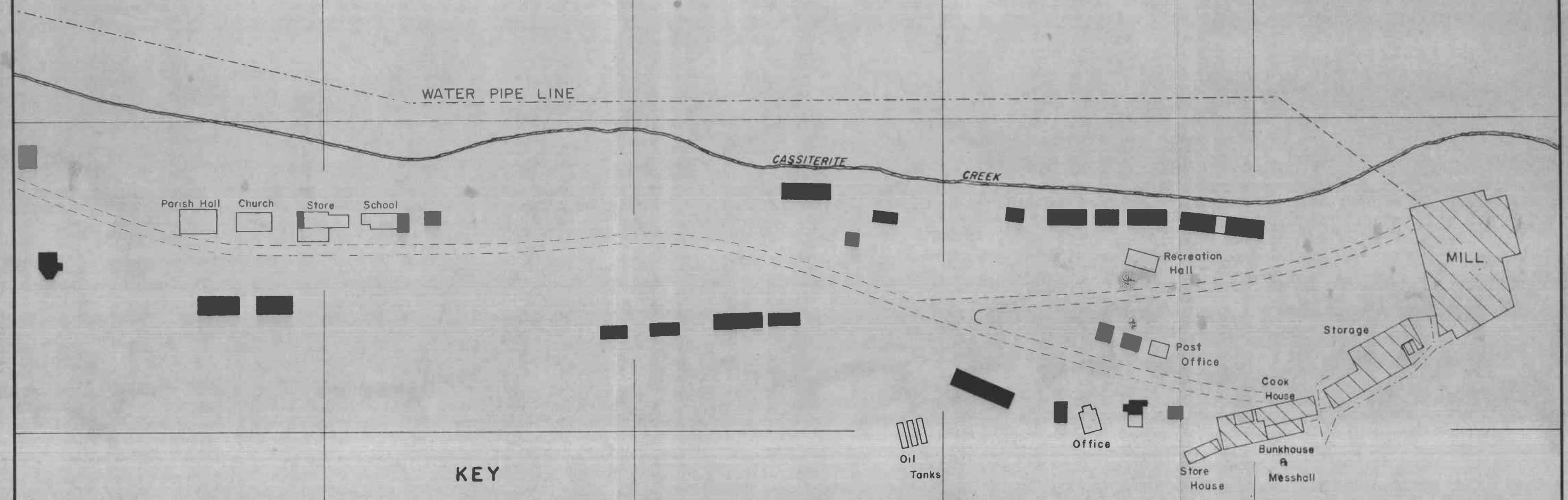
The buildings for the most part were moved to the settlement from several distant places. All were hauled to the village during the winter months by tractor

and sled over land and frozen sea. Most were rehabilitated by applying tar paper to the outside and cleaning the inside. The duplex dwelling units came from the beach camp about six miles from the Lost River site which had previously served as summer lodging for placer miners. The larger buildings, including the schoolhouse, general store, recreation hall, and a few of the dwellings were salvaged from an abandoned United States Army Air Base at Point Spencer, eight miles away. The mission church and parish house were moved 88 miles from the historic mission station, at Mary's Igloo, under the sponsorship of the Lutheran church.

The schoolhouse was reconstructed and furnished in order to provide education facilities for the children of the mine workers. The Alaska Native Service assumed responsibility for the necessary supplies, provision of a teacher and her salary.

The 35 separate buildings at Lost River form an elongated settlement along the east bank of Cassiterite Creek. It has developed into two distant groups: the schoolhouse, general store, mission church and most of the dwellings are located on the river terrace and lower hill slope; the mill buildings, post office, bunkhouse, mess hall and six dwellings are higher on the hill slope and to the north. The mining company has constructed

LOST RIVER SETTLEMENT



KEY




-  Dwelling Unit
-  Service Unit
-  Mine Buildings

Figure 15.
Scale
1" = 133'

roadways which connect the individual units of the settlement with the main road. All buildings except the church are owned by the company and housing is furnished rent free to all workers.

PEOPLING THE SETTLEMENT

Since the area was uninhabited it was necessary to recruit all workers from points at least 30 miles away. The company paid transportation costs of bringing families to Lost River. Eskimos were recruited from Wales, Teller, and other villages of Seward Peninsula for laborers. The supervisory personnel came from other parts of Alaska and from the United States. These men had previous mining experience in Bolivia, Spain, Panama and the Philippines.

In the summer of 1955 there were 16 families living at the settlement. Of this total 11 were Eskimo, three white and two mixed (white and Eskimo). The total offspring of all ages numbered 47. The total population was 125; 108 Eskimos, 13 white, four mixed. Of this number 54 were employed at the mine, 24 were adult dependents (unemployed) and 47 children. In addition a fluctuating number of visiting relatives and friends are always at the settlement, some seeking work and others just visiting.



Figure 16. Left to right: Mr. and Mrs. John Thunes, Mrs. Edythe Long, and Rev. Tastad. All residents at Lost River community.



Figure 17. Typical Eskimo family at Lost River; Mr. and Mrs. Oxereok. Mr. Howard Murray, mine superintendent, is in the background.

TABLE III
CENSUS OF LOST RIVER

Married couples and children (Eskimo & mixed)	Children
Guy Elam (white, with Eskimo wife).....	none
Harvey Kugzruk.....	1
Art Keelik.....	2
Clara Okluik.....	2
Frank Oxereok.....	3
Ralph Noyahuk.....	3
Harvard Brown (white, with Eskimo wife).....	4
John Kakaruk.....	5
Dan Lee.....	6
H. Kakoona.....	6
Elmer Seetot.....	7
Willie Kugzruk.....	8
Elmer Long (white).....	none
John Runes.....	none
John Sloan.....	none
Morris Thompson.....	none
Total.....	47

SERVICE FACILITIES

The general store operated by Morris Thompson, an Eskimo, is about 20 x 30 feet long, unpainted and has a rough overhanging porch with a hip-roof. The interior portion is divided off into living accommodations, storage space and sales room. The wide variety of merchandise is displayed on shelves and tables. Prices are comparable to those at Nome. A stock of popular name brands of dried fruits and canned commodities and a limited supply of fresh fruits are available. Other sections include ready-to-wear, miscellaneous hardware, kitchen utensils, dry-goods, toys, drugs, film, magazines and books. Weekly trips are made to the main store at Teller to replenish supplies as needed during the summer season. Much of the trading by the Eskimos is done on a credit basis.

The Lutheran church is located next to the general store. This is the center of the religious life of the community. The church seats 80 to 100 and has an organ which is played by Mrs. Kugzruk, an Eskimo woman. It is the finest building in the community, painted white with red trimmings. The parish hall is large and accommodating, and is used for social gatherings, Bible classes and young people's functions. The minister is Reverend Tastad of Seattle, sponsored by a Lutheran church. The majority of

Eskimos are protestants. Services are held twice on Sunday and a midweek service on Wednesday.

The schoolhouse is a long rectangular building, unpainted and weather-beaten, but the interior painted yellow is bright and cheerful. The school teacher and her husband live in half of the building. Total enrollment has never exceeded sixty children and the fall enrollment of 1954 was 32. The children are about evenly distributed from the beginner's level to the eighth grade. Pupils beyond the eighth grade must go to Anchorage for high school. The one large classroom is not crowded so that each child has his own little desk. The teacher has made every attempt to attractively decorate the walls with pictures and maps. Blackboard space is limited.

One corner of the classroom is devoted entirely to practices of good health. Individual charts for each child are maintained, recording daily weight and general health. Excellent visual material supplied by the Alaska Native Service illustrates precautions against tuberculosis. Mid-morning snacks of milk and crackers, or juice and crackers, and afternoon fruit (dried) are served free to the children. The school teacher also acts as nurse for the community and administers treatment for all sickness. A visiting nurse from the Alaska Native Service makes seasonal calls at Lost River, by plane or by dog-team,

and supervises periodic chest X-rays for tuberculosis. This disease is the worst enemy of the inhabitants and many of the adult Eskimos have it in advanced stages.

THE HOMES

The average dwelling, unpainted, shabby and weathered, consists of a one or two-room bungalow, or duplex. Each one contains a number of beds, a table and benches, and an oil-burning stove. Homes are crowded, poorly ventilated, and lack running water or sanitary facilities. All have electric lights and oil heaters. Since electricity is supplied free by the mining company, washing machines, radios and record players are common.

In addition to rent-free housing the company provides all maintenance and repair work, water supply and electricity without charge. Water is not piped to the homes but must be carried in buckets from taps in the mill building. Mostly the women do the carrying. However, showers and modern washrooms have been installed in the mill building for employees. Hot water is furnished to the mill building by a central heating system. The only expense the Eskimo families have is fuel oil for heating their homes and this they buy at cost from the company; food and clothing are the other two items.



Figure 18. Looking south from the Post Office building. Eskimo dwellings in the foreground.

UTILITIES

Water for the mill is secured from a spring emerging at the airport 9,000 feet from the mill building. The spring flows all year. The flow is 120 to 200 gallons per minute. In order to supply the mill with water during the winter months it was necessary to construct an electrically heated pipeline at the cost of \$150,000.00. This water pipeline extends from the pumphouse then across Cassiterite Creek before re-crossing on a trestle to the mill. The pipeline casing is 18 inches wide and is used as a crosswalk from the mine to the west side of the creek. This water is used only for the milling operation.

The domestic water for cooking, drinking and washing, is supplied from ground-water which is tapped

in the mine and piped.

Homes are heated by oil-burning stoves. Heat and power for the mill is derived from five diesel motors having a total capacity of 630 kilowatts. Current is generated at 440 volts and transformed down to 220 or 110 volts. For the 9,000 feet of electrically heated pipeline system to the pumphouse the current is stepped up to 4,160 volts. Heat from the generators is utilized throughout the mill building.

COMMUNITY ORGANIZATION AND ACTIVITIES

The unofficial leader of Lost River is "Papa" John Karkaruk, who organizes Eskimo dances, parties and community functions. Lost River is unincorporated but has a United States Post Office. Communal cooperation exists in the settlement. Oftentimes in heavy down-pours of rain houses begin to slide from their hillside locations toward the swollen creek; everybody turns out to help and mine equipment is frequently used to pull the dwelling back into place. In the same way roadways which need constant clearing due to rock slides and heavy snow are maintained.

During 1953 and 1954 a newspaper was published (mimeographed) by Mrs. Long, the school teacher, under the name, "The Cassiterite Bugle." Children contributed poems,

short stories and local news items. All the mine activity was reviewed and life of the community reported. There is a movie every week, for which a charge of 25 cents is made to defray costs. The mining company brings them by plane from the United States. Popcorn and soft drinks are sold by the storekeeper. (10, p.7)

Many of the children "mine" part-time after school and on holidays. They pick up loose tin crystals from the surface of the mineralized veins and sell them in pokes to the mining company at 10 cents a pound. Much of the pocket money is earned by the younger generation in this way.

(11, p.4)

The clothing of the children marks the old and the new way of life, the parka on top half, blue jeans and rubber boots on the lower portion. However, underneath the parka is a typical T-shirt decorated with a Husky dog and the words "Lost River" printed across the chest.

HEALTH PROBLEMS

Good health is an important economic consideration at Lost River. The loss of laborers due to "flu" and colds usually is heavy during the winter months. Tuberculosis is rampant and many of the community members are awaiting admittance to the tuberculosis sanitarium near Juneau. Lack of understanding of public and personal health

measures result in widespread minor illness which hampers work. For example, company records show that in February 1953 about half the employees were unable to work during that winter month due to a flu epidemic in the camp.

There is no doctor or registered nurse at Lost River. In cases of emergency the patient is flown out or moved by dog-team if in winter. In some cases the visiting nurse of the Alaska Native Service makes a special trip to Lost River. During the last year Mrs. Long, the school teacher, acted as community nurse and did such service as administering vaccination shots.

CHAPTER VI

CONCLUSION

Tin production from the Seward Peninsula is not new. It has never been important, and there is at present no reason to suppose that it will be important in the future. Production data reveal sporadic placer mining during years of high tin prices and during the several years under sponsorship of the United States Government. In 1954, the year of largest production, the 223 tons of tin concentrate amounted to only a fraction of one per cent of the total imported into the United States.

Field studies including fairly extensive churn drilling have proven the existence of tin-bearing gravels over a considerable area of the Seward Peninsula. Testimony given at a Senate Hearing indicated a total of 1,000 square miles of tin-bearing area (34, p.6). The major known lode tin deposit is at Lost River. A definitive tonnage estimate of reserve ore cannot be given with present knowledge. Testimony of Mr. John C. Reed of the United States Geological Survey is indicative of present knowledge:

"The resources of tin in terms of available data might aggregate for the whole Territory at the present time between six and eight thousand tons...probably four thousand would be on the Seward Peninsula.....

"...two-thirds would be in the lode at Lost River. Let me emphasize, however, that the final extent is unknown to anyone at the present time." (34, p.28)

A drilling program conducted by the United States Bureau of Mines apparently added little to knowledge of a possible large deep ore body. It is clear that the known tin ore is comparatively minor in tonnage when compared with the United States' annual requirements.

Throughout the twentieth century it has been repeatedly demonstrated that tin mining on the Seward Peninsula and at Lost River is uneconomical except under artificially high prices, such as are created by war conditions or government subsidy. All of the evidence points to the inability of the Lost River tin ore mine to compete in a free world tin market.

The impact of the three years of mining at the Lost River lode mine has had a major impact on the social and economic life of the Eskimo in the area. It is an additional episode in the story of contact of Eskimos with the twentieth century society of men and machines. While the mine was active there were jobs paying big money. The Eskimo, though having no experience with regular work, readily learned the jobs and performed well in the mines. Their earnings gave them a taste of modern living and conveniences. But like children, the Eskimo lacks

responsibility and has not yet become accustomed to the routine of a regular work week as shown by the rapid turnover at the mine. Comments of mine supervisors who know the Eskimos point out their lack of initiative. The mine records reveal widespread development of white man's diseases, especially tuberculosis and minor illnesses such as colds and skin diseases. Whether these contacts with commercial activities such as the Lost River mine are good or bad is almost impossible to answer. There is much to be said on both sides.

The question of whether there should be major United States Government assistance to establish and maintain tin mining at Lost River is not an easy one to answer. United States tin supply channels are precarious, even though stock-piling of imports during years of peace is possible. The tin mining activity of the past years has been important in the economic life of the Eskimo living on the Seward Peninsula and also to the business people. Without the income from tin mining, welfare requirements will probably be increased. Consideration must also be given to the high cost of tin produced with government assistance as compared to world market price. In the final analysis the question is not so much one of economics but of national policy and is directly related to the circumstances of a world at war or fearful of war.

Groups concerned with tin are understandingly interested in promoting the support of a domestic tin industry. For example, the Domestic Tin Association with offices at Seattle, Washington, represents a group of Alaska producers. In July 1955 Senate Bill 2648 was introduced for the purpose of amending the Domestic Minerals Program Extension Act of 1953 to include the establishment of a base price of \$1.25 a pound of metallic tin in concentrates and to establish receiving points within the United States, and to accept delivery of not more than 10,000 long tons of metallic tin.

With the ending of the Government contract as of December 31, 1955, the mining activity both in exploration and production has ceased. The Eskimo workers have returned to their original homes and Lost River has become a ghost town.

BIBLIOGRAPHY

1. Alaska Planning Council. Preliminary economic survey of the Seward Peninsula. Juneau, Alaska, 1940. 86p.
2. Anderson, Eskil. Mineral occurrences other than gold deposits in northwestern Alaska. Juneau, Alaska, 1947. 48p. (Alaska. Department of Mines. Pamphlet no. 5-R)
3. Brooks, Alfred H., et al. Report on progress of investigations of mineral resources of Alaska in 1904. Washington, Government printing office, 1905. 196p. (U.S. Geological Survey. Bulletin no. 259)
4. Brooks, Alfred H., et al. Report on progress of investigations of mineral resources of Alaska in 1905. Washington, Government printing office, 1906. 169p. (U.S. Geological Survey. Bulletin no. 284)
5. Brooks, Alfred H., et al. Mineral resources of Alaska, report on progress of investigations in 1907. Washington, Government printing office, 1908. 294p. (U.S. Geological Survey. Bulletin no. 345)
6. Brooks, Alfred, H., et al. Mineral resources of Alaska, report on progress of investigations in 1914. Washington, Government printing office, 1915. 373p. (U.S. Geological Survey. Bulletin no. 652)
7. Bell, Robert N. Letter to the editor. Engineering and mining journal 76:820. 1903.
8. Cassiterite Bugle (Lost River, Alaska) p.3. March 8, 1953. (Mimeographed)
9. Cassiterite Bugle (Lost River, Alaska) p.7. April 5, 1953. (Mimeographed)
10. Cassiterite Bugle (Lost River, Alaska) p.7. May 5, 1953. (Mimeographed)

11. Cassiterite Bugle (Lost River, Alaska) p.4. June 30, 1953. (Mimeographed)
12. Cathart, S. H. Mining in northwestern Alaska. In U.S. Geological Survey. Bulletin no. 712. Washington, Government printing office, 1920. pp.185-198.
13. Chapin, Theodore. Lode developments on Seward Peninsula. In U.S. Geological Survey. Bulletin no. 592. Washington, Government printing office, 1913. 407p.
14. Collier, Arthur J. Reconnaissance in northwestern Seward Peninsula, Alaska. Washington, Government printing office, 1902. 70p. (U.S. Geological Survey. Professional paper no. 2)
15. Collier, Arthur J. Tin deposits in the York region Alaska. In U.S. Geological Survey. Bulletin no. 225. Washington, Government printing office, 1904. pp.154-167.
16. Collier, Arthur J. The tin deposits of the York region Alaska. Washington, Government printing office, 1904. pp.9-23. (U.S. Geological Survey. Bulletin no. 229)
17. Collier, Arthur J. Tin in the York region. Engineering and mining journal 76:999-1000. 1903.
18. Curtis, W. M. Tin in Alaska. Engineering and mining journal 73:142. 1902.
19. Daily Miner News (Fairbanks, Alaska). Article on the Lost River tin mine. p.4. July 1, 1952.
20. Dobbs, B. C. We've got tin. In L.S. Harrison's Nome and Seward Peninsula. Souvenir edition. Seattle, 1905. pp.123-125.
21. Fearing, Frederick C. Alaska tin deposits. Engineering and mining journal 110:154-158. 1920.
22. Fearing, Frederick C. Geological report covering the report of the National tin mining company at Lost River. 1919. (Unpublished)

23. Harrington, George L. Tin mining in the Seward Peninsula. In U.S. Geological Survey. Bulletin no. 692. Washington, Government printing office, 1919. pp.353-361.
24. Heide, Harold E. Investigation of the Lost River tin deposit, Seward Peninsula, Alaska. Washington, Government printing office, 1946. 57p. (U.S. Bureau of Mines. Report of investigations no. 3902)
25. Hess, Frank L. Tin mining in Alaska. In U.S. Geological Survey. Bulletin no. 520. Washington, Government printing office, 1911. pp.89-92, 285-286.
26. Knopf, Adolph. Geology of the Seward Peninsula tin deposits, Alaska. Washington, Government printing office, 1908. 67p. (U.S. Geological Survey. Bulletin no. 358)
27. Rickard, Edgar. Tin deposits of the York region, Alaska. Engineering and mining journal 75:30-31. 1903.
28. Smith, Philip S. The settlement and climate of Seward Peninsula. The Bulletin 5:10-20. April 2, 1907.
29. Steidtmann, Edward and S. H. Cathart. Geology of the York tin deposits, Alaska. Washington, Government printing office, 1922. 125p. (U.S. Geological Survey. Bulletin no. 733)
30. U.S. Bureau of Mines. Minerals yearbook Vol. 1, metals and minerals, 1952. Washington, Government printing office, 1955. 1218p.
31. U.S. Bureau of Mines. Mining division. Strategic minerals investigation progress report on exploration of tin deposits. Washington, Government printing office, 1941. 5p. (Information circular no. 7154)
32. U.S. Bureau of Mines. Mineral trade notes Vol. 41, no. 1. Pittsburgh, Pennsylvania, July, 1955. 56p.

33. U.S. Congress. 83d Congress, 2d session. Senate Committee on Interior and Insular Affairs. Accessibility of strategic and critical materials to the United States in time of war and for our expanding economy. Washington, Government printing office, 1954. 415p. (Senate report no. 1627)
34. U.S. Congress. 84th Congress, 1st session. House of Representatives, Committee on Interior and Insular Affairs. Alaska tin: hearing before the subcommittee on mines and mining...on Federal tin purchase program in Alaska, May 20, 1955. Washington, Government printing office, 1955. 37p. (Serial no. 10)
35. U.S. Department of Commerce. Materials tin survey. Pennsylvania State College, State College, Pennsylvania, 1953. 772p.
36. U.S. Weather Bureau, Weather Division, Headquarters Army Air Forces. Climatic atlas for Alaska. Washington, Government printing office, 1943. 229p. (Report no. 444)
37. U.S. Weather Bureau, Weather Division, Headquarters Army Air Forces. Climatology of Alaska. Washington, Government printing office, 1943. 72p. (Supplement to report no. 444)