

DEPARTMENT OF  
TERRITORY OF ALASKA

DEPARTMENT OF MINES  
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ASSAY OFFICE  
ANCHORAGE, ALASKA

Pamphlet No. 5-R

# MINERAL OCCURRENCES OTHER THAN GOLD DEPOSITS IN NORTHWESTERN ALASKA

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JUNEAU, ALASKA

May, 1944

Revised March, 1947

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## FOREWORD

This pamphlet was originally issued during the War Period as a limited mimeographed edition, the principal purpose of which was to serve as a ready-reference guide for prospectors in their search for deposits of minerals, other than gold, that were then needed in prosecuting the War.

It is believed that the post-war demand for and continuing shortage of such metallic minerals as copper, lead, zinc, antimony and tin justify intensified prospecting for deposits of such minerals in Northwestern Alaska and that the reissuance of this pamphlet will serve a useful purpose in expediting the work of the prospector who will be searching for them.

It will be noted that the only non-metallic mineral deposits that are listed in the pamphlet are those of asbestos, graphite and the mineral fuels, coal and petroleum.

The great economic importance that may attach to the discovery and development of favorably situated deposits of any one of a considerable number of non-metallic minerals, particularly those such as limestones, clays, etc. whose products could be used locally in the building, construction and other such trades and industries, should not be overlooked by the prospector. The value of industrial non-metallic minerals mined in the United States during 1945 was more than three times that of metallic minerals produced during the same period.

Benefits derived by the Eskimo natives of the Point Barrow region from the operation of the small coal mine that has been opened by the Alaska Native Service on Meade River, about 70 miles south of the village of Barrow, have stimulated interest in establishing similar small-scale coal-mining ventures at other native villages along the Arctic Coast. Opportunity exists for largely expanding the field within which other small-scale enterprises may be found feasible.

The deposits of jade that occur in the general vicinity of the village of Shungnak on the Kobuk River, the limited exploitation of which within the past few years has attracted nation-wide attention, are described in a separate pamphlet entitled "Asbestos and Jade Occurrences in the Kobuk River Region, Alaska" that was issued by this department as Pamphlet No. 3 in 1945.

During the past two years widespread interest has developed in many sections of the Territory in the use of a considerable variety of semi-precious minerals that have been found to occur locally and which furnish excellent raw material for supplying the lapidary trade. These minerals include, besides jade, agates of several varieties, jaspers, chalcedony, agatized woods, and other such materials. It seems quite likely that deposits of similar semi-precious gem materials are to be found in Northwestern Alaska. Silicified contacts between limestone and basic igneous intrusive rocks, such as greenstones, appear to be favorable areas for the occurrence of several varieties of such deposits. Other favorable areas are zones where there is an occurrence of pegmatitic materials which are very coarsely crystallized phases of granite and similar rock. Such areas are reported to exist in Northwestern Alaska. Gem materials may also occur among the gravels and boulders of stream and beach deposits. Some of the best jade that has been recovered from the tributaries of the Kobuk River has been in the form of stream boulders.

A pamphlet entitled "Industrial Minerals as a Field for Prospecting in Alaska, including a Glossary of Elements and Minerals," by A. E. Glover, has been issued by the Territorial Department of Mines, copies of which may be had on application to the office of Commissioner of Mines, Juneau, Alaska. This pamphlet provides an excellent guide for the prospector in his search for deposits of industrial minerals, which field is destined to become of increasing importance in the development of the mining industry of Alaska.

B. D. STEWART,  
Commissioner of Mines.

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## MINERAL OCCURRENCES IN NORTHWESTERN ALASKA

### INTRODUCTION

This pamphlet has been prepared to serve as an easy reference for prospectors and miners to deposits of minerals other than gold in Northwestern Alaska. Some such deposits which do not warrant further prospecting are visited and revisited mainly because no definite information concerning them is available. Others that deserve prospecting are little known.

Much information has been obtained through field and assay offices of the Territorial Department of Mines. This information, combined with that obtained from reports by the U. S. Geological Survey, should represent a very nearly complete list of the known mineral occurrences of possible economic importance in the area.

Only a brief description, or if no description is available, a mere brief record of each occurrence is contained in this pamphlet. Descriptions of deposits containing any gold have not been included for the reason that such deposits are very numerous and the exact information necessary to determine their individual importance is in most instances lacking.

Many of the descriptions are taken from publications of the U. S. Geological Survey, particularly from bulletin 722, "Mineral Resources of Alaska, 1920," which is an early compilation of information on lode deposits. Some of the material from Geological Survey bulletins has been condensed instead of quoted directly. Appropriate references are given for use in case more exact descriptions are desired. In order to avoid unnecessary repetition a number of tin deposits well described by the U. S. Geological Survey are indicated only by references to such publications.

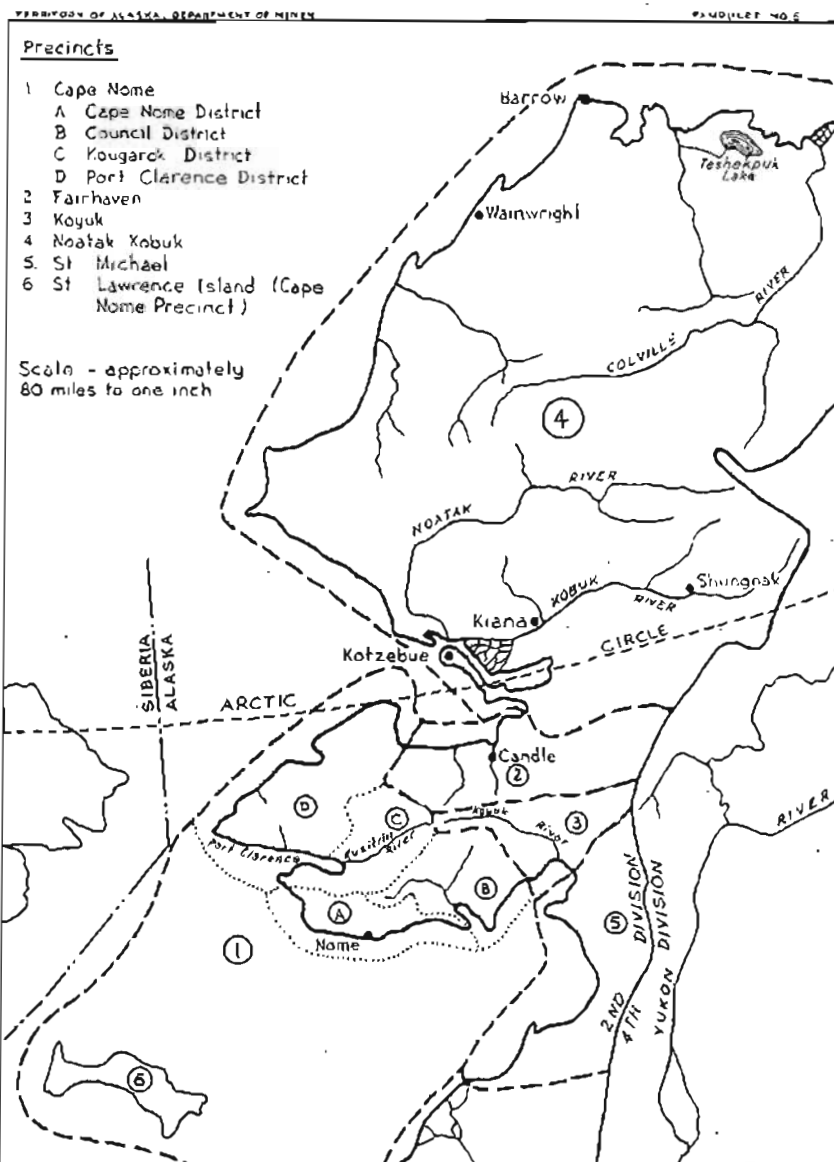


Fig. 1 Map of Northwestern Alaska showing mining precincts

The deposits are classified by metal or material, according to precincts and the localities within precincts in which they occur. No attempt has been made to give complete geological descriptions, but an effort has been made to include available information most indicative of the economic possibilities of the prospect. Somewhat more detailed descriptions have been given of deposits which are not described elsewhere or which, because of their inaccessibility, would be difficult to revisit.

The area considered includes most of the Second Judicial Division of Alaska, or, roughly, the region north and west of a line between the Yukon River delta and Heald Point on the Arctic Ocean about 200 miles southeast of Pt. Barrow (Fig. 1).

Specifications and prices of minerals and metals are not included in this report. Non-metallic minerals which are of strategic importance and command exceptionally high prices at present are various types of asbestos and large, clear crystals of quartz, calcite and mica.

The advice of experienced government mining engineers is available to prospectors throughout Alaska and should be obtained before any large expense is incurred in the development of a prospect.

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## ANTIMONY

### Cape Nome Precinct

#### Cape Nome District:

Dahl Creek, tributary of Lost Creek, tributary of Stewart River—During the first World War, from the Hed & Strand antimony mine on Dahl Creek, 106 tons of antimony ore was shipped. A small amount of work has been done since that time, but no further shipments of ore have been made. An estimated 10 tons of about 30%



ore is now on the dump. Over 1000 feet of tunnel is accessible, but only a few small lenses of stibnite were encountered in that distance. A possible 30 to 40 tons of antimony ore could be mined from lenses now in sight in the mine. The average gold content of the ore is low. Available information on the deposit consists of a map of the mine by A. B. Shallit of the Territorial Department of Mines and a description in U. S. Geol. Survey Bull. 722.

Manila Creek, tributary of Hobson Creek, tributary of Nome River—Sliscovitch Mine—Development work in the Sliscovitch antimony-gold mine consists mainly of several hundred feet of drifts, shafts, and some small stopes. The ore is in a quartz-stibnite vein also containing high-grade stibnite lenses and pockets. The vein occurs in the zone of quartz-antimony mineralization extending from Hobson Creek to Steep Creek. Many of the veins in this zone occur in sheared and mineralized schist near a limestone contact. Only the widest parts of the Sliscovitch vein have been stoped. A detailed description can be found in U. S. Geol. Survey Bull. 722.

Cold Creek, tributary of Grouse Creek, tributary of Snake River—Breen Prospect—About 14 tons of float ore has been shipped from the Breen antimony-gold prospect. The ore carried gold and about 10% antimony. There are no underground workings, the ore having been taken from pits and surface trenches. It occurs as quartz-stibnite veins in mineralized and sheared schist. Float from these veins indicates that some are over two feet thick in places. In the ore shipments made, the seller was penalized for the antimony and paid only for the gold content.

Steep Creek, tributary of Goldbottom Creek, tributary of Snake River—The McDuffee antimony prospect on Steep Creek is a high grade stibnite lens in sheared schist on a limestone and schist contact. The only lens visible is 6 inches wide at its widest point and narrows to less than an inch within a few feet. A hundred pounds of stibnite has been picked out of the lens and is present on the dump. About

. 50 feet away, and on the opposite side of Steep Creek, small pieces of float stibnite are present. No development work has been done.

Waterfall Creek, tributary of Last Chance Creek, tributary of Snake River—In the Christophosen property on Waterfall Creek the ore is iron-stained schist and quartz in which stibnite occurs as lenticular masses. None of the antimony stringers are over 12 inches in thickness. About 2½ tons of high-grade stibnite has been mined and sold. Development work consists of two short tunnels and several open cuts. Gold is present in the schist and in the stibnite. The above description consists of extracts from U. S. Geol. Survey Bull. 722.

Bonita Creek, tributary of Osborne Creek, tributary of Nome River—Small lenses of gold-bearing stibnite are said to occur near the head of Bonita Creek. Nothing is known of the mode of occurrence or of any development work done there.

Dorothy Creek, tributary of Nome River—Large bladed stibnite crystals are common in the placer concentrates of Dorothy Creek. The Hed and Strand antimony mine is on the opposite slope of the ridge at the head of Dorothy Creek.

Big Hurrah Creek, tributary of Solomon River—Quigley Prospect—A stibnite lens about one foot thick in a four foot zone of schist and quartz is said to occur in the Quigley prospect on Big Hurrah Creek. Small nests of stibnite are present elsewhere in the zone. The deposit is about one mile above the mouth of Big Hurrah Creek. Another small stibnite lens is reported on Big Hurrah Creek about a quarter of a mile below the Quigley prospect.

Anvil Creek, tributary of Snake River—Stibnite veins up to 18 inches in width occur in a shear zone in schist in a lode on Anvil Creek opposite the mouth of Specimen Gulch. U. S. Geo. Survey Bull. 379, Mineral Resources of Alaska, 1908.

Other occurrences—Stibnite has also been found in other lodes on Anvil, Glacier, Rock, Boulder and Goldbottom Creeks; in quartz veins of the Solomon-Casadepaga region and at Bluff. These occurrences do not appear to be of commercial importance.

#### Council District:

Omalik Creek, tributary of Fish River—At the Omalik Mine in the upper Fish River district stibnite ore occurs in thin bands in a shattered zone of limestone. No veins of sufficient width to warrant mining are known. U. S. Geol. Survey Bull. 649, Antimony Deposits of Alaska.

Foster Creek, tributary of Camp Creek, tributary to Niukluk River—At the Brookins prospect on Foster Creek an 8-foot shaft and a 60-foot tunnel have been driven to explore stibnite lenses. The workings are now caved and no ore in place is visible. The largest pieces of stibnite float observed were about 6 inches in diameter. According to Mr. Brookins, the widest stibnite lens encountered was one foot thick. About 600 feet upstream from the shaft and tunnel another narrow lens was exposed by Brookins for a distance of 8 feet. Elsewhere in the area the schist is said to contain tiny stibnite stringers and pockets in the intricate folds of a contorted mica schist. More development work is reported to have been done late in 1943. The stibnite here apparently occurs in small, discontinuous lenses and gives only slight promise of commercial production under present conditions.

#### Kougarok District:

Kougarok River—Small stibnite particles (from the vicinity of Taylor) were submitted to the Nome assay office of the Department of Mines in 1941. The location of the deposit and the mode of occurrence are not known.

#### Port Clarence District:

Tin Creek, tributary of Lost River—About three-quarters of a mile west of the mouth of Tin Creek at the "Wolframite-topaz" lode small amounts of stibnite associated with fluorite are found. The stibnite is not abundant enough to be of economic importance.

Stibnite is also reported to occur in a tunnel on the west side of Brooks Mt. and in the saddle at the head of Tin Creek. U. S. Geol. Survey Bull. 649, Antimony Deposits of Alaska.

#### St. Michael Precinct

Ungalik River—Stibnite float is reported to have been found on the divide between the Ungalik and Shaktolik Rivers on the slopes of Christmas Mt. about 4 miles northeast of Bonanza Creek. U. S. Geol. Survey Bull. 449, Southeastern Seward Peninsula and Norton Bay-Nulato Region, Alaska. About 1911 a stibnite lode was found by Thomas Moon on the ridge between the Shaktolik and Ungalik Rivers about 15 airline miles from the coast. According to his description the stibnite occurred in small veinlets and lenses in a series of large quartz veins. The authenticity of extremely high gold and silver assays, reported to have been obtained from some of this ore, is questioned. The exact location of the deposit is known to residents of the Ungalik River region.

Bonanza Creek, tributary of Ungalik River—Occasional stibnite particles are found in the placer concentrates of Bonanza Creek.

### ASBESTOS

#### Cape Nome Precinct

#### Port Clarence District:

Bluestone River, tributary of Tuksuk Channel—An asbestos occurrence in the Bluestone River area is reported by Mr. A.

Rydeen of Nome. No definite information is available on the deposit.

#### Fairhaven Precinct

Kiwalik region—Asbestos is reported by A. Rydeen of Nome to have been found on the coast between Alder Creek about 10 miles west of Kiwalik. The exact location and the nature of the deposit are not known to the writer.

#### Koyuk Precinct

Koyuk River—Asbestos is reported from the Koyuk vicinity. No definite information has been obtained on this occurrence.

#### Noatak-Kobuk Precinct

California Creek, tributary of the Kogoluktuk River—Asbestos is reported to have been found in placer workings on California Creek. The maximum length of fibers found there is said to have been about three inches.

Dahl Creek, tributary of Kobuk River—Seams of long-fibered chrysotile asbestos are found in outcrops of ultrabasic rocks on Asbestos Mt. about 7 miles from the Kobuk River near Dahl Creek. Most of the chrysotile is the slip-fiber type and is of good quality. The length of the fibers is unusual, often up to 12 inches. The seams observed were less than two inches in width and irregular in strike and dip. At no place did they form a stockwork or network which could produce any large tonnage. Exposures are limited and it is possible that larger concentrations of asbestos occur in a zone of sheared serpentine which cuts across the intrusive. This zone does not contain the prominent outcrops common in the unsheared areas.

In the sheared zone mentioned above, and near the top of Asbestos Mt., asbestos float in some small areas forms the

bulk of the overburden. For a distance of several hundred feet along the north side of the mountain much of the float is fibrous tremolite. At one end of this area the asbestos is chrysotile. Four trenches were dug across the zone of tremolite float. A vein about 6 inches in width was exposed in place in the narrow bottom of one of these trenches. The vein material is practically all white tremolite. The fibers are weak but very long. Bundles of fibers up to two feet in length were removed from this exposure by hand. Float above this vein indicates the presence of at least one other similar seam. Tremolite of the type found at this deposit is worth from \$300 to \$500 a ton at the present time.

Cosmos Creek, tributary of Kobuk River—Asbestos has been reported to occur in an area of ultrabasic rocks above the canyon on Cosmos Creek.

Shungnak River, tributary of Kobuk River—On Bismark Mt., first mountain north of the Kobuk and on the right limit of Shungnak River, is an area of ultrabasic rocks containing some highly serpentinized areas and some asbestos. The asbestos occurs in the highly serpentinized areas and was observed only as fibers in a mass of scaly serpentine float about 1,000 feet long and several hundred feet wide. This mass of float is soft, incoherent and in places over 6 feet deep. It is composed entirely of small whitish-green scales of serpentine with asbestos fibers still attached to many flakes. Very little strong and silky fiber was found. Most of the fibrous material is less than one inch long and lacking in tensile strength. From surface indications at this place it appears that the bedrock is a sheared serpentine which has yielded to pressure by flowing in the solid state and has developed a scale-like structure. Most of the asbestos probably occurs as short, slip-fiber chrysotile on the flakes of serpentine, and the fibrous material may comprise as much as several percent of the bulk of the bedrock.

About half way up the canyon of Shungnak River and near the base of Shungnak Mt., on the left limit of the river,

an abesbestos deposit is also reported. This deposit has not been examined.

Jade Creek, tributary of Kobuk River—In the vicinity of Jade Mountain, at the head of Jade Creek, there is serpentine float in the creeks and on the mountain which contains short cross-fiber chrysotile asbestos of high quality. No large amount of asbestos float was seen and no veins in place were found. A tunnel is said to have been driven many years ago on a narrow vein of asbestos near Jade Mt. Cross-fiber tremolite asbestos float is present in a zone of schistose nephrite near the top of Jade Mt. The largest veinlet observed during a visit to the area in 1943 was about one inch thick.

Hunt River, tributary of Kobuk River—A specimen of mountain leather grading into strong, flexible amphibole asbestos was found at the extreme head of Hunt River by an Eskimo hunter. The fibrous asbestos is about two inches in length. The Eskimo, Frank Jackson of Kiana, reports that the seam from which it was taken was not more than half an inch wide. Asbestos is also reported to have been found by Eskimo hunters at a place about 40 miles northwest of Jade Mt.

## BERYLLIUM

### Cape Nome Precinct

A small dike about a mile west of the mouth of North Star Creek, a tributary of Sinuk River, is typical of pegmatites in that area. It attracts attention because of the beauty of some of its well crystallized minerals. Minerals seen in the hand specimen are brown and white micas, tourmaline, garnet, and beryl. U. S. Geol. Survey Bull. 533, Geology of the Nome and Grand Central Quadrangles, Alaska.

## BISMUTH

### Cape Nome Precinct

#### Cape Nome District:

Charley Creek, tributary of Sinuk River—Two parallel quartz veins 10 and 5 inches wide containing a little disseminated bismuth and bismuthinite were exposed in an open cut for about 50 feet near the head of Charley Creek. A 4-foot quartz vein carrying about 15 percent of bismuth was also reported from this area. U. S. Geol. Survey Bull. 592, Mineral Resources of Alaska, 1915.

Oregon and Hungry creeks, tributaries of Cripple River—Bismuth is reported to occur in placer concentrates from these streams.

Prospect Creek, tributary of Snake River—Bismuth is reported to have been found in a quartz vein on Prospect Creek. In the present exposure galena is the only visible metallic mineral.

Bismuth specimens are reported to have been found in the Kigluiak Mts. In 1938 a specimen of tetradymite (bismuth tellurium sulfide) was identified at Nome for Pat O'Brien of Nome. The locations of these occurrences is not known to the writer.

#### Port Clarence District:

Kruzgamepa River, tributary to Imuruk Basin—According to Bernard Vogen of Teller, a  $\frac{3}{4}$ -pound bismuth nugget was found near Igloo by Eskimos.

Brooks Mt., head of Lost River—On the north side of Brooks Mountain, at an altitude of 1850 feet, is a small galena prospect. The iron oxide of the gossan contains lead and traces of bismuth. U. S. Geol. Survey Bull. 358, Geology of the Seward Peninsula Tin Deposits, Alaska.



#### St. Michael Precinct

Hopeful Gulch, tributary of Ungalik River near Bonanza Creek—Bismuthinite was a fairly common mineral in a sample of placer concentrates from Hopeful Gulch.

#### CHROMIUM

##### Koyuk Precinct

Dime Creek, tributary of Koyuk River—Chromite and chrome spinels are found in placer concentrates from streams in this vicinity which contain platinum. See "Platinum."

##### Noatak-Kobuk Precinct

Kobuk River—Chromite boulders up to a foot in diameter have been found in placer workings on Dahl Creek and on Shungnak River. U. S. Geol. Survey Bull. 815, Geology and Mineral Resources of Northwestern Alaska.

Kugururok River, tributary of Noatak River—A specimen of chromite which contained 20% chromium was brought in by Peter Wood, Eskimo, from a deposit near the mouth of the Kugururok River. A large amount of similar material is said to occur in that area.

#### COPPER

##### Cape Nome Precinct

##### Cape Nome District:

Dexter Creek, tributary of Nome River—A lode containing small amounts of copper minerals and gold in quartz is known on Dexter Creek near Nome. The copper content is apparently too low to be of economic importance.

Copper Creek, tributary of Nugget Creek—On the divide between Copper Creek and Dickens Creek near the head of Nome River a small amount of development work has

been done on copper prospects. Chalcopyrite, bornite and galena in narrow irregular veins form a replacement deposit in limestone near a contact of limestone and schist. U. S. Geol. Survey Bull. 345, Mineral Resources of Alaska, 1907.

Spruce Creek, tributary to Bering Sea east of Solomon—Copper minerals are found in quartz veins near the gold prospects west of Spruce Creek. U. S. Geol. Survey Bull. 722.

Twin Mt., head of Twin Mt. Creek, tributary of Snake River—A short tunnel was driven on Twin Mt. Creek to prospect a vein containing copper minerals. The deposit appears to be localized in a shattered quartz vein. U. S. Geol. Survey Bull. 662, Mineral Resources of Alaska, 1916.

Waterfall Creek, tributary of Last Chance Creek, tributary of Snake River—Chalcopyrite with galena, malachite and azurite is reported to be present in a lode at the head of Waterfall Creek. U. S. Geol. Survey Bull. 662, Mineral Resources of Alaska, 1916.

Copper has also been reported from the following localities:

On the ridge at the head of Manila Creek. U. S. Geol. Survey Bull. 722;

Near the head of North Fork, a tributary of Last Chance Creek in the Nome District. U. S. Geol. Survey Bull. 722;

Half a mile north of the mouth of Little Hurrah Creek in the Solomon District. U. S. Geol. Survey Bull. 722;

On the Klokerblok divide near the head of Eldorado Creek in the Bluff region. U. S. Geol. Survey Bull. 722;

On Prospect Creek, tributary of Snake River; and

In tetrahedrite in a small quartz vein on Grouse Creek, tributary of Goldbottom Creek.

At most of these localities copper is present in such small amounts that no development work is justified.

#### Council District:

Casadepaga River, tributary of Niukluk River—Copper prospects are known near the contact of limestone and schist

on Mt. Dixon and in the Moonlight Creek divide. U. S. Geol. Survey Bull. 345, Mineral Reserves of Alaska, 1907.

Timber Creek, tributary of Koyuk River—Prospect pits were sunk in 1906-7 in the hills near Timber Creek in the Tubutulik divide, on copper stained greenstones near their contact with limestone. So far as could be determined the copper mineralization is distinctly local and of insignificant quantity. U. S. Geol. Survey Bull. 449, Southeastern Seward Peninsula and the Norton Bay-Nulato Region, Alaska.

Darby Peninsula—About 3 miles north of Carson Creek on the east coast of Darby Peninsula, small, irregular and discontinuous bodies of copper ore occur. There is no reason for believing that a commercially workable deposit will be found at this place. U. S. Geol. Survey Bull. 449, Southeastern Seward Peninsula and the Norton Bay-Nulato Region, Alaska.

Bendeleben Mt. vicinity—On the divide between Kingsland and Nugget creeks copper prospecting has been carried on for from five to eight years. These streams are tributaries of the Niukluk from the east about 4 miles south of the Birch Creek-Niukluk divide. The ore occurs near the contact of a limestone and a schist. It consists mainly of chalcopyrite and is of low grade. No distinct vein was found and no considerable body has been exposed. U. S. Geol. Survey Bull. 449, Southeastern Seward Peninsula and the Norton Bay-Nulato Region, Alaska.

#### Kougarok District:

Kougarok Mt. vicinity—Ward Property—The Ward property is about 3½ miles north of west of Kougarok Mountain, in the Kougarok district. Development work consists of a number of open cuts and shallow shafts. From a description given by the owners it appears that the ledge is an impregnated zone lying along or near a limestone-schist contact. About 40 tons of ore was shipped between 1906

and 1916 averaging between 30 and 40 percent copper. Most of the ore shipped was carbonate float. Sulphides were present in the main vein, said to be from 6 to 21 inches wide, on which a 25-foot shaft and a 20-foot incline were driven. U. S. Geol. Survey Bull. 662. Mineral Resources of Alaska, 1916.

Worcester property—About 3 or 4 miles southeast of Kougarok Mt. several lode claims have been staked on a deposit in which malachite, azurite, and galena are said to be present. U. S. Geol. Survey Bull. 722.

Sherrette Creek, tributary of Kruzgamepa River—Several copper lodes have been prospected along a contact of limestone and schist near the head of Sherrette Creek. Other copper prospects occur along the divide between Iron Creek and Kruzgamepa River and between Iron Creek and the broad flat drained by tributaries of the Kruzgamepa and of the Niukluk. U. S. Geol. Survey Bull. 345, Mineral Resources of Alaska, 1907.

Iron Creek, tributary of Kruzgamepa River—Wheeler property—The Wheeler copper claims are at the head of several small tributaries of Iron Creek on the west side below the mouth of Canyon Creek. Principal development work consists of a 60-foot tunnel and a shaft 80 feet deep. U. S. Geol. Survey Bull. 662, Mineral Resources of Alaska, 1916.

Head of Sherrette Creek, tributary of Kruzgamepa River—Wheeler prospect—A 200-foot adit and a shaft 90 feet deep have been driven on this prospect. The ore occurs in a zone of mineralization 5 feet wide in schist. About 25 tons of ore was shipped from this property. Unoxidized ore taken below a depth of 25 feet assayed: Gold 1.82 ounces; silver 5.15 ounces; and copper 17.18 percent. The best exposure of copper ore seen in the district is about half a mile northeast of this Wheeler prospect. The workings are only 8 feet deep. The ore zone is about 5 feet wide and is composed of narrow discontinuous bands of ore minerals and quartz. U. S. Geol. Survey Bull. 722.

Taylor Creek, tributary of Kougarok River—A copper prospect has been reported from the Taylor Creek area. In a hand specimen copper is disseminated through a metamorphosed limestone, mainly in the form of sulfides. The specimens do not indicate a vein of any continuity, but development work has uncovered only the surficial portions. U. S. Geol. Survey Bull. 345, Mineral Resources of Alaska, 1907.

#### Port Clarence District:

Lost River, tributary of Bering Sea—Wolframite-topaz lode—Described under "Tungsten".

Tin Creek, tributary of Lost River—Idaho Claim—A few hundred yards below the mouth of Tin Creek a copper prospect has been opened on the edge of the 15-foot bench fronting Lost River. The deposit occurs in an irregular, shattered zone in limestone and is about 15 feet wide. The ore mineral is chalcopyrite, with pyrrhotite, calcite, fluorite and particles of slickensided rock. The percentage of copper is low. U. S. Geol. Survey Bull. 358, Geology of the Seward Peninsula Tin Deposits, Alaska.

Ear Mountain—Some prospecting has been done on contact-metamorphic deposits of chalcopyrite and galena on Ear Mountain. U. S. Geol. Survey Bull. 733, Geology of York Tin Deposits, Alaska.

Budd Creek, tributary of American River, tributary of Agiapuk River—Copper minerals have been found by placer prospectors on Budd Creek.

Ear Mountain—Winfield prospect—Small lenses of chalcopyrite were encountered in the Winfield shaft on Ear Mt. which was sunk while prospecting for tin. U. S. Geol. Survey Bull. 733, Geology of York Tin Deposits, Alaska.

#### Fairhaven Precinct

Split Creek, tributary of Bear Creek—Betz prospect—Copper prospects have been exposed in open cuts on the north

side of Split Creek at an average elevation of about 600 feet above its mouth. The copper apparently occurs as chalcopyrite in quartz veins. U. S. Geol. Survey Bull. 692, Mineral Resources of Alaska, 1917.

#### Koyuk Precinct

Peace River, tributary of Koyuk River—Small amounts of copper minerals are present as accessory minerals in granite on upper Peace River. The occurrence is of no economic importance. U. S. Geol. Survey Bull. 449, South-eastern Seward Peninsula and the Norton Bay-Nulato Region, Alaska.

#### Noatak-Kobuk Precinct

Shungnak River, tributary of Kobuk River—Small copper and silver nuggets are occasionally found in the placer concentrates of Shungnak River. U. S. Geol. Survey Bull. 815, Geology and Mineral Resources of Northwestern Alaska.

Dahl Creek, tributary of Kobuk River—Small copper and silver nuggets are found in placer concentrates of Dahl Creek. A blowpipe examination revealed the presence of cadmium in one of the silver nuggets. U. S. Geol. Survey Bull. 815, Geology and Mineral Resources of Northwestern Alaska.

Kogoluktuk River, tributary of Kobuk River—At the head of the Kogoluktuk River considerable float of copper ore has been found on the Noatak side of the pass. A small specimen containing quartz and tetrahedrite was brought from this place by Lewis Lloyd of Shungnak.

Kiana—Some lode prospecting has been done in the vicinity of Kiana. Copper samples have been submitted which assay from 7 to 50% copper. Nothing is known by the writer of the nature of the samples or of the deposit from which they came.

Ruby Creek, tributary of Shungnak River—Copper bearing leads on Ruby Creek have been known for many years and were critically examined in 1906 by experts in private employ. The mineralization appears to be confined to a brecciated zone or zones in the limestone. The sulfides of economic importance are mainly bornite and chalcopyrite, but galena and iron pyrite were also noted. Limonite in several places forms a gossan several feet thick over the sulphide-impregnated limestone. Development work consists of a 40-foot adit, 30 feet of drift and two surface trenches. U. S. Geol. Survey Bull. 815, Geology and Mineral Resources of Northwestern Alaska.

Aurora Mt., left fork of Ruby Creek near head of Cosmos Creek—A deposit similar to the Ruby Creek deposit has been prospected with an open cut, shaft and tunnel on Aurora Mt. No descriptions of the actual size and tenor of either of these deposits is available. The prospecting done apparently showed that neither of the deposits was workable at the time of the prospecting, about 1906. U. S. Geol. Survey Bull. 815, Geology and Mineral Resources of Northwestern Alaska.

#### St. Michael Precinct

Chalcopyrite specimens have been sent to the Nome assay office of the Territorial Department of Mines from Unalakleet and from the Ungalik region. Nothing else is known of these occurrences. The occurrence of copper minerals on Besboro Island has also been reported.

#### St. Lawrence Island

Chalcopyrite is found associated with molybdenite in a granitic intrusive body southwest of Gambell. The occurrence is of no economic importance.

## GRAPHITE

### Cape Nome Precinct

#### Cape Nome District:

Small amounts of graphite are found in the schists in the Cape Nome district. One deposit which is of possible commercial importance is described below under "Port Clarence District."

#### Port Clarence District:

Imuruk Basin—Graphite deposits which give promise of becoming of commercial importance are found in a zone along east-west striking schists which extend from east to the head of the Grand Central River across the head of Windy Creek and the head of Cobblestone River to the region about 2 miles south of Graphite Bay, an arm of Imuruk Basin. Several hundred tons of ore has been shipped from the western end of this area which is very close to tide-water. U. S. Geol. Survey Bull. 722 contains a description of the deposits. The deposits south of Graphite Bay were examined in 1945 by the U. S. Bureau of Mines and the U. S. Geological Survey.

### Noatak-Kobuk Precinct

Artifacts of very nearly pure graphite have been found in excavations of ancient Eskimo villages between Shungnak and Kiana on the Kobuk River. Similar graphite utensils were found in excavations at Pt. Hope. No graphite was found in the sites of villages less than several hundred years old and the origin of the specimens is unknown. (Louis Giddings and Froelich Rainey, College, Alaska.)

Lucky 6 Creek, tributary of Noatak River—According to Lewis Lloyd of Shungnak, graphite was found by prospectors in the Lucky 6 Creek area many years ago. No description of the deposit is available.



## IRON

### Cape Nome Precinct

#### Cape Nome District:

Sinuk River—"Several groups of claims have been staked on iron deposits near the Sinuk River. The deposits consist of limonite veins and stockworks and their residual products. Hematite, sphalerite, galena, pyrolusite, fluorite and small quantities of gold occur as accessories in some of the lodes. The veins range in width from a few inches to 30 feet. The high-grade iron ores probably aggregate at least several hundred thousand tons. The iron content of this lode at depth cannot be judged from the surface indications; in fact, it is entirely possible that this deposit is only a surface capping, or 'iron hat', covering some other metalliferous deposit." Abstracts from U. S. Geol. Survey Bull. 722. Maps of the deposit have been prepared by A. B. Shallit of the Territorial Department of Mines.

### Noatak-Kobuk Precinct

Iron Mountain, east of pass between Cosmos Creek and left fork of Ruby Creek—Masses of magnetite float are found in the hills north of Shungnak, especially on Iron Mountain. No large ore bodies are known and the occurrences do not appear to be of economic importance. U. S. Geol. Survey Bull. 815, Geology and Mineral Resources of Northwestern Alaska.

### St. Lawrence Island

The University of Alaska Archaeological Expedition to St. Lawrence Island has reported the occurrence of bog-iron ores on the island. No indication of the size of the deposit is given.

## LEAD - SILVER - ZINC

### Cape Nome Precinct

#### Cape Nome District:

Sinuk River—See "Sinuk River Iron Deposit."

Waterfall Creek, tributary of Last Chance Creek, tributary of Snake River—See "Copper."

Steep Creek, tributary of Goldbottom Creek, tributary of Snake River—Narrow irregular stringers containing galena, sphalerite and pyrite in bleached limestone occur in a deposit on Steep Creek. The widest mineralized zone observed was 6 feet in width and contained a small percentage of sulfides. U. S. Geol. Survey Bull. 722.

Penny River—On the ridge between the head of Oregon Creek and Penny River, a shallow shaft has been sunk on an iron-stained zone of mineralization in limestone. The ore is sphalerite with pyrite in a quartz gangue. U. S. Geol. Survey Bull. 722.

Lead minerals in small amounts are known in quartz veins on Dickens Creek and on Rock, Mountain, Prospect, Anvil, and Grouse Creeks in the Snake River basin. These occurrences do not appear to be of commercial importance.

#### Council District:

Omalik Creek, tributary of Fish River—Omalik Mine—Several hundred feet of tunnel and drift and a 180-foot shaft have been driven at the Omalik silver mine. Between 300 and 400 tons of lead-silver ore has been produced. The silver content of the ore is high. Apparently no continuous vein of galena ore existed, the ore being found only in irregular and discontinuous pockets, formed by replacement processes in limestone. The claims have been inadequately prospected. The ore is of excellent quality, but the deposits likely to be found will probably be pockets, not

very large and not adaptable to cheap mining methods. U. S. Geol. Survey Bull. 449, Southeastern Seward Peninsula and the Norton Bay-Nulato Region, Alaska.

Fish River—A silver-lead lode on Fish River about 5 or 6 miles above the mouth of the Niukluk is said to have been worked sporadically for several years. Some silver-lead ore is reported to have been mined in 1915. Cinnabar is also present at this property, and it is reported that a number of flasks of mercury have been produced. U. S. Geol. Survey Bull. 449, Southeastern Seward Peninsula and the Norton Bay-Nulato Region, Alaska.

Mt. Bendeleben—Lead and copper are reported to have been found northeast of Mt. Bendeleben. This occurrence may be the same as that of the copper prospect reported near Mt. Bendeleben.

#### Kougarok District:

Iron Creek, tributary of Kruzgamepa River—Galena has been found with associated copper minerals at the Wheeler lead-silver prospect at the mouth of Iron Creek. Two kidneys of galena ore were discovered on the west bank of the Kruzgamepa in a schistose limestone near its contact with a chloritic schist. Sphalerite and pyrite were also present in the ore. Only a small tonnage is in sight. The ore uncovered has been in disconnected masses along the zone of shearing and offers little encouragement for further prospecting. U. S. Geol. Survey Bull. 722.

Kougarok Mt.—A small amount of galena occurs in the Worcester copper deposit near Kougarok Mt. U. S. Geol. Survey Bull. 722.

Coffee Creek, tributary of Quartz Creek, tributary of Kougarok River—Small amounts of cerussite and pyromorphite were present in a sample of placer concentrates from Wonder Gulch, a tributary of Coffee Creek.

Port Clarence District:

Brooks Mountain—Read Prospect—At the west end of the Brooks Mountain granite mass a prospect trench discloses a body of argentiferous galena ore occurring 20 feet from the granite contact in a coarsely crystalline white limestone. A thickness of  $3\frac{1}{2}$  feet of solid ore is exposed, consisting of galena strongly admixed with a lustrous black zinc blende. Pyrrhotite and fluorite are present, but not common. Assays of the ore yielded 34% of lead and 11 ounces of silver per ton. U. S. Geol. Survey Bull. 358, Geology of the Seward Peninsula Tin Deposits, Alaska.

Luther Lead Prospect—Near the prospect described above is a contact-metamorphic deposit on which a small prospect hole has been dug. The ore body consists of a confusedly intergrown mass of tourmaline, fluorite, calcite, arsenopyrite, brilliant black sphalerite, pyroxene and axinite. The ore body is 4 feet thick and penetrates the marmorized limestone in irregular tongues a few inches thick. Galena is found in the ends of these tongues. A few hundred feet north of this occurrence sphalerite occurs in a highly metamorphosed limestone. On weathering this material resembles a gossan. U. S. Geol. Survey Bull. 358, Geology of the Seward Peninsula Tin Deposits, Alaska.

On the north side of Brooks Mt., at an altitude of 1850 feet, is a small galena prospect. The galena occurs in a gossan, the skeleton of which consists of tourmaline. The iron oxide of the gossan contains lead and traces of bismuth. U. S. Geol. Survey Bull. 358, Geology of the Seward Peninsula Tin Deposits, Alaska.

Lost River—See description of Wolframite-topaz lode, under "Tungsten".

Rapid River, tributary of Lost River—Alaska Chief Property—A 35-foot shaft and an adit 143 feet long comprise the development work on this lode. About 7 feet of low grade galena ore was exposed. Where observed the ore body consisted of porous red iron oxide containing galena. U. S. Geol. Survey Bull. 358, Geology of the Seward Peninsula Tin Deposits, Alaska.

Tin Creek, tributary of Lost River—Idaho Claim—On Tin Creek a galena prospect has been opened on some gossan croppings at an altitude of 1100 feet, 800 feet above the bed of the creek. The deposit occurs in a fracture zone in the limestone. The gossan consists of honeycombed masses of iron oxide containing abundant galena and lead carbonate. U. S. Geol. Survey Bull. 358, Geology of the Seward Peninsula Tin Deposits, Alaska.

Lost River—Bessie and Maple Claims—On the east slope of the ridge opposite the mouth of Tin Creek a tunnel has been driven into the hill for about 150 feet. A few narrow galena veins are said to have been exposed in this tunnel, the largest being about three inches wide. A dike containing fine seams of galena was also exposed by pits in several places on this ridge. U. S. Geol. Survey Bull. 733, Geology of the York Tin Deposits, Alaska.

Small amounts of limonite gossan containing lead carbonates and mimetite are also present on the hill. The deposit does not appear to be of economic importance.

Tin Creek, tributary of Lost River—Yankee Girl Lead and Tin Prospect—Two short tunnels were driven on a prospect a few hundred feet southwest of the Tin Creek granite boss. Lead, tin, and copper minerals are present on the dump. In 1939 the deposit was sampled across a 15-inch width. Assay results showed: 0.02 ounces of gold and 0.6 ounces of silver per ton, also 3.1% lead and 0.47% tin. A brief description of the prospect is given in U. S. Geol. Survey Bull. 733.

#### Fairhaven Precinct

Inmachuk River—A galena and silver lode with a capping of limonite similar to that of the Sinuk River iron deposit is reported to occur on the left limit of Inmachuk River on the ridge between the head of Inmachuk River and Collins Creek. Magnetite is said to be present in ore from this deposit. Some development work has been done. Mention of the deposit is made in U. S. Geol. Survey Bull. 722.

Candle Creek, tributary of Kiwalik River—On Candle Creek the bulk of the dredge concentrates is said to be composed of galena for short distances below small veins of galena which are encountered in bedrock. Pyrite ordinarily comprises a large part of the concentrates.

Mud Creek, tributary of Kiwalik Lagoon—Small amounts of galena are reported in concentrates from drifting operations on Mud Creek.

Patterson Creek, tributary of Candle Creek—Small galena veins were exposed in drifting operations on Patterson Creek. On No. 4 Above a vein about one foot wide and low in silver content was found. Several veins from eight inches to one foot wide were found on No. 8 Above. The veins on 8 Above were reported to have contained considerable silver. A vein of galena three feet wide is said to have been found on Patterson Creek years ago. A shallow shaft was sunk on this vein and it is reported to have pinched out within a few feet.

Canoe Creek, tributary of Kiwalik River—A specimen sent to the College assay office of the Department of Mines, and identified as "galena rich in silver" was taken from a vein about 1½ feet wide on Canoe Creek by R. L. Gillis of Candle.

Cunningham Creek, tributary of Hannum Creek, tributary of Inmachuk River—A sample of placer concentrates from 1942 drift mining operations of J. B. Johnston on Cunningham Creek assayed 50% lead and 5.70 ounces of silver. Lead carbonates and pyromorphite were the most common minerals. Galena was also present. Similar concentrates are said to be found in places on Milroy, Harris, Hannum and Collins Creeks. Specimens of high-grade galena float were found on Harris Creek. The lode occurrence of the ore on Harris Creek is reported to have been found during the summer of 1943.

Independence Creek, tributary of Kugruk River—Between the years 1916 and 1921 considerable work was done on a

lead-silver lode about a quarter of a mile southwest of the mouth of Independence Creek on Kugruk River. Several hundred feet of drifts and shafts were driven. The ore body, according to miners who worked on the property, was usually wider than the drifts and in places was 10 to 12 feet wide. At present none of the workings are accessible. Specimens taken from the dump average about 20 ounces of silver and 20% lead. On the 140-foot level in the shaft no ore was found and work was discontinued. The deposit has been examined by engineers for private concerns.

#### Noatak-Kobuk Precinct

Kiana—Several specimens of galena said to have been found in the Kiana district and north of the Kobuk River have been identified at assay offices of the Territorial Department of Mines. Nothing is known of the deposits from which these specimens were taken.

Lucky 6 Creek, tributary of Noatak River—According to Lewis Lloyd of Shungnak, a small lens of high-grade silver ore was found on Lucky 6 Creek by gold prospectors. The lens was narrow and only a few feet long. Very little work was done before the vein pinched out.

For descriptions of occurrences at Shungnak River, Dahl Creek, Kogoluktuk River, Ruby Creek and Aurora Mt. see under "Copper".

Mauneluk River, tributary of Noatak River—Silver ore is reported to have been found on the north side of the Kobuk-Noatak divide between Reed and Mauneluk River portages. (Lewis Lloyd, Shungnak.)

Arctic Slope—A few quartz specimens containing galena and sphalerite in small quantities have been brought to Barrow by Eskimo prospectors.

### St. Lawrence Island

The University of Alaska Archaeological Expedition to St. Lawrence Island reports the presence of galena in small amounts on the western end of the island. No commercial importance is attached to these occurrences.

### MERCURY

#### Cape Nome Precinct

##### Cape Nome District:

Bluff district—Cinnabar has long been known to be a common constituent of placer concentrates from Koyana, Swede and Daniels creeks and from beach placers at Bluff.

Bluff Cinnabar Deposit—At the mouth of Swede Creek about  $1\frac{1}{2}$  miles east of Bluff a cinnabar lode has been prospected with two short tunnels and a few small shafts. Equipment for working and retorting the ore was shipped in several years ago and is still idle on the beach. The two tunnels apparently were begun in pockets of ore, but most of their lengths is in barren limestone. The cinnabar occurs in limestone beds exposed on a cliff overlooking Bering Sea. Several beds in the limestone as much as 10 feet wide are stained by hematite to a color very similar to that of the cinnabar ore. Assays of these zones varied from 0.04% to 0.14% Hg. and they cannot be considered as possible ore. Adjacent to the portal of the easternmost tunnel is a small pocket of ore, exposed only on the cliff face. An 18-inch chip sample across this kidney assayed 6.76% Hg. A 7-foot chip sample across the same kidney and into lower grade ore on both sides assayed 2.36% Hg. Channel samples would probably give somewhat lower values. The kidney is not more than 7 feet long and does not justify more than hand prospecting. The deposit, however, has not yet been thoroughly sampled.



Council District:

Fish River—See "Lead-Silver-Zinc."

Kougarok District:

Coffee Creek, tributary of Quartz Creek, tributary of Kougarok River—A small amount of placer cinnabar is found in concentrates from Coffee Creek and from Wonder Gulch, a tributary of Coffee Creek.

Port Clarence District:

Budd Creek, tributary of American River—Cinnabar in small amounts is found in placer concentrates on Budd Creek.

Fairhaven Precinct

Inmachuk River—Cinnabar pebbles up to half an inch in diameter are recovered in dredge concentrates of the Dry Creek Dredging Company on Inmachuk River a short distance below the mouth of Washington Creek.

Mud Creek, tributary of Kiwalik Lagoon—Small amounts of cinnabar are found in concentrates from the drifting operation of O. F. Weinard on Mud Creek.

Koyuk Precinct

Kwiniuk River—Placer cinnabar is reported to have been found by Eskimos on Kwiniuk River.

Noatak-Kobuk Precinct

Canning River—High-grade cinnabar specimens have been found by prospectors on Canning River, a tributary of the Arctic Ocean east of Barrow. Some of these specimens were brought to Barrow by prospectors and sent to Department of Mines assay offices by Stanley Morgan of Barrow.

## MOLYBDENUM

### Cape Nome Precinct

#### Cape Nome District:

Small amounts of molybdenum were found in the California Mine on Goldbottom Creek and in quartz stringers on the divide between Anvil and Glacier creeks, tributaries of Snake River. U. S. Geol. Survey Bull. 722.

#### Port Clarence District:

Lost River—In the Greenstone Lode on Cassiterite Creek small pockets of fluorite and molybdenite are found associated with tin and tungsten ores. Zones high in molybdenum exist in these pockets, but known occurrences are too small to be of economic importance.

### St. Lawrence Island

Near West Cape, about 25 miles southwest of Gambell on St. Lawrence Island, molybdenite occurs as a fairly common accessory mineral in parts of a large granitic intrusive body. The only prospecting has been done by Eskimos. The area in which the highest known concentration of molybdenite is present is on a low, bare, granite shelf exposed to tide and wave action. This shelf averages about 150 feet in width for a considerable distance along the shore. On the inland side of the exposed granite a low tundra covered plain extends several miles to hills in the interior of the island. The molybdenite occurs both as an accessory mineral and as a later introduction along joint-planes in the granite. Along the shore some large boulders of granite thrown up by wave action appear to contain high percentages of molybdenite. On careful inspection it is evident that the molybdenite forms a thin coating on joint-plane surfaces and that molybdenite flakes are only sparsely scattered through the rock as a whole. The zone of highest grade ore was exposed at low tide for about 50 feet and lies parallel to and between strong joint

planes. A small amount of chalcopryite is associated with the molybdenite in this zone. A 3-foot sample cut across what appeared to be the best ore assayed 0.71% MoS<sub>2</sub>. A 6-foot cut across the same band of ore assayed 0.28% MoS<sub>2</sub>. In a sample cut 15 feet long and crossing this zone the molybdenite content had dropped to 0.17%. Sampling was not extended further as the ore was obviously of lower grade. Samples from the granite nearby assay less than 0.10% MoS<sub>2</sub>.

Granite float in the tundra farther from the beach carries occasional flakes of molybdenite. It is possible that some parts of the intrusive contain molybdenite in sufficient quantities to be of commercial importance, but prospects found up to the present do not warrant any development work.

## NICKEL

No nickel deposits of importance have yet been found in northwestern Alaska and in fact very few deposits containing nickel in any quantity have been observed. Ultrabasic rocks on Dahl Creek contain nickel, but no occurrences of economic importance are known there as yet.

## PETROLEUM - COAL

### Cape Nome Precinct

#### Cape Nome District:

Sinuk River—Narrow seams of coal of good quality have been found on Sinuk River near the iron deposits in that area. The widest seams are reported to be about 18 inches thick. The area underlain by coal is small and the prospect is of no importance except for possible local consumption.

#### Kougarok District:

Dahl Creek, tributary of Quartz Creek, tributary of Kougarok River—Small beds of lignite of good quality occur on Dahl Creek. The coal has been used by miners for fuel.

### Fairhaven Precinct

Kugruk River—Two mines in the Kugruk River basin have supplied coal for use at Candle. One of these mines is on Chicago Creek, the other is on the Kugruk River about 5 miles above the mouth of Chicago Creek. The coal beds in both places are over 60 feet thick. However, each of beds contain some coal not suitable for fuel. Much of the coal is of fair quality, but ice mined with it causes difficulty in its burning unless it has been allowed to thaw. About two tons of this coal is said to be equal in heat value to a ton of the imported bituminous coal. An analysis by the Alaska Railroad of coal from a 17-foot bed in the Kugruk River Mine follows:

		COAL	COAL	COAL	COAL
Air-dry Loss		(air dried)	(as received)	(moisture free)	(moisture & ash free)
7.8%					
Proximate Analysis	Moisture .....	7.2	14.4		
	Volatile matter .....	41.3	38.3	44.8	49.8
	Fixed carbon .....	42.0	38.7	45.2	50.2
	Ash .....	9.5	8.6	10.0	
		100.0	100.0	100.0	100.0
British Thermal					
Units .....		10470	9655	11275	12540
Sulphur .....		1.2	1.7	2.0	2.2

These coal seams are described in U. S. Geol. Survey Bull. 442, Mining in Seward Peninsula, Alaska.

Wilson Creek, tributary of Kiwalik River—A seam of lignite over 3 feet wide has been prospected on Wilson Creek, two or three miles from Sweepstakes Creek. U. S. Geol. Survey Bull. 692, Gold and Platinum Placer of Kiwalik-Koyuk Regions, Alaska.

Hunter Creek, tributary of Buckland River—A coal bed is reported to occur on Hunter Creek, near the mouth of the Buckland River. U. S. Geol. Survey Bull. 722.

### Koyuk Precinct

Koyuk River—Lignite of fair quality occurs near the mouth of the Koyuk River. Some attempts to work the deposit

have been made. U. S. Geol. Survey Bull. 449, Southeastern Seward Peninsula and the Norton Bay-Nulato Region, Alaska.

Tubutulik River—Coal occurs along tributaries from the east into the Tubutulik at Death Valley. It has been used occasionally by prospectors in the district.

#### Noatak-Kobuk Precinct

Kobuk River—A few hundred tons of coal have been mined from a seam on the Kobuk about 25 miles above Squirrel River. The seam is about  $2\frac{1}{2}$  feet wide and the coal is said to be bituminous. Several other beds are exposed along the Kobuk, the coal from which is used by Eskimos when camped nearby. The beds are considered to be of Tertiary Age. The deposit above Squirrel River is described in U. S. Geol. Survey Bull. 815, Geology and Mineral Resources of Northwestern Alaska.

Coal float has been found in Ambler River, Kogoluktuk River and Pah River, tributaries of the Kobuk. U. S. Geol. Survey Bull. 815, Geology and Mineral Resources of Northwestern Alaska.

Paleozoic coals in this area are best known in the vicinity of Cape Lisburne. The coals are of high quality, but the beds are more disturbed than the younger coal beds and mining costs would ordinarily be higher. U. S. Geol. Survey Bull. 815, Geology and Mineral Resources of Northwestern Alaska.

According to the U. S. Geological Survey, Mesozoic coal beds have been found over much of northwestern Alaska north of the Noatak River. Some of these coals are sub-bituminous and bituminous. In the Kukpowruk-Utokok section 187 feet of coal was measured in beds 3 feet wide or wider. In the Corwin region 135 feet of coal is present in beds 3 feet or more wide. U. S. Geol. Survey Bull. 815, Geology and Mineral Resources of Northwestern Alaska.

Petroleum seeps have long been known on the Arctic slope from Cape Simpson eastward to the Canadian border. Dur-

in the summer of 1943 six of the seeps were examined by members of the U. S. Bureau of Mines and the Territorial Department of Mines. Seepages near Point Barrow were reported by the U. S. Geological Survey many years ago.

Oil Shales have been found on Etivluk River, Kivalina River, and Meade River. Some of these shales indicate an oil content of over 50 gallons per ton. U. S. Geol. Survey Bull. 815, Geology and Mineral Resources of Northwestern Alaska.

A specimen of oil shale containing over 100 gallons of oil per ton was found in 1934 on the lower Noatak River by Louis Giddings of the University of Alaska.

#### St. Michael Precinct

Unalakleet—A seam of lignite near Unalakleet has been mined by natives and the coal used locally. The seam is reported to be of minable width and the coal of good quality.

#### St. Lawrence Island

Lignite has been found in several places near Neskok Lagoon, about 10 miles southeast of Gambell, and is occasionally used for fuel by the Eskimos. No large deposits are known.

### PLATINUM

The only known occurrences of platinum in northwestern Alaska are in placer workings in the Kiwalik-Koyuk region. Platinum has been recovered with gold on Dime Creek and its tributaries and on Sweepstakes Creek in the Koyuk; also from Quartz Creek, tributary of Kiwalik River, and Bear Creek, tributary of the West Fork of the Buckland River. Smaller amounts are reported from Rube Creek, a tributary of Peace River, and from Candle Creek. The platinum is believed to have its origin in basic intrusive rocks occurring in the area. U. S. Geol. Survey

Bull. 692, Gold and Platinum Placers of Kiwalik-Koyuk Regions, Alaska.

No platinum has been reported from the central Kobuk and Noatak regions, but the widespread occurrence of ultra-basic rock suggests the possibility of its discovery in that region.

## TIN

### Cape Nome Precinct

#### Cape Nome District:

In the Cape Nome district small amounts of placer cassiterite have been found in concentrates from Rocky Mt., Monument, and Glacier creeks. The occurrences do not appear to have any economic importance. The cassiterite probably occurs in small amounts with scheelite in the narrow, irregular quartz veins common in the district.

According to the U. S. Geological Survey, cassiterite is also present in the gravels of Goldbottom Creek and is thought to be associated with pegmatites in that area. U. S. Geol. Survey Bull. 533, Geology of the Nome and Grand Central Quadrangles.

#### Kougarok District:

Small amounts of placer cassiterite are found on a number of creeks in the Kougarok District; but no deposits of commercial importance are known.

#### Port Clarence District:

Placer cassiterite has been recognized in a majority of the streams which have been mined in this district. Streams near Potato Mt. and Cape Mt. have furnished a considerable production of placer tin. Some tin was also produced from the Lost River district.

During the summer of 1943 the U. S. Bureau of Mines drilled 14 creeks in the Cape and Potato Mountain areas

for placer tin. Diamond drilling of the Lost River lode and of a lode on Cape Mountain was also nearly completed. Preliminary results indicate that profitable operation of some of the placer and lode deposits could be effected during the present war if the price of tin were raised to about \$1.00 a pound.

Descriptions of the tin placers and lodes of the York region are given in U. S. Geol. Survey Bull. 733 and will not be repeated here.

Lost River—Wolframite-topaz lode—See under "Tungsten".

Several streams in the northeastern part of the Port Clarence district yield placer tin in some quantity. Pish River and Dick Creek, a tributary of Serpentine River, are among these. It is doubtful if any commercial production can be made of the tin on these streams. The mode of occurrence of the lodes from which the cassiterite was derived is not known.

#### Fairhaven Precinct

Placer cassiterite occurs on several headwater tributaries of the Inmachuk River, but no deposits of commercial importance have yet been found. American, Old Glory and Hannum creeks are among these streams.

Cassiterite was the most common mineral present in a sample of concentrates from the placer operation of Walsh Brothers on Humboldt Creek, a tributary of Goodhope River.

#### Noatak-Kobuk Precinct

In 1935 a specimen of cassiterite was sent from Kiana to the College assay office of the Department of Mines. The location of the deposit from which the sample came is not known, but its origin apparently was in the region north of Kiana.

#### St. Lawrence Island

Occasional reports of the occurrence of cassiterite in the vicinity of Boxer Bay on St. Lawrence Island have been



received. The first of the reports came in 1933 during archaeological investigations of St. Lawrence Island headed by Otto Geist of the University of Alaska.

## TUNGSTEN

### Cape Nome Precinct

#### Cape Nome District:

Scheelite has been observed in placer concentrates from most of the streams which have been mined for gold in the Cape Nome district. Its mere presence in concentrates cannot be regarded as of importance. Streams in which it is not found are much less common than those in which it is present, not only on Seward Peninsula, but also throughout the interior of Alaska.

Placer scheelite in amounts which approach commercial importance is found on several tributaries of Snake River and on at least two tributaries of Nome River. Among these streams are Rock, Glacier, Lindbloom, Prospect, Boulder, and Twin Mountain creeks. During the summer of 1943 some scheelite concentrates were produced at the residual deposit on Rock Creek. None of the other streams in the Snake River basin was mined for scheelite in 1943. During World War I placer scheelite was produced from several of these streams.

An attempt to mine scheelite on Rocky Mountain Creek, a tributary of Nome River, was made during 1943, but the operation was shut down soon after work was begun, ostensibly because proper equipment could not be obtained. Much placer scheelite is present in the gravels of Rocky Mountain and adjacent creeks.

Under present conditions the outlook for lode scheelite production in this area is not good. The known deposits are small, as the mineral usually occurs in shoots in small, irregular quartz veins. No evidence of typical replacement-type scheelite deposits has been observed in the Nome region.

On Twin Mountain Creek, a tributary of Snake Rivers, two small lenses of almost pure scheelite were found during World War I. Claims were staked and a small amount of prospecting for similar lenses was done on this creek in 1943.

On Rock Creek two shafts were sunk as scheelite prospects about 1916. The scheelite occurs mainly in small, irregular quartz stringers and occasional particles are present in the mineralized schist in which the stringers occur. Scheelite in quartz veins has also been found in lodes on Lindbloom, Glacier, Bangor, Boulder, Mountain, Tee and Twin Mountain creeks. A detailed description of scheelite occurrences in the Nome region is given in U. S. Geol. Survey Bull. 722 and in U. S. Geol. Survey Bull. 533.

Most tributaries to Solomon River are known to carry some scheelite in their gravels. Small amounts of scheelite are present in quartz veins at the Big Hurrah Mine and at the R. W. Silver mine on Trilby Creek.

#### Council District:

Relatively small amounts of scheelite are found in placer concentrates from this area and in some samples examined scheelite was absent. Seely Gulch, a tributary of Ophir Creek, is reported to contain more placer scheelite than other streams in the district.

#### Kougarok District:

Scheelite is a common constituent of placers in the Kougarok district. Several tributaries to Quartz Creek and Homestake Creek, a tributary of the Kougarok River, contain relatively large amounts, but no deposits of economic importance have been reported.

#### Port Clarence District:

Gold Run Creek near Teller, Camp Creek in the York region, and Dick Creek, a tributary of Serpentine River, are re-

ported to contain placer scheelite in fairly large amounts. Most other streams in the Port Clarence district carry some scheelite. Placer wolframite is present in Cassiterite Creek and is reported to occur in large amounts on the upper Pinguk River.

Cassiterite Creek, tributary of Lost River—Lost River Mine—Lode wolframite is an important accessory constituent in the tin ore at the Lost River Mine. It is present in several nearby lodes, but not in sufficient amount to make the deposits minable for tungsten alone. Minor amounts of scheelite are found in the tin ores throughout the York region. These lodes are described in bulletin 733, Geology of the York Tin Deposits, Alaska.

Lost River—Wolframite-topaz lode—On the west slope of the low saddle opposite the mouth of Tin Creek a tunnel has been driven on a tin and tungsten lode. The deposit is a fissure filling composed of a topaz gangue with wolframite, stannite and galena and minor amounts of stibnite and fluorite. The wall rock is limestone and the vein is unusual for its regularity as well as for its mineral content. In the 65 feet that the tunnel is now open the vein maintains a width of about 14 inches with only slight variation. The limestone wall rock is altered to a fine grained fluorite in places, but the walls of the ore body remain definite and clean-cut throughout the length now exposed. The vein is nearly vertical and strikes roughly east and west. Three channel samples taken at 24, 44 and 60 feet from the portal gave the following assays:

Sample out	Sn%	WO <sub>3</sub> %	Pb%	Au	Ag
* 24'	0.74	0.62	4.17	Tr.	9.34 oz.
* 44'	0.96	0.41	4.66	Tr.	9.30 oz.
**60'	0.83	0.32			

\* A. Glover.

\*\* U. S. Bureau of Mines.

The adit was filled with ice at about 65 feet from the portal, but there was little change in the appearance of the vein at that point. The deposit was first described by Knopf, U. S. Geol. Survey Bull. 358, Geology of the Tin Deposits of Seward Peninsula, Alaska.

#### Fairhaven Precinct

Scheelite is a common mineral in placer concentrates from Gold Run Creek, a tributary of Kiwalik River. Kyanite, scheelite and wolframite make up a considerable portion of a sample obtained on that stream about 11 miles above its mouth. On other streams in the district scheelite appears to be less common, although only a few samples have yet been examined.

#### Koyuk Precinct

Only unimportant amounts of scheelite are known in concentrates from the Koyuk precinct.

#### Noatak-Kobuk Precinct

Only small amounts of scheelite have been found in the placers of the Kobuk region. Little mining is carried on elsewhere in the precinct. Concentrates composed mainly of wolframite were received from Shungnak, but later investigations have not disclosed the presence of that mineral in the area, and the sample may have originated elsewhere.

#### St. Michael Precinct

Scheelite is common in the Bonanza Creek placers and both scheelite and wolframite occur in nearby Hopeful Gulch, also a tributary of the Ungalik River.

### MISCELLANEOUS

#### Cape Nome Precinct

##### Cape Nome District:

Oregon Creek, tributary of Cripple River—Transparent calcite and quartz crystals have been found on Oregon Creek, below the mouth of Nugget Creek. Specimens of calcite crystals brought to Nome by Oscar Lay are clear and apparently free of defects.

Council District:

✓ Fish River—Pargon Mt. mica deposit—In 1901 several claims were staked on a muscovite deposit at the foot of Pargon Mt. on the northwestern edge of the upper Fish River flats. According to pioneer citizens of Nome, Float mica from this deposit was used for some time in stove windows and lamps. Sheets as large as six inches in diameter were not uncommon. The largest sheets reported to have been found were about 20 inches long by 14 inches wide.

In the summer of 1943 the deposit was relocated by L. E. Ost of Council. At that time only a few caved surface trenches were visible. The largest mica flakes seen were about six inches in diameter. No bedrock was exposed and about half a ton of pegmatite float composed mainly of books of mica and quartz were scattered about on the surface. Probably 50 pounds of book mica varying from  $1\frac{1}{2}$  to 3 inches in diameter was also lying on the dump. No idea of the size or attitude of the sill or dike could be obtained. Bedrock in the area is composed of schist, limestone and gneiss. The overburden appeared to be about 8 feet deep.

Late in the summer Mr. Ost moved approximately 2000 cubic yards of material from the deposit with a bulldozer, and is said to have exposed the pegmatite in place.

Pegmatite dikes containing mica flakes of exceptional size have been reported from several other places in the Bendeleben and the Darby Mountain ranges. One of these places is at the head of Birch Creek in the Bendelebens; another is near the head of Etchepuk River in the Darby range. The Birch Creek pegmatites are reported in U. S. Geol. Survey Bull. 449, Southeastern Seward Peninsula and Norton Bay-Nulato Region, Alaska.

Aggie Creek, tributary of Fish River—Of purely scientific interest is the reported finding of several meteorites, one weighing 92 pounds, during dredging operations on Aggie Creek.

#### Port Clarence District:

Fluorite is a common mineral in the tin deposits of the York region. In the Greenstone Lode on Lost River the mineral in some places comprises most of the gangue. It is doubtful whether it is of commercial importance at present market prices.

#### Fairhaven Precinct

Gold Run Creek, tributary of Kiwalik River—A lode occurrence of kyanite has been found by H. M. Xavier in his placer cut about 11 miles above the mouth of Gold Run Creek. The kyanite occurs in bands of coarse, bladed crystals, some as much as 10 inches in length. According to Mr. Xavier, the width of the zone of kyanite as exposed in the cut is  $4\frac{1}{2}$  feet, but the body is flat dipping and is actually close to 2 feet thick. This band of kyanite is exposed for a distance of 18 feet. Other narrower bands have been encountered in the same area during his operations.

Chicago Creek, tributary of Kugruk River—Chicago Creek Coal Mine—Small pockets of amber were occasionally encountered during coal mining operations in the Chicago Creek coal mine. U. S. Geol. Survey Bull. 379, Mining in the Fairhaven Precinct.

#### Noatak-Kobuk Precinct

Dahl Creek, tributary of Kobuk River—Veins containing quartz crystals are common on Dahl Creek and on the Kogoluktuk River and its tributary, California Creek. Large numbers of the crystals were recovered during placer operations on California Creek.

In a pass at the head of Dahl Creek one deposit consists of a series of quartz veins in limestone. The veins average about a foot in width and are commonly separated from each other by from 6 to 18 inches of limestone. The zone is at least 30 feet wide, the veins being composed of dense, white quartz with some clear to milky well-formed crystals in vugs.

About a half a mile from this prospect is an outcropping of narrow, steeply dipping quartz veins cutting a thin bedded limestone country rock. The veins average about 6 inches in width and appear to be spaced a few feet apart. Where seen in place they were composed entirely of crystalline quartz grown out from the walls and the veins were not filled. The largest crystal found on the surface was 7 inches long and 2 inches in diameter, but was not clear. Most of the crystals are clear, but small.

No development work has been done on either of these deposits. In the late fall of 1943 float from these veins was collected and sacked and a small shipment of quartz crystals was made. Whether the material was suitable for strategic purposes is not known.

Wainwright—Occasional small pieces of amber are found in the vicinity of Wainwright on the Arctic coast. Nothing is known to the writer of the occurrence of the material.

Kivalina—Specimens of earthy and oolitic hematite somewhat similar in appearance to cinnabar ore are occasionally brought in from the Kivalina region by Eskimos. They report a large outcrop of the material.

Kiana—In 1940 a sample of columbite and tantalite from the vicinity of Kiana was identified at the Nome assay office of the Department of Mines. The location of the deposit from which the specimen came is not known to the writer, but it appears certain that its origin was in the hills north of Kiana.

Kobuk River—Jade or nephrite float is found on most of the tributaries of the Kobuk from the north between the Kogoluktuk River and Jade Creek. Attractive jewelry has been made from float material found on Shungnak River and Jade Creek. Several lode occurrences have been reported, but none of these contains nephrite of gem quality. Comparatively little prospecting has been done and the discovery of some quantity of jade suitable for use as gems is to be expected.