

TERRITORY OF ALASKA  
DEPARTMENT OF MINES  
JUNEAU, ALASKA

Preliminary Report of Investigations in the Juneau and  
Petersburg Precincts and Itinerary of J. C. Roehm,  
Associate Mining Engineer for the Territorial  
Department of Mines,  
August 31 to September 23, 1945.

August 31 - The shore lines of the Payne Fox Island, the largest island of the Keku Group, was examined for a silver-bearing dike rock that had been reported. The island is made up of Carboniferous and Triassic sediments. The Carboniferous sediments, which underly the Triassic, consist mainly of dark to black limestones with sills or beds of green clastic lava in the upper portion. The Triassic appears to lie upon the Carboniferous with a very slight unconformity.

The structure of the island consists of an upturned edge or limb of a small syncline with east and northeast dips and a low angle of plunge to the north. Due to this plunge the Triassic sediments cover the north end of the island and the Carboniferous the southern portion.

The Carboniferous limestones apparently have a great thickness, but are comparatively thinly bedded, as indicated by the abundant layers of fossil shells. Limy shales of this age, which also contain abundant fossil remains, overly the limestones and are interbedded with the green clastic lavas.

The Triassic sediments are represented at the base by a coarse conglomerate made up of limestone and shale rocks, a few hard quartzites and many others ranging down to fine pebbles. The matrix is a sandy lime. Limy shale and a green clastic breccia were found above the conglomerate. This base of the Triassic may be observed at the base of the bluffs at the north end of the island.

The base of the Carboniferous was not observed, and the greater part of the island appears to be made up of rocks of this age.

Sample 1182 was taken from a stratum of black limestone on the east shore of the island. This limestone contained shiny black crystals which have been identified as Grahamite or Albertite with no trace of vanadium.

Sample 1154 was taken from the green breccia of the Triassic on the northern tip of the island, and was taken across 8 feet. Results were: V. nil, Au. 0.01 oz. per ton, Ag. nil.

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P. F. A. C. Roehm

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The occurrence of these hydrocarbon minerals contained in these various beds of Carboniferous limestones are of special significance. The minerals, according to Dana, are classified as asphaltum minerals derived from petroleum, which is believed to have originated from the fossil remains contained in the formations. The interbedded lava sheets or flows in the upper portion have acted as cap rocks and probably have been factors in the formation of these petroleum minerals.

September 1 - Kadak Bay, Kuiu Island.

The south side of Kadak Bay was examined for reported coal outcrops. The formations at tidewater consisted of green clastic lavas. Inland a distance of 100 to 200 yards the Tertiary conglomerate was noted resting as an unconformity upon the lavas. The entire ridge on the south side was found to rise to an elevation of over 1000 feet and consisted of Tertiary conglomerate, shale and sandstone.

The coal seams were reported to occur near the base or in the shale above the conglomerate near the base of the ridge. Thin shale beds were observed along the side of the ridge at elevations of 100 to 200 feet. The coal seam or seams are apparently below this elevation. Talus and heavy vegetation evidently obscured the beds from view in the areas examined, since coal float can be found on the beach and no coal seams were found above the shale beds. The pieces of coal on the beach were lignite and were considerably weathered. The largest coal seam reported measured 2 feet in thickness. Further investigations could probably locate these croppings.

First Bay North of Kadak Bay: A series of warm springs was investigated at a location one-fourth mile upstream and along the bank of Gill Creek. This creek enters salt water at the head of a small indentation in an unnamed bay due north of Kadak Bay, Kuiu Island. Brecciated lava was found to form the bedrock in the creek, and is the formation from which the warm spring water was escaping. Sandstone strata form the high bank on the south side. Black carbonaceous matter was found to be contained in the sandstone and in the fractures in the lava.

Six springs were noted along the north bank of the creek for a distance of 100 feet. The escaping waters are from a series of northwest-striking fractures within the lava. The water is only slightly warmer than the creek water. The flow from the springs was judged to be between 100 and 200 gallons per minute. A sulphur-dioxide odor is noticeable but not strong. A white colloidal precipitant emits with the water from the springs and collects along the sides of the flow. Siliceous sinter as float and contained in some of the fractures was observed. This sinter is made up of quartz, agatized quartz, red jasper and disseminated pyrite.

Sample 1175 consisted of vuggy quartz of a fine crystalline character showing pyrite and some black carbonaceous matter. Results were: Au. Tr, Ag. 0.70 oz. per ton.

Sample 1176 consisted of a limy sandstone with dark cementing matrix. Results were: Au. Tr, Ag. 0.30 oz. per ton.

Sample 1177 consisted of brecciated lava cemented with a black matrix. Results were: Au. Nil, Ag. 0.90 oz. per ton.

Sample 1178 consisted of a heavy pyritized quartz taken from fractures near the springs. Results were: Au. Nil, Ag. 0.500z. per ton.

Specimens No. 8, 11, 12, 31, 32 and 33 have been retained for observation.

September 2 - The south shore of Hamilton Bay was examined for the purpose of observing the coal-bearing Tertiary strata. The beach line is made up of sandstone with a few thin strata of shale which contain abundant Tertiary flora. The coal-bearing stratum was not observed, but was reported to be off-shore 100 to 150 yards and can only be observed at extreme low tide. A shaft 29 feet in depth was sunk on the bank, and from the shaft a drill hole was put down to a depth of 250 feet. Thin partings of coal were reported cored at various depths, 8 inches being the greatest single thickness encountered. Pieces of amber were found in the core taken at a depth of 200 feet. The coal outcrop off-shore was reported to contain a thickness of 16 inches and consisted of lignite.

The Tertiary sediments strike N. 50° W. and dip 10 to 15° S., and are found only along the south side of the bay with north side consisting of Triassic sediments.

Another shaft known as the "Russian Shaft" is located on the west bank at the mouth of Hamilton River or head of Hamilton Bay. The formation in this vicinity is a sandy conglomerate with a few thin strata of shales. The shaft was reported to have a depth of 18 feet and cut an 8-inch coal seam at the bottom. A drill hole, located 200 yards upstream on the same side, reached a depth of 85 feet and cut the same seam at 65 feet in depth. This coal was reported to be lignite.

A blue gummy clay stratum was noted overlying the Tertiary sediments in a small blts along the south shore of the bay and midway from head to mouth. The stratum outcrops at high tide level at the beach and inland up a very small stream. The upper 2 feet of the clay contains considerable sand, while below the clay appeared to be of better quality. Thickness of the stratum was not determined nor was its areal extent estimated. The clay has a deep grayish blue color, which may turn red on firing, in which case the clay may be utilized for the manufacture of common brick. The quantity appears to be adequate for limited brick manufacture. Samples could be obtained and the areal extent of the deposit could easily be checked with the aid of a hand auger.

September 3 - Limestone formations in Saginaw Bay were investigated and sampled. The Bluffs along the west shore consist of Silurian limestone, and these range from 100 to 500 feet in height. At several points these bluffs are within a short distance of deep water.

The east shore of the bay from the cannery north and including Halleck Harbor contains numerous bluffs of Carboniferous limestone. These bluffs range from 100 to 400 feet in height. Limestone strata along this shore contain abundant fossil beds, and also chert and sandy beds. It is very doubtful if these strata on the east shore are of sufficient purity to be suitable for industrial use. The Silurian along the west shore appears to have a high degree of purity, and compares in megascopic observation with strata of the same age on Dall Island.

Details of these limestones, with analyses, will be contained in a later report on limestone.

September 4 - Occurrences of the mineral barite were examined along the west shore of Saginaw Bay near the entrance. The formation at tide water and in which the barite occurs is green clastic lava underlying the Silurian limestone. The barite is confined to small fissures and fractures of very irregular distribution. Calcite is the associate mineral with the barite, and both minerals are slightly stained by iron oxide. Crystals of bladed type barite are intergrown with calcite crystals, showing slow growth from secondary cold solutions. The largest occurrence noted had a width of 4 inches and a traceable length of over 100 feet. The deposits are widely scattered and irregular which, with the lack of minable widths, makes them unimportant under present economic conditions.

September 5 - Saginaw Bay to Warm Springs, Baranof Island.

The Bahovec collection of rocks and polished specimens was examined. The greater part of this collection is of Alaskan origin and consist of agatized geodes from Baranof Island, green and red lava breccia (called Plasma) from Kuiu Island, and bluish agates and pink quartz, probably from Kuiu Island.

September 6 & 7 - Portions of two days were spent in search for the old President prospect described in U. S. G. S. bulletin 284, which gives the location one mile east of Fishery Point, Admiralty Island. The area both east and south of Fishery Point, which is situated on the west coast of the island 20 miles south of Hawk Inlet, was examined. The elevation of the workings was reported to be 250 feet. Investigations were made along this level of the main mountain mass to the east, however, the workings were not located. They may be situated on one of the knolls which are scattered between the main mountain mass and the beach.

September 8 - Wm. Nelson (Native) and son of John Nelson, both of Angoon, reported that his father (Mr. Nelson furnished the office with the samples of limestone saturated to a slight degree with petroleum) had found oil-bearing rock at Wilson Cove on the southwest end of Admiralty Island.

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The entire shore line of Wilson Cove was traversed and only clastic lavas were noted among the outcropping rocks. These lavas are of considerable thickness and consist of many successive flows of variable thickness. They are laid uniformly and conformably upon one another with low to steep dips to the east. Thin breccia zones mark the bedding of the flows and these are made up of angular pieces of lava, some chert, agate and jasper.

5. 114  
It is within the realm of possibility for petroleum indications to be found within the area bordering Wilson Cove. The discovery of the minerals Grahamite and Albertite in the Carbonaceous limestones on Keku Islands, south and across Summer Strait, indicates that the same formation at depth in the area may contain petroleum in some form. Carboniferous limestones are found on the south end of Admiralty Island, 3 miles east of Tyee. The prevailing northwest strike of the formations and the low angle of plunge of the folds would by projection extend the Carboniferous formations through the area occupied by Wilson Cove but beneath the volcanics. The source of the lavas was apparently at a distance to the east and the direction of flow toward the west. Recent fracturing in the volcanics may have penetrated downward sufficiently to allow escape of the petroleum to the surface.

September 9 - John Nelson was contacted at Tyee, where he and his family work for the cannery during a few months in the summer. One of Nelson's discoveries was reported by his son, William, to have been in the vicinity of Tyee. Nelson described his discovery as a big bluff on the beach from which oil oozed slightly and which when ignited with a match caused an explosion. The distance across the oil-bearing formation was given as nearly one-half mile. Mr. Nelson agreed to reveal the location only and unless an amount of money was paid him.

5. 114  
The shore line for a distance of 4 miles east of Tyee was examined. Stormy weather prevented examination of the remaining 5 miles of shore line shown on Plate No. 1, U. S. G. S. bulletin 800, as Carboniferous limestone. One condition was noted along the shore line investigated which may account for Mr. Nelson's discovery. The salmon cannery at Tyee has its power house situated across the narrow neck of land from Murder Cove at tidewater. The exhaust from the two diesel motors have over a period of years caused considerable accumulation of petroleum residue upon the rocks of the shore line. Tidal currents and wind action

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have distributed this oil along the beach for a considerable distance. Limestones of Lower Cretaceous and Carboniferous ages outcrop along the beach. The action of the salt water on the limestone through dissolution have made it porous and the oily residue has penetrated the rock to the extent that it appears as a natural oil-bearing limestone.

The Carboniferous limestones beginning about 2 miles east of Tyee and extending for nearly 8 miles were found over the 2-mile section covered to be semi-crystalline. These limestone bluffs are a potential source of limestone, however, due to lack of good harbor facilities and doubtful composition, they were not sampled.

September 10 - Tyee to Juneau.

September 11-13 - At the Juneau office.

September 14 - Juneau to Endicott Arm.

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Investigations were made along the northeast shore of Endicott Arm opposite Sumdum on a wide belt of mineralized schists. This belt was formerly held as the Portland Group.\* The schists are contained in a wide belt of metamorphic rocks that form the coast line along the northeast shore. A zone with a width of over 1000 feet is heavily mineralized and represents the dolomitic and calcareous section of the schist belt. <sup>Kt 115 39</sup>

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The schist zone is impregnated with disseminated sulphides in the layers paralleling the schistosity, with some bands consisting of nearly massive sulphides. The following sulphides were noted in order of abundance: Pyrite, pyrrhotite, sphalerite and galena. Low gold values ranging from \$0.50 to \$3.00 per ton (old price) have been reported. Some sections of the zone carry as much as 25 percent sulphides with 80 to 90 percent pyrite.

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The most unusual feature in regard to this band of schists is the west dip. The explanation of this west dip in this section is not known and may be of special importance in accounting for the general widespread mineralization in the area. This calcareous zone of schists lies between the greenstone lavas to the west and graphitic slates to the east.

Sample No. 1171 was taken across 100 feet of this zone at a point along the shore line where some rock work in the form of open-cuts was exposed. This point is 4 miles north along the coast from the entrance of Fords Terror. Results were: Au. 11, Ag. 1.20 oz. per ton.

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September 15 - A trip was made inland along the north bank of Powers Creek, which is located on the northeast shore of Endicott Arm near the mouth. Powers Creek cuts the same belt of mineralized schists that were examined along the shore to the south. The gravels of the creek have been reported to contain gold in placer form, and some mining was done in the early days of the district. <sup>R-115-39</sup>

\*U.S.G.S. Bull. 287, p. 45.

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Sundevall 115

Three miles inland Powers Creek comes from under a glacier. At this point a large area of the schists are exposed, which consist of metamorphic black slate. Pyrite is distributed throughout the belt of slate, and due to oxidation on the surface the entire zone has a deep red color. The calcareous zone of schists below the slate zone could not be observed due to vegetation and high water in the creek. Further investigation of this zone may be warranted to determine the source of the gold and to sample the mineralized belt.

September 16 - Endicott Arm to Steamboat Bay.

Fred Schindler of Juneau made a discovery of a gold-bearing sulphide rock on a small tidal island along the south shore of Steamboat Bay. This small island is shown on the navigation chart as a rock, and rises only a few feet above sea level. A long sand spit connects the island with the mainland. The bedrock of the entire island consists of a fractured greenstone lava, probably andesite, with many of the fractures filled with calcite and limestone.

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Two sets of fractures are evident, one set strikes N. 45° E. and the other set north. The greenstone lava appears as a flow overlain by limy shales. The east shore of Steamboat Bay consists of limy shales which strike N. 35° W. and dip 57° E. This structure conforms with the general structure of the area.

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Sundevall 115

The sulphides are unevenly distributed from nearly massive to slight disseminations and are confined to fractures and fracture intersections. The largest single fracture noted measured 4 inches. The majority have widths of less than one inch. The intervals between fractures vary. Some widths up to 4 feet were noted where several fractures occur, however, the amount of sulphides across this width was considered by visual inspection as insufficient to make an ore.

The sulphides noted were pyrrhotite, pyrite, galena, sphalerite and chalcopyrite. Low gold values are associated with these sulphides, as determined by former assays on samples received from this prospect. The gangue minerals consisted of lime carbonates, lime silicates, epidote, quartz and altered lava.

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Sundevall 117

September 17 - A revisit was made to the lead-zinc prospect on Taylor Creek in Duncan Canal. The sulphide-bearing zone contained in the limestone stratum was traced north along the east bank of Taylor Creek for an additional distance of 100 feet to the top. Here further tracing will require the removal of surface gravel and vegetational cover. This makes an exposed outcrop for the deposit of 550 feet and a width averaging 12 feet. Surface trenching and rock blasting is required before representative channel samples can be taken.

117-29

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The occurrence of aplite material along the west bank opposite the main showing may account for this mineralization. Microscopic slides are being made of this dike material and the sulphide-bearing limestone from which the type of mineralization is to be determined. This determination is essential before further recommendations can be made.

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September 18-19 - The Towers Arm Copper prospect of the Kupreanof Mining Company, and later known as the Northern Copper Company, was examined. The location of this prospect is 5-3/4 miles inland from the head of Towers Arm in Duncan Canal, Kupreanof Island. The old underground and surface workings are on the crest of the ridge directly north of the head of Towers Arm at an elevation of 1275 feet. KX-37-31

This prospect is held under Mineral Sur. No. 652 of 1904 which was patented in 1907 to John Johnson of Juneau, Alaska. The above survey included the following claims:

117

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|---------------|----------------|
| "Copper Bell" | "Treasure Box" |
| "Tuscarora"   | "Buck Horn"    |

117-31

117

The Sunlight group of claims, Nos. 1 to 14, inclusive, has been staked, apparently covering this patented survey tract and surrounding territory. The locators of this claim group are Mary McKallick, G. W. Morgan and Mike McKallick.

There has been no development work other than some trail blazing since 1921 when the company terminated operations. The old workings are described in U. S. G. S. Bull. 739, "Mineral Resources of Alaska, 1921," pp. 70, as follows:

"Traces of copper are found at most of the prospects in this district, but the only developed copper ore bodies are those of the Northern Copper Co. near the head of Duncan Canal, on Kupreanof Island. This property was formerly held by the Kupreanof Mining Co. The mine is 5-3/4 miles inland at an altitude of 1,275 feet. Development work and the construction of a plank motor-truck road with connecting tram to the mine was started in November, 1918, and was in process of completion in 1921.

"The ore bodies occur within a series of black slate and phyllite interbedded with chert and associated greenstones. In part the greenstones are altered dikes and sheets of diorite, in part they may be intercalated andesite flows, and in part they are probably contact-metamorphosed limestone beds. The ore is reported to occur predominantly along the contact of the greenstone and the slate, usually as replacement bodies in the greenstone but also replacing the slate.

The property has been developed by many prospect pits, several open cuts, two main tunnels, and a shaft. At the time of the writer's visit the trenches and prospect pits were caved in and no detailed examination could be made. At a stripped area just east of the cabin the following relations were observed: The ore bodies lie on the crest of an anticline, and the beds and ore zones show gentle dips of  $10^{\circ}$  to  $30^{\circ}$ . The hanging wall of the ore body is a sheet of much altered fine-grained diorite composed of uraltic hornblende and plagioclase ( $Ab_{90}An_{10}$ ). The footwall comprises interbedded slate and chert. The country rock of the ore, as indicated by unreplaced lenses remaining in the ore body, is a pyroxene granulite. This rock as seen in thin section consists of pyroxene, of a variety near hedenbergite, in euhedral crystals, with interstitial granular quartz shot through with hornblende needles. A little garnet is a local component of the rock. Magnetite octahedrons are very abundant and replace the silicate minerals. In thin local layers magnetite completely replaces the country rock. It also occurs along the joint planes. The ore mineral is cupriferous pyrite or chalcopyrite and occurs essentially as veinlets and blebs in masses of pyrrhotite which is replacing the pyroxene granulite. Narrow veins of pyroxene with a little pyrrhotite, chalcopyrite, and quartz are common in the country rock. The character of this ore body and its associated rocks very strongly suggests that it has been formed through the metasomatic replacement of a limestone bed. The mineral association and the successive order of mineral formation (silicates, magnetite, sulphides) are characteristic of many contact deposits. A little sphalerite is associated with ore minerals at one prospect pit. Narrow veins of glassy quartz with calcite, carrying pyrrhotite, garnet, acicular hornblende, and a trace of sphalerite and chalcopyrite, cut the country rocks. Veins of quartz with epidote crystals are also found.

Wright states that this property was first located in 1900 -- and that a vein deposit 200 feet long and 3 to 6 feet wide is exposed at several points. The vein material, he says, is composed largely of sulphide minerals, chiefly pyrite and pyrrhotite, and contains chalcopyrite and a little gold and silver; the gangue consists of quartz and calcite. This vein deposit is probably one cut by the tunnel and was not seen by the writer. Specimens of chalcopyrite several inches in diameter with residual remnants of chlorite schist are found on the dump."

The open-cuts and strippings mentioned above still show the ore and its position within the crest of a small southward plunging anticline. The lower cross-cut adit approximately 100 feet vertically below and 300 feet to the northeast, was found still open and measured 360 feet. The entire length shows altered shale with occasional thin seams of secondary

117  
References  
117  
calcite and limy material. The bedding in the adit strikes N. 22° W. and the dip is 13° E. The adit was below the contact horizon, and consequently missed the ore horizon. A shaft of undetermined depth is located on the top of the ridge and crest of the anticline. Estimated from the size of the dump, the depth of the shaft probably ranged from 75 to 100 feet. Segregated from the material is a small dump of 50 or so tons of ore. Sample 1172 represents six pounds of this material chipped from the larger pieces. Results were: Au. Tr, Ag. 1.40 oz. per ton; Cu. 0.24%, Pt. Nil oz. per ton.

The metallic minerals contained in the ore and the associated gangue minerals are of unusual interest. Iron oxides of primary origin are associated with the iron sulphides pyrite and pyrrhotite with lesser amounts of chalcopyrite and sphalerite. There is evidence of replacement to a slight degree. The association of garnet, epidote, and lime silicate minerals indicated contact metamorphism origin of the ore. Further examination with development is necessary to determine the economic possibilities of this prospect.

September 20 - Duncan Canal to Column Point.

A 40-pound sample of bentonitic clay was obtained from a clay deposit located three-fourths of a mile inland from Column Point on the south end of Kupreanof Island. For a description of this deposit see "Report of Investigations, Petersburg Precinct, etc., 1943" by J. C. Roehm.

September 21 - Column Point to Rocky Pass.

September 22 - Rocky Pass to Kake.

September 23 - Kake to Juneau.

C O N T E N T SP A G E

Column Point (bentonite clay) Kupreanof Island	10
First Bay North of Kadak Bay (description of 6 warm springs observed. Also siliceous sinter carrying Silver)	2
Hamilton Bay (coal formation) amber	3
Kadak Bay (Kuiu Island) (Report on search for coal seams said to occur in this Bay)	2
Kupreanof Mining Company (Towers Arm copper - Northern Copper Co.) Patented	8
Nelson, John & Son (Inc.) (Oil bearing sand- stone) Admiralty Island - Wilson Cove Tye	5
Payne Fox Island (Keku Group) (Carboniferous limestones - black bearing hydrocarbon)	1-2
Portland Group (Indicott Arm) (Pyrite, pyrrhotite, sphalerite & galena)	6
Powers Creek (Indicott Arm)	6
President Prospect, Fishery Point Admiralty Island	4
Saginaw Bay (Limestone & barite)	4
Schindler, Fred (Steamboat Bay (Frederick Sound) Gold-bearing pyrite prospect	7
Sunlight Group (McKallick & Morgan)	8, 9 & 10
Taylor Creek, Duncan Canal (lead-zinc)	7
Tye - Carboniferous limestones	5
Warm Springs - Saranof Island (Bahovec collection)	4

1945

PR - Wrangell & Petersburg Precincts -  
June 9 - 29, 1945

PR - Ketchikan and Hyder Precincts -  
July 14 - Aug. 18, 1945

PR - Juneau & Petersburg Precincts -  
Aug. 31 - Sept. 23, 1945