

August, 1935.

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REPORT ON SOME BLACK SAND DEPOSITS OF KODIAK
ISLAND, ALASKA

By L. D. Gassaway

Introduction:

During the months of May and June a search for gold-bearing black sands was made in certain localities on the islands of Kodiak, Tugidak and Chirikof - Territory of Alaska. The beach sands were the chief objective as a source of values. Numerous samples were taken and subsequently assayed and listed in an improvised laboratory at the town of Kodiak. While taking the samples the geologic conditions were carefully studied for any bearing that they might have on gold occurrences; also much panning was done in the field that nothing be overlooked. In taking samples, the most favorable portions of the beaches were first ascertained by inspection and panning and later small pits were sunk to bedrock, or as deep as it was possible which was generally to water level, or into basal gravels where any values were usually found to stop. As soon as the pit was completed a sample weighing around 12 to 15 pounds was taken from a channel cut from top to bottom of the hole. Each sample was sacked, labeled and taken to Kodiak for final testing. In all the work conducted in this examination the writer wishes to commend Mr. H. W. Whiting, Assistant Engineer, for his help and advice. Much appreciation is expressed for the skill and efficiency of Messrs. Lynn Blankman and Leimantine in operating the airplane and clearing difficulties along the trip.

General Geography of the Region:

An inspection of the map of Alaska will indicate that Kodiak Island, separated from the mainland by Shelikof Straits, is probably a part of the submerged Kenai Range, and that the Trinity Islands, containing Tugidak Island and Chirikof Island, are parts of the extension toward the southwest. Kodiak Island is about 100 miles long by 60 miles wide. A high rugged range trends its length and contains perennial snows and glaciers. The temperature ranges from 85° F. to - 12° F. (Average 49° F.). The mean rainfall is 55.18 inches. Kodiak is the principal town, and fishing is the main industry. Cape Alitak is the extreme southwestern part of the island.

Tugidak Island lies 30 miles south of Cape Alitak and is an island of very low relief, such that during violent storms much of the northern part is inundated. This island has an extent of 22 miles by 7 miles. It is surrounded by many hidden reefs and violent currents so that only small boats in calm weather can land. The surface is covered with moss and tundra with no brush or timber present.

Chirikof Island lies 60 miles southwest of Tugidak Island or 100 miles from Cape Alitak. It is constantly hidden by fog and is difficult to find from the air except on occasionally very clear days. It also is surrounded by many hidden reefs so that only a few seamen have the courage to attempt landings on its shores. The fishing boats all keep far away from these waters. However, the western side of the island has a wide splendid beach for landing an airplane. The violent storms in this region come from the southeast and northeast in the early spring. They beat with extreme violence on the islands tearing down the cliffs and seasonally changing the entire aspects of the beaches. At the same time, the western sides of these islands are building great sand dunes and broad beaches. Chirikof is about 13 miles long by 7 miles wide.

General Geology:

The geologic formations of Kodiak Island are similar to those of the adjacent mainland comprising ancient slates and intruded by granitic rocks, and graywackes overlain by some Tertiary sands and gravels, and large quantities of glacial debris. There are also certain beach deposits formed from the breaking down of the glacial gravels. The coast line of Kodiak is extremely irregular with many embayments, capes and inlets. The slates are well filled with quartz veinlets which in many cases are gold-bearing. The continual breaking down of these slates by ice action and erosion has resulted in enormous masses of morainal materials, which has been pushed down to form bluffs along the ocean shores. The waves are constantly tearing down these gravels, re-assorting them into new deposits, and concentrating some gold values in gravels and beach sands. This gold was derived from the wearing down by glaciers and minor stream action. The streams on the island are quite short so that very little concentration of gold values can take place along their courses. From the tearing down of slates and granitic rocks, considerable black sand is derived which under action of the waves is concentrated in small patches and lenses at favorable localities on certain beaches; i. e., those beaches principally on the southeastern exposures to the ocean. It is common knowledge that following certain storms these black sands seem to be more intensely concentrated than during other parts of the year. Following this knowledge, prospectors with rockers and pans work these deposits deriving some encouraging returns in fine gold. However, the deposits are usually very small, are soon exhausted, and the miner turns to other labor for his living. On the other hand, severe storms from adverse quarters may frequently wipe these beaches clean of the sand leaving masses of boulders which do not usually act as a riffle or concentrator to hold back the retreating gold. These conditions are found to be common to the islands of Tugidak and Chirikof perhaps greatly intensified on the latter island.

Tugidak Island, one of the Trinity group, has a northeast-southwest trend. Its coast line is fairly smooth with narrow beaches and vertical cliffs. The general surface is an undulating plane covered by several feet of moss and tundra. This island gives every indication of having risen out of the sea in recent times. From the air, several successively higher beaches are observed, while the geologic formations are soft clayey shales, soft sandstones and unconsolidated marine gravels. The shales and sandstones contain fossils identical with living forms of marine life. The shales are the basal member of the series with the sandstones overlying conformably, and the gravels as great lenses within and overlying the sands. The strike is generally a little west of north with a flat dip to the northeast. Peat beds of considerable thickness overlie much of the island. It is believed that these formations belong to very late Tertiary or Pleistocene Age. No metamorphic or intrusive rocks are observed on the island. There are some concentrations of black sand carrying gold along these beaches, but the source of the gold is not fully determined. The clays and sandstones may be eliminated as a source of the gold leaving the marine gravels as a possible source of any black sand and gold. Careful sampling and panning of these gravels, from top to bottom, gave no colors of gold and only a trace of black sand. As the beach gravels and older marine gravels are similar in character (slates, granites, diorites and other rocks not exposed on the island) it is believed that the gravels and gold have been brought from the mainland by wave action and the action of floating icebergs. All black sand concentrations found on this island were very small in extent and located in narrow lenses, very close to the base of the high cliffs at high tide. A little gold was mined from a small deposit of sand near our camp on Tugidak while we were present, but the deposit was quickly exhausted and the miners returned home.

The geologic conditions on Chirikof are almost identical with those of Tugidak as to kinds and age of formations, strike of beds, peat deposits, shore cliffs and character of beaches. More exposed to storms than Tugidak, the east side of Chirikof is subject to enormous wearing down processes while the west side is rapidly building great wide beaches. Very little black sand was found along the east shore, but better showings of sand were found at the north tip of the island. Some of the old placer claims, located several years past along the northeast shore, have been entirely destroyed and removed by the encroachment of the ocean. Much of the north end of the island is composed of drifting sand dunes. As in the case of Tugidak, it is believed that the gold has drifted to Chirikof from the mainland by wave action and drifting currents.

Description of the Sampling:

Alitak - The first black sands inspected are situated on Cape Alitak at the extreme southwestern tip of Kodiak Island. The sands are covered by four full placer claims belonging to "Hank" Russell of Alitak. Twenty acres would easily cover this area of black

sands. The sands extend from high-tide level back under the overlying sand dunes. Several shafts were sunk in the deposit indicating the thickness of black sand material to be not over 2 feet with barren yellowish beach sands beneath. The gold content, as observed by panning and amalgamation, was much below commercial possibilities. The gold was extremely fine and rather difficult to amalgamate. Mr. Russell had done some mining here with a sluice box and amalgamating plates. He was able to recover only a small percentage of the values, but could make wages at one or two places. A revolving bowl carrying a load of mercury was experimented with on this property, but was never brought to efficiency. Messrs. Whitell and Fidge were endeavoring to install another variety of revolving bowl on this property, but it is not known concerning their success. There is about 65,000 cubic yards of available material carrying a fair proportion of black sands available in this area, but there is also a heavy overburden of dune sand to be removed to reach the desired materials. The gold values are so low that this property is not attractive.

Tugidak Island: 2-13 3-3

The only black sands on this island are along the southeast coast. The marine gravels, described above and capping the cliffs and plateau, were carefully sampled and panned especially where small creeks cut back from the beach toward the interior. Here, good vertical cross sections were obtained and tested. The results were nil as regards gold values and any black sand. Along these beaches, the high-tide level is more or less against the base of vertical cliffs, and the waves are constantly pulling down masses of the cliffs. At this high-tide mark, close up to the cliffs, a few scattered patches of black sand concentrations are found. Their volume is quite small and widely distributed and the gold content is very low. Mr. Blankman had his men stake several claims along this area as a protection while we were at work. Mining operations along this beach would necessarily be conducted from the high cliffs above, due to the tides preventing any installation of machinery on the beach. Much less mining by prospectors has been done on this island than at Alitak due to its inaccessibility and also due to the lack of auriferous concentrations.

Chirikof Island: 2-13 3-4

The conditions and occurrences of black sand on this island are identical with those of Tugidak. The black sands were found on the northeast coast and extreme north end covering a stretch of about 10 miles. The black sands were found commonly as thin surface crusts on the beaches near high-tide level, and especially where small creeks cut the beach. Also, thin crusts were found on the faces of wind blown sand dunes, but in no case were sands found in volume sufficient to constitute workable deposits. Panning showed also that gold was not universally present in the black sands, there being long stretches of beach where no colors were found in the sand concentrates. The sand dunes

were sampled also but showed few or no colors over large areas. Mr. C. N. Frye of Seattle, and others, have located many claims along this beach in the past, but have never been able to find anything of value commensurate with the samples reputed to be gathered from this territory. On the north tip of the island was found the most promising concentrations of black sand encountered on the trip. However, the greatest volume inspected was a surface layer about 6 inches thick, and covering perhaps an eighth of a mile of beach in a narrow strip. No gold or platinum values were found in this sand. Hard blue clay, shale bedrock lies at the surface or near it along this entire beach for several miles. The tides frequently sweep the beach clear of sands to build new deposits. No deposits worthy of consideration were found on this island, and the field work was terminated.

Laboratory Tests at Kodiak:

The selected samples were worked over at a small laboratory established in Kodiak. Each sample was first weighed as taken and then weighed dry to determine loss of moisture. It was then quartered by thoroughly mixing and putting through a Jones sampler. The 1/4 cut was weighed and volume measured, and then put through the screens (40, 60, 80, 100-mesh). The material on each screen was weighed and panned, the colors of gold counted, amalgamated and the black sand concentrates saved, dried and weighed. From these results, the weight per cubic foot of original material, percentage of black sand in the sample, number of pounds of black sand per ton of material, ratio of concentration, value per ton of sand at different points of concentration and total value of the material per ton could be figured. The attached table displays this tabulated information for each sample. By this system and a strong magnifying glass, we were able to see the gold and study the characteristics of the sand throughout the testing. The concentrate from each sample was saved, sacked and labeled for any further experimentation in San Francisco. The remaining portions of the original sample were also sent to San Francisco in order that the field tests might be checked, if it were thought necessary.

As the original purpose of the trip was to discover if there were values sufficiently high in these black sands, recoverable by amalgamation to be commercially attractive, the above system it is believed fully justified itself.

Conclusions:

The object of this investigation was to examine certain reported black sand deposits in southwestern Alaska as to their volume and gold content. It was decided that if attractive commercial values could be recovered by amalgamation and screening tests in the field, then more refined and complete laboratory tests could be worked out later in a well-equipped laboratory. Our field tests indicated that in all the samples the gold was extremely fine, passing through to plus 100 and

minus 100 mesh screens, and this would require expensive concentration and equipment. Also, the gold is difficult to amalgamate, requiring a bath of lye or weak cyanide solution to brighten the gold. It was further found that there were no commercial deposits of black sand, but that the black sand was in all cases greatly diluted with barren gray sand. At no locality was there sufficient volume of sands in a limited area to warrant efficient mining by a stationary plant, had commercial values been present. At most places examined, the dangers from storms would require the plant to be placed well back from the deposits of sand. Cost of transportation is one of the major items in this country in considering these beach deposits for it is almost impossible to land supplies by boat on Tugidak and Chirikof during most of the year. It is finally concluded that of the deposits shown us by Mr. Blankman none contains commercial values or sufficient tonnage to be of any value from a mining standpoint. The samples indicated values all under \$1.00 per ton. The attached table shows the results of the tests made in the field. The values are computed on the new price of gold. The last column of values for the concentrated black sands, of each sample, cannot be complete or very accurate due to the difficulty of weighing very small quantities of gold in the field with the scales at our disposal. However, the results show plainly that the sands are of no commercial value.

(Sgd) L. D. GASSAWAY.

Am sending by regular mail a copy of the Engineer's report, thinking it may be of some value to you, or to others who may hear tales of rich sands. This letter I am sending air mail on the chance that it may expedite delivery

FRENCH

MEMORANDUM

State of Alaska

TO:

Martin W. Jasper

FROM:

James A. Williams

DATE : July 26, 1962

SUBJECT: Reported Kodiak
Gold-Iron Sands

Enclosed are copies of correspondence with Art Erickson on the subject. Please give him the benefit of your ideas and information on his questions. As I am sure you know, Art is always willing to help out with equipment wherever a mining show has real promise.

Enclosed also for your report files in case you do not already have it is a Kodiak sand report by one L. D. Gassaway written in 1935.



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Enclosures - 3

RECEIVED
Anchorage, Alaska

JUL 31 1962

Division of Mines and Minerals
Alaska Dept. of Natural Resources

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July 10, 1962.

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REC'D. JUNEAU

JUL 13 1962

Div. Mines & Minerals

Mr. James Williams
Director of Mines and Minerals
State of Alaska
Juneau, Alaska.

Dear Jim:

I have been shown some maps and analytical reports on sands that were dug on Sitkinak Island, which is in the Trinity group near Kodiak Island.

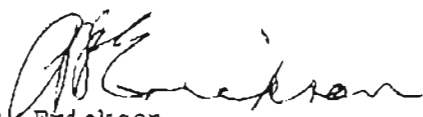
The location of the prospecting would be on the southwest beach where a creek with considerable erosion has taken place and built up a considerable beach. This area is about midway between the western point and another point that extends further south about midway of the island. This southern point is west of the tidal flat that runs all the way across the island. Perhaps you can get an idea of where it is from the above description.

I don't have too much background of the work, but I understand it was done by H. W. Waterfield of Anchorage, Alaska, and they apparently dug open holes from 7 to 16 ft. deep, and sent samples to the Hayes Mineral Service in Denver. They apparently had a small concentrator or jig with them, but it does not say whether these were concentrated samples or not. They give values per yard from nothing on to \$1.05, but in their comments they say on practically all the reports that the gold is seen as imbedded in the range of quartz, and the report mentions nothing about free gold. They also speak of this gold adhering to the quartz as a sort of "paste" -- apparently the gold is quite fine. Also, they were unable to sink these holes any further due to the water level they would reach.

Have you any information on this area of other prospecting; and if it has ever been drilled to bed rock? There is a chance that there might better and coarser gold values at depth on bedrock, and again it may be the usual deposit of fine gold associated with beach sands. Apparently the sands carry a certain amount of iron of approximately 20% in most instances.

Yours very truly,

THE CARRINGTON COMPANY


A. F. Erickson
President

AFE/mm

FROM
STATE OF ALASKA
DIVISION OF MINES AND MINERALS
P. O. BOX 1391 - JUNEAU

July 26, 1962

Mr. A. F. Erickson, President
The Carrington Company
91 Columbia Street
Seattle 4, Washington


Dear Art:

In re Kodiak Iron-Gold Sands

Regret this answer to yours of July 10 is so late. I have been out of town on various field trips. I have seen a couple of reports on Kodiak sands that do not sound as if the sands at Kodiak have much commercial promise. However, I have no personal knowledge of Kodiak, and certainly would not want to knock a possible commercial venture in the head. I am sending your letter to Martin Jasper, whose knowledge of Kodiak is extensive. You will hear from him shortly, if he is not gone on a field trip before this reaches him.

As further information, I have heard Mr. Waterfield spoken of with some respect around our Anchorage office. I do not know if Mr. Cornelius might be mixed up in this venture, but if so, it should be handled with some caution. Martin can also advise you further on this.

Sincerely,


James A. Williams, Director
Division of Mines and Minerals

je
cc: Martin Jasper ✓