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Mr. C. Paulsen's Expedition to the
foothills of Mt. St. Elias, north
of Icy Bay, Alaska
by
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Data contained in the following report is for the benefit of prospectors or field parties, who may be interested in this particular vicinity.

The information was obtained from a six weeks examination of the rock formations, and mineralization of the Mt. St. Elias slopes. The area covered was from the eastern shore line of Icy Bay, north to the valley lying between the Chaix Hills and Mt. St. Elias.

Our prospecting equipment consisted of a portable drill rig, small flotation machine capable of handling 20 lbs. per hour, microscope, and other necessary tools, etc. for the trip. For transportation overland a Fordson tractor was used with a trailer of one ton capacity.

We arrived in Icy Bay June 16th on the gas boat "North Light" owned by Nils Landin, and found the western shore blocked by an ice pack from the ocean entrance to the head of the bay, which is headed by a large glacier "Guyot Glacier".

Our original destination by water was Mud Bay, a small bay that extends into the western shore of Icy Bay. Mud Bay affords a harbor when free of ice. The exceptionally warm summer season caused the "Guyot Glacier" to become more active than normal and thousands of tons of ice were discharged daily, with a continuous booming that could be heard for many miles.

An almost continuous northeasterly breeze from the glacier moved the ice pack along the western shore line. The larger bergs, stranded in the shallow waters, had a tendency to hold the smaller ones from moving to sea. The result was an ice pack extending several miles wide into Icy Bay. As it was impossible to penetrate the pack we anchored off the eastern shore and waited for favorable winds to shift the ice pack.

While waiting for the bay to clear, the ocean beach sands from Point Rio, east to the Yahtse River, a distance of about four miles, were prospected. Sands taken from a depth of two and three feet were run through the flotation machine. Nearly all of the samples taken showed visible specks of fine gold.

From some of the more concentrated spots which are recognized by the ruby sand "garnet" and iron as many as fifty or more colors were observed, but nothing was found to warrant the sinking of anything more than a few shallow holes. The Yahtse River cannot be forded where it empties into the Gulf of Alaska even at low tide.

When after waiting two weeks, very little change was seen on the west shore line, and as Mr. Landin had to return for the salmon fishing, we decided to find a suitable place to unload our equipment and examine the St. Elias range. A small island, "Movraine Island" four miles up the bay affords a good safe harbor from drifting ice and a few hundred feet opposite the island, the beach line is steep enough and water deep enough to unload a boat. The boat was run into about six or seven feet of water at high tide and with the lowering of the tide it lay against the bank and was unloaded. Camp was established and five or six days spent prospecting the beach. One drill hole was put down to a depth of 25 feet, opposite Movraine Island, Sand run through the flotation machine showed very little gold concentrates, chalcopryrite and iron. A survey of the surrounding country was made for the easiest route as far north to take with our tractor and supplies. A small stream a few hundred feet N. E. of Movraine Island afforded good going for a half mile where we finally left the creek bottom and headed for a large outwash plain. The plain extends from the ocean front as far back as the "Malaspina Glaciers" lateral Movraine, a distance about ten miles in length. The plain in most places is barren of vegetation except in some elevated spots, where thickets of alder and cottonwood grow. The western border of the plain was followed over a carpet of moss and young alder trees which made a good road bed for the tractor. Camp was established about a mile northeast from the head of Icy Bay. Plenty of wood is available, spruce driftwood on the outwash plain, that had been carried down from the upper slopes by the ice advance. A large river empties into the northeast end of Icy Bay that cannot be crossed by fording. The head of this river, north three miles, comes from a hole in the Malaspina Glacier with tremendous force. The river deposits great amounts of debris into the bay, ice bergs floating in the bay covered with rocks are stranded and deposit boulders which weigh tons that are rapidly filling this part of the bay.

From the head of this river a lateral movarine bounds the southern border of the Malaspina Glacier, a few miles wide and many miles east in length, but ends to the west against sandstone mountains. A few miles further west from the head of river described a smaller river flows from a hole in the

glacier. This river can probably be forded at certain times, but traveling is good around the head of it, which is the southwesterly end of the Malaspina Glacier. Rocks on the lateral moraine of this glacier are similar to those described in the northwest valley. From here the Sandstone Mountains arise to a height of a few thousand feet. Continuing westerly over a terminal moraine, more small streams are crossed, and the country becomes broken up with sandstone ridges and valleys. These valleys are free of any ice excepting their extreme heads, where the hard packed snow covers little local glaciers. Plenty of cottonwood and alders grow in the valleys and on the more gentle slopes with a few scattered spruce. The valleys and ridges to an elevation of a few hundred feet show glacial rocks left by the receding Guyot Glacier. From the amount of glacial wash on the sandstone ridges, the glacier undoubtedly carved out the beginning of these valleys. Stream erosion have cut them hundreds of feet deeper.

Continuing west a few miles further, a large valley is entered - "The Northwest Valley". This valley is the most favorable approach to the Mt. St. Elias Range from Icy Bay. The valley is cut out of the sandstones and shales to a depth of a few thousand feet. The north arm of the Guyot Glacier covers the valley floor and continues northwest until it becomes a solid mass of ice, that covers the upper portion of the range. The lower part of the glacier is covered with freshly broken rocks from the St. Elias Range and many pit lakes are formed from their heat. Observations were made from a distance of four miles up this valley. Approach closer than this to the contact would be difficult and dangerous, unless equipped for glacial travel. Many large ice crevices were seen and the glacier quite active. The mountains surrounding the glacier on its eastern border dip steeply into a large lake in the glacier. These mountains cannot be crossed, or if so dangerous, as their steep slopes are barren of vegetation and afford little footing. From here the contact zone can be clearly observed by the altered rocks affected from the heat, which show in red contrast to the surrounding mountains. This was noted more particularly a few miles east from the head of the valley. It seems as if some dyke-like intrusives have penetrated the sandstones for a few miles, which has caused a more extensive alteration noted then elsewhere. From our distance of observation there nature could not be determined. The contact rocks picked up on the moraine seem to be an iron sandstone altered by heat, and a gneiss as the possible intrusive sheets mentioned. Greenstones seem to be of the

most abundant rocks that cover the moraine. Of the granite rocks quartz diorite seem to predominate, although many others of this type are noted. The volcanic rocks present, including the greenstones, were andesites, rhyolites and others. The metamorphic rocks recognized were slate, serpentine and gneiss. Throughout the entire trip an absence of schist was noted. Quartz is scattered among the other rocks and is of a hard glassy character. Examinations under the microscope and by panning revealed the presence of chalcopyrite and iron. Of all the quartz examined, free gold was not detected.

Numerous samples of fine material, taken from the edge of pit lakes, were panned and a few specks of fine gold were seen with the aid of a pocket glass, among the chalcopyrite and iron.

Microscopic examinations and flotation tests were made by Mr. C. Paulsen of Spokane. The Mt. St. Elias Range shows very little faulting or shearing, but east and west of the main peak some closely compressed folds were seen. West of the main peak a few miles a narrow fracture zone was observed, which is probably due more from the cooling magma than from greater stresses. From the slight fissuring that must have taken place, and the great fields of ice that made weathering and erosion a slow process, this particular vicinity from a geological viewpoint, is unfavorable for prospecting both lode and placer deposits. Unless a more thorough examination is conducted, and some of the more precious metals are found in greater quantities, little attention will likely be given it by prospectors on account of transportation difficulties and other unfavorable conditions mentioned.

Some of the greenstones carry considerable chalcopyrite and iron, and it is the belief that most of the fine gold in Icy Bay is derived from such. Some fossiliferous rocks were seen both in the sedimentary and metamorphic rocks and in one of the small valleys mentioned, shales containing fossils were seen to an elevation of four or five hundred feet. With the closing of this brief report the writer wishes to say for a geological study in general this district affords one of the most interesting in Alaska. It is hoped that in the near future more complete data, will be furnished by the U. S. Geological Survey on this interesting district.