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Arctic Gold, Alaska

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ARCTIC GOLD

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To armchair travelers, especially in the United States, few places have a stronger allure than far-off Alaska. Now that the "wild and woolly" west is really alive only so far as it serves to accentuate our historical heritage, this land of the far north has become our last frontier. To the geologist, mineralogist, and, I might add, even to the layman, one of the most interesting features of the territory is its large placer gold deposits. Every American boy has heard of the Nome gold rush, and the more literarily adventurous have undoubtedly delved into the sagas of Jack London.

Like most lands which have been glorified in the popular mind, many erroneous notions have arisen about Alaska. While I am still a green-horn as far as the North is concerned, my picture of this territory has, since my brief visit to Alaska, changed considerably. Part of what is said here is a reflection of this change of mind.

During my stay in Alaska, I spent some time on Seward Peninsula. While there, I visited the Casa de Paga Gold Co., mine near Deering (see accompanying map for its exact location), on the northern side of the Peninsula. The only means of transportation to the mining site is by small planes which come from Nome or Kotzebue. These towns are served several times each week by regular commercial flights using DC 3's which originate in Fairbanks and which connect with lines in the continental United States. These small planes which come to the mine (Piper Cubs, Norsemen, etc.) are flown for the most part by expert bush pilots, men highly skilled in the art as well as the science of flying, for here there are no easily accessible emergency fields, and directional radio beams are frequently lacking. Since for many people he often is the only link with the outside world, the pilot in this region acquires a position of unique responsibility. All the food and some of the personnel are flown in by these bush pilots. Some of the lighter machinery which is transported in this manner is brought into a landing strip near the mine.

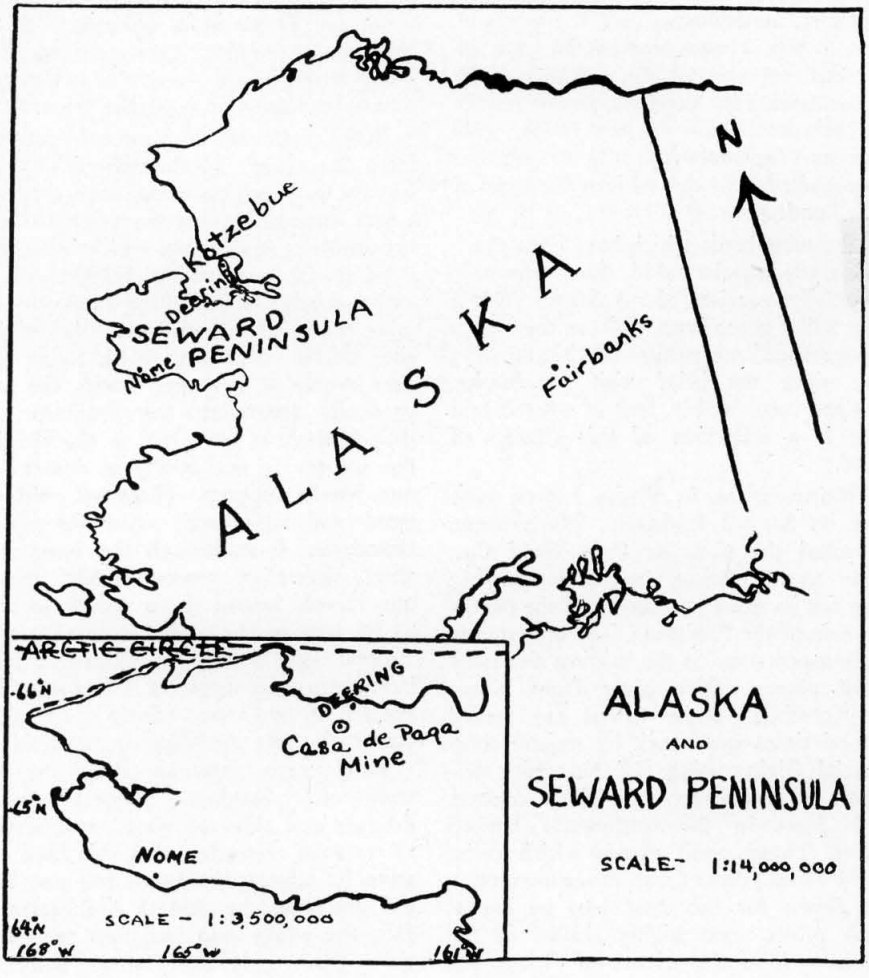
Bulky materials such as oil, gas and large machinery are brought in by the supply ships which come once or twice a year during the short summer to Deering. Starting at Deering, which is nothing more than a small coastal Eskimo village, a dirt road used only for trucks to the mine continues inland toward the mining site. Leaving Deering, which today consists largely of tar paper shacks, the road gradually climbs into the mountains. Although there is not a tree in the vicinity, the scenery is not nearly as desolate as one would suppose. There are willows, grass and varicolored wild flowers in abundance. Even though the summer is short, vegetation grows quickly, and as one travels inland there are some trees to be seen in the more sheltered places. Animal life is also in evidence, birds being especially common. I was most impressed by two swans taking to the air as our truck came rumbling up the road.

At frequent intervals along the way were old abandoned miners' shacks, dredges and piles of waste rock serving as constant reminders that this land, despite its relative isolation, has not been left untouched by modern civilization. In fact, the whole area has been gone over quite thoroughly many times since the

initial gold rush of the early 1900's. Although today most of the mining is done with mechanical dredges, the day of the independent prospector has by no means passed. At the present time many of the residents, including the bush pilots and even some of the local Eskimos, work their own claims.

When I arrived at the Casa de Paga mine in mid-July, patches of snow could still be seen on the surrounding hills. In spite of this the mosquitoes were in profusion. As anyone who has visited in any arctic or sub-arctic region knows, this is a considerable understatement. These little beasts are always present in numbers that approach the mathematical concept of infinity; no matter how much you swat, or regardless of the quantity of fly dope you use, they are impossible to eliminate. This is especially true when walking over the tundra, where you may lose sight of all landmarks but never of the mosquitoes.

Like most operations of this sort the houses were arranged in a way that would facilitate their easy removal. A mess hall, bunk house, tool shed and sod house used as permanent living quarters were the most imposing structures. The scene of the operations in this little tundra valley is by no means awe-inspiring, but that does not mean that it is lacking in beauty. A little river runs clear and cold



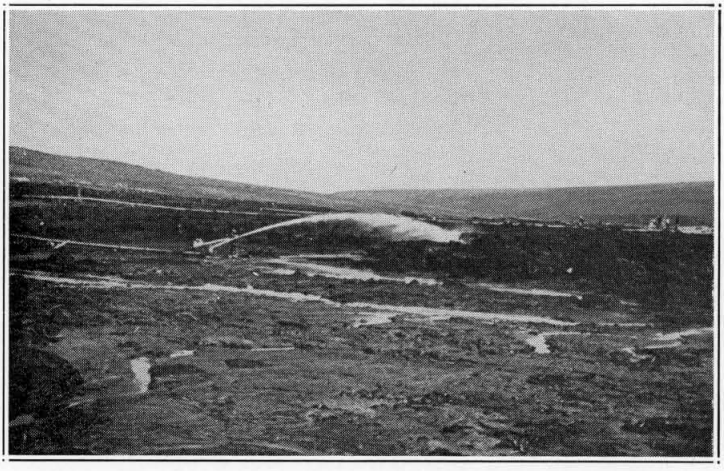
past verdant willows garlanded with daisies. Thickets of alders, the bark of which is utilized by the Eskimos for making a dye, and bright berry patches dot the grass-covered hills that roll gently from the valley. This picture of the brief Arctic summer no doubt differs considerably from the scene most people imagine. It can get very warm during the fleeting summer, and there was quite a heat wave at the time of my visit to the mine. Several of the men went swimming in the nearby river, and only a day before I had taken a dip in the ocean, even though it was but a few weeks since the ice pack had gone out to sea. The water was cold but refreshing, and it seemed to be much less salty than in the mid-latitudes.

Modern mining, as I was soon to learn, is a very complex process. The first step, prospecting, is now called exploration. In this operation holes about six inches in diameter are drilled down to bedrock. The gravel is then brought to the surface and panned to assay its gold content. The region is dredged if gold-bearing gravel is found in sufficient quantity and over a large enough area. But before the dredge can start operations there is a great deal of preparatory work that must be done.

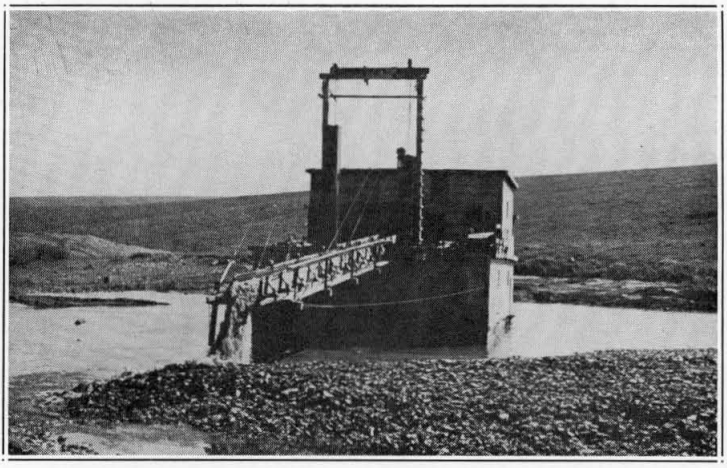
First the underlying gravel must be exposed. This means that the living surface vegetation, the accompanying peat and the muck beneath must be stripped away and removed. Usually the surface vegetation is only about a foot think, and the peat is no more than a few feet in depth. This is often removed with a bulldozer. Underneath there is at least twenty feet of black to gray silt, which means just plain muck. Interspersed through this material are ice lenses which are to be expected in this region where permafrost occurs. A few feet beneath the surface the ground remains frozen the year 'round, and thawing by artificial means is necessary for mining purposes.

The best way to remove the silt is to wash it away with high pressure hoses (see accompanying photo). It was in an operation similar to this that an almost perfectly preserved baby mammoth was uncovered near Fairbanks, Alaska. Old mammoth tusks and Eskimo artifacts are among some of the other things that have been recovered from these deposits at this mine.

After the muck has been removed, the gravel as well as the bedrock is still frozen. Before dredging can begin, therefore, the gravel must be thawed. This is accomplished by the use of cold water joints (¾ inch pipe on 5 - 10 foot centers). A ten-day cycle is required, and the water is usually between 45-60°F.



These high pressure hoses wash away the silt covering the gold bearing gravel.



This was one of the two dredges in operation when I visited the mine. The water is rushing out the flume at the rear end.

The course of the river is then diverted by makeshift gravel dams, and the dredge is brought in to eat its way through the gold-bearing gravel. To one who has never watched a dredge in operation, it is truly a fascinating sight. At first glance it appears to be a floating barge with a revolving chain of iron buckets biting into the gravel at one end and a stream of water shooting out of a flume at the other.

Climbing on board, after dodging the water spouting from the forward end, I received a rather different picture. This gobbling and groaning Goliath was anchored at the stern end by a huge steel pillar called a spud. This support is sunk into the gravel when the dredge begins operations and is raised when the machine is moved. At the top of the bucket conveyor belt sits a panner who takes a sample of the gravel every few minutes and pans it to check on its gold content.

This fellow was one of the several old time prospectors who had quit working on his own. Panning for gold is not confined to gravel, it seems, for he told me that when part of Nome burned down several years ago, he was able to recover some of his gold by panning the ashes. At the top of the conveyor belt the gravel is dumped into a hopper. There it is subjected to a powerful stream of water, and everything is washed down the flume. The gold and silt containing the heavy minerals are thus caught in the riffles (little slots on the flume).

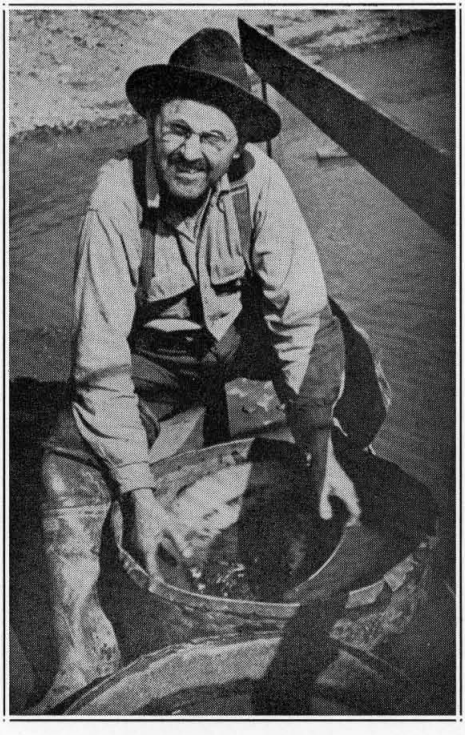
About once every ten days, the dredge is shut down and the gold which is mixed with the other heavy silt is removed. About 95% of the gold which is taken from the flume requires only superficial cleaning. The remaining portion is then mixed with concentrate finely ground up in a ball mill, and the gold is separated by amalgamation. Next, the gold amalgam is hydraulically separated, and the mercury is distilled off. At this stage the gold is about 90% pure. The remaining 10% is made up of copper, silver and iron. This finished product is then shipped to the bank in Nome.

The gravel is a rather complex mixture but consists mainly of quartz, several forms of iron oxide and limestone in varying combinations. Among the less common constituents are goethite, marble with limestone, actinolite schist (silicious aluminum oxide), fibrous actinolite (which resembles asbestos), garnets, magnetite, specular hematite, pyrites, cinnabar (very rare), scheelite and hydroger-

tite (iron oxide, FeO, and water).

The gold itself is of various kinds, but the fineness and purity remain similar in all types. Rough black gold with an iron oxide coating is the predominant kind. Less common are fine plates of gold which show evidences of transportation and abrasion. Rarest of all is the subcrystalline and angular type which occurs in relatively thick lenses, and there are, of course, variations in these types due to the individual circumstances under which the chemical growth by precipitation occurred.

The bedrock in the area is mostly limestone and schists, the latter probably originating from sandstone and shale. There are also calcareous and graphitic schists in the surrounding country, and several outcroppings of lava flows occur in the nearby hills.



This man sits at the top of the dredge's bucket chain and pans the gravel to assay its gold content.

Preparatory mining work begins about the first of May; the dredging starts in the middle of July and continues well into October. Of course, these dates vary depending upon the weather conditions. Contact with the outside is maintained by radio. In addition, a mail plane usually comes a few times a week. The total labor force is about thirty men, mostly Eskimos recruited from Deering, plus two women who act as cooks. The chow at the mine was unexpectedly good for this part of the world and included fresh vegetables, meat, freshly baked bread and powdered milk. The vegetables are grown in an adjoining garden while all the rest of the food is shipped in by air.

Later that summer I had an unanticipated opportunity to contrast present conditions with those that existed at the turn of the century. This occurred when I met one of the old-timers who arrived when the gold rush at Nome was just getting underway. At this period there was a large influx of people to the Seward Peninsula, just as there is during any gold rush. Some made a fortune in gold, others set up businesses, but many soon became discouraged and returned home. A few chose this spot as their new home.

Today, a half-century later, most of these old-timers are gone, and the few remaining ones are rich chiefly in memories. James Henry is one of these men. He is an octogenarian who, several times a year, commutes from his home up river to a little Eskimo village by rowing eight miles. This is necessary since he has no other way to obtain supplies. Recently married to a native woman, he does a little mining now and then, but just enough, he says, "to keep myself in grub."

As he recalled "the good old days" in his tar paper town house by the shore of the Arctic Ocean, he was animated by an enthusiasm that belied his chronological age. His father was one of the fabled pioneers who migrated overland to California during the middle of the last century. James in turn left California for

Alaska and headed for Seward Peninsula. It was a hard and arduous life, and unlike the many who, after getting off the boat, took one look at Nome and sold their outfits for a fraction of their cost, he stayed on.

There was little glamour in his chosen career, but there was much pain and misery. The winters were severe and the unwary often froze. There were no dredges and few machines, so much of the mining technique consisted of pick and shovel operations. Rewards, however, were not lacking. Gold was there, and in relative abundance, too, if you just happened to strike the right place. This, of course, meant continuous prospecting for new sites.

Some areas, Candle Creek near Deering for example, have continuously yielded large revenues since they were first discovered. The large majority of areas, though, like most of the sites I passed on the way up to the mine, have long since been abandoned. for after they were originally discovered most of the gold was extracted in a short time.

Today, with the price of gold relatively low, it is only the larger operators who can survive, and many of them do so only with great difficulty. Besides mining, the coming of the airplane has also caused this area to lose much of its previous isolation. It is nevertheless beyond the pale of what we are accustomed to term the indispensables of civilization; it goes without saying that running water, central heating, sanitation systems and electricity are either unknown or little used.

Despite all its forbidding aspects, this land has a strong allure which can be perceived even by the traveler. For some of those who came to exploit its wealth, Seward Peninsula has become a permanent home. Describing his last trip "outside" (the Alaskan term for the continental United States), James said that his greatest thrill was returning to his secluded arctic cabin.

Acknowledgment

I should like to express my gratitude to Don Stewart, manager of the Casa de Paga mine, and to Charlie Garret, mining engineer, for their hospitality and also for their invaluable assistance in enabling me to prepare this article.

Reference

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