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Report of Mining Investigations on Seward Peninsula 1946

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Only half of the placer mines that were active prior to the war on Seward Peninsula, resumed operation this season. Of the total number of 31 dredges, only 10 were active this season and a few of these only operated a month or two. The four dredges of the U. S. S. R. & M., situated in the vicinity of Nome, were inactive this year. These four dredges were the largest producing dredges in years prior to the war. The ten active dredges are comparatively small producers, each under one hundred thousand dollar seasonal production. Three of the ten active dredges were located in new areas; namely, Alaska Development and Engineering Company dredge on the North Fork of the Kougarok River, the dredge of the Casa de Paga Gold Mining Company on Pajara Creek, tributary of Eldorado, and the No. 1 dredge of the Arctic Circle Exploration, Inc. on the Kiwalik River below the mouth of Candle. The dredge of the Sourdough Dredging Company on Ophir Creek north of Council is redredging tailings. The remaining six dredges are working low grade virgin ground in old mining areas.

A shortage of both skilled and common labor, lack of repair parts and supplies, together with a late spring season, have been contributing factors in several mines not resuming operations and seriously handicapped those that started.

Army acquisitions during the war of caterpillars and draglines has also prevented some operations from resuming. Six draglines were operating in 1940 on the Peninsula. This season only three draglines were found to be at mining sites, with only two operating. One of these three had only been recently acquired from Surplus Property.

The most common method of mining on the Peninsula, and the one with lowest cost, is the combined use of bulldozer and hydraulic. In some operations of this type hydraulic water is available through the use of ditches and pipe lines, while others lacking hydraulic water require a pumping plant. Thirty-two hydraulic-bulldozer operations were active on the Peninsula this season. Four drift mines operated during the winter season. A total of ten hydraulic, shovel-in and ground-sluice operations were active during the season. In addition to the above there were five drilling operations, point thawing in one field of the U. S. S. R. & M. Co., and one operation preparing ground on the Intermediate Beach line for the new Johnson and Pohl dredge.

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C. O. Roberts operated the Big Hurrah Mine and mill during this season and plans on underground development this fall and winter. One hundred sacks of coal were mined at the coal mine at Chicago Creek on the Kugruk River. The Shamrock gold prospect owned by R. W. Silver on the right limit of Big Hurrah Creek remained inactive. K453.44-52 K453.155

The season was classed as dry other than considerable snow water that was available in the spring. This was keenly felt by those operations dependent upon hydraulic water and lacking pumping plants.

Total employment on Seward Peninsula in 67 mining operations was 450 men, distributed 439 in placer mines and 11 in lode mines. Further distribution among the placer mines is as follows: 186 employed on dredges, 131 on hydraulic-bulldozer, 9 in drift mines, 79 engaged in ground-sluicing, hydraulicking, sniping, thawing and dredge construction, and 15 men drilling. The greater portion of the men employed are native Eskimos. Skilled white men are very scarce on the Peninsula, which is due to the fact that mining cannot compete for skilled help in comparison to Government wages and board charges. Wages range from 90 cents per hour for common labor to $2 per hour for dragline operators and some dredge jobs. Board charges range from $2 to $3 while the actual cost of board in several camps was reported to be more than $3.

General Trends and Potential Possibilities of Seward Peninsula

The evolution of small-scale placer mining into hydraulic-bulldozer operations as the cheapest method of mining, appears to be fixed on Seward Peninsula. This type of mining, utilizing the bulldozer to push material into sluice boxes and both scrape and mine bedrock, has increased definitely the potential placer reserves on the Peninsula. A great many of the old placer workings were on creeks which occupied an area of contact between limestone and schists. Where the pay streak crossed the limestone bedrock, the pay penetrated into the limestone from a few inches to several feet. Hydraulic mining, ground sluicing, scrapers, and even the old-type dredges mined very little of the limestone bedrock. Modern bulldozers with rooters make possible the mining of considerably more of this pay bearing bedrock and makes profitable the reworking of considerable placer ground that was formerly mined. The bulldozer has proven, through improvements of late years in materials used in its manufacture, particularly in the dozer blade, much superior to dragline for use in bedrock pay where much resistance is encountered. The bulldozer costs less and operates under less expense than dragline in comparison to the amount of material moved.

There are several methods or combinations in mining with the hydraulic-bulldozer. The combination is usually dependent upon natural conditions. The usual method is to push material in front of the sluice boxes and then use a hydraulic giant to move the material through the boxes. This method works very satisfactorily for bench ground and creek ground where there is sufficient grade for tailings. The method is very

low in cost where hydraulic water is available. Where there is not sufficient grade for tailings, an additional hydraulic giant is used to stack tailings providing hydraulic water is available. If not, tailings are again pushed away and stacked with bulldozer or hydraulic water is made available with a pumping plant, which naturally increases costs. Usually a bedrock drain is dug and carried along upstream as mining progresses. This allows the sluice boxes to be placed below the bedrock level, and allows the bulldozer to push the greater amount of material direct into the boxes. Also some by-pass water is used in these operations to carry sufficient water over the sluice boxes. Some mining is done by setting the boxes on bedrock and pushing with bulldozer up sufficient grade into the front of the boxes to allow sufficient grade for sluice boxes. Thence tailings have to be bulldozed or hydraulicked except where sufficient grade allows for their disposal. An occasional mechanical slip scraper is used to stack tailings. Where the tailings are bulldozed, the operation requires two bulldozers. Where the pay streak is wide, usually over 300 feet, two bedrock drains are dug and two sets of sluice boxes are used. This allows continual mining in one cut, and does away with lost time in bulldozing during clean-up and other dead work. Pushing material further than 300 feet is not profitable with bulldozer, and the usual cuts mined range from 200 to 300 feet in length and width. The bulldozer has proven most economical for stripping frozen ground and surface material not mined. Stripping frozen ground as it thaws naturally downward is the common method used for thawing, where depths are not over 15 feet. Below this depth hydraulic nozzles are used against cut faces.

Some mining operations have found it profitable to hydraulic-bulldoze old tailing dumps. Other operations have been made profitable by working low grade virgin ground which was considered unprofitable for ordinary hydraulic mining.

While the bulldozer is not used in mining the dozer is easily detached and the caterpillar is used as a mobile unit for transportation. The caterpillar is the only fast vehicle capable of moving heavy loads over the tundra, which covers nearly the entire peninsula. Moving from one mining area to another is quickly done with this method of mining. Combined with dozer, ditches are rapidly dug, roads can be built, pipe line laid, and numerous other jobs.

Another recent trend, and very noticeable this season, is the acquisition of large tracts of gold-bearing ground by large corporations where low-grade ground is known to exist. The largest acquisition on Seward Peninsula is several miles of ground along the Kougarok River by M. & K. Construction Co. This may in the future lead to the installation of large dredges when conditions permit or possibly large dragline operations. This trend is toward handling greater amounts of material with less man power employed.

Several creeks on the Peninsula have been mined to the end or source of the pay streak. Promising quartz veins or minable lode areas were not found, as many of the miners were led to believe by old theories. Instead these pay streaks lead and end on small intrusives, yellow porphyry masses, contact zones, fractured and faulted zones which show direct evidence of hydrothermal emittence of hot solutions. The writer is of the opinion that the source of the gold was from these hot solutions, where it was held in solution, and precipitated as it reached the free oxygen zones and formed the residual placers and pay streaks in the vicinities of the ground saturated by the hot thermal solutions. Where there was little grade a small residual placer area was formed. Where a definite drainage line was followed by the hot solutions, a definite pay streak was formed. Post river and stream erosion has altered and complicated the areas and pay streaks. The precipitation of the gold from these hot solutions was brought about by the reduction in temperature and pressure in the zone of free oxygen and chemical precipitation by the oxides which also were precipitated in this zone. The other metals in the hot solutions after reaching the zone of free oxygen formed, oxides, carbonates, and hydroxides, many of which are found in association with the gold. Naturally, some gold precipitated near the surface in the intrusive itself; some in quartz stringers, seams, etc., of which a small percent was worn out and accounts for some of the rough gold, and gold with attached quartz. Also this accounts for the mining of the top of the intrusives themselves in many instances which, due to decomposition of the rock minerals by the hot acid solution, is soft enough to be mined by placer methods. Among the most noticeable factors with regard to these source areas, are that several are not at the heads of the rivers and streams altogether but are along mountain sides, on benches, on level areas, and in low areas. Some did not form pay streaks in beds of creeks, but formed residual placers surrounding the source itself, more or less in conformity to it. One notable discovery of great richness is the late discovery of Fritz Weinard on Mud Creek three miles west and over the divide from Candle. Here a residual hillside placer was found, by blindly drilling while tied up in a severe snow storm. The pay has as its source a small yellow porphyry mass on and near the top of a small mountain, and the gold was deposited in a zone over 600 feet in width down the slope for an undetermined distance but already proven for several claims. The stream of water which is present in the creek, has not even cut through the bottom of the black muck deposit which covers the deposit. While it may be shown, once this area is studied, that the deposit may have been near sea level and beach concentration may have aided, present evidence shows that the black muck deposit covers the portion indicative of sea or lake level. Nevertheless, beach concentration is not shown from the material taken from the drifts during the last two years of drift mining.

The application of these known facts and theories regarding the origin and location of placer gold deposits on Seward Peninsula, while prospecting, drilling and mining, may prove of great value in future gold mining. The potential area for residual and buried placer deposits are large on the peninsula. Gold placer mining on Seward Peninsula will not in the immediate future cease due to lack of gold bearing areas, but will depend upon the future price and uses of gold in comparison to operating costs.

Another potential for the future is to be found in the associated minerals of value in the gold placer deposits. Scheelite is associated in many of the placer deposits and possibly in economic amounts under present prices on Windy and Rock Creeks in the Cape Nome district. On Windy Creek an area of over one square mile has been reported to contain placer scheelite. This area is within 12 miles of Nome and connected with a good gravel road. Cheap freight rates are to be had on return freight from Nome to Seattle.

The lode antimony prospects on Manila, Big Hurrah and other creeks offer potential mining should a demand for antimony metal arise. The pegmatite and areas of large crystallization in the Darby Mountains are geologically favorable to the occurrence of the rare metals and stones.

The tin-bearing areas in the Cape York area of Seward Peninsula offer potential small-scale tin operations, providing the price and demand are sufficient. This area contains a good reserve of fluorspar associated in the very low grade tin veins and limestone contacts. This fluorspar may find a ready market on the Pacific Coast of the United States, depending upon demand, price and costs of transportation.

The coal mine on Kugruk River is a potential source of coal which may prove of value in the future. Plans for determining the amount of minable coal should be undertaken now for future utilization in case of need.