

GOLD DEPOSITS AND MINING METHODS AT CAPE NOME.

Cape Nome Mining District, generally speaking, includes that portion of the north shore of Norton Sound extending from the eastern extremity of Galoon Bay west for a distance of about seventy miles. The tundra, which is so novel and marked a feature of the region borders on the sea and extends to the foot hills. Sometimes the tundra is seven miles in width and underlying it at an average depth of five feet are the deposits of coarse black sand which contain the gold. Practically, the sand beneath the tundra and on the beach is identical, and some careful observers assert that the tundra has been formed by thesea which at times past extended over the flat and has gradually receded leaving the deposits of gold-bearing sand in their present position.

The more confident opinion is that these deposits are clearly of glacial origin which, in a diminutive way, can be observed at times of breaking up of winter, when the ice cakes of the streams invariably bring down loads of gravel which is deposited as they are dissolved by the heats of summer. This theory is responsible for the general belief that the deposits of gold-bearing gravel cover the entire floor of Norton Sound. This will be proved during the present season as a number of marine dredgers are preparing to work the territory as soon as the ice obstructions disappear.

As to the origin of the golden sands of Cape Nome, or the source from which they were derived, there is absolutely no information. If of glacial origin they would seem to have been transported from a distance, and this supposition is considered more probable from the fact that the flakes and nuggets so far found are distinctly sharp or angular in shape. They show few indications of the effects of erosion or friction, as would have been the case had they been washed down stream. In any event the gold deposits were not brought from any section near to Cape Nome, as explorations for a distance of 240 miles northeast and in the range between Kolzebue and Norton Sounds do not, as yet, show the existence of quartz deposits. Quartz has been found, but barren of gold. The bed rock in all this region is rarely over 7 feet below the surface, often much less. In this distance have been found no less than four different layers of gravel. In all the world there is nothing resembling these Cape Nome sands. The well known black sands found on the ocean shores in California, Oregon and Alaska, some of them yielding prolifically, are clearly deposits in channels of dry mountain streams, easily traced and well defined, but at Nome the gold-bearing gravel is spread in blanket form over a wide extent of country, the boundaries of which are not yet established.

The total output for the Cape Nome region has been segregated by the statistician of the United States Branch Mint at San Francisco, and amounts to \$2,400,000. This, for the first season, the product almost entirely of the most primitive methods, is conclusive of the extraordinary richness of the new fields.

With an early start and the aid of mechanical appliances of high efficiency, such as will be introduced this season, it is certain that a very great increase in the product will be the result.

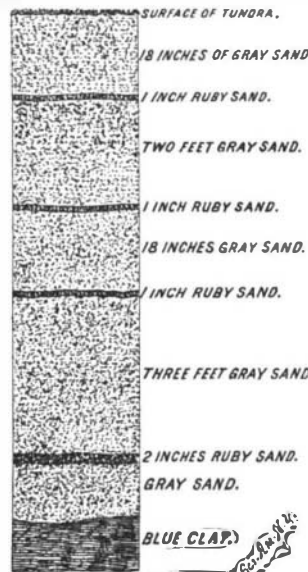
The extraction of gold from the auriferous gravel at Cape Nome is effected by the methods common in all placer deposits of the Pacific Coast, though the application of heat to disintegrate the sands, as in the Klondyke, is not necessary.

Every mechanical device used in placer mining is an amplification of the primitive pan or rocker, so successfully employed by the early miners in California. These machines were used at Cape Nome last summer, and by their aid \$2,400,000 was extracted. They are all of limited capacity, and their operation fatiguing, and, moreover, wasteful. In the Arctic regions where the seasons are so short, something more efficient is required, and invention has been stimulated to overcome the unfavorable conditions existing, and to produce a machine which would increase by a hundred times the capacity of the rocker, reduce the cost of running to the minimum, and at the same time do the work more effectively and save waste or loss. Economy in power, in help fuel, quicksilver and water, is a necessity, if such a machine is to meet requirements; and to these qualifications must be added compactness, strength, and a construction so simple that parts may be easily duplicated.

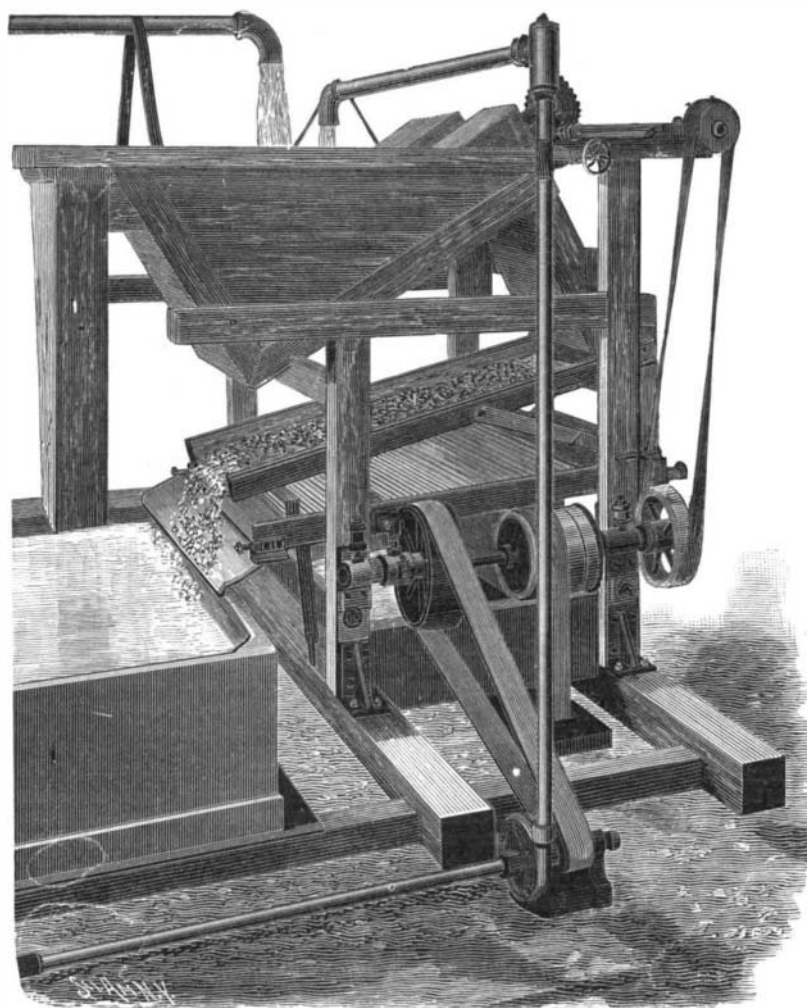
A large number of inventions have been offered and some of them meet most of the requirements; but the majority, while theoretically correct, are not practicable. All, without exception, endeavor to mechanically repeat the movement given to the pan in manual washing.

They are driven by hand or steam power and generally consists of a hopper to which the sand is raised by pump or shovel. A stream of water washes the sand down over the riffles, which oscillate rapidly, the gold collecting and being amalgamated by the mercury and amalgam lying between each. The rough gravel is thrown outside in the process.

We present an illustration of one of the most successful power machines, designed for the Alaska beach mines to meet the requirements indicated above. It is known as the Drake Amalgamator, and is manufactured by the Krogh Manufacturing Company, of San Francisco, Cal. It is carried in a stout timber frame and measures about 4½ feet square by some 6 feet in height. For successful operation it requires about 20 per cent water to 80 per cent of sand, and its capacity, as determined on the Cape Nome deposits, is 6 tons per hour, gross.



VERTICAL SECTION OF A CAPE NOME CLAIM.



TYPICAL GOLD-SAVING MACHINE FOR BEACH MINING AT CAPE NOME.

At the top of the frame is a hopper into which the sand and gravel are shoveled, and from the hopper a worm feeds the material, at a constant rate, to the upper end of a shaking frame, where water washes it down. The shaking frame consists of two adjustable tables, one above the other, each of which may be set to the desired grade independently of the other. The upper table is a steel punched slot screen of ½-inch mesh, which ends in three riffles which are formed by means of 1-inch cleats fastened across the lower part of the table. It is in this lower part that the coarse gravel is separated, and if there are any nuggets in the sand they are caught by the three riffles. The fine sand and the water flow through the screen which forms the upper part of the table, and fall through upon an inclined piece of sheet steel, which carries the material to the head of the table below. This table consists of forty-eight cross-riffles, 1 inch square, ar-

ranged in sections of eight, and filled with sufficient quicksilver to cover the bottom. The tables are both given a lateral oscillation by means of two eccentrics carried on a shaft attached to the side of the frame as shown in the illustration. It is considered by the inventor that the best grade at which to set the table is one of 2½ inches in 4½ feet, with a running speed of 350 revolutions per minute. It will be seen that the machine combines the riffle boards of the ground-sluice and the side-shaking of Frue vanner concentrator. It is claimed that at the most not more than one-tenth of a horse power is necessary to run this machine. The total weight of the amalgamator set up is a little over 800 pounds; but for convenience of transportation it is constructed so that no piece weighs over 100 pounds.

Russian Experiments in Electro-Culture.

Some Russian scientists have been trying some interesting experiments in electro-culture. One of them ascertained that electrified seeds germinated more rapidly, and gave better and quicker results than seeds which have not been submitted to preliminary electrification. He also repeated the experiments of Ross, that is, burying in the soil one copper and one zinc plate placed vertically and connected by a wire. He found that potatoes and roots grown in the electrified space gave crops three times heavier than those which were grown close by on a test plot; the carrots attained quite an unusual size of from 10 to 12 inches in diameter. The other Russian scientist tried a series of experiments that were more original; on his experimental plot he planted wooden posts about ten yards apart, which were provided at their tops with metallic aigrettes connected by wires so that the plants were cultivated under a sort of network of wire. He obtained some remarkable results and ripening barley was accelerated by twelve days. A series of laboratory experiments upon boxes of soil was also made. The temperature of the soil was raised by these currents; its moisture decreased at first, but began to increase after a course of three weeks, and at last the amount of vegetable matter in the soil was increased by the electric currents. Further researches seem promising.

The May Building Edition.

The Building Edition for May is a most interesting number of this periodical. It is filled with engravings of houses of various prices, and it also has several attractive features such as "The Breakers" at Newport, R. I. The new buildings at Stanford University are also illustrated and described. There are several pages of reading matter devoted to the subjects germane to the interests of the periodical. By mail, 25 cents. Munn & Co., Publishers.

The Current Supplement.

The current SUPPLEMENT No. 1272 is of unusual interest. The "Opening of the Paris Exposition" was written by our special correspondent, and is illustrated by engravings showing interesting features of the inauguration; it is also accompanied by maps showing the location of the various buildings. "Portable Pneumatic Tools" is an illustrated article describing the principal types of these important tools. "Pneumatic Malting" describes a new and important process of malting. "Liquid Hydrogen" is a most important lecture delivered by Prof. James Dewar before the Royal Institution. "The Relations Between Electricity and Engineering" is a lecture by Sir William Henry Preece. "The Means of Defense of Animals" is a lecture by Philip P. Calvert, Ph.D., of the University of Pennsylvania and has been revised by the author especially for the SUPPLEMENT. "The Shrinkage of Lake Nicaragua. A Question of the Permanency of the Proposed Nicaragua Canal" is by Prof. Angelo Heilprin, F.R.G.S., Professor of Geology at the Academy of Natural Science, Philadelphia. It is a most important and authoritative paper and is referred to elsewhere in this issue.

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