

leaving the gold untouched. When the process is finished, the pure gold left in the cupel resembles tinder. It is then annealed, rendered into a compact coil called the "cornet," and weighed. The weight gives the exact amount of pure gold. For the purpose of weighing, scales of the most delicate construction and the greatest accuracy are required. They will indicate a difference of the ten thousandth part of a grain. A fly's wing, or the smallest grain of sand that the human eye can detect, can be accurately weighed in these scales. The lightest breath disturbs their equipoise. Should their accuracy become impaired, even to the extent of the one-thousandth part of a grain, the result of the analysis would be seriously affected; for it must be remembered that the assayer has, from a piece of gold weighing originally 7½ grains, to determine the value of a deposit worth, perhaps, \$100,000.

Two pieces were, it will be remembered, taken from the metal after it had been melted. Each of these pieces is assayed separately, and the results must, of course, agree. If they should not do so, it is evident that a mistake must have occurred somewhere, and the whole process has to be repeated.

The assaying of silver is a much more simple process than that of gold. Chlorine and silver combine in definite proportions, forming chloride of silver. Upon this fact the process is based. A small quantity of granulated silver, taken from the crucible in the melting room, is dissolved in nitric acid. The quantity of silver is estimated, so that at least one gramme of pure silver shall be contained in the solution. A standard solution of salt, one hundred grammes of which will precipitate just one gramme of pure silver—not an atom more or less—is added to the nitrate of silver, and thoroughly mixed with it. The result is a precipitate of chloride of silver. One gramme of a solution of salt, one-tenth of the strength of that first used, is next introduced. If silver is still present in the liquid a cloud is formed, the density of which enables the assayer to determine approximately the quantity of silver remaining in solution. He then adds a sufficient quantity of the weak solution to precipitate all the silver that remains in the liquid. When the assay is completed, by a table of computations the precise amount of pure silver in the specimen is determined, and, by a simple arithmetical computation, the value of the deposit is determined. This process is so accurate that one-twentieth of one-thousandth part in fineness can be indicated.

As soon as the assays are completed, the assayer reports to the Treasurer, and on this report, after a careful calculation of value, and deduction of charges, the depositor is paid. If he desires to receive gold coin, one half of one per cent is charged. For gold bars, which are handier for shipment, he has to pay six cents for \$100. For every ounce of pure gold which his deposit has yielded, he receives \$20.67 2-10, less the charges stated above. Depositors of silver receive payment in silver coin at the rate of \$1.22½ per standard ounce. Brittle metal has, however, to be toughened, for which there is an extra charge. The private assayers of California, before the establishment of a government assay office there, used to make no charge for the assay, taking their pay out of the drippings from the crucible. The government assayers account for the entire weight of the deposit.

The depositor having received the full value of his deposit, the latter of course becomes the property of the government, and the gold, which always contains more or less silver, now has to undergo a process called "parting", before it is sent to the mint, or used in any way for commercial purposes. In parting silver from gold, enough silver is added to make the proportion about two parts in weight of silver to one of gold. Instead of invariably adding two parts of silver to one of gold, only sufficient silver is added to make the proportions above stated. There is thus a saving of about 30 per cent., and last year the sum of \$22,000 was saved. The mixture of gold and silver is next melted, thoroughly mixed, and poured into water, by which it is granulated. The granules are placed in porcelain jars containing nitric acid. Heat is then applied, and as the acid

boils, the yellow fumes which our readers have doubtless so often seen proceeding from the chimney of the assay office, are given off. This process goes on for about six or eight hours, when the jars are emptied, and in the bottom is found a brown substance resembling mud or anything else upon earth rather than "gold—glittering gold." It is in fact, however, pure gold, or at least nearly so. The silver has been dissolved by the nitric acid, and is in solution. It is carefully put aside for future treatment, for in the assay office nothing must be lost or wasted. The brown substance found at the bottom of the jars is placed in large wooden tubs and washed by percolation of warm water until all traces of acid have disappeared, and it is said to be "sweet." The gold is then of 940 thousandths fineness. Formerly it was subjected to a second boiling in nitric acid, which left it about 993-1000 fineness, but by the process at present in vogue it is treated with sulphuric acid, by which a fineness of 998-1000 is attained. This is termed pure gold, although it is not actually so, but to deprive it of the two parts of alloy it now contains would involve an expenditure of time, money and trouble, altogether useless. After its treatment with sulphuric acid, the gold, which still looks more like red mud, than a precious metal, is again washed until "sweet." It has now a reddish yellow hue. After being dried, it is taken to a hydraulic press, where it is made into "cheeses," so called from the color and shape. The cheese made in the assay office is far richer than the most fertile vales of Gloucester ever produced. Each "cheese" is but 13 inches in diameter, but it is worth about \$20,000. These cheeses are baked in an oven heated by steam until all remaining moisture is expelled, when they are re-melted, cast into bars or bricks, assayed and stamped with the weight, fineness and value.

The reader will remember that the nitric acid poured over the gold and silver granules, in the porcelain jars, and now containing a large quantity of silver in solution, has yet to be disposed of. A solution of chloride of sodium—common salt—is first added to the solution, and a deposit of white flakes is the result; this is chloride of silver. The next process is to free the silver from the chlorine, and this is done by placing it in vats with granules of zinc and a little sulphuric acid, to acidulate the water that is present. The chlorine and zinc readily combine and are dissolved in the acidulated water, and the silver is set free in the form of a light gray powder. This, like the gold, is washed, pressed and formed into "cheeses" worth \$800 each. These are melted and made into bars, which are stamped and ready to be disposed of as occasion may require. The silver obtained by the above process contains but one part of alloy in 1,000. Some silver is so pure that it requires no "parting," and, after being assayed, is sent at once to the mint.—*American Journal of Mining.*

MINING ON LAKE SUPERIOR.—Of the thirty-seven copper mines working on the south shore of Lake Superior during 1867, only two paid a dividend. The assessments were \$2,335,000; dividends paid, \$110,000. But taking into consideration the unusually low prices of copper, it will be more fair to give the total results of copper mining on the south shore of Lake Superior from its commencement in 1845 to the close of the year 1867, viz:

Assessments on 112 mines, 1845 to 1867	\$16,250,500
Dividends paid on 8 mines, 1845 to 1867	2,980,000

Excess of assessments over dividends.....\$10,270,500

Eight mines pay dividends out of one hundred and twelve that have been worked. Would it not be very hard even if the receivers of the above dividends, after risking their capital so liberally in opening a new country, should be compelled to pay royalties, but how much harder for those who have \$10,270,500 giving no return; if they had to levy more assessments every year in order to pay the Government tithes, of course they would not pay very long, for they would stop the mines.

It may be said these are the figures of copper

mining, and no royalty has yet been imposed on copper, but on gold and silver alone; still, this only adds more weight to the above figures; for it is well known, "take the world over," that money invested in copper mining gives a better return than money employed in working silver mines, and money invested in mining for silver gives a better return than it would if employed in working gold mines.

NEW MINING ENTERPRISE.—We are informed that a new iron mining association has recently been organized. This company has acquired valuable mining grounds on the River Betsiamites, and have been some time in negotiation with some well-known capitalists. They hope to be in operation early this summer. We learn also that this enterprise has originated in Quebec, and that the following gentlemen are among the shareholders: J. Langlois, Esq.; L. J. C. Fiset, Esq.; Gilbert LaRue, Esq.; Dr. F. H. A. LaRue; Elzear Fiset; Dr. A. G. Belleau; E. Angers, Esq.; O. Leduc, Esq.; Ed. R. Fréchette, Esq.; Ed. Remillard, Esq., from Quebec. L. N. Gauvreau, Esq.; G. A. Doucet, Esq.; D. Dumais, Esq.; A. Rouleau, Esq.; Felix Rouleau, Esq., from Isle Verte.

MOISIE RIVER IRON MINE.—The Quebec papers say that the steamer *Margaretta Steenson*, Capt. Hammond, arrived Thursday last at the old capital from the Moisie river with many passengers and a cargo of iron and ore. They say that the American Navy Department purchased 300 tons of iron at \$116 per ton, which would tend to prove that the working of that deposit will be highly remunerative. More than 500 persons wintered there. That little colony, with less than one year's existence, flourishes quite encouragingly. It has a church and a priest, a hotel and about 30 dwellings.

—Marble has been discovered near Sherbrooke said to be of as good quality as the famous Rutland marble. The quarry has been purchased by Mr. Orin Webster, of Compton, who is organizing a company to work it. It contains statuary marble, valued at \$10 a foot.

P. O. SAVINGS BANK.—The Post Office Savings Bank scheme is succeeding admirably. About \$19,000 were received during the first four days after the act went into operation. During the week ended 11th inst., \$44,000 more were deposited; and last week a still larger amount, the aggregate deposit in all now reaching, if it does not exceed, \$50,000. A tenth of this amount was deposited in Quebec city on one day. By the end of the year from six to eight hundred thousand dollars will probably be deposited. As fast as the money is paid in it is turned over to the credit of the Receiver General.

PAPER BOXES.—Mr. Richard Smith of this town has taken out a patent for making paper boxes from paper pulp, which will save the labor and waste of material in cutting, pasting, and making up boxes from paste-board. The cost of manufacturing boxes under this patent, it is said, will scarcely equal the first cost of the material when made in the ordinary way. They are formed in a metallic mould under heavy pressure, and come out smooth, and stronger and more perfect in size and shape than can be made any other way. When we consider the immense number of paper boxes now manufactured to hold envelopes, collars, hats, bonnets, and fancy articles without number, some idea may be formed of the importance and value of this invention. The manufacture of match boxes alone in connection with Messrs. Beckett's Match Factory in Sherbrooke, consumes annually about seventeen tons of paper for the small boxes, in addition to which about 200,000 quarter gross boxes made of wood are required yearly. All these boxes can be economically made from paper pulp under Mr. Smith's patent.

We understand it is proposed to form a joint stock company to carry on the business of manufacturing boxes on an extensive scale in Sherbrooke, if sufficient interest is manifested by our towns men to furnish the necessary capital. It is estimated that the factory will give employment to about 100 hands, principally unskilled.—*Sherbrooke Gazette.*