

tion, while that which presents specks and grains, or, in miners' phrase, "colors" of gold, will sometimes prove too poor to pay working expenses.

As the gold forms a very small proportion, either as to weight or bulk, of the mass of matter through which it is diffused, the obvious mode of obtaining it in a commercial form is concentration—that is, getting rid of the baser matter, and bringing the particles of gold together, so that they may be melted and run into a solid form. There are two stages of concentration; first, that which selects the paying ore from the dead matter, and, second, that which separates the gold from its immediate matrix. The first is done at the mine, and saves the expense of hauling and crushing that which gives no return; the second consists in reducing the ore to such a state of division as to release the particles of gold from the gangue in which they are mechanically held. This is effected by grinding or crushing, and apparatus employed in different countries are the arrastra, the Chilean mill, rollers, and the stamp-mill. Experience has proved the last-named to be the most effective and beneficial, and as it is generally used in our mines, we shall conclude this article with a concise description of its action.

The ore being first broken to the size of road-metal, is fed to the stamp-box, through which a slender stream of water is made to flow, and submitted to the action of the stamps, which reduce it to a powder sufficiently fine to pass through a screen or wire-cloth, or perforated metal, which extends along the aperture in front of the mortar. From this it is received on to a wooden shoot, lined with sheet copper, to the surface of which a film of mercury is made to adhere by chemical means, and which instantly seizes upon the small particles of gold that come in contact with it, and converts them into an amalgam.

Thence the pulp passes into a large iron pan, provided with a grinding apparatus, by the action of which it is reduced to a greater degree of fineness; from this it is conducted through a series of wooden spouts, furnished with trap boxes containing a portion of mercury, and lined (the spouts) with strips of coarse woollen fabric, or of the skins of animals with the hair on, which intercept the heavier matter, and allow the lighter particles to pass off along with the water. These "blankets" are taken out at intervals, and washed in a vat of water, in which they deposit the substances they have collected. From the shoots the slimes should be made to pass over a shaking-table having three or four "rifles," lined with amalgamated copper, which will retain any particles of mer-

cury or amalgam that might escape from the blankets and traps.

When a sufficient quantity has been operated upon, the concentrated "sands" are transferred to the amalgamating pan, with a charge of from sixty to one hundred pounds of mercury, and ground up together for several hours, after which the slimes are washed off, the mercury from the pan and that from the traps strained through chamois leather, and the resulting amalgam, together with that scraped from the copper-lined trough and shaking-table, put into a retort with a long beak, and placed in a furnace, the mercury distilled over and received in a vessel of water, the crude gold from the retort put into a crucible with a little borax and nitre, melted, cast into a bar, and the process is finished. The sulphurets, if they still contain a sufficient modicum of gold, are preserved for future treatment, either by being roasted in a proper furnace, or submitted to the slower, but equally effective process of atmospheric decomposition, after which the gold they contain is extracted by amalgamation with mercury, as above described.

#### STORMS AND STORM SIGNALS.

At some time during every autumn, these inland lakes are swept with one or more terrible storms of such violence as to dash the shipping about like pieces of drift-wood. Vessels are hurled helplessly upon the coast, and often shattered to destruction; their sails and rigging are torn away, and loss of life is a common incident of these annual disasters. In 1869, 231 vessels, valued at \$2,621,500, were lost on the great lakes, and, more serious than all, no less than 500 lives were sacrificed. This is a startling record, and it is time that some measures were adopted to lessen, if possible, this wholesale destruction of property, and arrest this grim carnival of death.

There can be no doubt that a thoroughly organized and correctly worked system of storm-signals would tend powerfully to the accomplishment of that desirable end. The effect would be that masters and owners of vessels would be apprized of the approach of storms, and would therefore remain in a port of safety, when otherwise, in the absence of such information they would enter upon their voyage, and perhaps encounter a violent storm when only a few hours out of port. The nature of the arrangement by which this information is obtained and transmitted is well indicated in a resolution adopted by the United States Congress in February last, and which is now law. It is in these terms:

"Be it resolved, &c., That the secretary of war be and he is hereby authorised and

required to provide for taking meteorological observations at the military stations in the interior of the continent, and at other points in the states and territories of the United States, and for giving notice on the northern lakes and on the sea-coast, by magnetic telegraph and marine signals, of the approach and force of storms."

This action of Congress has been supplemented by an arrangement with the Western Union Telegraph Company, for transmitting the signals with promptness and regularity. Observations will be made at each of the points named below and transmitted to Washington by telegraph, and interchanged with all the different stations. The observations will be taken three times a day, at about 8 a. m., 6 p. m., and one at midnight. The instruments used will be the barometer, the thermometer, the hygrometer, the anemometer and the rain gauge, and the information given will be the state of the barometer, the thermometer, the temperature, the direction and force of winds, the amount of rain, as well as all the local premonitory symptoms of storms and changes of weather.

The following points have been selected as posts of observation for the present, though it is expected the lists will be greatly enlarged: Plaister Cove, N. S.; St. John, N. B.; Portland, Me.; Boston, Mass.; New Haven, Conn.; New York city, N. Y.; Philadelphia, Pa.; Baltimore, Md.; Washington, D. C.; Wilmington, N. C.; Charlestown, S. C.; Augusta, Ga.; Savannah, Ga.; Lake City, Fla.; Key West, Fla.; Montgomery, Ala.; Mobile, Ala.; New Orleans, La.; Jackson, Miss.; Memphis, Tenn.; Nashville, Tenn.; Albany, N. Y.; Syracuse, N. Y.; Rochester, N. Y.; Oswego, N. Y.; Buffalo, N. Y.; Cleveland, Ohio; Toledo, Ohio; Detroit, Mich.; Chicago, Ill.; Indianapolis, Ind.; St. Louis, Mo.; Milwaukee, Wis.; St. Paul, Minn.; Duluth, Minn.; Omaha, Nebraska; Cheyenne, Dakota; Corinne, Utah; Santa Fe, New Mexico; Fort Benton, New Mexico; San Francisco, California.

It is intended to give the widest publicity to the reports obtained in order to make them useful to the greatest number. Copies of all reports will be furnished to the several daily papers for publication, and will be bulletined in the board of trade rooms, merchants' exchanges and other conspicuous places, immediately on their receipt. The beneficial operation of this system can be soon seen and can be readily calculated. It is not expected, however, that everything will work smoothly and perfectly at first, but there is good reason to hope for tangible results, which we hope will be seen in the record of marine casualties in 1871.

There is no novelty about the system of synchronous weather reports. They were adopted first in England, in February, 1861,