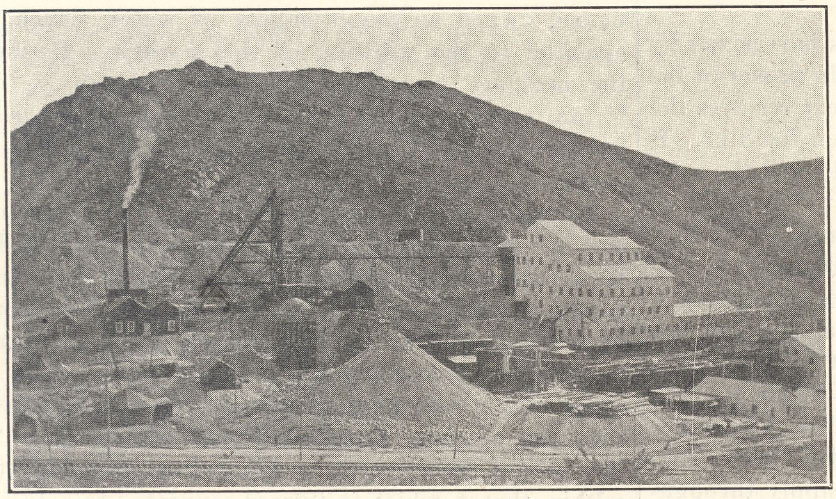
Montgomery-Shoshone Mine.

Written for the MINING AND SCIENTIFIC PRESS
By A. H. MARTIN.

The mines and mill of the Montgomery-Shoshone Consolidated Mines Co. are located in the Bullfrog district, Nevada, a short distance from the town of Rhyolite, the main commercial point of the district. The company owns a large tract of mineralized land comprising the original properties of the Montgomery-Shoshone, Shoshone Polaris, and Crystal Bullfrog companies. In addition the company also owns two mill-sites embracing 10 acres, water-rights with a flow of 500,000 gal. per day, and 500 acres of fertile farm land in Oasis valley. The mill, water-rights, and pipe-line are controlled by the Bullfrog Reduction & Power Co., a subsidiary corporation. The capitalization is for 500,000 shares of a par value of $5 each.

The most prominent and extensively developed mine of the company is the original Montgomery-Shoshone. This property was located in 1904 by E. A. Montgomery, and the property was opened by driving a cross-cut tunnel. The original discovery of ore was made by A. James, who received $10,000 as a reward from Montgomery. The cross-cut opened an immense body of talcose ore early in 1905. In 1906 the consolidation of this mine with the Shoshone Polaris and the Crystal Bullfrog was effected by Charles M. Schwab, the New York steel king. The deep development of the mine and the erection of the reduction works commenced almost immediately. As the company's treasury did not contain sufficient funds, sufficient capital for the construction of the mill was advanced by Mr. Schwab, the amount being about $300,000. This debt has been largely paid off and the company is rapidly approaching the period when dividends should be declared.



Montgomery-Shoshone Mine and Mill.

The formation is rhyolitic, with a huge fault-dike of basalt cutting into the rhyolite and breaking the formation badly. The ore occurs principally in the talcose formation lying south of the basalt fault. Cutting across the property is a hugh zone of crushed ore irregularly traversed by seams of quartz and ore-laden talc. The ore-zone has been opened in the centre of the glory hole for a width of 250 ft., but its length remains undetermined. In the glory hole the ore is quarried and shipped direct to the mill. Development and breaking costs are kept low, while the ore will average about $8 per ton. The glory hole is the principal source of production at the present time, with systematic development constantly augmenting the extent of the wonderful deposit.

The Montgomery-Shoshone shaft is north of the glory hole and has been sunk to a depth of 700 ft. It is triple-compartment, and has opened excellent bodies of rich talcose ore at several levels. At the 600-ft. point a heavy flow of water was encountered, while the talc shows a large percentage of sulphides. Levels have been run from several points and extensive orebodies intersected. The shaft is equipped with a Hendrie & Bolthoff double-drum geared hoisting engine with 12-in. cylinders and 16-in. stroke. A speed of 600 ft. per minute is generated, and with single cages 300 tons of ore are handled every 16 hours. A Chicago Pneumatic Co. compressor operates ten 3-in. drills. Two 100-hp. Heine water-tube boilers, using oil for fuel, furnish the steam for the compressor. The mill is operated throughout by electricity taken from the wires of the Nevada-California Power Co., the company contracting to furnish 300 hp. per day for a period of five years.

South of the glory hole the formation is less irregular, and a series of promising parallel southerly veins has been demonstrated to a considerable extent. These have been cut at varying depths, and are among the richest yet opened by the company. Farther west the Polaris fissure-vein has been demonstrated to a limited extent by a shaft. Considerable ore of fair grade is exposed. It is conservatively estimated that ore to the value of $1,000,000 is blocked in the various workings of the Montgomery-Shoshone mine proper, while systematic developments are adding to the estimated reserve. It is estimated that the developed ore will average $10 to $11 per ton. The company is directing particular attention to the development of the orebodies opened in the shaft, and to the enlargement of the glory hole, where the ore is exceptionally good. Later on the deposits of the Crystal Bullfrog and Polaris claims will be given more attention. About 100 men are employed.

The ore is received from the mine by two 13 by 24-in. Blake jaw crushers and reduced to a maximum size of 1½ in. It is then elevated to a storage bin commanding a set of 14 by 42 Traylor rolls, crushing through a ½-in. punched steel screen. The undersize passes to a second row of rolls of the same size and type, and the oversize is returned to the first battery for re-grinding. From the second rolls the reject returns to the first line for further reduction, while the undersize, reduced to 6-mesh, passes to the fine-grinding department. This consists of a battery of fine-grinding Traylor rolls and two Chilean mills. About 75 tons of material are handled every 24 hours, all the ore having to pass a 40-mesh Tyler double-crimped screen. Crushing is performed in cyanide solution and has proved quite satisfactory. From the re-grinding department the pulp passes to two Dorr classifiers dividing the product into concentrate, sand, and slime. The concentrate is delivered to a 4 by 9-ft. Allis-Chalmers tube-mill and treated for 24 hr. It is then discharged into five 12 by 16-ft. cone-tanks and kept in constant agitation by compressed air fed through an ordinary ½-in. pipe. This method has proved particularly effective. The extraction ranges from 97 to 99.57%. After passing from the two Dorr classifiers, the sand is received by seven Wilfley tables and delivered to a series of sand-collecting tanks. From these it is elevated to the strong-solution tanks by a Blaisdell excavator, Robins belt-conveyor, and Blaisdell distributor. The sand is kept in action four days, sufficient cyanide being added to the solution to make it sufficiently strong. The pulp next passes to the weak-solution tanks, where it remains six days.

The slime from the Dorr classifiers is received by 10 Frue vanners. From these the pulp passes to the collecting tanks. A Trent agitator next receives the pulp and keeps it in constant agitation for 8 hr. It is then transferred to the settling tanks and the solution decanted. It is now delivered to the filtering department. This contains two presses of 50 Butters leaves each, and one press of 40 Blaisdell leaves. The final solution is delivered to 10 zinc precipitating boxes, constructed of iron. The usual zinc precipitating process is used. The extraction runs from 89 to 90%. Milling costs are about $2.25 per ton, and efforts are being made to reduce this. The water is received through a 14-in. pipe-line from Goss Spring, which furnishes a constant supply throughout the year. The ore assays about 1 oz. gold to 12 silver, while the capacity of the mill is about 200 tons per day. The total costs of mining, developing, and milling are kept down to about $5 per ton, and late reports of the management indicate that the company is earning profits at the rate of $226,000 per year.

The mill was designed and installed by the Traylor Engineering Co. The gold-silver bullion is shipped by express from Rhyolite. A spur of the Las Vegas & Tonopah railroad connects the mine with Rhyolite, the line going direct to the ore-bins and mill warehouses. Supplies are accordingly handled at low cost. Timber is somewhat scarce, but the excellent transportation facilities enable this and other supplies to be brought in at comparatively low rates. John G. Kirchen is general manager of the property and E. M. Kirchen superintendent of the mill.

Rapid advancement of the large gas-engine was made possible by improvements in the production of cheap gas directly from fuel by means of the gas producer. A few scattered producer-gas plants were installed for power production in the United States before 1900, but the application of engines of this type to the production of power in any general sense has been developed since that date.

Stacker for Hydraulicking.

Written for the MINING AND SCIENTIFIC PRESS
By SUMNER S. SMITH.

In hydraulic mining one of the largest problems is the disposal of the tailing. In many situations there is not sufficient room to handle it by gravity, and some form of stacker must be introduced. Hydraulicking, where at all available, is such a cheap and successful method of work that stackers capable of handling the coarse material at low cost are much to be desired. W. R. Heslewood, of the Big Creek and Chanchula Placer Mining companies, operating in Hayfork valley, Trinity county, California, has devised one which is admirably suited to a number of such situations. While the general principle of the machine is old, credit for the device as a whole should be given to him. The form of stacker shown in Fig. 1 was designed to handle gravel from creek-bed where there was a heavy seepage and no other way to dispose of the tailing. The companies named owned an ample supply of water, which is essential to the working of the machine. Besides the ordinary hydraulic equipment, enough ⅛ or $^{3}/_{16}$-in. sheet iron for an elevator, ⅜-in. sheet iron for liners, and ⅜ by 2½-in. strap-iron for riffles is necessary.

To install the apparatus a site near the centre of one end of the channel is selected and a space of 30 ft. across washed clear to bedrock by one of the giants, an auxiliary lift keeping the pit free from any excess of water. A 3-ft. sump is dug in the bedrock to accommodate a hydraulic elevator. This is fitted with a ball joint to prevent the constant jarring and settling, throwing it out of line, Fig. 2. The bell of the elevator is 30 in. diam., tapering to a 12-in. throat, which in turn is connected to a 15-in. pipe with a reverse taper. The nozzle is of the ordinary 5-in. giant type. Working with a 90-ft. head the machine elevated the seepage, fine, and the water from two field giants 16 ft. vertically. The bell of the elevator is constructed of the ordinary hydraulic-pipe iron with ¼-in. liners riveted in position. These last for a season's run and occasion little trouble. The elevator thus constructed is so light that four men can carry it.

To stack the tailing a chute was built at right angles to the line of the elevator and sloping upward at an angle of 30°. It is 4 ft. wide, 24 ft. long, and constructed of 1¼-in. plank on a frame of 4 by 4-in. pieces which rest on 6 by 6-in. sills. The lower portion of the sides is lined with 1¼-in. plank spiked in position. In each corner and in the centre is a 2 by 4-in. stringer on edge, Fig. 2, on which the riffles rest. These are also made of 2 by 4-in. pieces spaced 2 in. apart and beveled off so as to give a drop of 2½ in. between. They are covered with ⅜-in. strap-iron 2½ in. wide. The grizzly, Fig. 3, and side-boards or wings, not shown, were then built over the elevator, and a 3-in. drive giant set up 20 ft. in front of the chute. Just back of the nozzle at a convenient point a gate-valve was placed that connected with an auxiliary lift that kept the pit free from water when the elevator stopped. Two 4-in.