

development work and the opening up of brighter prospects for the future than this property has seen for years. On the 2,200-foot level important developments have taken place. Here the quantity of the copper ore has greatly improved. The shipping product which is being taken from this level carries from 6 to 7 per cent of the red metal, and the deposit is of liberal dimensions.

Early in the year the force at the mine was increased considerably and by July production has risen to two cars or 100 tons per day. In consequence, it was felt by Mr. Loose and associates that improved mining facilities would greatly enhance the production and the profits. On the adjoining Gold Chain property an electrical hoist and machinery was proving a great economy, and it was decided to electrically equip the Grand Central and prepare it for a new era of production. Facing a most promising future, this property after several years of severe reversals, is getting ready to enter its old class, and who knows but what it will be able to duplicate its dividend record of \$1,560,000.

The Grand Central Mining company was incorporated in February, 1902, under the laws of Colorado. The first capitalization was \$250,000 and this was increased in 1909 to \$600,000—600,000 shares at a par value of \$1 per share. Of the increased capitalization 250,000 shares was given to the stockholders as a stock dividend.

The company has an immense amount of low grade silver, lead and copper ore, which with present prices is now becoming available for shipment at a good profit. It is declared that there is 1,000,000 tons of this low grade ore in the mine.

The mine is located one mile from the railroad and consists of fifteen patented claims. Its ore consists of silver, lead, copper and gold.

Great credit for the successful showing of the Grand Central is due to Colonel C. E. Loose of Provo, general manager of the company, whose strong belief in the property has been sufficient to pull it through every crisis when others were discouraged.

A quickened campaign to make a dividend paying mine out of the Gold Chain property in Tintic, with better results and a bigger production of ore than the property has seen for several years, is one effect of the increased mining activity of 1916.

During the first nine months of 1916 the Gold Chain produced 177 cars or 8,850 tons of ore as compared with ninety-nine cars or 4,950 tons for eleven months of last year. Copper values, predominated. Since this report the production has shown an increase, running around four and five cars per week. Reports have been current for some time that the Gold Chain interests have accumulated quite a surplus and that they contemplate a dividend before the end of the year. It is said that if no dividend is paid the company will be in possession of the biggest surplus it has had for years and in shape to conduct developments on a larger scale than ever.

Developments have been steadily pushed from the 1,500-foot level of the Mammoth mine into the adjacent workings in the Gold Chain, and in the 1,500-foot level of the Gold Chain, on the various levels between the 200 and 700-foot levels, southward through the Ophongo ground held under lease by the Gold Chain people into an entirely new part of the Gold Chain territory, and most of these explorations have developed ore.

A marked improvement was encountered in the character of the ore, particularly that coming from the 1,500 and the 1,550 levels.

The company has disbursed \$130,000 in dividends since it was organized in December, 1910, with a capitalization of \$250,000, with shares of a par value of 25 cents. The company absorbed the Ajax Mining company, which is said to have paid upwards of \$1,000,000 in dividends.

The property includes the Gold Chain group and the Ajax mine in the Tintic district. The average grade of ore is 5 to 7 per cent copper, 8 to 10 ounces in silver and \$2 to \$3 in gold.

The property is well equipped and has one of the best shafts in the district. The mine buildings are up-to-date with all the best equipment. C. E. Loose is president and general manager of the company. The other officers are: J. T. Farner, vice-president; Preston G. Peterson, secretary and treasurer; W. D. Loose, superintendent.

One of the most interesting enterprises in the Tintic district is the operations of Mr. Loose and associates on the Sioux Consolidated. After paying more than \$875,000 in dividends this property closed down several years ago. Most of the ore from which these dividends were paid was taken from the Phoebe S. claim, which is wedged in between the Iron Blossom and Colorado holdings. The claim carried the Colorado-Iron Blossom claim its full width of about 600 feet. The existence of this well known bonanza lode on this ground and the fact that here it has already produced in profits well up toward a million dollars has added zest to the operations that were started here about the middle of the year.

A further stimulus has been added to the project by the discovery of a notable body of copper ore in the Iron Blossom making straight for the adjoining Sioux ground.

The old Sioux workings were from a 600-foot shaft. From this level a crosscut has been made this year 200 feet in the direction of the Iron Blossom orebody where a winze is now being sunk. Contracts have also been let to sink the shaft from the 600 level to the 1,000-foot level. On the 600-foot level are large deposits of low grade copper ore. So regularly do the orebodies in the Iron Blossom rake downward into the Sioux ground that the management believes it has figured the points where the orebodies will be encountered with almost mathematical certainty.

In the meantime, the old Sioux workings which gave up the above named dividends have not been idle. Leasers have been busy here mining and shipping. The record of production has been steady. Notable among the leases is the one operated by W. D. Loose and Frank Rozelle. This lease has maintained steady shipments throughout the greater part of the year.

The Sioux Consolidated under the efficient management of C. E. Loose, is prepared to conduct an extensive campaign of development. It has for this purpose in its treasury \$23,000.

The Big Indian copper property, near Moab, Grand county, Utah, upon which the C. E. Loose interests are basing one of their largest mining projects, made a distinct advance toward this goal during the year. This property, which is said to disclose a mountain of low grade copper ore, in condition to be mined on a gigantic scale with steam shovels, has been kept year after year from its own, by distance from railroads and inaccessibility.

The man who has furnished the idea that has started it on the road to activity is Nels C. Christensen, who in connection with Harry J. Morgan, recently perfected in the metallurgical research department of the University of Utah, a process for the extraction of metal from low grade oxidized copper ores.

Following his discovery, Mr. Christensen conducted an examination of conditions at the Big Indian and later began installing a mill embodying his process at the property. The plant will have a capacity of 300 tons daily, and if successful, will undoubtedly be the prelude to a much bigger plant and one of the biggest mining and extraction enterprises in the state of Utah.

In describing the process which has made the process of mining these low grade ores possible, Mr. Christensen says:

"The process provides for the dissolving of

the copper contents of the ore through the agency of a solution of sulphur dioxide. The metallic values freed from the waste rock are thrown out of the solution when the sulphur dioxide gas is driven off as the sulphur is heated."

The 300-ton plant is now in process of installation and it is believed that in a short time mining and milling operations will start on a substantial scale.

All who have seen the Big Indian mine say it is a low grade wonder. The copper values are extensively disseminated through almost mountainous masses of sandstone. A profitable process of extraction will undoubtedly open up one of the biggest mines in the state. The property covers a large scope of country, affording all the elements of a truly stupendous mining enterprise.

The property lies south of the La Sal mountains on the rocky, desert mesa, but all the facilities for extracting the red metal by the proposed process are present.

Mr. Christensen says that in the region in which the Big Indian is located are some of the best low grade ore fields in the state, and that he expects his 300-ton plant to pay for itself in a very short time and make money for its owners.

The Big Indian property is over sixty miles from the railroad. This distance would prohibit most of the older processes of milling and shipping at a profit. It seems therefore, that this latest process of extracting the metal itself at a very low cost from the ore is just the key that is needed to unlock the rich, new and inaccessible regions of which it is the center. Mr. Loose who sized up just such developments and possibilities as these long ago and rounded out and held this truly big property in expectation for years, cannot be given too much credit.

#### VAHRENKAMP PROPERTIES

**B**OTH Utah and Idaho have profited and will profit still more we predict from the activities of Fred H. Vahrenkamp, president and manager of the Boston Development company, who has recently taken over the direction of the Empire Copper and Copper Basin properties near Mackay, Idaho.

It has been his experience that many of the so-called "worked out" mines of the west need only the application of scientific methods and accurate geological knowledge to repeat, or even outdo, their earlier successes. He has demonstrated the soundness of this conviction in Utah by restoring the famous old Maxfield mine in Big Cottonwood canyon to the list of live ones and he is brushing up the two Idaho mines so that they look like new.

Everyone in Salt Lake who has frequented the canyons in the summer time knows the Mexfield. Before automobiles came into general use it was customary to stop there on the road to Brighton and water the team at the old horse trough beside the road. The ancient boarding house was vacant the greater part of the time.

A long dump on the south side of the road testified to the vast amount of work done in former years in the underground workings.

If one happened to fall in with an old Big Cottonwood prospector he could hear wonderful stories of the bustle and activity which formerly characterized this place in the canyon and of the great tonnage of rich ore that used to pour from the mouth of the tunnel, but the recital of departed glories carried no word of hope for the future. Miners had been trying for years to make leases pay, the narrator would explain, ore would be found and all would go well until the mineral was followed down below the level of the tunnel. Then the water would come into the winze or incline and submerge the ore.

In more specific detail the history of the property was as follows: