

The Wealth Producing Smelters of the Salt Lake Valley

At the great smelting plants of the Utah Consolidated, American Smelting & Refining, United States and Bingham Copper & Gold, at Murray and Bingham Junction, the reduction of ore from this and adjoining states has gone forward under higher tension than ever before in the history of the industry in this commonwealth. Through this avenue the wealth of the world at the close of another anniversary has been increased by about \$20,000,000.

Here in the Salt Lake valley, the public has witnessed the very unusual spectacle of the smelting companies calling out to the producers—enough.

Equipment Inadequate.

The development of the mines during the past two years has been so rapid that the owners of the reduction works found themselves with equipment utterly inadequate to take care of the demands made upon them by the producers of the camps tributary to Utah's capital city. While the smelting companies have built additions to their plants and have added much new equipment, they are still unable to relieve the congestion that has been brought about through this unusual condition—of too much ore.

Producers Asked to Curtail.

The American Smelting & Refining company, some time ago, asked its patrons to curtail their output for a time—until the management might get a fresh breathing spell, and until a part of the great tonnage of silicious ores from the camps of Nevada, which had been piled up in almost every conceivable spot around the Murray plant, could be run through the furnaces. The producers of Goldfield and Tonopah have probably suffered the greatest inconvenience and had it not been for this condition, the output of those camps would have been much greater than the year will record. But the American will be in a position to take care of its clientele as soon as the new plant at Goldfield goes into commission early in the coming year.

U. S. Has Expanded.

The United States Smelting company has managed to take care of its patrons in a quite satisfactory manner. This company has made rapid strides during the past few years, and has grown to be a formidable competitor of the American; not only in the smelting of gold, silver, lead and copper ores, but also in the refining of the metals. During the present year it engaged in lead smelting. It now has three lead furnaces in commission, and three others are being installed. At the copper smelter six furnaces are working, and another will soon be added. In addition to 10 roasters and one reverberatory furnace.

United States Bullion Record.

The following is taken from the last report of Managing Director A. F. Holden to the stockholders of that corporation:

"During the year from October 1, 1904, to October 1, 1905, the smelter produced 71,445 ounces of gold, 2,107,556 ounces of silver, 14,965,488 pounds of copper, and 10,200,126 pounds of lead, with a total value of approximately \$5,300,000. Much improvement has been made in controlling our dust losses, thus eliminating a large factor in the so-called smoke trouble in Salt Lake valley. The large supply of custom ores that we are receiving will oblige us to build a third sampling mill.

"The Mammoth mine which has been purchased since the last report, is situated in Shasta county, near Kennett, Cal. As soon as we obtained possession of the mine we at once commenced opening the ore body and prospecting. The mine has developed splendidly, and we can count on a good life for the property. The ore is a copper-iron sulphide. A three-stack smelter, with a capacity of 600 tons a day, has been built, and has begun its initial run. We hope it will be working smoothly by Jan. 1 next. The outlook at the Mammoth mine is exceedingly promising, and I have every reason to anticipate a very profitable run at this plant the coming year.

"Since the last report your company has purchased the control of the De Lamar Refinery at Chrome, N. J. The refinery is in a thorough state of efficiency and doing excellent work. Its capacity is now being increased to 120,000 pounds per year. The work on this addition is well under way.

"In general your properties are in first class condition and are showing up extremely well. The ore developed during the year has more than equalled the amount drawn from the mines. The smelting operations are in a very satisfactory condition, and the ore supply is adequate."

Utah Consolidated Plant.

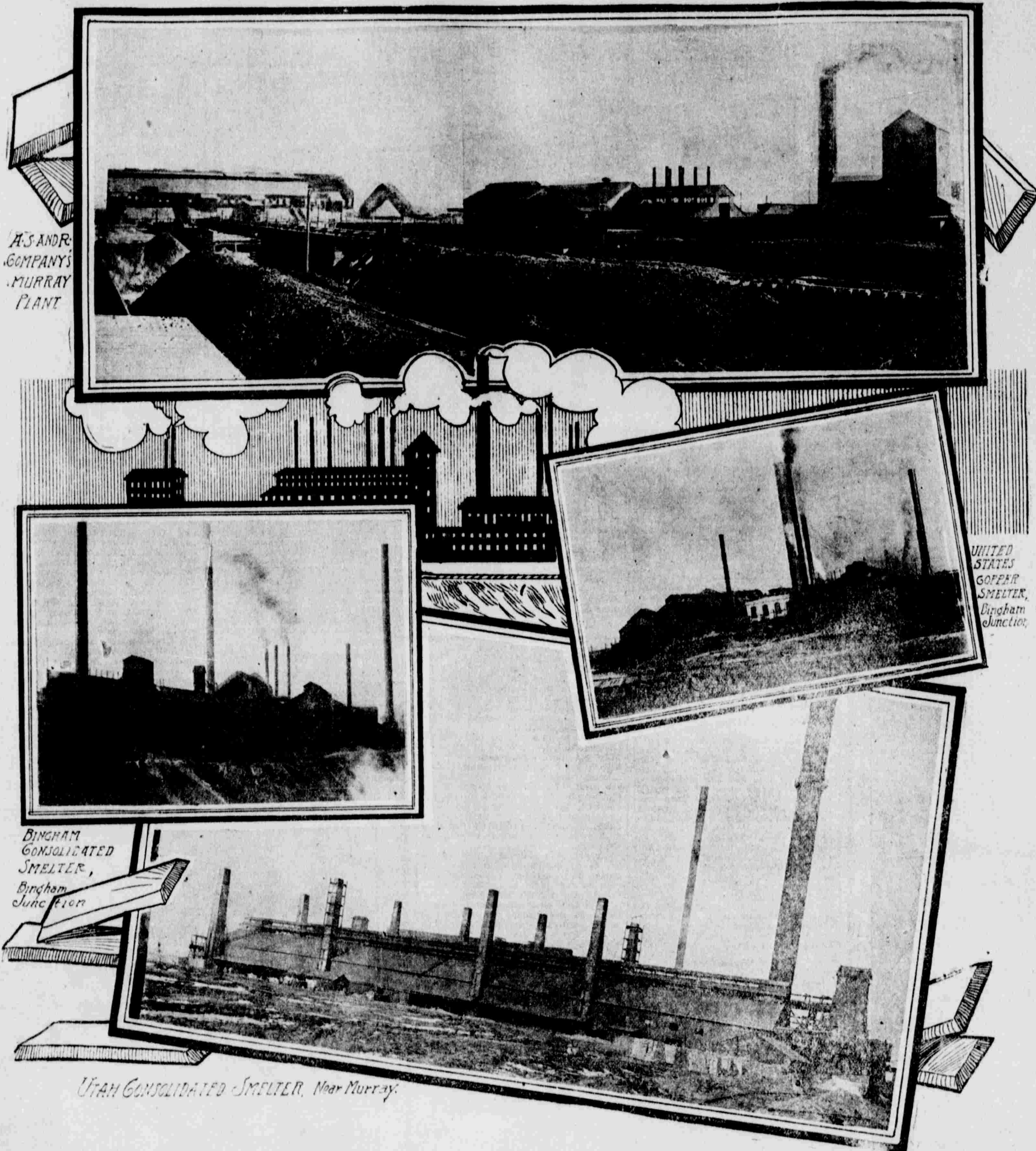
The Utah Consolidated Mining company operates its smelter near Murray, Utah, and in this plant only the ores of the company's mine at Bingham are treated.

The Utah Consolidated was the first one to indulge in the smelting of copper ores in Utah; and it laid the foundation for the greatness that Bingham has since achieved in the mining world. The original plant went into commission in 1899, equipped to handle 200 tons a day. Shortly afterwards, the present company came into possession of the smelter, also the Highland Boy Gold Mining company in Bingham.

In January, 1901, the capacity of the smelter was increased to 400 tons per day; another addition was made in 1904, and in June of that year equipment had been provided which brought the capacity up to 750 tons. Since that time, such changes and alterations have been made that the average tonnage coming from the mines for treatment is no less than 750 tons per day, out of which approximately 1,500,000 pounds of copper bullion are produced monthly.

How Ores are Moved.

The method of bringing the ores down



BECOMING WORLD'S GREATEST SMELTING CENTER.

Salt Lake is rapidly taking its position as the greatest smelting center in the world. The several great transcontinental lines of railroads converging at this point, and with others headed this way, places this city in a commanding position as regards the smelting industry. It is the natural mining and smelting center of the west and ores are brought here for treatment from the states of California, Nevada, Idaho, Montana, Wyoming and Colorado as well as from every district of our own state.

to the smelter, as stated elsewhere in this edition of the Christmas News, is over an aerial tramway, 12,000 feet in length, to lower Bingham, where it is loaded into cars of the Rio Grande Western and then brought down over the tracks of that company to the place of reduction.

Strictly Modern Smelter.

The Utah Consolidated smelter is in every sense a strictly modern plant. The buildings are constructed of steel and were put up with a view to permanency. The smelter and converter buildings are connected up in such a manner that they may be considered as one building, and a large electric crane operates between them.

There are twenty McDougall roasters in commission and nine reverberatory furnaces. To three of the latter are attached boilers and other especially designed contrivances for the utilization of the waste gases. These gases serve the purpose of fuel, supplanting the use of coal to a great extent in the creation of power for all uses. Thus the fuel bill is reduced to a minimum.

The converter plant consists of three stands, while the power house is no insignificant part of the equipment. The latter contains, among other things, one 350 horse-power blowing engine, two 400 horse-power tandem compound engines, each of which is directly connected with a 300 k. w. Westinghouse generator, which supplies the electrical energy for the operation of fans and elevators, and for the tram cars used in the handling of ore and calcines, and the electric railway used in conveying the slag away. The power house also contains a hydraulic plant, used in the operation of the converters, and it also supplies power for the blacksmith and electrical shops.

At the smelter, in order to meet any such emergency as a mishap at the mine or to the tramway, bins have been

provided which have capacity for storing 6,000 tons of ore, enough to keep the smelter going at full tilt for a period of about seven days.

The Process of Reduction.

The ore, on being brought to the smelter, is crushed and sampled; then conveyed in electric cars to the roasters where the necessary percentage of sulphur is driven off. The calcines are then dumped into the hopper cars, conveyed to the reverberatory building and dropped into the huge hoppers above the reverberatory furnaces. From these hoppers, the product is drawn from time to time as needed, to charge the furnaces.

After the reverberatory smelting, the slag is carried away in slag-pot cars, drawn by electric locomotives. The matte is tapped directly into the converters which are transported by the overhead traveling crane.

After charging, the converters are conveyed by this crane to the converter stands, where the matte is blown up to pig copper, which is then poured into moulds and made into slabs, in which shape the product is shipped to eastern refineries for final treatment.

Six Years Without a Shut-Down.

In the vicinity of the plant the company maintains its office buildings, warehouse, superintendent's residence, etc. The smelter has never been closed down for any purpose whatever since it went into commission a little over six years ago.

The company employs a force of about 750 men in its mine and smelter, the payroll amounting to about \$55,000 per month. It owns considerable railway trackage, connecting the smelter with the lines of the Oregon Short Line, solution of the vexatious question, and several hundred thousand dollars have been spent in the employment of expert talent to conduct a long series of experiments and in the equipment of the plants with devices, such as had been recommended in their final re-

ports. Three of the smelting companies—the Utah Consolidated, United States and the Bingham Consolidated, were diligent in their efforts to find a remedy for the existing evils, and it is gratifying to know that the work has been fruitful of results which indicate that the farmers will have very little reason to complain of any damage being done from that source. Rio Grande Western and San Pedro, Los Angeles & Salt Lake railroads.

Cost of Operation.

The total cost of operating the smelter last year with the freight on the ore from Bingham to the smelting plant included amounted to only \$2.65 per ton of ore, indicating a smelting expense of \$2.25 per ton of ore. The cost of operating the aerial tramway amounted to \$1.70 per ton of ore. The total cost of handling the ore, including the transportation of bullion cast, refining, selling, management and office expenses, was \$3.55 per ton.

The Utah Consolidated company has paid \$1,000,000 in dividends during the year, being 50 per cent on the total capitalization. While no official announcement has been made to that effect, it is quite probable that steps will be taken towards another enlargement of the plant during 1906.

Bingham Copper and Gold.

None of the Salt Lake valley smelters are more complete than the plant operated by the Bingham Copper & Gold Mining company, an accessory of the Bingham Consolidated Mining company. With the additional furnaces that have been installed, the daily capacity of the plant has been brought up to about 1,000 tons, and while no figures on the year's output have been released, it can be said that the output fully equals that of the Utah Consolidated.

The Bingham Copper & Gold smelter equipment consists of five blast furnaces, one reverberatory, one converting department, two sampling mills, railroad tracks and all other necessary adjuncts to make up a complete smelting plant. In the operation of the smelter, an average of 350 men are given employment.

Solving Smoke Problem.

Probably the most serious problem that confronted the owners of the Salt Lake valley smelters during the year has been the one involving the control of the fumes, of which the farmers residing in the vicinity of the plants had entered vigorous complaint. The

ARMY OF PEOPLE THE SMELTERS GIVE SUPPORT TO.

The smelters of the Salt Lake valley, directly and indirectly, give support to a population of about 50,000 persons in Utah and surrounding states. The existing plants are extracting the metallic contents from 4,250 tons of ore per day. Of this amount, the American Smelting & Refining company handles 1,500 tons; the United States and Bingham Copper & Gold, 1,000 tons each; the Utah Consolidated, 750 tons. During the coming year equipment will be provided to greatly increase the capacity of these plants.

But the "smoke" agitation, while it has caused the smelting companies to spend enormous sums of money, the investigations have led to the discovery of new methods for the saving of the values that heretofore passed off in the fumes and were lost. The investigations also revealed that the most serious damage has been caused by the volatile or metal fumes, which, on being cooled, formed into a fine dust, afterwards scattered broadcast over the country. The mere depositing of this dust apparently has no serious effect on vegetation until it comes in contact with moisture. Then a subterranean acid forms, and its poison causes plant life to wither and die.

What the U. S. Has Done.

For the purpose of suppressing the smelter fumes the United States Smelting company expended between \$50,000 and \$60,000 in equipment during the year. Of this amount, \$20,000 has been spent in the construction of a large flue system, with the purpose of cooling the gases before reaching the top of the stack and for the collection of the dusts. The balance was spent in the erection of a large reverberatory in which the flue dust from the expansion chambers and the ore fines undergo treatment. In this application, the dust and fines are made into a matte, after which it is remelted to extract the values contained therein. Since the installation of the device the change is so marked that officials of the company declare that the elements escaping should cause no damage to growing crops.

Where Water is Used.

It has been just about a year since Manager R. H. Channing of the Utah Consolidated inaugurated the experiments at the smelter of that company. At this plant, water is to play a very important part in the suppression of the gases. The experiments conducted during the year proved that a very effective way of controlling the situation could be had by the erection of scrubbing towers into the top of which the smoke and fumes are conducted from the McDougall roasting furnaces. These towers are built of wood, with shelves at intervals, the intermediary being filled with coke. The gases are drawn up through the tower by a fan, coming in contact on the way with the water, which comes trickling down through the coke.

In the early stages of the experiments it was thought that at least 10,000 gallons of water per minute would be required in the purification of the smoke and the management was confronted with the problem of disposing of the water, which had collected the poisons. Two solutions were proposed—one of them was to pipe the water out on to the alkali flats; the other to carry it in flumes out to the shores of the Great Salt Lake. Both involved great expense and carried other very unsatisfactory features besides. But after progressing this far a simpler method of disposing of the acid water presented itself and the company's chemists have been endeavoring to work out any imperfections.

In conducting the experiments the company has had an extra force engaged, consisting of a chief engineer, and three chemists, with the required mechanical help of about 12 men. It is claimed that 92 per cent absorption of the smoke is possible, under the system of using the scrubbing towers.

What the Bingham Has Done.

During the past year the Bingham

Copper & Gold Mining company has made extensive improvements for the purpose of eliminating dust and fumes from the gases escaping into the air.

An improvement on the original flue system was placed in commission on May 7, 1905, and consisted of a steel chamber 70 feet long, 30 feet wide and 20 feet high. This increases the area of the flue system three times in its cross-section; it is provided with special appliances for the condensation of fumes and means of these and fine flue-dust by means of its large surfaces for contact and radiation of heat and consequent reduction of the temperature of the gases passing through it. This chamber has a tunnel under it for the purpose of withdrawing its contents.

On Aug. 12, 1905, a brick and steel chamber, the total length of which is 220 feet, was placed in commission. This chamber is 20 feet wide and 20 feet high, and is connected with the steel flue. In this chamber the course of the current is changed three times and the distance of low current velocity and condensation much increased. The roof of this chamber is of steel, thereby securing a large reduction of head by radiation. Since the construction of the brick chamber, tunnels have been placed under the two sections and the bottoms hoppers for the purpose of removing the dust and fumes without causing any to sift away and perhaps pass in to the atmosphere.

A long and expensive tunnel will also be placed under the old flue system to facilitate the removal of the dust without causing any of it to get into the air current and perhaps be carried out into the atmosphere.

A large chamber with hopper attachments will be added to the converter flue to promote the condensation of fume and dust from the converter.

William H. Tibbals' MARKET LETTER

contains considerable valuable information regarding the mining industry of Utah. No state in the Union has made more rapid progress during the past year than Utah. Her mining industry is growing rapidly, and it is well that anyone desiring to secure part of the wealth which the mines of the state will produce in the next few years should secure an interest at present.

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