

GREAT FALLS SILVER SMELTER.

The Largest Industrial Establishment of the Kind in the Northwest.

Great Falls is justly proud of the Smelter as the extensive works of the Montana Smelting company are called. This large establishment was begun and completed in 1888. It stands beside the broad Missouri, about four miles from the business center of the city with which it is connected by railroad. The Giant spring and the Rainbow falls are near the works and buildings which cover large area.

These works may be described by explaining in popular terms how the lead and silver are extracted from the ores. Nature does her part in providing that chemical compound called ore which hardy miners find in the depths of the earth in the far off Cœur d'Alenes or the much nearer mines in Red mountain, Neihart and Barker.

The ore comes direct from the mines to the door of the sampling works at the Smelter. Here it is unloaded in order that its value and quality may be ascertained, the purpose of these works being to provide an absolutely accurate sample that will give the average value per ton of the entire shipment. The motive power is supplied by an engine of 150 horse power. The ore is crushed and an aliquot portion is taken from it in a certain systematic way. This "quartering" as it is called alternates with successive degrees of fineness so that finally only a few pounds of very fine powder are left. Every grain in this powder represents a large proportionate quantity in the entire shipment. An automatic mill of an ingenious design is used to sample and grind such ores as require roasting, but the oxidized ores are sampled by manual labor, in combination with the crusher and Cornish rollers.

The final sample provides the assayers and the chemist with material for their analyses which are carried on in the laboratory. The value of the ore is determined by these assays which are conducted with so much care that the quantity of lead, silver and gold in the ore can be computed with absolute accuracy.

Roasting ores, that have been ground during the sampling process are removed on tram cars to the bins where they are bedded in proper proportions to prepare them for purification by fire.

The ore is conveyed from these storage bins to the roasting furnaces where under the influence of intense heat the sulphur or arsenic takes wing into space, leaving these ores in a condition adapted for treatment in the blast furnaces—a condition like that which the oxidized ores possess naturally.

This roasted ore is stored in an extensive series of bins. The oxidized ores which do not require the preparatory roasting are immediately unloaded at these bins upon arrival. From these bins all ores are taken to undergo final treatment in the blast furnaces, the purpose being to reduce the lead, silver and gold under the influence of proper fluxes and fuel to an alloy—the so-called bullion. The impurities in the ore fuse together in the combination with iron ore and limestone which are intentionally added for that purpose and yield a waste product—the slag. The separation of slag and bullion takes place in the furnace itself as both are independently withdrawn from different levels of the lower part of the furnace where the fusion takes place. This tapping of slag and lead goes on without interruption so long as the furnace is running, the slag being caught in large pots mounted on wheels and run outside of the furnace-building where it is thrown away while the bullion is ladled into moulds bearing the stamp of the company. These are loaded into railroad cars and shipped east to the refiners whose business it is to separate the gold and silver from the lead.

The reduction process just described is conducted on an extensive scale at the smelter, which will be four times larger than now when the original plan is carried out. As it is this is the largest silver smelter in the northwest. Its extent may be estimated from the following details of the buildings and machinery:

There are 10 "reveratory" roasting furnaces and 10 "reveratory" fusion furnaces. The building which contains these furnaces is 375 feet long and 150 feet wide. The round stack which provides a draught for the furnaces is 125 feet high and 10 feet in diameter. The double flue which connects the furnaces with the stack is 600 feet long. The blast furnace building is 165 feet long and 100 feet wide. There are four blast furnaces. The large flue would suffice for ten, blast furnaces and with the fine dust chamber is 500 feet long. The huge stack is 12 feet in diameter and 150 feet high. The engine house is 205 feet long and 60 feet wide. It is built of brick and has an iron roof. In this building are two 150-horse power steam engines and three Baker rotary blowers of the largest size. In this house is also a large Thompson-Houston

dynamo electric machine, which is run by a 50-horse power engine. Steam is supplied to the works by five boilers, each 16 feet long and five feet in diameter. These boilers are connected with the sampling works. The plant includes a well appointed assay room and machine shop. Near the river is a large Worthington pump, which forces water to a height of 150 feet, along a distance of 3,500 feet to a reservoir that contains 2,500,000 gallons. Water is procured also from the Giant spring by a ditch.

The establishment includes also a well designed brick building of three stories, in which is the counting room. This is illustrated on the second page. The general manager, H. W. Child, resides in a handsome building, which is illustrated on the same page.

These works employ about 300 men. The company has an office in New York, where the following officers reside: Abraham S. Hewitt, president; W. S. Burnee, treasurer, and A. Eilers, managing director. The staff at the smelter comprises the following: A. H. Danforth, vice president; H. W. Child, general manager; Robert Sticht, superintendent; R. M. Raymond, assistant; V. Laubenheimer,

accountant; H. Ferguson, assistant; W. W. Stewart, weighmaster; John C. Bausemer, civil and mechanical engineer; A. L. Dean, chemist; P. J. Schumann, assayer; Messrs. Smith, Palmateer, Bigelow and Dwyer, foremen. The boarding house is in charge of Messrs. Brand and Nelson.

SAM DEAN'S COAL MINES

Adjoining the lands of the Sand Coulee Coal company, at Sand Coulee, Samuel Dean owns 108 acres of as good coal lands as are found in Northern Montana. Mr. Dean began working this vein in 1884—nearly four years before the company began active operations. He is one of the pioneers of Sand Coulee and was instrumental, with others, by his early efforts, in bringing these great coal deposits into prominence.

The Dean mine is developed by a tunnel 500 ft. long, from which are opened six rooms. The daily output of the mines is about thirty tons. But the plans are arranged and sufficient force will soon be put on so that by

June 1, the daily product will be 100 tons, and the mine will give steady employment to about 30 men.

Mr. Dean's mines are conveniently located near the Sand Coulee branch of the Great Northern railroad and he has made agreeable arrangements by which cars are furnished as needed and reasonable rates of transportation are secured.

GREAT FALLS enjoys the good opinion of the ablest and most observant people in the country. All who have seen the city and studied carefully its own resources and those of this region are convinced that the elements of permanent prosperity are here.

The Great Falls Real Estate Exchange is commended to our friends and patrons as composed of reliable gentlemen of business ability and experience. Messrs. Morrow & Co. the managers, are backed by some of our largest real estate owners.

THE SAND COULEE MINES.

History of the Sand Coulee Coal Company and a Review of their Present Operations.

The "Sand Coulee coal fields" has been a general term used to designate the coal region extending along the northern base of the Belt mountains for more than 60 miles; but since mines have been opened at various points in this region, the name may now be properly restricted to that country lying between Box Elder creek and Smith river, and extending far up toward the mountains.

The principal mines are operated by the Sand Coulee Coal company at a point about 12 miles south of Great Falls. To this place the Manitoba railway company has extended a branch line, and the enterprise and business of the company have built up the growing town of Sand Coulee, which bids fair to become one of the important tributaries to Great Falls.

Nature seems to have specially favored this country in locating the coal beds so that they are easily accessible. About half way up the steep sides of the coulee the coal crops out in veins of from six to

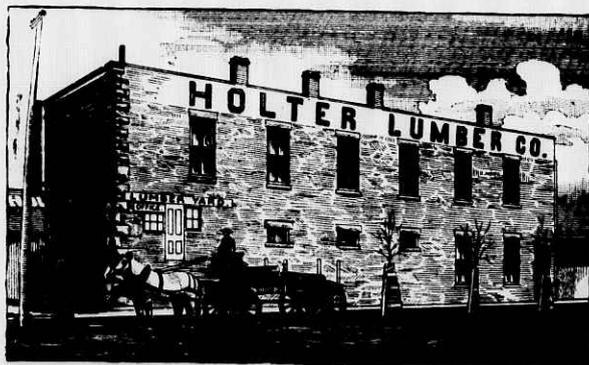
IRON WAGON BRIDGE AT GREAT FALLS.



fourteen feet, and could not have been more conveniently located if man had done the planning for his own accommodation. The vein has a regular thickness of from six to nine feet between the shale, although in some places the vein has been found to be twenty-two feet thick. The veins produce an excellent quality of steam coal which forms a good field for the railroads and smelters; and a part of the seams is found to be good coking coal which has been submitted to practical tests and found to be all that is required in a coking coal.

RAPID PROGRESS.

In 1888 the Sand Coulee Coal company was incorporated under the laws of



HOLTER LUMBER CO.'S STONE STORE, GREAT FALLS.

Minnesota with a capital of \$250,000. J. J. Hill is the president, and A. H. Bode was the first secretary. Mr. E. Anderson, managed the affairs of the company until August 1889—when he resigned and Mr. H. Burrill succeeded to the control of the mining operations. The company owns about 6,000 acres of coal lands.

The company commenced operations in July, 1888, and in the short space of eighteen months have made wonderful progress. Mining is here carried on after the most approved principles and the latest improved machinery is satisfactorily used.

The excellent management is shown in the enormous output of the mines. In January, 1889, the mines were producing 300 tons per day while in January, 1890, the daily product is 1,500 tons and before February, this will be increased to 2,000 tons daily. Sixteen entries are now being driven at the rate of six feet each per day; and yet only 50 per cent. of the work is expended on the daily product, the remainder of the work being employed on opening up entries for future product.

COAL IN DEMAND.

The quality of the coal has constantly improved with the depth, until now it is almost entirely supplanting the product of other mines in the chief industries of Montana. The Manitoba and Montana Central use this coal exclusively; so also does the Montana Smelting company at Great Falls. The company supplies 250 tons daily for the Anaconda smelter at Anaconda, and 150 tons to the Boston & Montana smelter at Butte. The coal is used exclusively by the following companies: Drum Lummon mine at Marysville; at Butte, the Lexington and Parrott smelters, Butte reduction works, motor railway, and the Butte & Boston Mining company. At Helena the motor line, gas works, electric light plant, water works, Hotel Broadwater and several dealers use this coal exclusively. Shipments are also made to Wickes, Livingston and other towns. Under the present efficient management the daily product of the mines seems to be limited only by the demand.

DWELLINGS AND STORES.

The company have built 45 neat cottages for the use of the miners and their families, and have erected two large boarding houses for additional accommo-

ARMINGTON.

On the line of the Great Falls and Belt mountains railroad, in the beautiful valley of the Belt river, the new town of Armington has been laid out. It is so called from its present owner, Hon. J. T. Armington, state senator from Cascade county.

Armington is located at one of those natural sites, where even under adverse conditions, a town is soon to spring up and grow. Upon both sides lie extensive beds of fine coal. The vein averages from eight to twelve feet in thickness and can be mined at the minimum cost of 0 cents per ton. In quality it closely resembles the famous Sand Coulee coal, but as it contains a larger per cent of coking coal, is a more valuable deposit. A number of practical working tests in coking have been made and the fact has been established that a superior coke can be economically obtained from this coal. So successful, indeed, have these experiments been that two large companies have already been formed to mine this coal and put up extensive plants for coking. These companies will begin work in the spring with large forces of men. The employees of the companies alone will form quite a town.

Armington, as stated, is upon the main line of the Great Falls & Belt Mountain railway, which runs to the mining camps of Neihart and Barker. The branch line to the Judith and the Wolf creek mining district will be started from this point. This will make it the most available point from each of these important camps, and taken in connection with its fuel advantages will undoubtedly result in the erection of large sampling works.

Again, owing to its geographical location, the Northern Pacific extension to Great Falls will necessarily cross the Belt river here. This will give Armington unsurpassed railroad facilities. And it is hinted that the Northern Pacific have already acquired possession of a tract of the adjacent coal lands and will at once develop them on a scale equal to that of the extensive works of the Manitoba company at Sand Coulee.

But Armington will not depend upon her mineral advantages. She holds the key to the famous Judith basin, and is the nearest railroad market to the two finest agricultural sections of Montana, i. e., Highwood and Upper Belt.

The Cataract Mill Co. of this city have announced their intention of erecting a large elevator at Armington and the railroad company will build a large wool warehouse, and also put in stockyards. In this way a valuable and extensive trade will be centered here at once.

The natural advantages here are so great that a town would spring up even under adverse conditions. But, as is well known, Mr. Armington is a man of enterprise and push, and will turn all of these natural resources to the greatest advantage in furthering the prosperity of the new town. And as he is closely connected with and stands high in favor with the management of the Manitoba company, this town will have the warm support of that company, which means a great deal.

We understand that property in Armington has been scheduled on a very reasonable basis, and we confidently expect to see it move very rapidly when placed upon the market. H. O. Chowen is the sole agent in Great Falls for the sale of property in Armington.

Mr. Randall has compiled a statement of the land business for the year 1889 in Cascade county. The number of land entries was as follows: Pre-emption, 340; timber culture, 179; homestead, 84; coal land, 27, and desert land, 21. Final proof was made as follows: Cash entries, 184; homestead, 23, and desert, 20. It follows from this statement that apart from the coal lands, 109,920 acres were entered last year, estimating each pre-emption and timber culture as a quarter section and each desert land entry as a section. On the same basis the final proofs represent an area of 37,920 acres. No other part of Montana shows such rapid settlement. All this is exclusive of land bought from earlier settlers by immigrants. There are still millions of acres of good government land in this district upon which many homes will be located during the year 1890.

PROSPEROUS MINERS.

The miners are as a rule steady, sober and industrious. They command good wages and are contented and happy.

A fine brick school house was built in the town during the past few months and now the children have all the advantages of schooling to be found in the east. The country surrounding the town is composed of the rolling bench lands covered with grasses for which Montana is famous.

NEW YORK CASH BAZAAR

Is one of the most popular dry goods houses in Great Falls. Mr. R. D. Beckon, the proprietor, has been located in the city about two years and his business has been constantly increasing. He believes that cash sales, small profits and quick returns are the secrets of business success. His stock of goods is large and complete, including fine dress goods of all kinds, ladies' furnishings, cloaks, shawls, jerseys, knit goods, hosiery, fine shoes, boots and rubber goods, notions, etc. In his millinery department may be found a complete stock of the latest styles, and with an experienced trimmer the most fastidious cannot fail to be pleased. Mr. Beckon has had firm faith in the growth of Great Falls. He has built up a prosperous business which must continue to grow rapidly. He buys on the best terms in the eastern markets and procures every novelty in his line as soon as it appears.