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TRADE DOLLAR CONSOLIDATED MINING COMPANY'S ELECTRIC PLANT, SNAKE RIVER, IDAHO.

The choice of water power for running the Trade Dollar Consolidated Mines, which are situated in Silver City, Idaho, was rendered a necessity by the fact that, as this is an old camp, all the wood fuel supply has been exhausted, and that coal costs $17 per ton at the mines.

After examining all possible sources of power, Snake River was selected as the most available, and the point known as Swan Falls as the best site for the construction of works for the development of the power.

The river at this point flows in a lava cañon about 700 feet deep. It has a low-water flow of 7,000, and a high-water flow of 70,000 cubic feet per second. Swan Falls was merely a rapids caused by a lava dike extending across the river, with an island in the center dividing it into two equal channels, each about 450 feet wide.

It was decided to close the right channel entirely by a masonry dam, of which the power house forms a part, and to place in the left channel an overflow

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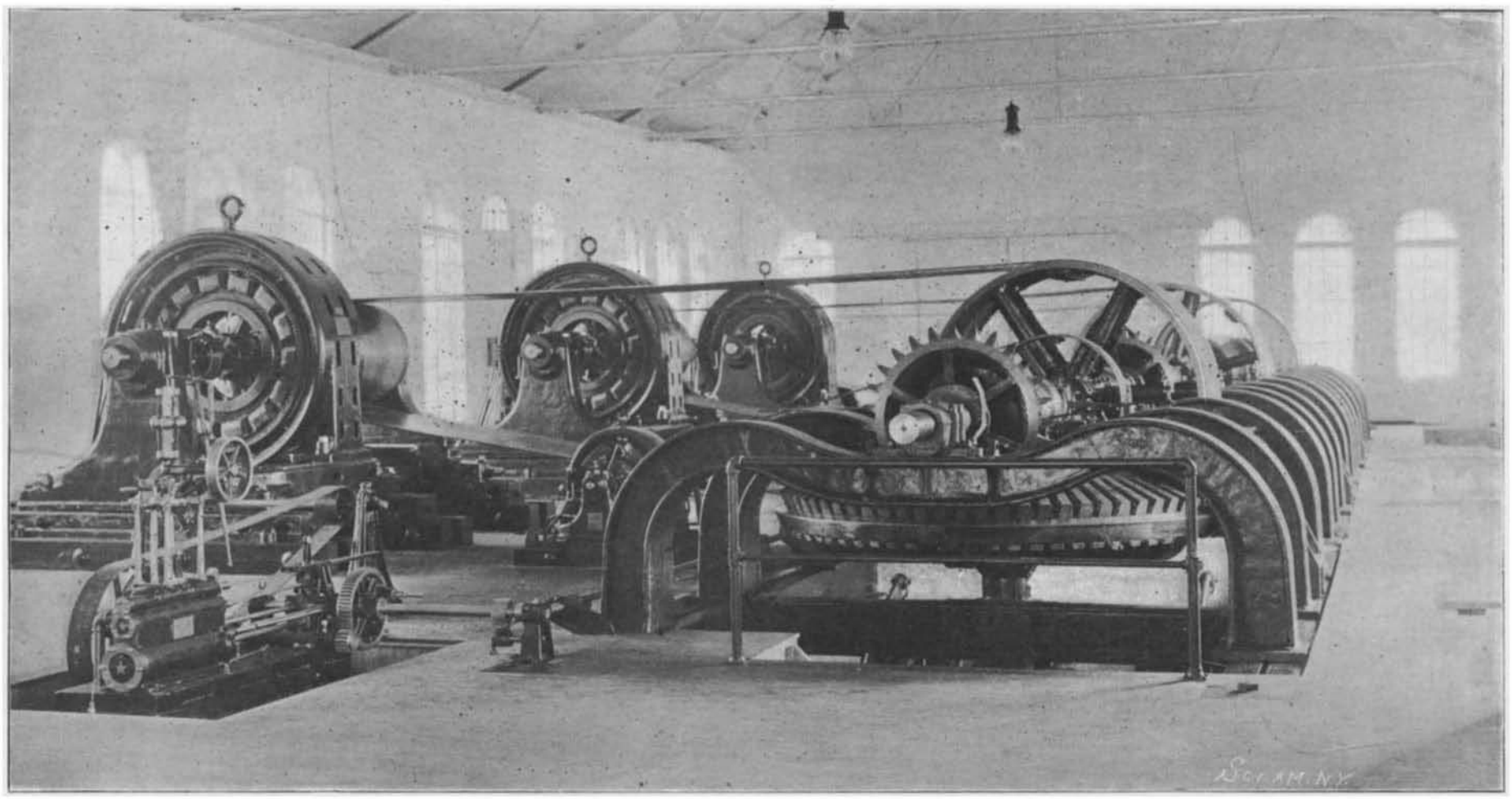
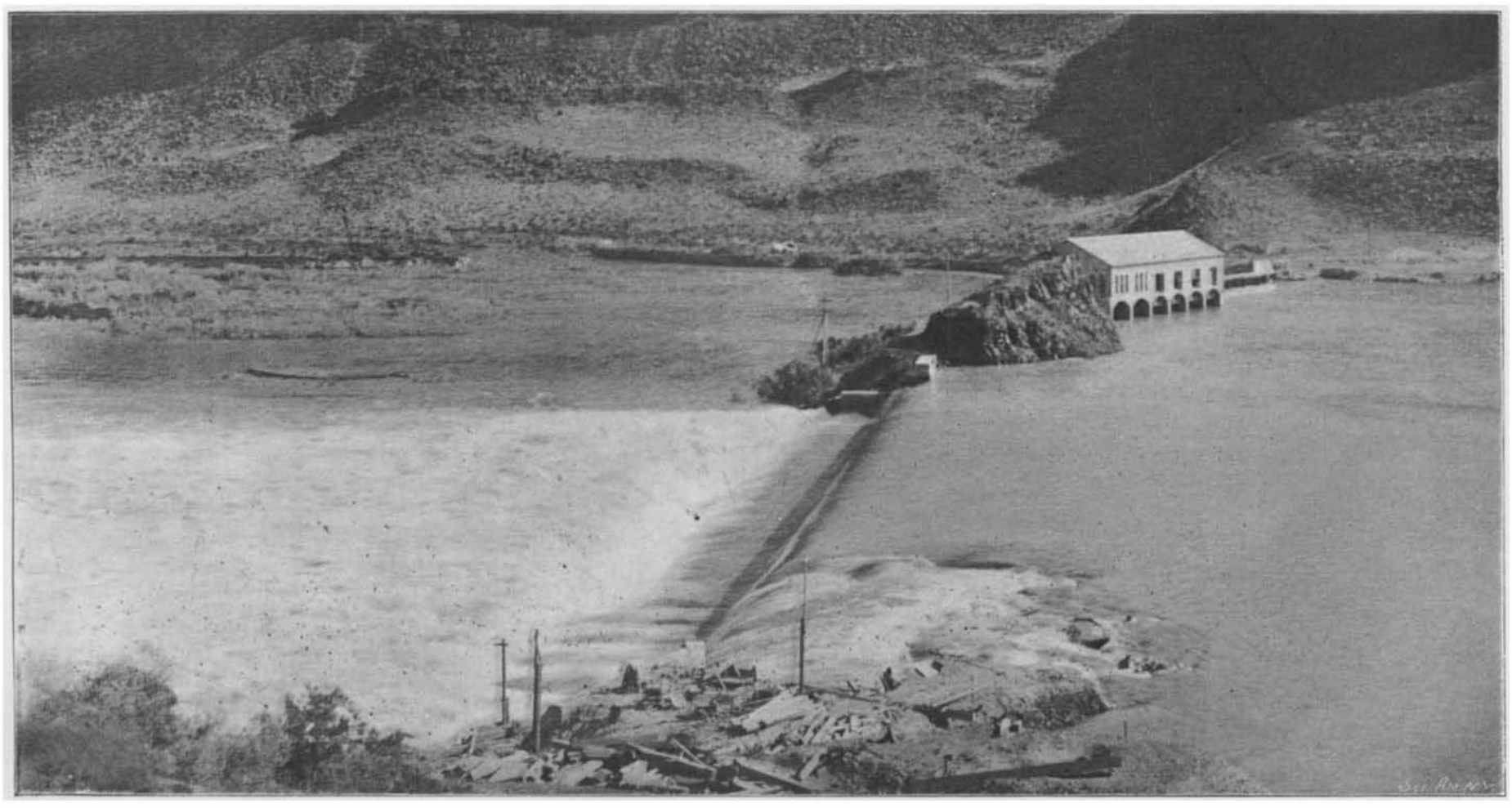


Interior View of Power House.



General View of the Dam and Power House.

THREE THOUSAND HORSE POWER ELECTRIC PLANT ON THE SNAKE RIVER, IDAHO.

TRADE DOLLAR CONSOLIDATED MINING COMPANY'S ELECTRIC PLANT, SNAKE RIVER, IDAHO.

(Continued from first page.)

weir with its crest at such a height as to give a working head of 17 feet on the wheels.

The rock dike itself was 4 feet above the water immediately below it; the height of the crest was fixed at 12 feet above the dike, and as the minimum flow of the river will give a depth of 2½ feet on the crest of the overflow dam when all the wheels are running, the extreme head on the wheels will be 18½ feet at low water and 17 feet at ordinary flood stage.

The dam in this, the left or main channel, is of the rock-filled crib type, 6 feet wide on top, with slopes of 2 to 1 on the upstream, and 1 to 1 on the downstream side; with an apron 17 feet long on the downstream side. The covering of the top is 12 inches thick, and of the downstream slope and apron 10 inches thick.

The cribwork is formed of 12-inch square timbers bolted with 1-inch square drift bolts into rectangles, 8 feet square between centers. The upstream slope is covered with 4-inch plank. The interior of the crib-work is filled with rock and gravel, and the entire upstream portion of the dam is covered with gravel on top of the planking. The cribwork and the apron sills are bolted to the bedrock. The overflow is 424 feet long, and ends in concrete abutments on both sides of this channel.

The dam in the right channel has its crest 12 feet above the crest of the overflow dam in the right channel. It is 450 feet long, 9 feet wide below the river bed, and 5 feet wide above, with buttresses on the downstream side at intervals of 22 feet extending 20 feet down the stream from the main wall. The entire construction in this channel is of concrete made of Portland cement and gravel, usually in the proportion of 1 of cement to 9 of gravel.

The power house is located over the deepest part of the right channel, with its floor 7¼ feet above the top of the masonry dam, which runs centrally beneath the power house.

The four 750 horse power wheels are 72-inch McCormick turbines, with vertical shafts driving one horizontal shaft through beveled pinions. The horizontal line shaft is belted to three generators of 300 kilowatts each, and to two exciters of 20 kilowatts each. The current from the generators is at 500 volts, and it is raised by the transformer to 22,000 volts.

The main transmission line is 27 miles long to the distributing station. The transmission line is three-phase, with three No. 4 copper wires with 50 poles to the mile. Glass insulators are used, and in the three months that the plant has been operated, not a single insulator on the line has been found in any way defective and not a particle of trouble has been experienced from the transmission system.

The power house is entirely of concrete and steel construction with concrete floor and slate roof. It is 49 x 134 feet on the floor plan, space being provided for future electrical extensions. Regulation is effected by a Lombard governor, run by electric motors, and is exceedingly satisfactory, although the changes in load are frequent and very great.

Regarding the operation of the plant, it may be said that this has been unusually satisfactory. It was formally opened on April 10, and has been running 24 hours per day continuously since that time, with the exception of a stop of a few minutes on one occasion, due to the loosening of the wooden cogs in the beveled drive wheels. The head at high water proved to be 17.10 feet, and is now 19 feet at low-water stage with only one wheel running.

The hydraulic part of the work was planned by Thomas T. Johnston, of Chicago, the consulting engineer, and the electrical installation was the design of Mr. L. B. Stilwell, of Niagara Falls, the consulting electrical engineer. A. J. Wiley, of Boise, Idaho, was chief engineer, and the work was done under his direction, no contractor being employed. The actual work of construction was begun July 1, 1901, the months of May and June previous having been used in road-building and preliminary work. The plant was put in operation on the 10th of April, 1901, although it was not entirely finished till the middle of May, 1901.

The aqueducts and reservoirs of Jerusalem show that there was abundant provision for running water in the ancient city. Within the last few weeks they have been brought again into the service of the city, which for many centuries has been dependent upon small accumulations of rainwater. The water is piped from Solomon's Pools, nine miles south of the city, drawing water from the sealed fountain mentioned in the Song of Solomon. It is a deep subterranean spring, which flows through an arched channel to a distributing chamber. This increase in the city's water supply will enable twelve ancient fountains in the city to be used.

Automobile News.

Mezieres, France, has probably the distinction of having the first automobile savings bank. It consists of an electric motor carriage containing four seats, one for the driver, two for the clerks and one for a cashier. The vehicle carries a small safe and folding shelves make a desk for persons standing outside the vehicle who are depositing. It travels about the country, making short stops in the villages on stated days, and receives such sums as the inhabitants of the neighborhood desire to deposit.

The French Minister of Agriculture has issued a circular relating to a competitive test of apparatus using alcohol, and especially automobiles and motors, which will be held in November. The circular states that the Minister, M. Jean Dupuy, desires to find new outlets for the use of alcohol in the interest of the rural production of the country, and has thus decided to open a concourse designed to encourage the constructors of motors and of apparatus using alcohol for the production of light and heat. The concourse includes a public exposition which will be held at Paris in the Grand Palais from the 16th to the 24th of November. The motors and apparatus exposed will previously have been tested at the Agricultural Station. This exposition will not only serve to bring out the different methods of utilizing alcohol, but will also make known the results of the experiments, and give the industry a series of scientific data which will be valuable in future work. Gold, silver, and bronze medals will be awarded. The concourse is open only to constructors residing in France. The first class includes all the applications of motive power. A. Stationary motors. B. Motors for navigation. C. Pumping motors, etc. D. Automobiles, divided into five sections: 1. Moto-cycles and light machines. 2. Voiturettes, etc. 3. Automobiles proper. 4. Industrial vehicles, hauling and delivery wagons, tractors, etc. 5. Carbureters isolated. The second class comprises the lighting apparatus of all kinds, using either incandescence or flame, and the third class the heating appliances. The automobiles will have their motors tested while stationary, and will also be tried on the road. The object of the tests is to make known the actual state of the use of alcohol for automobiles, and the competitors are advised to pay especial attention to good methods of utilizing the alcohol, without trying to reach undue speeds or to construct vehicles of a lightness incompatible with solidity or easy keeping in order.

A correspondent of The Auto-Vélo says that the question of automobile transports is now the order of the day in Madagascar, since the completion of the two main routes which unite Tananarive, the capital, with Majunga and Tamatave, on either coast. The western route does not seem as yet to be sufficiently well provided with bridges, etc., to allow it to be frequently used by automobiles, although these have been already tried with some success. The new type of 2-place quadricycle experimented with by M. Bigot, of the Panhard firm, did remarkably well, covering 150 miles in less than 14 hours. But it is especially the eastern route, now in very good condition, which attracts the attention of the experimenters. The Governor-General, before his departure on a tour of inspection across the island, had experiments made with two automobile hauling wagons which he had ordered from the Panhard house at Paris. This type gave very good results; it has an 8 horse power four-cylinder motor of the vertical type. However, a series of frequently renewed trials showed that this vehicle, which is recognized as excellent in France, cannot give the same performance upon the roads of the colony owing to the peculiar local conditions. Two points must be modified, namely, the motor-cooling devices and the brake system. These defects are not due to mechanical construction, but to the geographical configuration of the island and the climate. The country has a very irregular profile, and upon the steep grades, which are everywhere met with, the vehicle can scarcely make an average of over 7 miles an hour. This speed is insufficient to allow the current of air to cool the motor at the high temperature which prevails in the region, and hence the motor soon becomes overheated and stops. As an accident of this kind generally occurs on a steep incline the brakes are generally powerless to keep the vehicle from going down the slope. Again, the consumption of gasoline is considerable owing to the extra work of climbing grades, and this may reach as high as 0.1 gallon per horse power hour. The Panhard & Levassor wagons covered each about 2,000 miles in all, and the experiments have proved their resistance and good mechanical construction. This model with slight modifications will be quite useful. The experiments with transportation of passengers and mail matter between Mahatsara and Tananarive with 12 horse power brakes have been conclusive, the more so as they ran day and night and even in the rainy season over quite marshy routes. From the experiments which have been made it is concluded that a special type of automobile must be constructed for use in the colony, considerably different from that in ordinary use in France, and that the engineers should look especially for a special system of cooling the motor. The topography of the island does not permit speeds sufficiently great for the motor to cool itself, and the cold water reservoir becomes in fact one of hot water, raised still further by the ardent rays of the sun.

Engineering Notes.

The use of steel freight cars continues to grow in South Africa, says The Engineer. We learn that the Pressed Steel Car Company has made another shipment of steel cars. The destination of these cars is Durban, and they will be used on the Zululand Railway. The shipment consists of ten flat cars of 50,000 pounds capacity. The cars are 32 feet long, 6 feet wide, and 3 feet 3¼ inches high. This is the third shipment of cars to South Africa made by this company within the last six months.

Mr. Enoch Gittings, Jr., of the Wisemore Iron and Steel Works, Walsall, England, has discovered a new process of smelting iron. By his invention the puddling is dispensed with, so that a great economy in labor and time in manufacturing is effected. The iron made by this process is silky, pure and white when fractured. It will stand the greatest combined tests in tensile strain, elongation, and reduction of area of any steel in the world, and is superior to basic, Bessemer, or Siemens-Martin soft steel. The fiber is clear and close. It is exceptionally uniform, and it welds well, owing to this uniform texture. By this process the iron can be made much cheaper, since it is so simple. The iron is already being sold in limited quantities for test purposes, until the patent rights are fully secured, at the price of $100 per ton.

Licenses for stationary engineers, for those in charge of boilers in factories, are not to be required in England, a committee appointed to consider the subject having reported adversely. It says, in substance, that great care is taken by owners of plants to obtain desirable men, and the former are held responsible for any damage or loss of life that may occur through explosions; further, that if licenses were required it would be difficult, in some parts of the country, to get engineers at all. The proportion of accidents, arising from absolute ignorance, the committee say, is very small, and for these reasons it is asserted that they report against the measure. We may say, in regard to the clause that owners are responsible in case of explosions, according to the trials published in such disasters British juries are very lenient indeed, the fines seldom exceeding $50, very rarely amounting to $100.

According to the report of the British Consul of Nagasaki for 1900 the Japanese are making rapid progress in their shipbuilding industry. No expense is being spared to render the Mitsu Bitsu Shipbuilding and Engineering Works thoroughly up to date in every respect. It is being equipped with tools and appliances of the latest and most labor-saving description. In the machine shop alone eight steam hammers, ranging from seven tons to half a hundred weight, have been installed within the year. To encourage the young hands of the machine shops to evince an interest in their work a technical training school for the accommodation of 250 boys has been erected. A reef facing the yard has been reclaimed, and by the removal of vast quantities of rock from the hill behind, space for the building of two vessels of 600 feet in length and two of 300 feet in length simultaneously has been provided. During last year four ocean-going steamships ranging from 2,000 tons were constructed, and the list of vessels laid down at the end of the year included two passenger ships, each of 6,300 tons, for the American line of the Japan Mail Company.

The Royal Commission formed to investigate the port of London dock accommodation will pronounce its verdict upon this momentous question within the next two or three months. There are two points upon which the commission has to offer recommendations: 1, The present administration of the port of London and the water approaches thereto, the adequacy of the accommodation provided for vessels and the unloading thereof, the system of charge for such accommodation and the warehousing of dutiable goods, and to report whether any change or improvement in regard to any of the above matters is necessary for the promotion of the trade of the port and the public interest; 2, the deepening of river channels. Owing to the tendency to increase the draft of ocean-going steamers, the Thames Conservancy is prepared to provide a navigable channel of 30 feet below low water of spring tides up to Gravesend, if Parliament will sanction the scheme and will provide the means of raising the money to carry out the work. The estimated cost of the undertaking is $10,000,000. It is also anticipated that the commission will recommend the purchase of the London docks by the government at an expenditure of $125,000,000.