

## POWER AND LIGHT.

Spokane, Wash.—It is reported that nine million dollars will be expended by the Chicago, Milwaukee & St. Paul Railway Company in developing 180,000 horsepower by harnessing thirty-five miles of the St. Joe River, between North Fork and St. Joe, in Northern Idaho, east of Spokane, and this electrical energy will be utilized in carrying freight across the Bitter Root Divide and operating a score of sawmills and plants. The work is to be completed in three years. This will be the first practical test of the substitution of electricity for steam power in this country, and if it is successful it will be employed on the entire line between Missoula, Mont., and the Puget Sound country, a distance of nearly six hundred miles. C. B. Price, a hydraulic engineer of wide experience, connected with the company's electrical department, has undertaken the project, which is so feasible that A. J. Earling, president of the company, accompanied by a staff of engineers, recently went over the ground on an inspection tour, passing several days at the construction work, viewing also the sites of the dams to be placed in the swift mountain river, the highest navigable stream on the Continent. The plans presented by Mr. Price show that practically every available cubic foot of water can be harnessed. Besides economy and the solution of the fuel problem, which has been a serious one to all the railroads in the Northwest the last two years, the Milwaukee is following the lead of other railroads in using electric power for operating through tunnels. The stretch of line between the Bitter Roots and Rock Lake, Wash., is one of recurring tunnel. The survey shows fourteen tunnels in 150 miles of line, and the aggregate of these tunnels will be 10,000 feet, ranging in length from 4,000 feet in Lost Pass to the numerous bores of not more than fifty feet through projecting cliffs.

Between North Fork and St. Joe the Milwaukee will run on a four-tenths of one per cent compensated grade, the grade on the curves being reduced enough to compensate for the increased friction. Three-tenths of one per cent will be the actual grade between these two points. This is equivalent to 15.8 feet to the mile, or 553 feet for the entire distance. Roughly estimated, the minimum flow of the river between these two points is 1,500 cubic feet to the second. This is sufficient, if converted into steam power, to drive 500 big mogul engines with 160 miles of train, or 20,000 loaded box cars—more than the Milwaukee system now owns.

From North Fork to Chatcolet the maximum grade does not exceed four-tenths of one per cent to the 100 feet, or sixteen feet a mile, while the maximum curves are ten degrees. It would be possible to reduce the curves by means of trestles, fills and tunnels, but the expense would be great. From the North Fork to the summit of the Bitter Root Mountain, where the line attains an elevation of 5,500 feet, the maximum grade is 1.7 per cent, or seventy-four feet to the mile. The road will cost \$55,000 a mile.

Between St. Joe and Chatcolet the road runs along the river. Grading is in progress on that part of the line, several miles of fill and a number of short tunnels having already been made. Two thousand men are at work on the line, while five thousand others are to be sent out on the other division, above St. Joe, in a few days. Right-of-way men are at work above St. Joe, and the timber has been removed and partly burned several miles up the river. Forty surveyors are in the field between St. Joe and North Fork.

Three dams are to be constructed at once, but it is given out that others will be in operation within three years. One of these will be at Little Falls, three miles above St.

Joe, where plans have been made for a dam eighty-six feet high, developing over 5,000-horsepower. Another will be built at Cottonwood Island, ten miles up the river. Ideal dam sites are to be found at frequent intervals along the river, and there will be little cost arising from the acquirement of flowage rights. In a few cases, such as at Elk Prairie, there is a broad stretch of meadow which will be entirely overflowed, and the company recently bought the McMichales Ranch for \$20,000, or \$125 an acre. In most cases the river runs either through a canyon of high rock walls or the mountain bases slope down to the edge of the river, giving the water little room to spread.

In many cases a dam fifty, or even one hundred, feet high, while the backwater several miles up the river would spread only a few feet over either bank. However, as the average height of the railroad is not more than forty feet above low water, the height of the dams is limited. While the average fall of the river for the thirty-five miles is 15.8 feet, it is much greater than this in many places; in others, less. It is said eighty-six feet high at Little Falls will back water twelve miles up the river. From North Fork to the summit of the Bitter Root Mountains, the line runs on a 1.7 per cent grade, the equivalent of 1.4 average fall. This means nearly seventy-five feet to the mile.

In addition to operating its heaviest division by electric power, the Milwaukee expects to make use of the same power in developing the resources of the country through which it will pass. To a greater extent than any other railroad the Milwaukee is using its own capital to develop its tonnage territory. The Monarch Lumber Company, admittedly a subsidiary concern, has acquired nearly 100,000 acres of timber land in Northern Idaho, 28,000 acres of which are adjacent tributary to the new line. Some of this timber runs as high as 10,000,000 feet to the quarter-section, while a good average is 2,000,000 feet. Hundreds of thousands of acres of timber land are along the banks of the St. Joe and St. Maries Rivers, where the timber will be easily logged, either by water or trail transportation. Branch lines are to be built from St. Maries up the St. Maries River, and other lines will run up Marble Creek and Mica Creek, where the company has heavy timber stands.

Two sawmills are now in course of construction at St. Joe by the Monarch Lumber Company, with a combined capacity of close to 100,000,000 feet daily. The planing mill is also in operation. A large pulp mill is to be erected near the site, but whether it is a Milwaukee project or a private enterprise is uncertain. The plant is said to be backed by Mr. Price, who has charge of the electrical power development for the Milwaukee, and who is a paper mill expert. Thousands of balm and gilead trees line the banks of the St. Joe, while spruce grows higher up the mountains. There is plenty of material available to keep a large paper mill in operation for years.

Timber tributary to the St. Joe River will keep the mill in operation for twenty-five years. That includes only the accessible timber, thousands of acres back in the mountains being too remote from transportation to enable its removal with profit at the present prices of lumber. However, the extensions of branch lines into the remote district will add to the tributary timber and the increase in the size of the mill or the building of new mills will be the natural result. Tributary to the St. Joe, St. Maries, Coeur d'Alene River and Coeur d'Alene Lake, it is estimated there are 25,000,000,000 feet of standing timber, or enough to keep the mills at Coeur d'Alene, Harrison, Hayden Lake and St. Joe in operation one hundred and fifty years.