

vious. Two riveted steel pipe lines leading from this regulating reservoir will be 6,300 feet long and 72 inches in diameter at the upper end. The lower end will be provided with Y branches, castings, and suitable gates and nozzles for conducting the water to the eight water wheels, each with a capacity of 9,000 horsepower. The pressure at the nozzle of the 7-inch stream impinging upon the water-wheel buckets will be 585 pounds per square inch, or nearly three times the high-steam pressure used by the big locomotives of the Southern Pacific Co.

That this work, both in the field and office, is most actively carried on is shown by the fact that the plans and specifications of the water wheels, generators, transformers, steel towers, and pipe lines are already in the hands of the manufacturers. Excavation for the powerhouse foundations began immediately upon securing the necessary permission from the railroad commission, and

Preliminary and final surveys and many of the rights of way have been already secured for the 118-mile transmission line from the Drum power house to Cordelia, and work on the foundations for this line will begin within a few weeks, so that the towers can be installed, assembled, and erected in the early spring of 1913, thus insuring and guaranteeing completion of the line before the fall of next year, which will witness without doubt the final completion of the entire project.

**THE SPAULDING DAM OF THE BEAR VALLEY HYDRO-ELECTRIC DEVELOPMENT, CALIFORNIA.**

BY HERMANN SCHUSSLER.

The dam will be located a short distance downstream from Lake Spaulding, and, owing to its contemplated height of 300 feet above the bed of the river, the original reservoir will be entirely submerged. While the length of the proposed dam will be only 60 feet at the bottom



Looking toward the Spaulding Dam site from upstream.

camp were established along the canal line from the Lake Spaulding Dam to the forebay. At the powerhouse sites at this time 1,400 men are busily engaged in clearing, excavating, and carrying on the many phases of work necessary to a project of this kind, while the engineers of the company have been for months preparing all necessary details, plans, and specifications for each and every individual part of the equipment for the necessary prosecution and construction of the work, as well as the large units which will be used in the final operation of the completed plant. The canal line for its entire length has already been cleared of all brush and trees, and excavation is actively in progress. The forebay site has been cleared of all loose material and objectionable surface earth which could not be used in the main body of the embankment, and some 300 head of stock and 150 men are now actively carrying on the excavating and placing of the earth for the embankment.

of the gorge, its length along the finished curved top will be 900 feet.

The reservoir to be created by the erection of the new dam will have a surface area of about 700 acres and a storage capacity of 4,000,000,000 cubic feet, or 30,000,000,000 gallons.

The watershed directly tributary to the reservoir has an area of fully 120 square miles, with an average annual rainfall of between 60 and 70 inches.

Owing to the generally rocky and precipitous character of the watershed, the percentage which the seasonal surface run-off bears to the gross precipitation on the watershed will be fully 50 per cent.

Thus, the average annual water product discharging from the above watershed into the proposed new Lake Spaulding will be equal to fully 8,000,000,000 cubic feet, or 60,000,000,000 gallons, or double the storage capacity of the proposed reservoir.

By the construction of the proposed main concrete dam across the gorge of the South Yuba the water surface of the proposed storage reservoir will be raised to such a height that it will be necessary to construct at two points of the divide on the northerly side of the lake two separate, comparatively low concrete dams. One or both of these will be so arranged that they will form capacious wasteweirs, or spillways, for such waters as will have to be wasted from the reservoir when the latter, during or immediately after the snow-melting season, has been filled to its utmost capacity. By the construction of these spillways the necessity of discharging such waste waters over the top of the high main concrete dam will be avoided.

The hydrographic features thus briefly outlined show that the reliability and constancy of the water supply from this source will be practically ideal.

In fact, I should be very much tempted, in spite of the already great height of 300 feet of the contemplated main dam, to still further increase the same, in order to bring the storage capacity more nearly up to the average annual water product of the tributary watershed if it were not for the necessity of having also to raise at considerable cost the two above-mentioned subsidiary lower spillway dams.

The ideal location of the proposed main dam in the precipitous narrow gorge of the Yuba, with its practically homogeneous rock bluffs on both sides of the river, fully excuses and justifies my above expressed desire of increasing the height of the dam above the contemplated height of 300 feet.

When, about seven years ago, I stood, like last week, on the rock bluff, the main body of which will form the southerly abutment of the proposed arch-shaped dam, I could not help feeling and expressing delight at seeing

one of the most admirably formed dam sites that I had ever beheld—admirable both from a topographical as well as geological point of view.

The dam, in all probability, will be built with the system of interlocking, keystone-shaped concrete blocks, built in place alternately, containing not less than 400 cubic yards each and similar to the dam built by me in San Mateo County, where it forms the large Crystal Springs reservoir of the Spring Valley Water Co. This same method was successfully employed in the construction of the large Barren-Jack dam in Australia.

The successful manner in which the above main Crystal Springs concrete dam resisted the tremendous wrenching to which it was subjected by the earthquake of April 18, 1906, although located close to the main fault-line, fully proved that the method of construction adopted by me, coupled with the first-class materials and thorough workmanship employed in its erection, fully justified the great care bestowed upon every portion of this important work.

The rock required for the concrete for the new Lake Spaulding dam, estimated at between 250,000 and 300,000 cubic yards of concrete, will be quarried out of or near the bluff over-topping the southerly abutment of the same, while the necessary gravel and sand is found of excellent sharp-grained quality and in great abundance, in a large nearby moraine—a remnant of the glacial period.

The successful construction and completion of the proposed new concrete dam for the greater Lake Spaulding, owing to its height as well as its great economic value for developing the resources of our state, will not only reflect credit upon the company that had the foresight and boldness to undertake this magnificent work, but also upon the engineering talent employed in its conception, design, and successful construction.