Big Cottonwood Power Transmission.

(From the Electrical Engineer, September 16, 1895.)

A keen and traveled observer, who puts the longitudinal limits of his wanderings at Turkey in the East and Utah in the West—from Moslem to Mormon—says a visit to Salt Lake City convinced him that from a sociological standpoint the followers of the Prophet Smith are more interesting as a whole than the followers of the Prophet Mahomet. One needs to see the capital of the Church of Jesus Christ of Latter-day Saints, with its great Mormon temple, its broad, rectangular streets, its mountain water system, its quaint Mormon walls, Temple and Tabernacle, to appreciate the marvel of the Mormon exodus of 1847, and the stupendous works of the Mormon chief and builder, Brigham Young. The lever which became such a mighty power in the hands of this great natural leader of men is now discarded, but the fulcrum which Brigham Young practiced and advocated plural marriages because I wanted his colony to increase. To him it meant fruitfulness and rapid consolidation. But polygamy is now dead in Utah, and the people have faced toward a new life. Confident in the strength of its history of pioneering and its splendid half century record of privation, patient industry, prosperity, culture and wealth, the great Mormon colony of the West is seeking touch with the rest of mankind, and expanding into wider sympathy with the outside world. Gentiles are now welcomed into the best Mormon social circles. The community on every hand shows signs of vigor and success, socially, politically and financially. Since the abandonment of polygamy, the membership of the Church has increased amazingly, and its missionaries in all corners of the globe tell of the rapid accession of converts that is being brought about by the removal of the primary cause of outside hostility. In the West alone, there are 400,000 communicants of the Church of Latter-day Saints. The Territory of Utah is about to be raised to Statehood, and its material wealth is seen in the number and magnitude of its home industries. But its career is only just begun. It has within itself a world of resources that will bring it into a leading place among the forces of the age, and it is to the development of these agencies that it is now busying itself. The sublime Wasatch range, under the shadow of which Salt Lake City springs out of the plain, is studded inside with steep streams, cave and pockets, fed by the springs and drainage of the mountains, the overflow from which has always been utilized by the Mormons for the irrigation of their valley farms. The grandeur and beauty of its peaks and lakes are unequaled even in the Bernese Alps, and the picture of Lake Mahopac in its settings of snow-mantled cliff, shown on this page, will suggest to the traveler in Central Europe the rugged and awful grandeur of the Wasatch range. This and seven other of the Wasatch lakes, lying silent, dark and solemn, at altitudes of 11,000 to 12,000 feet, are now in the wildest part of Bible the valley below with beauty and loveliness. In the picturesque Big Cottonwood canyon, where the granite masses for the foundations and piling of Mormon Temple were quarried, these waters are being dammed, and converted into a power that will develop the resources of Utah in mines, products and manufactures, to an extent almost unparalleled in the history of the West. The Big Cottonwood Power company has practically completed its plans for the generation and transmission of electric power from the various water supplies in the Big Cottonwood canyon, thirteen miles to the east of Salt Lake City, for the supply of light and power within the limits of the city, and to the factories and small towns in the vicinity.

II.

The power station is located in the canyon, at "The Stairs," 14 miles by pole line from the city receiving station of the Salt Lake & Ogden Gas and Electric Light company, in Salt Lake City. At this station there is a minimum flow of 3,400 cubic feet of water per minute, which, working under 300 feet head, produces 2,447 h. p. any and every hour in the year. During the months of the year, it will give nearly 4,000 h. p. The storage reservoir at the head of "The Stairs," has an available capacity of 24 hours' continuous flow of the stream, making all of the water available by using an excess during maximum loads and allowing the reservoir to accumulate during minimum loads. Fifty-eight thousand eight hundred h. p. hours per day of 24 hours, is to be had from this source, of which 85 per cent can be delivered in Salt Lake City in contract form, making 49,968 h. p. hours net daily. The 85 per cent efficiency is derived from Pelton water wheels 89 per cent, G. E. generators, 98 per cent, L. P. transformers, 98 per cent, H. P. transformers, 98 per cent, G. E. transformers (reducing) 97½ per cent, or a total of 85 per cent. The map of the reservoir and pipe line extending from the head gates, submerged to the bottom of the reservoir, is a pendant or reserve wheel bonus, in the sense that it is continuous from above the bridge. This pipe, steel-banded redwood, is anchored to the bottom by rock piles, and is to be used in the event of the being necessary to drain the reservoir, without interfering with the running of the station. This is accomplished by closing the hydraulic valves, and opening the reservoir valves in the drainage tunnel, and the station will thus be supplied from the natural flow of the stream, during some time as the reservoir might be empty.

III.

The outside dimensions of the generating station are 50 feet by 100 feet. The generating plant consists of four 450 h. w. three-phase general electric generators, separately excited, horizontally mounted, two with air-cooled armatures, and two with water-cooled armatures, all of the same type, and interchangeable on any one of the four units. Each generator is driven by one heavy special Pelton Wheel, of Doubles in diameter, provided with two nozzles 7½ inch diameter. The straight nozzle and deflector, with a gate valve for shutting off, and the lower nozzle is equipped with a hand regulator, so that both governor and hand regulation and economies are of water are secured. Each nozzle at 320 feet effective head, produces 310 mechanical h. p. and runs at 300 revolutions per minute, its mechanical speed. The water wheels are keyed directly on the armature shaft, in line of a pulley, in addition to the generators mounted, on 12 ft. w. exciters, which in the case, will be operated by a generator or exciter being mounted together by friction machines on each generator to drive with belt, and a 14 inch Pelton wheel, with belt and pulley. Each of wheels and exciters, and the wheels will be belt mounted, and the wheels will be belt mounted, and the wheels will be belt mounted