where the cost of power at the mines was from $150 to $200 a year, gold. A hydro-electric development was made and power delivered at $100 a horse-power, this making a great reduction in cost to the mine-owners and yielding a substantial profit to the electric company.

We once reported on a development in California which cost about $400 a horse-power to develop. A small portion of this power could be disposed of at the mines for $75 a horse-power with comparatively short transmission lines, but the remainder had to be carried a long distance and sold in competition with other power. The fixed charges alone on this development were at least $30 to $35 a year, and the running expenses were also high. It was impossible to produce power cheaply enough to compete with other sources of powers and pay the fixed charges on the investment.

Value of Water Power.

The value of water power to various industries will vary in approximately the same ratio as the cost of producing power in some other way, if considered as power, pure and simple, without taking into consideration other important items affecting the business which are sometimes more vital than the cost of power itself.

To illustrate the value and cost of power under different conditions, it may be well to mention two recent cases which we have passed upon.

As consulting engineer for a hydro-electric company, we were asked to submit prices for electric power to a colored textile mill for which we were also engineers, and were engaged at that time in planning a new steam power plant for the textile mill. The price quoted was 1.2c. per kw. hour. As engineers for the textile mill, we were obliged to reply to ourselves as engineers for the hydro-electric company that we could not afford to accept the offer, the principal reasons being;—

First.—On account of the use of steam for manufacturing purposes, and of the water of condensation for dyeing that the net cost of steam power would be less than the price of hydro-electric power.

Second:—That it was better for the textile company to own and control its own plant, if it had the capital to build it, which it had, than to purchase current brought over many miles of pole line, and be tied up to some foreign company.

The cost of power per kilowatt at the switchboard from the hydro-electric company for the operating time of the mill was about $35 per kw. per year; and for the steam plant which the mill was proposing to install, this cost was about $34 per kw. year, but if the power had been bought from the hydro-electric company, the mill would have had to install and operate a boiler plant nearly as large as the one required for both power and manufacturing steam.

It was estimated that the use of the waste products from the steam plant would reduce the net cost of the power at least $8 per kw.

The other case was where we were also making plans for a plain cotton mill for a new steam plant and where there were offers from two hydro-electric companys to furnish power. One offer was promptly turned down, asking too high a charge. A second offer was to furnish current at 1.2c. per kw. hour, which is the same price which we refused for the color mill. For a plain cotton mill, however, we concluded that it was proper to accept the offer at 1.2c. per kw. hour, and there has been a contract signed for the delivering of the current.

The principal reasons for accepting this offer, were:—

First:—1.2c. per kw. hour equal about $36 a kw. per year, or $27 an electric horse-power delivered. This reduced back to 1 horse-power equals about $23.50 per year, which was very near the estimated cost of steam power for the quantity required, and at the price of coal for this particular industry.

Second:—The mill desired to postpone the expenditure necessary for the steam plant if it could be done without serious loss.

TURNTABLE CONSTRUCTION WITH SOME DATA ON COSTS.*

The following questions were submitted by the committee and following are a few written answers:—

(1) Proper length, allowing for probable future increase in length of locomotives. (2) Plate girder tables, and cost. (3) Cast iron tables, and cost. (4) Gallows frame tables, and cost. (5) Other designs, and cost. (6) Foundation, circle wall, paving if any and pit drainage. (7) Power for operation; electricity, air and other power.

J. P. Canty, Boston & Maine R. R.—Anticipating the probable length of a turntable required for future locomotive service, is rather an uncertain problem just at this period. However, it is the opinion of many that, on the division where I am located, the lately purchased steam locomotives have apparently reached their economical limits in both length and weight, provided the class of traffic remains similar to that which is now being handled.

The largest engines on our division are turned easily on turntables 70 ft. long. This is now our standard length, and as far as we are able to predict, will answer for future requirements.

The steel work in these tables cost approximately $2,500 on board cars delivered to our road by the contracting bridge company. There is nothing unusual about the design. However, I will mention that we specify that four cast steel end wheels shall be furnished on each end of table and the centre pivot bearing shall be of the disc pattern; meaning that the table turns on a composition disc on top of the centre cast steel pivot casting, instead of on the familiar roller bearing.

Our turntable centre foundations have, of late, been made of concrete, being 10 x 10 ft. on bottom and bearing on piles when there is doubt about the earth being sufficiently solid to carry the maximum load on this area without settling. The bottom course of concrete is generally 2 ft. in depth. The foundation is then stepped 7½ ft. square by 2 ft. thick, and a granite cap 5 ft. square by 2 ft. in depth is placed on top to receive the cast steel centre pedestal.

There are 330 cu. yds. of masonry in our 70-ft. turntable pits. The whole outfit, including turning motor, costs us between $6,000 and $7,000. Figures vary for different locations, depending upon whether or not we are obliged to drive piles, provide expensive drainage, etc.

Practically all of these new outfits have been put in where older and smaller tables were installed and as the older tables were kept in service just as long as possible so as to avoid delays to engines, our work has always been made more expensive than if new tables were constructed where we would not be handicapped by keeping the old table in use.

We use gasoline power turning device.

The floors of the turntable pits are covered with a coal-tar concrete paving, about two and one-half inches thick, somewhat similar to that which is used extensively in small cities and towns in New England for sidewalk surfaces.

*Abridged from the committee report, of the American Railway Bridge and Building Association, Annual Convention, October 19, 1909.