The writer recently made a series of tests on a small wheel of this class, catalogued as the Pelton Motor No. 3. This wheel is approximately 18 in. in diameter, and the weight of the whole machine is given as 320 pounds. Two elevations of this motor are given in fig. 1.

The tests were made in the Hydraulic Laboratory of McGill University, and a brief description of the methods employed will be given. It was impossible to make tests with heads as high as some of those under which these motors run. The maximum head employed was that afforded by the city supply from the high level reservoir, which gives a pressure of 125 lbs. per square in. in the laboratory, equivalent to a head of 290 feet. Lower pressures were also obtained by throttling the supply from the same source.

These trials will give an idea of what may be expected of this type of motor when used under ordinary heads of from 100 to 300 feet. In many districts these are as large heads as are commonly met with. Also, where it is proposed to take power from a water-works system, the pressure under which water is supplied would rarely exceed 125 lbs. per square inch.

In the present series of trials the wheel tested was small compared with many in use; the effective work done did not in any case exceed 7 horse-power. There is no doubt that with a machine designed on a larger scale, as with larger heads, the efficiency would show some increase over the values found in the present case.

The results obtained in these experiments are offered as bearing directly on the question of the utilization of this system for small amounts of power under the conditions usually met with in districts outside those referred to as abounding in very high falls of water. With reason and judgment, the general conclusions arrived at by the consideration of these results may be extended to cases where the machinery and the generation of power is on a larger scale.

For the purposes of trial the wheel was set up as received from the makers, and the auxiliary apparatus was fitted in accordance with their instructions. The water, after passing through the valve which was used to regulate the pressure, was led along a length of 2½ inch pipe straight for 8 or 10 feet before reaching the nozzle. A Bourdon gauge was fitted on the supply-pipe less than one foot from the mouth of the nozzle-tip. This gauge was arranged on a pressure-chamber, enveloping the pipe and communicating with the interior through a series of small holes. Before being used the gauge was calibrated by means of a gauge tester. In the experiments the pressure in the pipe of course varied slightly. The pressure was read at intervals of one or two minutes, and the mean value during the whole trial was accepted as the pressure under which the flow took place. The extreme variation of the pressure was about one pound per square inch.

Three different sized nozzle tips were supplied with the wheel. These nozzles tapered gradually on the inside from the diameter of the supply pipe to that of the actual orifice. The outlet diameters were:

.5277″ .6307″ .7532″

Sets of trials were made using the largest and smallest of these nozzle tips, the largest giving the more satisfactory results.

The water was discharged from the motor into a flume beneath, whence it ran into measuring tanks, and all the water used was thus actually measured. For the purposes of these trials two tanks were used, each of the capacity of 1,000 gallons; these had both been previously calibrated.

The power given by the wheel was estimated by means of an absorption brake and a revolution counter.

The shaft was provided with an 18″ diameter brake wheel of special design, and the power was taken off this. In the earlier trials the brake consisted of one or more cords embracing a suitable arc of the periphery of the brake wheel, and having spring balances attached to the tight and slack ends to indicate the corresponding tensions in the cord. As the power varied slightly all the time, both readings were