

provement upon any yet built for a similar purpose. I received a letter a few days ago from a railway in the Western States which intends to order one if we give a satisfactory report.

The hydraulic division of the laboratory is furnished with a three throw pump with double acting cylinders, built specially for the school by Northey & Co., of Toronto. It has adjustable strokes, and has a maximum capacity of half a million gallons per day. It has been designed to produce an extremely steady pressure, this being requisite for hydraulic experiments. The maximum head under which it works is 230 feet. There will be practically no addition to the running expenses of the laboratory due to the working of this pump, as the same water will be used over and over again, and the power will be furnished by the experimental engine. In order to make engine experiments the coal has to be burned in any case, and the necessary resistance supplied either by a brake or otherwise. Driving the pump is one method of doing this. A three feet turbine wheel of the jet type, built by the Fensom Elevator Co., of Toronto, forms a part of the same equipment. The pump furnishes the power for this wheel. There are two large tanks, built by the Doty Engine Co., of Toronto, for experiments on the discharge of water through orifices and over weirs.

The above apparatus is arranged with a view to testing water meters, measuring the discharge of fire streams and various other hydraulic investigations within the capacity of the plant.

The electrical division of the laboratory is equipped with the following dynamos :

Edison, Ball, Thomson-Houston, two Gülcher machines and a Westinghouse alternator with transformers, a Crocker-Wheeler, and a Kay motor, also two small fan motors.

There are in connection with it a Roberts storage battery, a gravity primary battery, and a fair equipment of lamps, arc and incandescent, of different types.

The power department is equipped with the usual measuring instruments, indicators, gauges, gauge-testing apparatus, scales, brakes, dynamometers, ammeters, voltmeters, resistances, galvanometers, etc.

In the geodetic and astronomical department are 100 feet and 66 feet standard of length, a 10 feet Rogers comparator with graduating attachment, a Howard astronomical clock and electro-chronograph, a Troughton & Simms 10-inch theodolite, and all the ordinary surveying instruments.

That you may not leave this building to-night under the mistaken impression that our equipment is complete, and that we can spend no more money, I propose to conclude this paper by touching upon some of our most pressing wants.