

been very fully described in a paper* read before the Royal Society of Canada. The apparatus there used has also been described in detail in a paper† read before this Society in May, 1898, by Professor Bovey and J. T. Farmer, and also in a paper‡ read before the Royal Society of Canada by J. T. Farmer. As the apparatus used, and the methods adopted by the author in his experiments did not differ materially from those described in the papers referred to, it will not be necessary here to enter into any lengthy descriptions which would only cover the same ground.

In J. T. Farmer's experiments, which were on smaller orifices, the jets were discharged through a bifurcated tube into a calibrated vessel; in the author's experiments, however, owing to the larger quantity of water to be measured, it was necessary to depart from this arrangement. The jets were accordingly discharged through a tube—which prevented loss by splashing—into the flume running along one side of the hydraulic laboratory below the floor level. At the end of this flume is a weir, beyond which is a flap-door with bevelled edges, along the centre line of which runs a piece of india-rubber cord, so that when the door is closed and pressed home, a perfectly water-tight joint is formed. This door is opened and shut by a lever with a spring clasp actuating a system of links acting as a toggle-joint, so that the door can be rapidly and firmly shut and locked in position, each movement of the lever being recorded on the chronograph.

When this door is open the water runs to waste; while, when it is closed, the water flows over it into one or more of a set of five 1000-gallon cast-iron tanks set firmly in concrete below the floor level. Each of these tanks is connected through a valve to a header so that they can be used separately or in any combination. To each tank is connected a vertical four-inch brass pipe forming a float chamber; the float is attached to a brass rod with a pointer at the upper end moving over a brass scale, and attached to a counterweight by a fine cord passing over a frictionless pulley. The scale of each tank is marked at each 100 gallons up to 1000 gallons, and then at each 10 gallons up to 1080 gallons.

As indicated above, the duration of each experiment was recorded on a chronograph connected to a standard and accurately-regulated clock in the adjacent testing laboratory, a mark being made (by a fountain pen) on the record every second. The time

* "The Phenomena of Jets springing from non-circular Orifices." Strickland and Farmer. *Trans. Roy. Soc., Canada*, 1898-99.

† "Hydraulic Laboratory, McGill University." H. T. Bovey and J. T. Farmer. *Trans. Can. Soc. C.E.*, 1898.

‡ "The Determination of the Coefficient of Discharge for Sharp-edged Orifices." J. T. Farmer. *Trans. Roy. Soc., Canada*, 1896-97.