and with ease. An ordinary lock can be filled from the sides in four or five minutes. This avoids the surging of vessels, so much complained of when the water is admitted through valves in the gates—and, in short, there is no reason why a lockage cannot be made in from 12 to 15 minutes under ordinary circumstances.

9. It may, however, be well to draw attention to the facts concerning the proposed application of electrical power in opening the locks and bridges, and generally operating the Soulanges Canal. A power house will be established about mid-way of the line, and where it nearly touches the St. Lawrence at River à la Graisse. Here the surface of the river is about 20 feet below that of the canal. The ordinary water cross section of the prism at mean level of Lake St. Francis is about 2700 square feet. The fall in the summit level will, if necessary, give a current in the canal of say 100 feet per minute, or 270,000 cubic feet flow. Ten per cent. of this on a 20 foot fall would give 1000 horse power gross, or say 750 effective. This would obviously cover all requirements as to locks, bridges, weirs, etc.,—and possibly provide power to haul the vessels into and out of the three lower locks without using their own steam at all. Experiments were made, under my direction, at Lock No. 9, Beauharnois Canal, on a simple plan for opening and shutting the gates by means of a rigid girder, worked by rack and pinion movement, and driven by an electric motor. The girder was attached to the top of the gate, and the machines were placed on the copings of the lock. The gates were easily opened or shut in less than one minute, and there is no reason why both the gates, filling and emptying sluices, etc., should not be operated from a single switchboard in a small wooden house or box, placed on whichever side of the lock may be considered necessary. The cables to the motors on the opposite side to be taken across in grooves in the foundations. It is intended that the weirs shall operate automatically, and advantage will be taken of all the improvements made by electrical engineers to render the working of the canal as efficacious and economical as possible. It is evident that the adoption of this plan will greatly reduce the present cost of operating the canals.

10. Incidental to this question of canal location, it may be said that much confusion has arisen in reference to the available depth of canals by the mistake of referring their draught to the *mean water* of the river or lake by which they are alimented. This should be carefully avoided. The depth on the mitre sills should be referred to the *lowest known stage* of such lake or river, and not to any deceptive mean derived