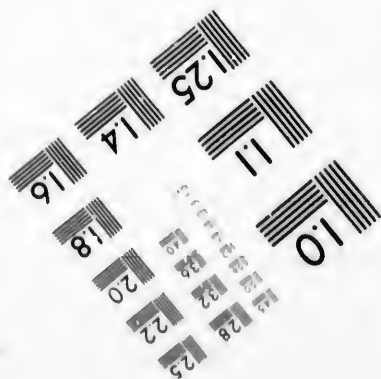
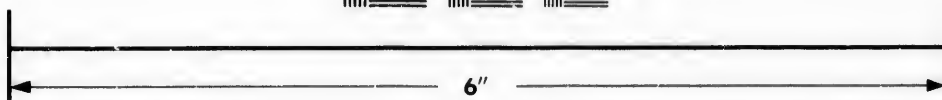
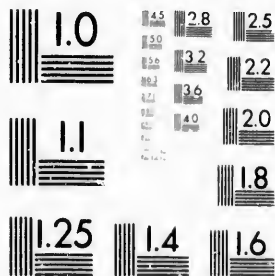


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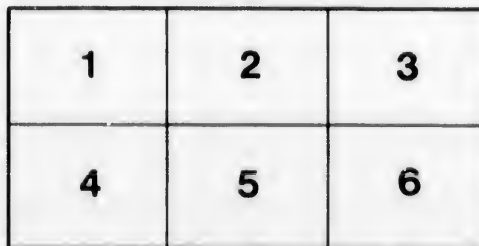
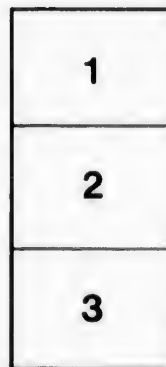
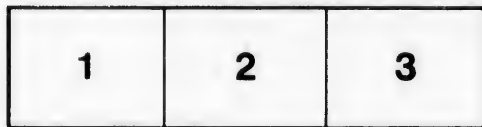
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# INTERCOLONIAL RAILWAY.

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General Instructions (No. 1.)

## **Respecting Measurement of Streams.**

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1. In order to determine finally the number, the character, and the clear waterway of Culverts and Bridges on the Line of Railway, information respecting the freshet discharge of streams is required.

2. Books have been prepared for the purpose of recording information—No. 1 for entering in the field, particulars as to the sectional area, velocity, and volume of streams; and Book No. 2, for entering results obtained from No. 1, and in addition other information bearing on the subject.

3. The observations and measurements for Book No. 1 must be made, if practicable, when the snow freshets are at, or near, their height; and if there be more than one freshet, the observations should be repeated.

4. The sectional area, velocity, and volume may be obtained with sufficient accuracy as follows:—

(1.) Select a place near where the Line of Railway crosses the stream, and where its bed and sides are tolerably regular, well defined and free from obstructions. Measure off a section of the stream, say 100 feet in length, in ordinary cases; at this place, drive stakes at the water's edge on both sides, and at each end of the section, until the heads of the stakes be level with the water; these stakes will be left until the water falls, and then the sectional area ascertained.

(2.) Take a piece of wood about the size of an egg; drop this into the stream at the upper stakes, noting

accurately the time by a second watch, that it takes to float to the lower stakes. Repeat this, say five times, entering each trial in the proper column in Book No. 1. The mean time and velocity per second will afterwards be found in the office.

5. The cross sections where the stakes are driven will be measured by a line and rule or other means when the water falls.

6. Special observations will be required for large rivers, and full enquiries should be made with regard to the effects of ice, the highest known floods, &c., &c.

7. The velocity of very small streams such as those less than 2 feet wide and 6 inches deep need not be ascertained, but these and streams of every description should be entered in columns A and C, Book No. 2; and all but the exceptions named, in column B.

8. The inclination of streams may be ascertained at any time before or after the freshet, and entered in column A, Book No. 2; the tape and spirit-level should be used in making these measurements.

9. All field measurements and observations should be entered as they are made in the proper place in the books provided for the purpose. Field notes should be distinctly made in pencil, and remain unaltered. Notes recorded in the office should be in ink.

10. The mean sectional area, velocity, and volume, when ascertained, will be transcribed from Book No. 1 to Book No. 2.

11. As much accuracy as possible is requested, and it is especially enjoined that when a freshet occurs, whatever the condition of the weather or the travelling may be, the opportunity of obtaining the information desired will not be allowed to pass, and that means may be adopted to have every stream on the line examined whilst the water is high.

12. In the event of the water in any stream having fallen before being reached, the Engineer making the examination will judge from water-marks on the banks as to the greatest height of the water, and leave the cross section stakes driven at this height; he should, however, ascertain the velocity of streams

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as he finds them, and enter the circumstances in the column for remarks. He will also note in the column for remarks the clear width and height of all common Road Bridges over streams near the Line of Railway, stating how long they may have been in use, and other particulars.

13. The object being to make ample provision for the easy flow of flood water across the Line of Railway, it is urged that every information bearing on the subject will be obtained, and entered in the books provided for the purpose. The Engineer making the observations will date and sign the books, and hand them to the District Engineer to be transmitted to me.

SANDFORD FLEMING,  
*Chief Engineer.*

HALIFAX, March 12, 1869.





1869.

Here enter No.  
of Contract or  
Division, &c.

(\*\*\*\*\* These columns will be filled up in the office.)

n.	Mean. *	Feet per * second.	Cross Section at upper stakes.	* Area sup. feet.	Cross Section at lower stakes.	* Area sup. feet.	* Mean area.



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*Information respecting Streams between.....*

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**REMARKS.**

*Here indicate any circumstances that may appear to effect the flow of water or the character of structure proposed. Where the line passes along sloping ground and the works will intercept the flow of water on the surface of the ground, give the Stations between which the ditches will draw the surface drainage to each proposed Culvert. In some special cases a sketch of the relative position of streams and Railway may be useful.*

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