

Early in May, 1911, a gauging station was established at Ben Millar, and since that date monthly measurements of flow have been made, and in connection with these measurements daily records of level were also obtained.

The records obtained up to the present time are tabulated hereunder:—

Date of measurement.	Discharge. Cu. ft. per sec.	Water level.	Electric h.p. per foot of head. Horse-power.
May 19, 1911	979	14.27	82
June 14, 1911	549	13.80	46
July 20, 1911	305	13.60	25
August 11, 1911	170	13.37	14
September 18, 1911	172	13.39	14
October 16, 1911	257	13.55	21
November 20, 1911	4,068	15.34	340
December 22, 1911	1,280	14.30	107
January 27, 1912	752	Ice	63
February 29, 1912	506	Ice	42
March 28, 1912	2,116	Ice	176
April 6, 1912	41,000	20.26	3,420
April 7, 1912	65,000	21.60	5,420
April 26, 1912	1,437	14.40	120
May 30, 1912	5,815	16.13	485
Estimated extreme minimum on Aug. 30, 1911	120	13.18	10

The last item in the above table is inserted by reason of the fact that there was no actual measurement of flow taken when the water-level reached its lowest stage of 13.18 at Ben Millar, as evidenced by the daily records. The estimated discharge of 120 cubic feet per second is considered to be a generous one and is to be considered the minimum volume of flow so far recorded.

The flow characteristics of the river during the term covered by these records may be summarized as follows:—

(1) The minimum run-off of the watershed was about .125 cubic feet per second per square mile.

(2) The maximum run-off of the watershed was about 68 cubic feet per second per square mile.

(3) The ratio of minimum to maximum flow was at 1 to 543.

(4) The low stages of flow occurred during the months of July, August, September and October.

(5) The intermediate stages of flow occurred during the months of November, December, January, February, March and June.

(6) The high stages of flow occurred during the months of April and May.

These records also indicate:—

(1) That the river is extremely sensitive to the effects of rain-fall.

(2) That the river is seriously deficient in ground storage capacity.

(3) That deforestation, cultivation and drainage have so accelerated the run-off that the ground storage of the watershed can never be filled to its natural capacity. The falling off in discharge from 65,000 sec. ft. on April 7th to 1,437 sec. ft. on April 27th plainly indicated the existence of this condition.

The records so far obtained seem to indicate, therefore, that the discharge of the Maitland is mainly dependent upon surface run-off, and the power capacity of the river from month to month will vary almost in proportion to the monthly precipitation on the tributary watershed. This contention is borne out by the evidence of the May discharge. On May 19, 1911, there was 82 h.p. per foot of head at Ben Millar,

with the May precipitation slightly below normal. On May 30, 1912, there was 485 h.p. per foot of head at Ben Millar, with the May precipitation 300 per cent. above normal.

This intimate relation between rain-fall and power capacity indicated the necessity of determining what relation the monthly precipitation during the year covered by the records bore to that of previous years, and precipitation records from all meteorological stations located in or adjacent to the Maitland River watershed were obtained with this object in view. These records proved to be so disconnected and otherwise unsatisfactory that an exhaustive analysis of the same would have been useless. The figures relating to precipitation have, therefore, a low degree of accuracy, and are submitted only because of the impossibility of procuring more reliable data.

The figures in the table below were compiled from precipitation records taken at Goderich for 36 years, at Clinton for 8 years, at Mount Forest for 7 years, at Stratford for 16 years, at Lucknow for 27 years, and at Listowel for 10 years. The first column contains the average of all records of monthly precipitation to date, and the second column contains the precipitation for the corresponding months during which the flow characteristics of the Maitland were being investigated.

	General average monthly precipitation for all years.	Monthly precipitation during months of measurement.	Difference	
			Above aver- age.	Below aver- age.
Jan.	3.55 inches	(1912) 4.70 inches	1.15	...
Feb.	2.95 "	(1912) 2.12 "	...	0.83
March	2.62 "	(1912) 1.59 "	...	1.03
April	2.15 "	(1912) 2.10 "	...	0.05
May	2.93 "	(1911) 2.71 "	...	0.22
June	2.91 "	(1911) 2.02 "	...	0.89
July	2.91 "	(1911) 1.90 "	...	1.01
Aug.	2.47 "	(1911) 2.59 "	0.12	...
Sept.	2.86 "	(1911) 3.71 "	.85	...
Oct.	3.39 "	(1911) 4.45 "	1.06	...
Nov.	3.49 "	(1911) 4.33 "	.84	...
Dec.	3.48 "	(1911) 2.13 "	...	1.35

It will seem from the above that the monthly precipitation during the year of investigation fell below the general average during the months of February, March, April, May, June, July and December, and was above the general average during the months of August, September, October, November and January.

While, as previously stated, the reliability of the precipitation data is questionable, several deductions can be drawn from the above figures which have a certain value.

These deductions may be itemized as follows:

1. The average precipitation for the three winter months of December, January and February from the above table is 9.98 inches. The precipitation for this period in 1910-11 was 9.46 inches, or 0.52 inches below the average. The precipitation for the corresponding period in 1911-12 was 8.95 inches or 1.03 inches below the average. It is to be inferred from this that there was a greater volume of spring run-off during the spring of 1911 than there was in the spring of 1912. This condition should reasonably be expected to produce a greater summer flow in 1911 than in 1912, on account of the fuller replenishment of ground storage.

2. The average precipitation for the three months of March, April and May is 7.70 inches. The precipitation for this period during 1911 was 8.21 inches, and for the same period in 1912 was 10.54 inches, being therefore 0.51 inches above the average for 1911, and 2.84 inches above the average for 1912. Under these conditions the tendency would be to produce a spring discharge in the Maitland slightly above