The deficiency was very marked in Ontario and Saskatchewan.

At the close of the month the ground was bare of snow except in Quebec and Northern New Brunswick, where there was a depth of from 2 to 20 inches.

The table shows for fifteen stations included in the report of the Meteorological Office, Toronto, the total precipitation of these stations for March.

Ten inches of snow is calculated as being the equivalent of one inch of rain:—

Station.	Depth in inches.	Departure from the average of twenty years.
Calgary, Alta.	1.10	+ 0.36
Edmonton, Alta.	0.80	+ 0.03
Swift Current, Sask.	0.10	— 0.76
Winnipeg, Man.	1.60	+ 0.35
Port Stanley, Ont.	0.60	— 2.26
Toronto, Ont.	0.66	— 2.49
Parry Sound, Ont.	1.60	— 1.41
Ottawa, Ont.	2.00	— 0.53
Kingston, Ont.	1.90	— 0.40
Montreal, Que.	1.50	— 2.40
Quebec, Que.	2.70	— 0.56
Chatham, N.B.	2.40	— 0.73
Halifax, N.S.	4.20	— 1.14
Victoria, B.C.	2.40	— 0.31
Kamloops, B.C.	0.20	— 0.22

WATER POWERS ON OUR NORTHERN SLOPE TO JAMES BAY, PROVINCE OF ONTARIO*

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In attempting to get together some information and results with reference to the water powers on the rivers of Northern Ontario, which empty into James and Hudson Bay, a certain amount of latitude must be granted, because of the lack of accurate information with respect to the different data, which necessarily enter into a fine computation of any water power development. Having travelled over some of these rivers from their head waters to the outlet, and taken some cursory notes, the writer feels that the impression gained and the results herewith obtained from a summary of these water powers may be of interest to most of you in this progressive age of hydro-electric development.

Looking over the map of Northern Ontario you will notice that the rivers north of the watershed to James Bay assume a tentacular aspect with delicate feelers reaching out from the main body of water (Hudsons Bay) to taste of the large bodies of fresh water, which form the head water lakes, visit the ground and you find them great feeders, raging torrents in high water, with no sense of delicacy towards their surroundings. You may also notice the absence of lake expansions, so prevalent on the southern slope. It it were possible to show every little creek, stream and brooklet, it would be seen how wonderfully systematic and complete nature has provided these small laterals to the larger water courses. If you travel up those rivers when your canoemen hug the shores to keep from the heavy current and to take advantage of the back eddies, you will notice the numerous small natural drains in quick succession, especially through the great clay belt, which you would pass unnoticed if travelling in mid stream. The rivers are in many respects similar, in the lower reaches they become wide, shallow and swift, after tumbling down over what has been termed the Archean Boundary by geologists where an altitude of approximately 250 feet in a distance from 5 to 15 miles, is overcome by a series of falls and rapids. The principal on each river at this Archean Boundary are as follows: On the Missinabi, at the end of Long Portage at what is known as "Hells Gate" a fall and rapid of 140 feet, on the Opazatika, at Break-neck Falls, a drop of 60 feet. On the Mattagami, at the Long Portage falls and rapids, of 150 feet. On the Abitibi, the long rapids between the mouth of little Abitibi River and New Post and on the French River tributary Nettogami at Kawash Falls, 110 feet.. Above this Archean Boundary there is less current in the rivers, and the basin is coursed by a succession of falls, chutes and rapids with intervening stretches of river, whose velocity varies from ⅓ to 2 miles per hour. The large lakes at or near the head waters are fairly uniform in altitude, being approximately 1,000 feet above sea level and may be enumerated as follows:—The Abitibi Lakes on the Abitibi River, the Frederick House and Night Hawk Lakes on the Frederick House River, the Mattagami and Kenogamisee Lakes on the Mattagama River, Pish-kan-og-am-a, Matagaming and Rice Lakes on the Ground Hog River, the Missinabi, Kapuskasing, Opozatika, Kabanikagami, Kenogami and Ogoke Lakes at or near the heads of the respective rivers of the same name, Rainy Lake, Lake of the Woods and Lac Seul at the head waters of the Winnipeg River and its tributary, the English River.

The drainage basin of these several rivers within the limits of the Province of Ontario is approximately 100,000 square miles. The altitude of the head waters and length of rivers being approximately the same, and the river beds having a fair degree of uniformity. I propose to make certain deductions and arrive at some conclusions as to the amount of water power in the larger falls on these respective streams.

Every water power estimate must be calculated to be accurate on its own merits taking into consideration the annual water flow and its superficial surroundings, the natural head varies with the flow, and the flow varies with the temperature and rain fall, from month to month; in fact the only constant is the drainage basin, which remains always the same; unless the water is diverted by artificial means from its natural course, or by earthquakes; of which we know little by experience in this country.

The greatest error in making an estimate is always in gauging the volume of flow; a single measurement of a stream is of no value except as to that particular time. A close estimate can only be made by a series of measurements extended over the whole year, not only of the volume discharged over the fall but also of any lakes required for storage basins.

In drainage area calculations, the amount of run off as composed with the total rain and snow fall must be known. This percentage will vary with the conditions of the atmosphere, the quality and chemical composition of the soil and the grades of the valleys, hills and plains, which comprise the entire drainage basin. From information to hand in this respect a fair and conservative deduction of the volume of flow in these rivers can be arrived at by assuming a constant number of cubic feet per second discharge, to each square mile of area drained. The drainage area and head waters of the Ottawa River adjoin some of those herein enumerated and the volume of water in this river has been carefully gauged and investigated in connection with the Georgian Bay Canal scheme, with the following results:

The average annual precipitation for 10 years preceeding 1906, was 31.72 inches and the average discharge 53 per cent. of the precipitation or 16.8 inches.

* Abridged from an address before the Engineer's Club, Toronto.