

**PRECIPITATION FOR SEPTEMBER.**

The precipitation was in excess of normal from Eastern Ontario to the Maritime Provinces, while from the Ottawa Valley and Middle Ontario westward to the Pacific there was a very general deficiency, except in the northern parts of British Columbia near the coast, where the rainfall was heavy. The largest positive departures occurred in New Brunswick, where the amount recorded was double the average, and the largest negative in the Western Provinces where the amounts recorded were in nearly all cases less than one inch, and in some but a small fraction of an inch.

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

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. ....	0.40	-0.71
Edmonton, Alta. ....	0.10	-1.38
Swift Current, Sask. ....	0.70	-0.64
Winnipeg, Man. ....	0.60	-0.99
Port Stanley, Ont. ....	1.00	-1.78
Toronto, Ont. ....	1.96	-0.77
Parry Sound, Ont. ....	4.90	+1.09
Ottawa, Ont. ....	3.10	+0.43
Kingston, Ont. ....	3.90	+1.20
Montreal, Que. ....	4.90	+1.64
Quebec, Que. ....	6.40	+2.69
Chatham, N.B. ....	8.20	+5.33
Halifax, N.S. ....	5.90	+2.06
Victoria, B.C. ....	0.80	-1.40
Kamloops, B.C. ....	1.20	+0.21

**SOCIETY NOTES.**

Mr. W. J. Francis, C.E., of Montreal, addressed the Engineering Society of Toronto University in the Chemical and Mining Bldg., on Wed. afternoon, Oct. 13, his subject being *The Relation of Technical Education, Personality and Character, to the Engineer*, which was a resume of his own experience in this line. Mr. W. D. Black was chairman. Mr. Francis is a graduate of the School of Practical Science, and has been engaged in government work as consulting engineer for some time. He was called into consultation regarding the danger threatening the Quebec bridge.

After the meeting Mr. Francis was entertained at the St. Charles Cafe by the past presidents of the society. Mr. H. E. T. Haultain, presided.

**AMERICAN INSTITUTE ELECTRICAL ENGINEERS.**

The annual meeting of the Toronto Section of the Institute will be held Friday, October 15th, at 8 p.m., in the rooms of the Engineers' Club, 96 King Street West. Mr. A. J. Soper, of Smith, Kerry & Chace, Toronto, will present a paper on *"Transmission Line Calculations."* The Executive Committee will submit, for final vote, the list of recent nominations for officers for the coming year.

An informal luncheon will be served at the St. Charles Cafe at 6.30 p.m. sharp, to which members are requested to invite their friends.

**1,200-VOLT D. C. CAR EQUIPMENT.\***

By F. E. Case, Engineer of Railway Equipment, General Electric Company.

Direct current of 1,200 volts has been adopted in preference to 600 volts as the trolley potential of a number of interurban and other railways on account of lower first cost and lower cost of operation. That 1,200-volt current can be more economically delivered to the car requires little argument. On a railway having a given size and length of feeder, a car equipped with 1,200-volt apparatus will entail a line loss of only one-quarter that of a 600-volt car of the same size operating at a similar speed. With dense traffic, where cars are required to run on a very close headway, consequently giving practically a uniformly distributed load, the substations at 1,200 volts can be located twice as far apart as at 600 volts for the same maximum per cent. line loss.

Under the other extreme condition of two cars or trains only between substations and passing midway the substations can be located four times as far apart as at 600 volts with the same maximum per cent. line loss. The latter condition, however, is rarely practical for interurban operation on account of the great headway between cars. Under the usual prevailing conditions of interurban service it will be found that the substations at 1,200 volts can be located from 2½ to 3 times the distance apart as at 600 volts to give the same percentage line loss.

The adoption of commutating poles has made the operation of 1,200-volt generators entirely practicable. Where alternating current is better adapted to long-distance distribution, rotary converters in substations are also well designed to translate the alternating current to 1,200 volts direct. No more complicated or less reliable pieces of switchboard apparatus are required in the power house or substation than for the ordinary voltages.

Either the third rail or trolley wire can be used for carrying current to the car. One road is now successfully using the former, and there are several others using the latter. The third rail is of the under-running type, and is installed in a similar manner to a 600-volt practice, but the insulators are of somewhat increased dimensions.

No radical departure from standard 600-volt practice is required in the line construction to ensure a safe insulation. Cross suspension, side bracket or catenary method of trolley wire support can be used, but additional insulation over that used for 600 volts is, of course, required. The catenary form of suspension is usually recommended, as not only does it require a minimum number of poles and insulators, but it provides the most flexible support, which is a great advantage for high-speed operation.

The standard trolley base, pole and wheel give better results than with 600 volts, as the current to be collected for a given weight and speed of car is only half, which increases the life of the wheel especially.

The motors are similar electrically to ordinary 600-volt commutating pole motors, with increased insulation, and there is no departure in mechanical features from other direct current motors for lower voltage. The brush holders are located in a similar manner, and there are no more of them, so that inspection is just as readily made as in other

\* Abstract of paper presented on Section (k) of the report of the Committee on Equipment of the American Street and Interurban Railway Engineering Association, Denver, Col., October 4, 5, 6, 7 and 8, 1909.